C.6 NOISE AND VIBRATION

Testimony of Erin Bright

C.6.1 SUMMARY OF CONCLUSIONS

California Energy Commission staff concludes that the Ridgecrest Solar Power Project can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards and, if built in accordance with the conditions of certification proposed below, would produce no significant adverse noise impacts on people within the affected area, either direct, indirect, or cumulative.

C.6.2 INTRODUCTION

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts under CEQA. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The groundborne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the Ridgecrest Solar Power Project (RSPP) and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards (LORS) and to avoid creation of significant adverse noise or vibration impacts. For an explanation of technical terms and acronyms employed in this section, please refer to **NOISE APPENDIX A** immediately following.

C.6.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land jurisdictions of the California Energy Commission and U.S. Bureau of Land Management (BLM). Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws.

As noted above, CEQA identifies criteria that may be used to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (Cal. Code Reg., tit. 14 (hereinafter State CEQA Guidelines) Section 15382).

In comparison, NEPA states that "'Significantly' as used in NEPA requires considerations of both context and intensity…" (40 CFR 1508.27). Therefore, thresholds serve as a benchmark for determining if a project action will result in a significant adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) is prepared when the proposed federal action (project) as a whole has the potential to "significantly affect the quality of the human environment."

Criteria for determining significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff. In addition, staff's evaluation of the environmental effects of the proposed project on land uses (i.e., those listed below) includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

Effects of the proposed project on noise and vibration (and in compliance with both CEQA and NEPA) have been determined using the thresholds listed below.

C.6.3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (*See* Cal. Code Regs., tit. 14, Section 15063) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. Exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance or applicable standards of other agencies;

2. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;

3. Substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. Substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying item 3 above to the analysis of this and other projects, has concluded that a potential for a significant noise impact exists where the noise of the project plus the background exceeds the background by 5 dBA or more at the nearest sensitive receptor. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

Staff considers it reasonable to assume that an increase in background noise levels up to 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA is considered significant. An increase between 5 and 10 dBA should be considered adverse, but may be either significant or insignificant, depending on the particular circumstances of the case.

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

1. The resulting combined noise level;[1]
2. The duration and frequency of the noise;
3. The number of people affected;
4. The land use designation of the affected receptor sites; and
5. Public concern or controversy expressed at workshops or hearings or in correspondence.

Noise impacts due to construction activities are usually considered to be insignificant if:

- The construction activity is temporary;
- Use of heavy equipment and noisy activities are limited to daytime hours; and
- All industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the minority population.

[1] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
(OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure.
State	
(Cal/OSHA): Cal. Code Regs., tit. 8, §§ 5095–5099	Protects workers from the effects of occupational noise exposure.
Local	
Kern County General Plan Noise Element Policies (5)(a) and (5)(b)	Policy (5) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated to (a) reduce noise levels in outdoor activity areas to 65 dBA L_{dn} or less, and (b) reduce interior noise levels to 45 dBA L_{dn} or less.
Kern County Code of Ordinance, Chapter 8.36 (“Noise Control”)	Subsection H limits hours of noisy construction work.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (29 USC § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration (OSHA) has adopted regulations designed to protect workers against the effects of occupational noise exposure (29 CFR § 1910.95). These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4** immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers’ hearing to detect any degradation.

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

The only guidance available for evaluation of power plant vibration is guidelines published by the Federal Transit Administration (FTA) for assessing the impacts of groundborne vibration associated with construction of rail projects. These guidelines have been applied by other jurisdictions to assess groundborne vibration of other types of projects. The FTA-recommended vibration standards are expressed in terms of the “vibration level,” which is calculated from the peak particle velocity measured from groundborne vibration. The FTA measure of the threshold of perception is 65 VdB,[2] which correlates to a peak particle velocity of about 0.002 inches per second (in/sec).

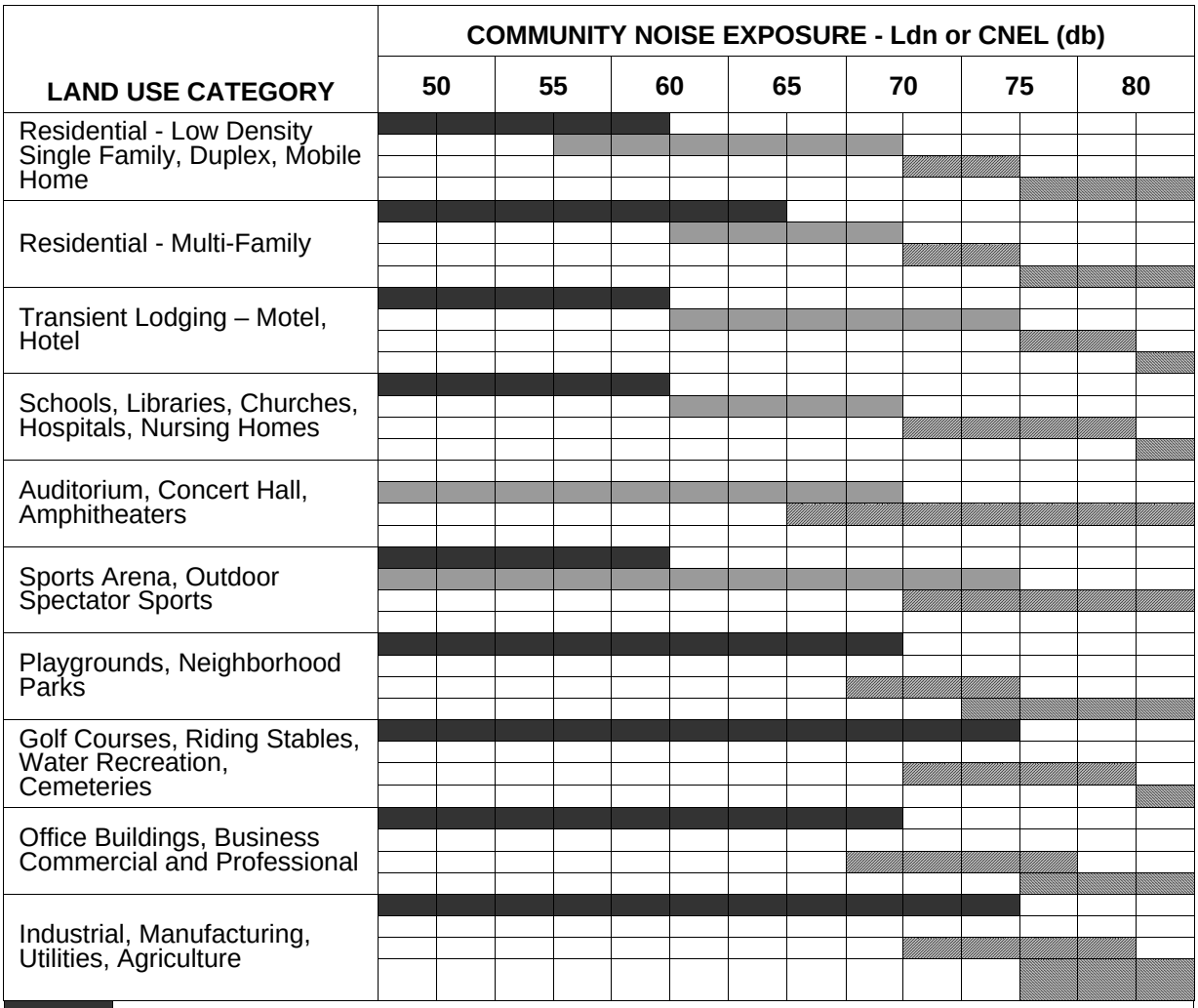
[2] VdB is the common measure of vibration energy.

The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its General Plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are listed in **Noise Table 2**.

Noise Table 2
Land Use Compatibility for Community Noise Environment



	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

The California Occupational Safety and Health Administration (Cal/OSHA) has promulgated Occupational Noise Exposure Regulations (Cal. Code Regs., tit. 8, §§ 5095–5099) that set employee noise exposure limits. These standards are equivalent to the federal OSHA standards (see the **WORKER SAFETY AND FIRE PROTECTION** section of this document, and **Noise Appendix A, Table A4**).

LOCAL

Kern County General Plan Noise Element

Two policies enunciated in this noise element (Kern County 2007) impact the construction and operation of a project such as the RSPP. Policy (5)(a) prohibits new noise-sensitive land uses in noise-impacted areas unless effective mitigation measures are incorporated into the project design to reduce noise levels in outdoor activity areas to 65 dBA L_{dn} or less. Policy (5)(b) prohibits new noise-sensitive land uses in noise impacted areas unless effective mitigation measures are incorporated into the project design to reduce interior noise levels within living spaces or other noise sensitive interior spaces to 45 dBA L_{dn} or less. It should be noted that there are no current noise ordinances in Kern County.

Kern County Code of Ordinance

The Noise Control Ordinance in Chapter 8.36 of the Kern County Code states that noise from construction should be limited to the following hours when construction takes place within 1,000 feet of a sensitive receptor:

- Weekdays 6:00 a.m. to 9:00 p.m.
- Weekends 8:00 a.m. to 9:00 p.m.

(Kern County 2009)

C.6.4 PROPOSED PROJECT

C.6.4.1 SETTING AND EXISTING CONDITIONS

The proposed SES Solar Two Project would be constructed on a 1,440 acre site located approximately 5 miles southwest of the town of Ridgecrest in Kern County. The site is primarily on undisturbed federal land managed by the BLM (SM 2009a, AFC §§ 2.1, 2.3).

The ambient noise regime in the project vicinity consists primarily of highway traffic, wind and wildlife. The nearest noise sensitive receptor to the power block of the project is a residence located approximately 3,000 feet west of the project's western site boundary. Additional sensitive receptors are located northeast of the project boundaries at greater distances (SM 2009a, AFC 5.8.2.2; SM 2010a Data Response 262, Figure DR-Noise-249).

Ambient Noise Monitoring

In order to establish a baseline for comparison of predicted project noise to existing ambient noise, the applicant has presented the results of an ambient noise survey (SM 2009a, AFC § 5.8.2.4, Tables 5.8-4 and 5.8-5). The survey was conducted on

June 10, 11 and 12, 2009, and monitored existing noise levels at the following locations, shown on **Noise and Vibration Figure 1** (SM 2010a, Data Response 262, Figure DR-Noise-249):

1. Measuring Location LT-1: Near a residence located approximately 3,000 feet west of the project site boundary, approximately 5,000 feet from the power block. This represents the noise sensitive receptor closest to the power block, thus the receptor most likely to be impacted the greatest by project operation. Long-term (25-hour) monitoring showed ambient noise levels typical of a desert environment.

2. Measuring Location ST-3: Near a residence located approximately 2,500 feet from the project's eastern site boundary, on the opposite side of Highway 395. This represents the noise sensitive receptor closest to the project site boundary, and thus the receptor likely to be impacted the most by project construction noise.

3. Measuring Location ST-4: Near a residence located approximately 3,600 feet northeast of the project's eastern site boundary, on the opposite side of Highway 395.

Long term (25-hour) monitoring was only performed at location LT-1. Short term (10 to 20 minutes) measurements were taken for ST-3 and ST-4.

Noise Table 4 summarizes the ambient noise measurements:

Noise Table 4
Summary of Measured Ambient Noise Levels

Measurement Location	Measured Noise Levels, dBA		
	L_{eq} – Daytime[1]	L_{eq} – Nighttime[2]	L_{90} – Nighttime[3]
LT1: Northwest Residence	44	41	35
ST3: East Residence	46	-	-
ST4: Northeast Residence	40	-	-

Source: AFC § 5.8.2.4, Tables 5.8-4 and 5.8-5
[1] Staff calculations of average of 15 daytime hours
[2] Staff calculations of average of 9 nighttime hours
[3] Staff calculations of average of 4 consecutive quietest hours of the nighttime

C.6.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Direct Impacts and Mitigation

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

Construction Impacts and Mitigation

Construction of the RSPP is expected to occur over a period of 28 months (SM 2009a, AFC § 5.8.3.1).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances. It should be noted that there are no specific LORS limiting construction noise levels in Kern County.

The Kern County Code limits noisy construction to daytime hours, but only if construction takes place within 1,000 feet of a residence. There are no residences within 1,000 feet from any project boundary, so this LORS restriction does not apply to the RSPP.

CEQA Impacts

Power Plant Site

To evaluate construction noise impacts, staff compares the projected noise levels to the ambient. Since construction noise typically varies continually with time, it is most appropriately measured by, and compared to, the L_{eq} (energy average) metric.

The Applicant has predicted the noise impacts of project construction on the nearest sensitive receptor (SM 2009a, AFC § 5.8.3.1; SM 2010a Data Response 262). Assuming peak construction activity, a maximum noise level of 85 dBA L_{eq} is estimated to occur at a distance of 50 feet from the acoustic center of the construction activity and attenuate to 51 dBA L_{eq} or less at the residence east of the project near location ST3, the nearest noise-sensitive receptor, and to 49 dBA L_{eq} or less at the residence west of the project near location LT1 (SM 2009a, AFC § 5.8.3.1; SM 2010a Data Response 262, Figure DR-Noise-249; and staff calculations). A comparison of construction noise estimates to ambient measurements is presented in **Noise Table 5**:

Noise Table 5
Predicted Power Plant Construction Noise Impacts

Receptor	Highest Construction Noise Level[1] (Dba L_{eq})	Measured Existing Ambient[2] (dBA L_{eq})	Cumulative (dBA L_{eq})	Change (dBA)
ST3 – East Residence	51	46 daytime	52 daytime	+6 daytime
LT1 - West Residence	49	44 daytime	50 daytime	+6 daytime

1 Source: AFC § AFC § 5.8.3.1; SM 2010a Data Response 262, Figure DR-Noise-249; and staff calculations
2 Source: AFC Table 5.8-5 and staff calculations of average of daytime hours.

Construction may be expected to reach levels as high as 51 dBA L_{eq} at the nearest sensitive receptor, the residence to the east, for construction activities occurring near the eastern project boundary, which, when added to existing ambient levels, would result in a noise level increase of 6 dBA. A similar increase would occur at the residence to the west of the project for construction activities taking place near the

western project boundary. Such an increase is considered potentially significant. However, most of the construction activities are expected to take place closer to the power block (approximately 5,000 feet further from the east receptor and 2,000 feet further from the west receptor than the respective project boundaries), which would attenuate to a level of 41 and 45 dBA L_{eq} at the east and west receptors, respectively. Thus most of the construction work would result in an increase of no more than 3 dBA over ambient levels at any sensitive receptor, which is less than significant.

If noisy construction work is restricted to daytime hours, staff believes it will be noticeable, but tolerable, at the nearest residences. To ensure this, staff suggests that the project be subjected to the regulation set forth by Kern County which limits hours of noisy construction, even though the noise sensitive receptors are more than 1,000 feet away. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Because the maximum construction noise would be temporary and limited to daytime hours, staff considers the noise impacts due to construction activity to be less than significant.

In the event that actual construction noise should annoy nearby residents, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a Notification Process to make nearby residents aware of the project, and a Noise Complaint Process that requires the applicant to resolve any problems caused by noise from the project.

Linear Facilities

Linear facilities include a new water supply pipeline extending five miles from the Ridgecrest Heights storage tank to the project, and existing electrical transmission lines currently running through the project site that would be rerouted around the southern solar field (SM 2009a, AFC §§ 2.5, 2.5.5.2, 2.6.1). Only the water supply pipeline would extend past the project boundary. While the construction noise levels for the linears would be noticeable to nearby sensitive receptors, construction on linears proceeds rapidly, so no particular area is exposed to noise for more than a few days.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feedwater and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

The Applicant intends to employ a low-pressure steam blow technique in which lower pressure steam is released over a continuous period of approximately 36 hours. Resulting noise levels reach only about 80 dBA at 100 feet, compared to 130 dBA at 100 feet for a high pressure steam blow. Noise levels from the steam blow at the nearest residence to the power block (that to the west of the project, near LT1) would

thus be about 46 dBA, resulting in an increase of no more than 4 dBA in the existing ambient, which is less than significant (SM 2010a, Data Response 262; and staff calculations).

Though the noise impacts from the low pressure steam blow would be minimal and temporary, staff proposes a notification process (see proposed Condition of Certification **NOISE-7** below) to make neighbors aware of impending steam blows.

Vibration

The only construction operation likely to produce vibration that could be perceived off site would be pile driving, which the applicant has stated would not be employed (SM 2009a, AFC § 5.8.3.1). Staff therefore believes there would be no significant impacts from construction vibration.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (SM 2009a, AFC § 5.8.1). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**, below.

Operation Impacts and Mitigation

The primary noise sources of the RSPP include the steam turbine generators, air cooled condenser (ACC), start-up boiler, and various pumps and fans (SM 2009a, AFC §§ 2.5, 5.8.3.2). Staff compares the projected noise with applicable LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

Common noise mitigating factors included in parabolic trough solar thermal generating facilities include:

- Metal acoustical steam turbine enclosure; and
- 25-foot high solar mirror arrays surrounding the power block.

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (SM 2009a, AFC § 5.8.3.2; SM 2010a, Data Response 262). Project operating noise levels are expected to attenuate to 45 dBA L_{eq} (51 dBA L_{dn}) at the nearest sensitive receptor, the residence to the west of the project near measuring location LT1. This figure complies with the noise level limits specified in the Kern County General Plan Noise Element; see **Noise Table 6**.

Noise Table 6
Plant Operating Noise LORS Compliance

Receptor	LORS	LORS Limit	Projected Noise Level (L_{dn})
LT1	Kern County General Plan Noise Element	65 dBA L_{dn} daytime	51 dBA

Source: Kern County 2007, and SM 2010a, Data Response 262

CEQA Impacts

Power plant noise is unique. Essentially, a power plant operates as a steady, continuous, broadband noise source, unlike the intermittent sounds that comprise the majority of the noise environment. As such, power plant noise contributes to, and becomes part of, the background noise level, or the sound heard when most intermittent noises cease. Where power plant noise is audible, it will tend to define the background noise level. For this reason, staff compares the projected power plant noise to the existing ambient background (L_{90}) noise levels at the affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be incorporated in the project to reduce or remove the impact.

In many cases, a power plant will be intended to operate around the clock for much of the year. As a solar thermal generating facility, The RSPP would operate only during the daytime hours, typically 15 hours per day during the summer (with fewer hours during the fall, winter, and spring), when sufficient solar insolation is available. Nighttime operation would be limited to the auxiliary boilers for the steam seal system of the steam turbine and the HTF heat exchanger for HTF freeze protection, and maintenance activities (SM 2009a, AFC § 2.5.2).

Typically, daytime ambient noise consists of both intermittent and constant noises. The noise that stands out during this time is best represented by the average noise level, or L_{eq}. Staff's evaluation of the above noise surveys shows that the daytime noise environment in the RSPP area consists of both intermittent and constant noises. Thus, staff compares the project's daytime noise levels to the daytime ambient L_{eq} levels at the project's noise-sensitive receptors.

As shown in **Noise Table 7**, power plant noise levels are predicted to be no more than 45 dBA L_{eq} at the nearest sensitive receptor (the western residence near location LT1) during daytime operation and no more than 25 dBA L_{eq} at night (SM 2010a, Data Response 262; and staff calculations).

Noise Table 7
Power Plant Noise Impacts at Nearest Sensitive Receptor

LT1 (West Residence)	Power Plant Noise Level, dBA L_{eq}[1]	Ambient Noise Level, dBA	Cumulative Noise Level, dBA	Change from Ambient Level dBA
Daytime	45	44 L_{eq}[2]	48	+4
Nighttime	25	35 L_{90}[3]	35	+0

[1] Source: SM 2010a Data Response 262, and staff calculations.
[2] Source: AFC Table 5.8-5, and staff calculations of average of fifteen consecutive daytime hours.
[3] Source: AFC § 5.8.2.4.

When projected plant noise is added to the daytime ambient value (as calculated by staff), the cumulative level is higher than the ambient value at location LT1 by a barely audible amount (see **NOISE Table 7**). No change in ambient noise at night would result from plant operation. To ensure that project operational noise does not cause annoyance, staff proposes Condition of Certification **NOISE-4** below.

Tonal Noises

One possible source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant can to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design. To ensure that tonal noises do not cause annoyance, staff proposes Condition of Certification **NOISE-4**, below.

Linear Facilities

Noise effects from the electrical interconnection line typically do not extend beyond the right-of-way easement of the line and would thus be inaudible to any receptors.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of the RSPP consist of a high-speed steam turbine generator and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Based on experience with numerous previous projects employing similar equipment, Energy Commission staff believes that ground borne vibration from the RSPP would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. None of the project equipment is likely to produce low frequency noise; this makes it highly unlikely that the RSPP would cause perceptible airborne vibration effects.

Worker Effects

The applicant has acknowledged the need to protect plant operating and maintenance workers from noise hazards and has committed to comply with applicable LORS (SM 2009a, AFC § 5.8.1). To ensure that plant operation and maintenance workers are, in fact, adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**, below.

FACILITY CLOSURE

In the future, upon closure of the RSPP, all operational noise from the project would cease, and no further adverse noise impacts from operation of the RSPP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it can be treated similarly. That is, noisy work could be performed during daytime hours, with machinery and equipment properly equipped with mufflers. Any noise LORS that are in existence at that time would apply. Applicable conditions of certification included in the Energy Commission decision would also apply unless modified.

C.6.4.3 CEQA LEVEL OF SIGNIFICANCE

For the purposes of CEQA compliance, the significance of construction and operating noise impacts of the proposed project at the nearest sensitive receptors has been determined.

Construction Impacts

As discussed in detail in section C.8.4.2 above (under the subsection entitled "Construction Impacts and Mitigation"), the noise level increase at the nearest sensitive receptors resulting from construction of the project (presented in **Noise Table 5**) would be noticeable. However, given the temporary nature of construction noise and the fact that noisy construction activity would be restricted to daytime hours (by both the local LORS and Condition of Certification **NOISE-6**), the impacts due to construction noise are considered less than significant.

Operation Impacts

As discussed in detail in section C.8.4.2 above (under the subsection entitled "Operation Impacts and Mitigation"), power plant noise levels are predicted to be no more than 45 dBA L_{eq} at the nearest sensitive receptor during daytime operation, which would result in a barely audible increase over ambient noise. No change in ambient noise at any sensitive receptor at night would result from plant operation. Thus, operation noise impacts of the project would not be significant.

C.6.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources

(desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

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

C.6.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would be constructed within the boundaries of the proposed project described in Section C.8.4.1. As a result, the setting is the same as that of the proposed project. The ambient noise regime in the project vicinity consists of highway traffic, wind and wildlife. The nearest sensitive receptors would be the same as for the proposed project, located 2,500 east of the eastern project boundary and approximately 3,000 feet west of the western project boundary (SM 2010a, Data Response 262).

C.6.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Operational noise impacts for the Northern Unit Alternative would likely be the same as the proposed project because the power block would be in the same location and the same noise sources would be in use. So, as discussed above in section 10.4.2, operational noise impacts would not be significant. Construction noise impacts would

likely also be the same as the proposed project because construction activities would take place at approximately the same distance from the receptors and would produce the same noise levels.

C.6.5.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the Northern Unit Alternative, if built and operated in conformance with the proposed conditions of certification defined for the proposed project, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.6.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (AECOM 2009). The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative

would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.6.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would be constructed within the boundaries of the original proposed project described in the AFC; the solar field would be located south of Brown Road and the power block would be located to the north of the road (in the same location as the proposed project, as discussed in section 10.4.1 above). As a result, the setting is similar to that of the proposed project. The ambient noise regime in the project vicinity consists of highway traffic, wind and wildlife. The nearest sensitive receptors would be the same as for the proposed project, however their position in relation to project features would be slightly different. The power block would be the same distance from the receptors as for the proposed location, but the boundaries of the solar field would be further away (see **Alternatives Figure 2**).

C.6.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Operational noise impacts for the Southern Unit Alternative would likely be the same as the proposed project because the power block would be in the same location and the same noise sources would be in use. So, as discussed above in section 10.4.2, operational noise impacts would not be significant. Construction noise impacts would be lower than those of the proposed project because construction activities would take place at greater distances from the receptors. The maximum construction noise would be expected to come from activities at the power block, which would be the same as discussed in section 10.4.2 above and would cause less than significant impacts.

C.6.6.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the Southern Unit Alternative, if built and operated in conformance with the proposed conditions of certification defined for the proposed project, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.6.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

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

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would

require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (AECOM 2009). The 18-acre off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

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

C.6.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would be constructed within the boundaries of the original proposed project described in the AFC. As a result, the setting is similar to that of the proposed project. The ambient noise regime in the project vicinity consists of highway traffic, wind and wildlife. The nearest sensitive receptors would be the same as for the proposed project; however their position in relation to project features would be slightly different. The power block would be the about 1,300 feet further from the receptors as for the proposed location, and the boundaries of the solar field would be slightly further away.

C.6.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Operational noise impacts for the Original Proposed Project Alternative would be slightly less than the proposed project because the power block would be located further south, and thus slightly further away from the receptors. As discussed above in section 10.4.2, operational noise impacts for the proposed project would not be significant, thus impacts from this alternative, with its slightly lower noise levels at receptors, would also be less than significant. Construction noise impacts would be similar to those of the proposed project because the project boundaries (and thus the closest construction activities) would be only slightly closer to the receptors.

C.6.7.3 CEQA LEVEL OF SIGNIFICANCE

Like the proposed project, the Original Proposed Project Alternative, if built and operated in conformance with the proposed conditions of certification defined for the proposed project, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

C.6.8 NO PROJECT/NO ACTION ALTERNATIVES

C.6.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the construction and operation noise-related impacts of the Ridgecrest Solar Power Project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.6.8.2NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site. Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. Construction would require the use of large construction vehicles that would create unwanted noise and some intermittent noise during operations. However, as with the proposed project, it is expected that solar technologies create minor increases in ambient noise during operation. As such, this No Project/No Action Alternative could result in an impact from increased ambient noise during construction and operation similar to under the proposed project.

C.6.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA

Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain with the existing ambient noise from its existing condition. Ambient noise of the site is not expected to change noticeably from existing conditions and, as such, this No Project/No Action Alternative would not result in impacts from any increase in noise at the project site. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.6.9 CUMULATIVE IMPACT ANALYSIS

GEOGRAPHIC EXTENT

The geographic scope for considering cumulative noise impacts on sensitive receptors for this project consists of the region immediately surrounding those receptors in the vicinity of the project, as shown in **Noise and Vibration Figure 1**.

EXISTING CUMULATIVE CONDITIONS

Any existing cumulative noise conditions are included in the existing ambient noise survey conducted at the sensitive receptors.

FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Ridgecrest Area

There are no future foreseeable projects near enough to the RSPP to create cumulative noise impacts.

Foreseeable Renewable Projects in the California and Arizona Desert

Projects further afield than the immediate vicinity of the project, whether renewable or otherwise, would be outside the geographic scope of consideration for noise impacts of the project and would thus pose no potential for cumulative noise impacts.

C.6.10 COMPLIANCE WITH LORS

A detailed discussion of the proposed project's compliance with LORS applicable to noise and vibration is provided above in subsection C.8.4.2.

C.6.11 NOTEWORTHY PUBLIC BENEFITS

The proposed project would affect the daytime ambient noise levels in the project area. While this change would not be very noticeable at the sensitive receptors near the project, and thus not significant, development of the proposed project would not result in any noteworthy public benefits.

C.6.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

NOISE-1 At least 15 days prior to the start of ground disturbance, the project owner shall notify all residents within two miles of the site, by mail or other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project and include that telephone number in the above notice. If the telephone is not staffed 24 hours per day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction in a manner visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: Prior to ground disturbance, the project owner shall transmit to the Compliance Project Manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed and describing the method of that notification, verifying that the telephone number has been established and posted at the site, and giving that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the construction and operation of Solar Two, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- Use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- Attempt to contact the person(s) making the noise complaint within 24 hours;
- Conduct an investigation to determine the source of noise related to the complaint;
- Take all feasible measures to reduce the noise at its source if the noise is project related; and
- Submit a report documenting the complaint and the actions taken. The report shall include: a complaint summary, including final results of noise reduction efforts, and if obtainable, a signed statement by the complainant stating that the noise problem is resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a copy of the Noise Complaint Resolution Form with the CPM, documenting the resolution of the complaint. If mitigation is required to resolve a complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is implemented.

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program and a statement, signed by the project owner's project manager, verifying that the noise control program will be implemented throughout construction of the project. The noise control program shall be used to reduce employee exposure to high noise levels during construction and also to comply with applicable OSHA and Cal/OSHA standards.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit to the CPM the noise control program and the project owner's project manager's signed statement. The project owner shall make the program available to Cal/OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 Within the specified time frame in **Verification**, below, of the project first achieving a sustained output of 90 percent or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at LT-1. The survey shall also include the octave band pressure levels to ensure that no new pure-tone noise components have been introduced. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints. If the results from the survey indicate that the noise level from the project alone is in excess of 45 dBA L_{eq} at LT-1 (near the residence located west of the project site (shown in **Noise and Vibration Figure 1**), additional mitigation measures shall be implemented to reduce noise to a level of compliance with this limit.

Verification: Within 30 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limits, and a schedule, subject to CPM approval, for implementing these measures. Within 30 days of completion of installation of these measures, the project owner shall submit to the CPM a summary report of a new noise survey, performed as described above and showing compliance with this condition.

NOISE-5 Following the project's first achieving a sustained output of 80 percent or greater of rated capacity, the project owner shall conduct an occupational noise survey to identify the noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations sections 5095–5099 and Title 29, Code of Federal Regulations section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures that will be employed to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal/OSHA upon request.

CONSTRUCTION TIME RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times of day delineated below:

Weekdays:	6:00 a.m. to 9:00 p.m.
Weekends:	8:00 a.m. to 9:00 p.m.

Haul trucks and other engine-powered equipment shall be equipped with mufflers that meet all applicable regulations. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to ground disturbance, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

C.6.13 CONCLUSIONS

Staff concludes that the RSPP, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Ridgecrest Solar Power Project
(09-AFC-9)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

C.6.14 REFERENCES

Kern County. 2007. Kern County General Plan, Noise Element. March 13, 2007.

Kern County 2009 — Kern County Code of Ordinance, Title 8, Chapter 8.36: Noise Control. Effective November 3, 2009.

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

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

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that “A-weighting” of sound intensities best reflects the human ear’s reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, those higher levels nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (U.S. Environmental Protection Agency, Effects of Noise on People, December 31, 1971).

To help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** illustrates common noises and their associated sound levels, in dBA.

Noise Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the noise level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location.
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing

Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the

level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of 1 dB cannot be perceived.

2. Outside of the laboratory, a 3-dB change is considered a barely noticeable difference.

3. A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

4. A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). **Noise Table A3** indicates the rules for decibel addition used in community noise prediction.

Noise Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0

Figures in this table are accurate to ± 1 dB.
Source: Architectural Acoustics, M. David Egan, 1988.

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by 6 dB.

Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure and list permissible noise level exposure as a function of the amount of time to which the worker is exposed, as shown in **Noise Table A4**.

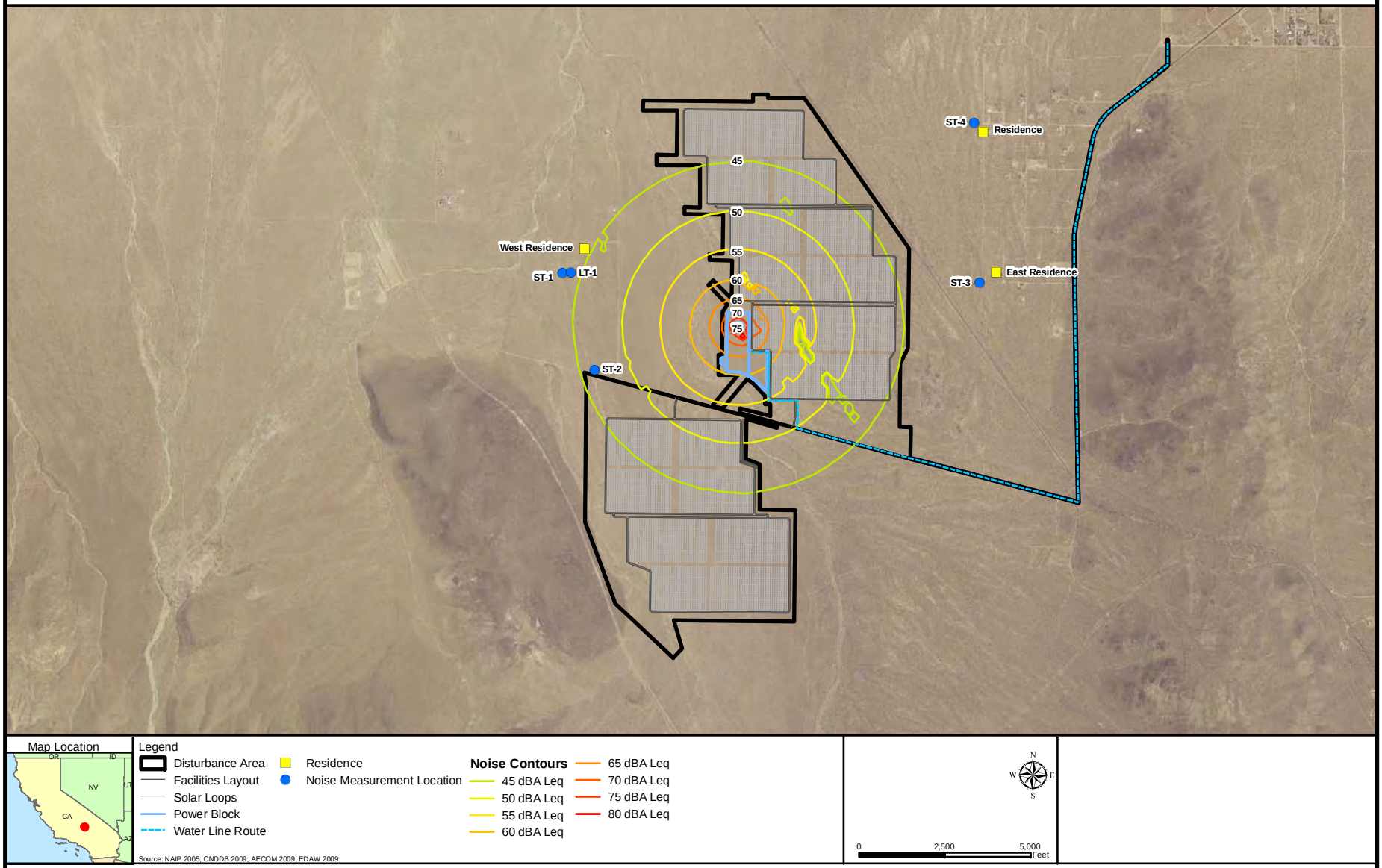
Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 CFR § 1910.95.

NOISE AND VIBRATION - FIGURE 1

Ridgecrest Solar Power Project - Noise Measurement Locations and Noise Contours



SOURCE: Solar Millenium, January 2010

C.7 PUBLIC HEALTH AND SAFETY

Testimony of Alvin Greenberg, Ph.D.

C.7.1 SUMMARY OF CONCLUSIONS

U.S. Bureau of Land Management and Energy Commission staff (hereafter jointly referred to as staff) have analyzed potential public health and safety risks associated with construction and operation of the Ridgecrest Solar Power Project (RSPP) and does not expect there would be any significant adverse cancer, or short - or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed RSPP project was based on a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from RSPP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

C.7.2 INTRODUCTION

The purpose of this section of the Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) is to determine if emissions of toxic air contaminants (TACs) from the proposed RSPP project would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to less than significant levels.

In addition to the analysis contained in this Public Health and Safety Section that focuses on potential effects to the public from emissions of toxic air contaminants, other related aspects to the assessment of potential public health and safety impacts from RSPP are considered elsewhere in this document as listed and briefly described below:

- Air Quality - evaluates the expected air quality impacts from the emissions of criteria air pollutants from both the construction and operation of the RSPP Project; Criteria air pollutants are defined as air contaminants for which the state and/or federal governments have established an ambient air quality standard to protect public health;
- Hazardous Materials Management - evaluates the potential impacts on public and worker health from accidental releases of hazardous materials;
- Socioeconomics and Environmental Justice - evaluates project-induced changes on community services including law enforcement and hospitals;
- Soil and Water Resources – evaluates the potential for RSPP to cause contamination of soil and water resources, to exacerbate flooding, and to cause adverse effects to water supply in consideration of other existing users and projected needs;
- Transmission Line Safety and Nuisance – evaluates potential effects associated with proposed transmission lines accounting for both the physical presence of the lines

and the physical interactions of their electric and magnetic fields; The potential effects include aviation safety, interference with radio-frequency communication, audible noise, fire hazards, hazardous shocks, nuisance shocks, and electric and magnetic field (EMF) exposure.

- Worker Safety and Fire Protection - assess the worker safety and fire protection measures proposed by the applicant including determining whether the project would have any adverse impacts on fire protection and emergency medical services that are also relied upon by the public;
- Waste Management - evaluates issues associated with wastes generated from the proposed project construction and operation including ensuring that wastes would be managed in an environmentally safe manner.

C.7.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of proposed project effects must comply with both CEQA and NEPA requirements given the respective power plant licensing and land jurisdictions of the California Energy Commission (CEC) and U.S. Bureau of Land Management (BLM). CEQA requires that the significance of individual effects be determined by the Lead Agency.

Because this document is intended to meet the requirements of both NEPA and CEQA, the methodology used for determining environmental impacts of the proposed project includes a consideration of guidance provided by both laws.

CEQA requires a list of criteria that are used to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (State CEQA Guidelines Section 15382).

In comparison, NEPA states that “‘Significantly’ as used in NEPA requires considerations of both context and intensity…” (40 CFR 1508.27). Therefore, thresholds serve as a benchmark for determining if a project action will result in a significant adverse environmental impact when evaluated against the baseline. NEPA requires that an Environmental Impact Statement (EIS) is prepared when the proposed federal action (project) as a whole has the potential to “significantly affect the quality of the human environment.”

Thresholds for determining significance in this section are based on Appendix G of the CEQA Guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff. In addition, staff’s evaluation of the environmental effects of the proposed project on land uses (i.e., those listed below) includes an assessment of the context and intensity of the impacts, as defined in the NEPA implementing regulations 40 CFR Part 1508.27.

Effects of the proposed project on the environment (and in compliance with both CEQA and NEPA) have been determined using the thresholds listed below.

The **PUBLIC HEALTH AND SAFETY** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- Identify the types and amounts of hazardous substances that RSPP could emit to the environment;
- Estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- Estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- Characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- Using the highest levels of pollutants that could be emitted from the plant;
- Assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- Using the type of air quality computer model which predicts the greatest plausible impacts;

- Calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- Assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- Using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process for this project addresses two categories of health impacts: chronic (long-term) noncancer effects, and cancer risk (also long-term). Since the only TAC emitted from this project would be diesel particulate from emergency diesel-fueled engines, and since only long-term health effects have been established for diesel particulate, no acute (short-term) health effects are calculated for this project.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 percent to 100 percent of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The Reference Exposure Levels are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested

for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

SIGNIFICANCE CRITERIA

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants for this project are evaluated for long-term (chronic) noncancer health effects as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of these categories.

Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is

likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that "the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure." This level of risk is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by many air districts. In general, a project with a cancer risk level above 10 in 1 million would not be approved.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Public Health and Safety Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	This act requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Health and Safety Code Sections 44300 et seq.	Air Toxics Hot Spots Program requires participation in the inventory and reporting program at the District level.
California Health and Safety Code Sections 44360 - 44366	Air Toxics Hot Spots Information and Assessment Act requires that based on results of an HRA conducted per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
Kern County Air Pollution Control District (KCAPCD) Rule 419; Nuisance	Prohibits the discharge of air contaminates or other materials which cause injury, detriment, nuisance, or annoyance to the public or which endangers the comfort, repose, health or safety of the public or which causes injury or damage to business or property.
KCAPCD CEQA Implementation Guidelines	Provide significance thresholds under CEQA for exposure of sensitive receptors to cancer and non-cancer public health risk impacts.

C.7.4 PROPOSED PROJECT

C.7.4.1 SETTING AND EXISTING CONDITIONS

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas, due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affects public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality, existing public health concerns, and environmental site contamination.

Site and Vicinity Description

The proposed facility would be located in the high desert portion of Kern County, approximately five miles southwest of the city of Ridgecrest. The project layout (which has been slightly revised since the original AFC) is described and depicted in Data Response ALT-49 and accompanying figures (SM 2010a). The topography of the site is essentially flat (about 2,630 feet to 2,770 feet above sea level). Undeveloped desert surrounds the project site from all directions, with some elevated terrain existing to the east, west, and south within 2-3 miles of the site (SM 2009a, Section 2.4.1).

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. Sensitive receptors in the project vicinity are listed in Section 5.6.2.1 of the AFC. There are four sensitive receptors within a 3-mile radius of the project site, the nearest of which is the Mountain View Christian Academy (school or church) located about 1.6 miles northeast of the project site. The nearest residence is approximately 2,000 feet west of the northwestern fenceline of the reconfigured solar field #1 (SM 2009a, Section 5.6.2.1 and SM 2010a). As mentioned above, the location of sensitive receptors near the proposed site is an important factor in considering potential public health impacts.

Meteorology

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may be increased.

This region of Kern County (part of the Mojave Desert) is characterized by a dry-hot desert climate; summers are hot and dry, winters are moderate with low precipitation, and temperature inversions are strong. The region typically experiences clear skies and

strong seasonal winds. Winds generally flow from the southwest across the region and tend to transport air pollutants from the Los Angeles area into the Mojave Desert Air Basin (SM 2009a, section 5.2.2.1).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **AIR QUALITY** section presents more detailed meteorological data.

Existing Air Quality

The proposed site is within the jurisdiction of the Kern County Air Quality Management District (KCAQMD). By examining average toxic concentration levels from representative air monitoring sites in the project vicinity with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States from all causes is about 1 in 3, or 333,000 in one million. For the year 2004, the American Cancer Society estimated that the death rate due to cancer was 23.1%, about 1 in 4.

There are no monitoring stations within the Mojave Desert Air Basin (MDAB) that measure TACs, and therefore the background cancer risk in the MDAB cannot be determined. The nearest California Air Resources Board (CARB) air toxics monitoring station that actively reports values is located in Bakersfield, approximately 80 miles west of the project site. Although staff does not consider this location to be representative of air quality in the area of the proposed site, it serves to show the upper-bound levels of toxic air contaminants found in the region. In 2008, the background cancer risk calculated by CARB for the Bakersfield California Ave monitoring station was 92 in one million (CARB 2009). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, accounted together for more than half of the total risk. The risk from 1,3-butadiene was about 25 in one million, while the risk from benzene was about 33 in one million. Formaldehyde accounts for about 21% of the 2008 average calculated cancer risk based on air toxics monitoring results, with a risk of about 19 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed facility. The risk from hexavalent chromium was about 5 in one million, or ~5% of the total risk.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk in all areas of California during the past few years. For example, in one large air district, cancer risk was 342 in one million based on 1992 data and in 2002, the average inhalation cancer risk decreased to 162 in one million. Similar reductions occurred throughout the state's major metropolitan areas.

Existing Public Health Concerns

When evaluating a new Project, staff sometimes conducts an analysis of existing public health issues in the Project vicinity. This analysis is prepared in order to identify the

current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed Project, which provides a basis on which to evaluate the significance of any additional health impacts from the proposed Project. Because of the very low population in the immediate vicinity of the project and because no existing health concerns within a 6-mile radius of the project have been identified by the applicant (SM 2009a, Section 5.10.2) or by the Kern County Health Department, staff did not conduct an analysis of existing public health issues.

Environmental Site Contamination

Site disturbances occur during demolition of existing structures, facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off-site through soil erosion, and uncovering buried hazardous substances. The Phase I Environmental Site Assessment conducted for the original proposed site in 2009 found no “Recognized Environmental Conditions” per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of hazardous substances on the site, nor was there any other environmental concern that would require remedial action (SM 2009a, Section 5.16.2.3 & Appendix I).

To address the possibility that soil contamination would be encountered during construction of the RSPP, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. Staff believes that adherence to current ordinances and to staff’s proposed Conditions of Certification mentioned above will be adequate to address any soil or groundwater contamination that exists on this site. See the SA/DPA/DEIS section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

C.7.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction Impacts and Mitigation

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation (discussed in the “Setting” section above), as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff’s **AIR QUALITY** analysis.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP) on Toxic Air Contaminants recommended a chronic REL (see REL discussion in Method of Analysis section above) for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

Construction of the RSPP, including site preparation, is anticipated to take place over a period of 28 months (SM 2009a, Section 5.2.4.1). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

AFC Appendix E.2 and the Construction Emissions Attachment to DR- AIR-3 (SM 2010a) present maximum daily and annual emissions from construction activities including fugitive dust and diesel exhaust. In response to Data Request # 123, the applicant conducted a health risk assessment for diesel particulate matter (DPM) from construction equipment emissions using the OFFROAD2007 model to estimate emissions. The applicant estimated that 13,934 pounds of DPM would be emitted during the entire construction period (about 2.3 years). In order to model the cancer risk from construction emissions, the applicant divided the total amount of DPM by the exposure period of 70 years which is typically used to assess health risks. The applicant's modeling of worst-case construction emissions (using a 100-meter spacing receptor grid) found that the cancer risk was estimates to be 3.42 in one million at the point of maximum impact (PMI), below the level of significance of 10 in one million. The chronic hazard index was found to be 0.002 at the PMI, below the level of significance of 1.0. The PMI was located in a remote area that is not frequently accessed by the public (SM 2010a, DR-PH-123).

Mitigation measures are proposed by both the applicant and Air Quality staff to reduce the maximum calculated PM10 as well as PM2.5 concentrations. These include the use of extensive fugitive dust control measures that are assumed to result in 90% reduction of fugitive dust emissions. In order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Air Quality staff recommends the use of ultra low-sulfur diesel fuel and Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. The catalyzed diesel particulate

filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85-92%. Such filters will reduce diesel emissions during construction and further reduce the impacts associated with diesel exhaust. (See the **AIR QUALITY** section of this SA/DPA/DEIS for staff's proposal to control particulate matter.)

Operation Impacts and Mitigation

Emissions Sources

The emissions sources at the proposed RSPP site include one auxiliary boiler, one HTF heater, one cooling tower, one diesel-fueled emergency generator, one diesel-fueled emergency fire pump, one ullage tank vent, and DPM from maintenance vehicles.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. Table 5.10-4 of the AFC lists toxic air contaminants that may be emitted by the project along with the toxicity values used to calculate their health affects. Toxicity values include RELs which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health and Safety Table 2** lists toxic emissions and shows how each contributes to the health risk analysis.

Public Health and Safety Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions*

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Benzene			✔	✔	✔
Biphenyl**					
Chloroform			✔	✔	✔
Dichlorobenzene			✔	✔	
Diesel Exhaust			✔	✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Naphthalene		✔	✔	✔	
Polycyclic Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Toluene				✔	✔
Xylene				✔	✔

*Source: OEHHA 2003 Appendix L and SM 2009a, Table 5.10-4.
**Biphenyl has no established risk factors or RELs.

Appendix E.2 and Tables 5.10-5 through 5.10-8 of the AFC lists non-criteria pollutants and their emission factors that may be emitted from the sources listed above (SM 2009a). Emission factors for the majority of plant components were obtained from the U.S. EPA emission factors database (AP-42) and the California Air Toxics Emission Factors (CATEF II) database. Data from an existing solar plant (Kramer Junction Solar Energy Generating System Facility) was used to estimate emissions from the HTF expansion tanks, which consist of benzene and biphenyl. Since biphenyl has not been assigned a health risk factor, it was not included in the HRA calculations (SM 2009a, Section 5.10.3.2).

In response to Data Request 127, the applicant stated that VOC emissions from the HTF expansion tank are estimated to be 137 pounds per MW per year, based on comparable thermal solar projects and on an operational mass balance for the ullage system developed by the applicant's solar design engineer. In regards to the composition of VOC emissions from the HTF expansion tank, the applicant notes that HTF breakdown products may include benzene, toluene, xylene, phenol, naphthalene, methane, ethane, benzenol, and biphenyl. In the health risk assessment conducted for this project the applicant modeled the entire amount of HTF emissions as benzene since it is the compound with the highest health risk factors for cancer and non-cancer effects (SM 2010a, DR-PH-127).

In response to Data Requests 124 and 126, the applicant provided total daily and yearly DPM emissions from maintenance vehicles and total cumulative daily and yearly PM2.5 emissions including fugitive dust and DPM. The total DPM emissions from maintenance vehicles were estimated to be 2.13 pounds per year and the total PM2.5 emissions were estimated to be 4,360 pounds per year. DPM emissions are therefore negligible when compared to non-exhaust emissions which represent 99.9% of PM emissions. The estimated DPM emissions from maintenance vehicles were added to the applicant's revised health risk assessment.

Since the RSPP project intends to use groundwater for cooling, the potential exists for TACs present in the water to disperse into the air via cooling tower drift. The applicant conducted water sampling and analysis of the on-site well water for VOCs, petroleum hydrocarbons, pesticides, herbicides, minerals and metals. The results are presented in Table DR-PH-129-1, showing that two metals considered as TACs are present in the well water, arsenic and vanadium. Emissions calculations for the project's health risk assessment were revised to include the metals detected in the groundwater samples (SM 2010a, DR-PH-129).

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the project. This is accomplished by using a screening air dispersion model and assuming conditions that

result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Impacts

The applicant's revised screening health risk assessment for the project (provided in Data Response 125) including all sources resulted in a maximum acute hazard index of 0.035 and a maximum chronic hazard index of 0.0011 at the point of maximum impact (PMI). The worst-case cancer risk was calculated to be 2.55 in 1,000,000 at the PMI. As **Public Health and Safety Table 3** shows, both acute and chronic hazard indices are under the significance level of 1.0 and cancer risk is under the significant level of 10 in 1,000,000, indicating that no short- or long-term adverse health effects are expected.

Public Health and Safety Table 3
Operation Hazard/Risk at Point of Maximum Impact

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.035	1.0	No
Chronic Noncancer	0.0011	1.0	No
Individual Cancer	2.55 in one million	10 in one million	No

Source: SM 2010a Table DR-PH-125-1.

Staff conducted a thorough evaluation of the risk assessment results presented in the Ridgecrest Solar Power Project AFC (09-AFC-9) and in the "Responses to CEC Staff Public Health Data Requests 123-130" (January 2010). Staff conducted this evaluation in order to determine if the applicant's modeling was both transparent and verifiable. Modeling files provided by the applicant were also reviewed. Staff concludes that standard procedures were followed and appropriate assumptions were made in the applicant's analysis.

Construction Phase Analysis

For the construction phase analysis, atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from construction equipment and vehicles was conducted by the applicant using the OFFROAD2007 Model. Total on-site PM emissions from diesel construction equipment exhaust over the estimated two and a half year construction period was provided in the January 2010 data responses and is

13,934 lbs. The corresponding annual DPM emission rate for exhaust emissions from onsite construction equipment and vehicles is 199 lb/yr for residential exposure over a 70 year lifetime.

The maximum predicted offsite concentration of diesel particulate matter, on a 70-year basis, was reported by the applicant to be 0.0107 ug/m^3 (Tighe 2010). Cancer risk due to diesel exhaust emissions was determined by multiplying the DPM concentration by the diesel cancer inhalation unit risk of 0.0003 (ug/m^3)$^{-1}$. Cancer risk at the location of the maximum offsite concentration was determined to be 3.2 in a million and chronic HI to be 0.0021 (noncancer chronic REL is 5 ug/m^3).

Operations Phase Analysis

For the operations phase analysis, atmospheric dispersion modeling of facility emissions was conducted by the applicant using AERMOD. Local meteorological data were used, building downwash effects were included for 26 buildings, and 1,444 grid receptors were modeled.

A total of 17 emitting units were modeled by the applicant for facility operations including:

- 1 auxiliary boiler
- 1 cooling tower (modeled as two sources)
- 1 HTF (heat transfer fluid) heater
- 1 ullage system vent
- 1 diesel emergency generator
- 1 diesel firewater pump
- Mobile sources involved in routine operations (mirror washing trucks, trucks used in weed abatement, trucks used in application of soil stabilizer, water trucks); 10 on-site points modeled for emissions
- Total of 17 emitting sources evaluated at the proposed facility

The HTF (heat transfer fluid) is circulated through the solar field where it is heated by sunlight concentrated on the receiver tube elements of the solar collectors. HTF is comprised of biphenyl/diphenyl oxide. Thermal decomposition of HTF results in decomposition products that can include benzene, phenol and toluene. In modeling HTF fugitive loss emissions, the applicant assumed that 99% of the emissions would be comprised of benzene.

Staff used the HARP On-Ramp program to load the applicant's AERMOD results into the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a for the risk analysis. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. Emission factors obtained from the applicant's modeling files and used in this analysis are listed in **Public Health and Safety Table 4**. For risk calculations using the HARP model, the "Derived (Adjusted) Method" was used for cancer risk and the "Derived (OEHHA) Method" was used for chronic noncancer hazard.

Cancer risk and chronic and acute hazard index values obtained by staff are compared to results reported by the applicant in the January 2010 response to data requests in **Public Health and Safety Table 5**. Risk and hazard were determined at the point of maximum impact, PMI, under the 70 year residential scenario. The nearest residential receptor was identified by the applicant to be located approximately 2000 feet west of the northwest boundary of the reconfigured northern solar field while the maximally exposed individual resident (MEIR) is located at the northeast corner of the project site. Seventy-four residential and four sensitive receptors were identified within three miles of the project site.

Public Health and Safety Table 6 presents substance- and source-specific cancer risks at the PMI. Analysis of this table indicates that 97% of the cancer risk at the PMI is attributed to emissions from three sources: 50% due to emissions from the HTF ullage system, 26% due to emissions from the diesel firewater pump engine and 21% due to emissions from the emergency generator. Additional analysis indicates that 98% of cancer risk at the PMI is attributed to emissions of two substances: 50% due to benzene emissions (from the auxiliary boiler, the HTF heater and ullage system) and 48% due to diesel particulate matter emissions (from onsite mobile sources as well as the two diesel engines).

Cumulative impacts were not evaluated. A proposed Super Wal-Mart store and wind monitoring projects on Bureau of Land Management lands are located within six miles of the project site (SM 2009a, page 5.10-19).

Public Health and Safety Table 4
Operation Phase Emission Rates

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
EMISSION RATES FROM THE AUXILIARY BOILER		
Benzene	1.17E-01	7.21E-05
DiClBenzenes	6.69E-02	4.12E-05
Formaldehyde	4.18E+00	2.57E-03
Hexane	1.00E+02	6.20E-02
Naphthalene	3.40E-02	2.09E-05
Toluene	1.90E-01	1.17E-04
PAHs-w/o	3.32E-03	2.05E-06
EMISSION RATES FROM EACH OF 2 COOLING TOWER CELLS		
Arsenic	7.71E-04	2.08E-07
Chloroform	6.94E+01	9.38E-06
Vanadium	3.08E-03	8.33E-07
EMISSION RATES FROM THE HTF HEATER		
Benzene	3.60E-02	7.21E-05
DiClBenzenes	2.06E-02	4.12E-05
Formaldehyde	1.29E+00	2.57E-03
Hexane	3.09E+01	6.20E-02
Naphthalene	1.05E-02	2.09E-05
Toluene	5.80E-02	1.17E-04
PAHs-w/o	1.02E-03	2.05E-06
EMISSION RATES FROM THE ULLAGE SYSTEM VENT		
Benzene	3.00E+02	7.50E-01
Biphenyl	3.00E-02	7.50E-05
EMISSION RATES FROM OPERATION OF EACH OF 4 EMERGENCY GENERATORS		
Diesel PM	48.3	-
EMISSION RATES FROM OPERATION OF EACH OF 4 EMERGENCY FIRE PUMPS		
Diesel PM	4.96	-
EMISSION RATES FROM ON-SITE MAINTENANCE VEHICLES		
Diesel PM	0.18 – 0.24	-

Public Health and Safety Table 5
Cancer Risk and Chronic Hazard Due to Operation Phase Emissions.

	Staff's Analysis			Applicant's Analysis		
	Cancer Risk (per million)	**Acute HI**	**Chronic HI**	**Cancer Risk** (per million)	**Acute HI**	**Chronic HI**
PMI (for cancer risk and chronic HI, Rec #1157)	2.50	0.023	0.0015	2.55	0.035*	0.0011
MEIR (Rec#1406)	0.081	0.0049	0.000065	0.088	0.0072	0.00004

**At Receptor 1156.*

Public Health and Safety Table 6. Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact (PMI).

Substance	Auxiliary Boiler	Cooling Tower (2 stacks)	Diesel Generator	Diesel Firewater Pump
Arsenic		3.65E-09		
Benzene	1.44E-10			
Chloroform		3.40E-08		
DieselExhPM			5.26E-07	6.42E-07
Formaldehyde	1.08E-09			
Naphthalene	5.02E-11			
PAHs-w/o	2.30E-08			
TOTAL	2.43E-08	3.77E-08	5.26E-07	6.42E-07

Substance	HTF Heater	Ullage System Vent	On-site Mobile Sources (10 sources)	Total Cancer Risk
Arsenic				3.65E-09
Benzene	6.80E-12	1.25E-06		1.25E-06
Chloroform				3.40E-08
DieselExhPM			1.96E-08	1.19E-06
Formaldehyde	5.12E-11			1.13E-09
Naphthalene	2.38E-12			5.26E-11
PAHs-w/o	1.08E-09			2.41E-08
TOTAL	1.15E-09	1.25E-06	1.96E-08	2.50E-06

Cooling Towers

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth including Legionella to occur in the one small wet cooling tower used to cool ancillary equipment. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the RSPP project since it intends to use groundwater supplied from the Indian Wells Valley Water District (IWVWD); however, the potential remains for Legionella growth in cooling water at the RSPP due to nutrients found in groundwater.

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested were found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to six percent. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed condition of certification **PUBLIC HEALTH-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling

system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **PUBLIC HEALTH-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the small wet cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance. The applicant has stated that an appropriate biocide program and anti-biofilm agent monitoring program would be implemented for the cooling towers (SM 2009a, Section 5.10.3.5).

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed RSPP (temporary or permanent) would follow a closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Staff expects that impacts to public health from the closure and decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed RSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that public health-related impacts from closure and decommissioning of the RSPP would be insignificant.

C.7.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of public health impacts from the proposed RSPP has determined that impacts would be below the CEQA level of significance.

C.7.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all

impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint. The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

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

C.7.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1.**

C.7.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit Alternative is likely to result in some reduced emissions due to the smaller scope of the project, which would slightly decrease the cancer risk and chronic and acute hazard indices predicted for the 250 MW project as proposed. However, the differences in health risk would be so minor as to not be quantifiable and the public health analysis has determined that the cancer risk and chronic and acute hazard indices are far below the level of significance pursuant CEQA at the point of maximum impact for the project as proposed.

C.7.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Northern Unit Alternative, as both the project as proposed and the Northern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Northern Unit Alternative and the project as proposed.

C.7.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road. The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

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

C.7.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.7.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit Alternative is likely to result in some reduced emissions due to the smaller scope of the project, which would slightly decrease the cancer risk and chronic and acute hazard indices predicted for the 250 MW project as proposed. However, the differences in health risk would be so minor as to not be quantifiable and the public health analysis has determined that the cancer risk and chronic and acute hazard indices are far below the level of significance pursuant CEQA at the point of maximum impact for the project as proposed.

C.7.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Southern Unit Alternative, as both the project as proposed and the Southern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Southern Unit Alternative and the project as proposed.

C.7.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

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

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

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

C.7.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

C.7.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction and operation of the Original Proposed Project Alternative would have similar public health impacts to those analyzed for the current configuration of the RSPP, since this alternative is comprised of the same equipment rearranged in a different configuration and location and with a slightly smaller footprint.

C.7.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for public health would not change with the Original Proposed Project Alternative, as both the project as currently proposed and previous configuration would have impacts below the level of significance. The same conditions of certification would be required for both alternatives.

C.7.8 NO PROJECT/NO ACTION ALTERNATIVES

C.7.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the public health-related impacts of the Ridgecrest Solar Power Project would not occur at the proposed site. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.7.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. It is expected that public health-related impacts would result from the construction and operation of the solar technology and would likely be similar to the public health-related impacts from the proposed project. As such, this No Project/No Action Alternative could result in the public health-related impacts similar to the impacts under the proposed project.

C.7.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, this No Project/No Action Alternative would not result in public health-related impacts. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.7.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Table X Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Estimated Cancer Risk at PMI	Below level of significance of 10 in one million	Below level of significance of 10 in one million (the differences in health risk would be so minor as to not be quantifiable)	Below level of significance of 10 in one million (the differences in health risk would be so minor as to not be quantifiable)	Below level of significance of 10 in one million (the differences in health risk would be so minor as to not be quantifiable)	Unknown

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.7.10 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR §1508.7).

C.7.10.1 GEOGRAPHIC EXTENT

For the purpose of the public health cumulative analysis, emissions from construction or operation of the RSPP could potentially combine with emissions from past, present and reasonably foreseeable projects to result in adverse health effects to the public. Cumulative impacts in the area of public health could occur if emission sources are close enough so that their plumes combine. Due to differences in emission source elevations, terrain features, wind direction, and other meteorological factors, it is unlikely that emission plumes from two or more facilities would combine unless they are located in very close proximity. Furthermore, dispersion of plumes tends to occur in parallel, preventing the mixing of plumes from separate locations. On the basis of numerous previous air dispersion modeling conducted by staff to assess public health cumulative impacts, staff finds that the geographic area considered for cumulative impacts on Public Health is only within the project boundaries or within 1/4 mile of the project.

C.7.10.2 EXISTING CUMULATIVE CONDITIONS

For this analysis, staff analyzed the potential of existing projects in the vicinity of the RSPP to contribute to cumulative impacts. The only existing nearby facility is the China Lake Naval Weapons Center, where activities may produce fugitive dust and DPM. This emissions source, located several miles north of the proposed RSPP, is not close enough to cause cumulative impacts with the proposed RSPP. Staff's previous modeling has shown repeatedly that unless two sources are within approximately one-quarter of a mile, their cumulative health risks do not combine to turn an insignificant individual health risk into a significant one.

C.7.10.3 FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Project Area

Staff analyzed the potential of foreseeable projects in the vicinity of the RSPP to contribute to cumulative impacts, which include a waste water treatment plant, a solar project, and three wind projects.

The construction of the RSPP is not expected to result in short term adverse impacts related to public health. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the RSPP, however, short term impacts related to Public Health during construction of those cumulative projects are not expected to occur due to the short duration of construction and the distance between the RSPP and future projects.

The operation of the RSPP is not expected to result in long term adverse impacts related to Public Health. The worst-case cancer risk calculated by the Applicant is 2.55 in one million at the PMI. The point of maximum impact occurs where pollutant concentrations from RSPP would theoretically be the highest. Even at this location, staff does not expect any significant change in lifetime risk to any person, and the increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower since worst-case estimates are based on conservative

assumptions and thus overstate the true magnitude of the risk expected. Therefore, staff does not consider the incremental impact of the additional risk posed by RSPP to be either individually or cumulatively significant.

Foreseeable Renewable Projects in the California Desert

The nature of public health impacts from exposure to materials that could result in negative health effects combined with the vast area over which the future solar and wind development projects would be built in southeastern California, as well as the relative isolation of these projects from sensitive receptors, precludes the potential for impacts of these projects to combine with each other to result in significant impacts. Any emission from construction of these projects would be dispersed over these areas and would not be expected to result in chronic health problems to sensitive receptors. Operation of the future solar and wind energy projects would result in negligible emissions, mostly related to worker vehicles and maintenance trucks, therefore, operation of these future projects would not result in negative regional health effects.

C.7.10.4 OVERALL CONCLUSION

Public health impacts of the RSPP would not combine with impacts of any past, present, or reasonably foreseeable projects to result in cumulatively considerable local or regional impacts. Therefore, no mitigation is recommended to address potential cumulative project impacts.

C.7.11 COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any significant chronic or cancer health risk as a result of that exposure. Staff believes that it incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health and safety impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with **PUBLIC HEALTH AND SAFETY**.

Staff concludes that construction and operation of the RSPP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH AND SAFETY**.

C.7.12N NOTEWORTHY PUBLIC BENEFITS

It is noteworthy that a solar electric generating facility such as the proposed RSPP project would emit significantly less TACs to the environment than other energy sources available in California such as natural gas or biomass, thereby reducing the health risks that would otherwise occur with these non-renewable energy sources. At the same time, the proposed RSPP would provide much needed electrical power to California residences and businesses, and will contribute to electric reliability. Electrical power is not only necessary to maintain a functioning society, but it also benefits many individuals who rely on powered equipment for their health (such as dialysis equipment and temperature control equipment). For example, it is documented that during heat waves in which elevated air-conditioning use causes an electrical blackout, hospitalizations and deaths due to heat stroke are increased.

C.7.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

PUBLIC HEALTH-1 The Project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every six months. After two years of power plant operations, the Project owner may ask the CPM to re-evaluate and revise the Legionella bacteria testing requirement.

Verification: At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

C.7.14 CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the RSPP and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed RSPP uses a conservative health protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the RSPP project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. With the incorporation of staff's proposed mitigation (Condition of Certification **PUBLIC HEALTH-1**), the proposed facility will not present a significant health risk to the public.

C.7.15 REFERENCES

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SRP. 1998. Scientific Review Panel on Toxic Air Contaminants. Findings of the Scientific Review Panel on The Report On Diesel Exhaust as adopted at the Panel's April 22, 1998 Meeting.

Tighe 2010. Electronic communication from Steven Tighe of AECOM Environment to Effie Fourakis of Risk Science Associates. February 10.

C.8 SOCIOECONOMCIS AND ENVIRONMENTAL JUSTICE

Testimony of Sue Walker

C.8.1 SUMMARY AND CONCLUSIONS

Energy Commission staff (hereafter referred to as staff) concludes that the 250-megawatt (MW) (nominal) Solar Millennium Ridgecrest Solar Power Project (RSPP or proposed project) would not result in significant adverse direct, indirect, or cumulative socioeconomics impacts. Staff additionally concludes that the RSPP would not result in any disparate health impacts to environmental justice (low income or minority) populations. Gross public benefits from the proposed project include capital costs, construction and operation payroll, and sales taxes.

C.8.2 INTRODUCTION

Staff's socioeconomics impact analysis evaluates project-induced changes on existing population and employment patterns, housing, public services, local business and government revenues and related community issues such as environmental justice. A discussion of the project's estimated beneficial economic impacts and contribution to cumulative impacts are addressed as well.

C.8.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

C.8.3.1 METHODOLOGY

Staff reviewed the socioeconomics section of the applicant's RSPP Application for Certification (AFC) (09-AFC-9), its Data Adequacy Supplement to the AFC, and conducted independent research and analysis from various sources information provided by governmental agencies and trade associations to both verify the content of the AFC's socioeconomics section and augment the information that was contained within it.

In this analysis, staff used fixed numeric and percentage criteria for evaluating population, demography and employment. Impacts on housing, schools, hospitals and emergency services, law enforcement, fire protection, parks and recreation, and cumulative impacts are based on both qualitative and quantitative data, as available from governmental agencies and trade associations, and involved, as needed, professional judgment. The impact criteria used for this analysis and its conclusions are provided in Section C.10.3.2, below.

C.8.3.2 THREHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The analysis of RSPP's impacts must comply with both California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) requirements given the respective power plant licensing and land management jurisdictions and authority of the California Energy Commission and BLM.

For the purposes of satisfying the requirements of both CEQA and NEPA, the phrases "action" and "project" are used synonymously in this analysis to refer to implementation (construction, operation and closure and decommissioning) of the proposed RSPP or one of its alternatives.

CEQA requires a list of criteria to determine the significance of identified impacts. A significant impact is defined by CEQA as “a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project” (State CEQA Guidelines Section 15382).

Thresholds serve as the benchmark for determining if a project will result in a significant adverse impact when evaluated against existing conditions (e.g., "baseline" conditions). CEQA and the State CEQA Guidelines do not provide specific, quantifiable thresholds of significance for socioeconomic impact determinations. To the contrary, State CEQA Guideline Section 15064(e) specifies that: "[e]conomic and social changes resulting from the project shall not be treated as significant effects on the environment." However, Section 15064(e) continues by stating that when "a physical change is caused by economic or social effects of a project, the physical change may be regarded as a significant effect in the same manner as any other physical change resulting from the project. Alternatively, economic and social effects of a physical change may be used to determine that the physical change is a significant effect on the environment. If the physical change causes adverse economic or social effects on people, those adverse effects may be used as a factor in determining whether the physical change is significant. For example, if a project would cause overcrowding of a public facility and the overcrowding causes an adverse effect on people, the overcrowding would be regarded as a significant effect."

In lieu of specific thresholds of significance for socioeconomic impacts under CEQA, staff has used Appendix G of the State CEQA Guidelines for this analysis, which specifies that a project could have a significant effect on population, housing, and public services if it would:

- Induce substantial population growth in an area, either directly or indirectly;
- Displace substantial numbers of people and/or existing housing, necessitating the construction of replacement housing elsewhere; or
- Adversely impact acceptable levels of service for fire and police protection, schools, parks and recreation, and hospitals and emergency medical response.
- In addition, staff concludes that the following is relevant to the proposed project's adverse and beneficial effects:
- Substantially change local employment; or
- Cause a substantial change in revenue for local businesses or government agencies.

- Under CEQA, impacts are typically categorized as being significant and unavoidable (e.g., impacts that cannot be mitigated to a level of less than significant), adverse but mitigable to a level of less than significant, adverse but less than significant or no impact. Staff has used these categories to calibrate impacts and identify conditions of approval/mitigation measures, as warranted and feasible.

Appendix D of the BLM's "Land Use Planning Handbook" (BLM 2005) provides the socioeconomic attributes that are recommended for consideration as part of the BLM's land use decision making process. Appendix D of the "Land Use Planning Handbook" acknowledges that the full range of socioeconomic topics to be considered in land use decisions is shaped, in part, by the specific social context and potential resource allocation(s) associated with an action. Table D-2 of the "Land Use Planning Handbook" lists 27 socioeconomic topics for possible consideration as part of the land use decision making process, and the table's accompanying text recommends the prioritization of these topics according to the following criteria: (1) "Basic" (the topic should be addressed); (2) "Optional" (the topic should be addressed if warranted by "context" and "issues"); and, (3) "Not Currently Indicated" (the topic should be addressed if warranted by new information) (BLM 2005).

Of the 27 topics listed in Table D-2, the following socioeconomic issues are noted as "Basic:" population; inequality (e.g., the identification of vulnerable populations); communities of place (e.g., the identification of local and regional population centers); occupational and interest groups; distribution of communities, roads, and resources (e.g., the identification of wildland-urban interfaces and recreational demand); interrelationships among producing sectors (e.g., regional economic sectors); employment; personal income; and, environmental justice (BLM 2005). Based upon staff's review of the Table D-2 of the BLM's "Land Use Planning Handbook," it has been determined that the "Basic" topics listed above are germane to the RSPP's socioeconomics analysis; however, no additional topics have been identified as needing review and assessment.

C.8.3.3 LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Socioeconomics Table 1 contains the socioeconomic and environmental justice laws, ordinances, regulations, and standards (LORS) applicable to the proposed RSPP.

Socioeconomics Table 1
Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	
Emergency Economic Stabilization Act of 2008 (P.L. 110-343) Business Solar Investment Tax Credit (ITC) (IR Code §48)	This Act extends the 30% ITC for solar energy property for eight years through December 31, 2016. The bill allows the ITC to be used to offset both regular and alternative minimum tax (AMT) and waives the public utility exception of current law (i.e., permits utilities to directly invest in solar facilities and claim the ITC). The five-year accelerated depreciation allowance for solar property is permanent and unaffected by passage of the eight-year extension of the solar ITC.
State	
California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996–65997	These sections include provisions for school district levies against development projects. As amended by Senate Bill 50 (Greene, Chapter 407, section 23, Statutes of 1998), these sections state that, except for fees established under Education Code 17620, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost of school facilities.
California Revenue and Taxation Code, Sections 721–725: California Board of Equalization (BOE) – Property Tax Rule 905 (BOE authority to assess electrical generating facilities is found in Article XIII, Section 19, of California's Constitution)	Property Tax Rule 905 states “the Board shall annually assess every electric generation facility with generating capacity of 50 MW or more...” It also states that for purposes of this rule, “electric generation facility” does not include a qualifying small power production facility or qualifying cogeneration facility within the meaning of section 201 and section 210 of Title II of the Public Utility Regulatory Policies Act of 1978. According to this act, (16 USC, Section 796 [17] [A]), a “small power production facility is defined as ’A facility which is eligible solar, wind, waste, or geothermal facility...[that] has a power production capacity, which together with any other facilities located at the same site, is not greater than 80 MW.’”

C.8.4 PROPOSED PROJECT

C.8.4.1 SETTING AND EXISTING CONDITIONS

The RSPP is located northeastern Kern County, California, approximately five miles southwest of the City of Ridgecrest. The proposed project site is located on federal land managed by the BLM. The RSPP would include two solar fields: Solar Field #1 (North) would be approximately 894 acres in size; and, Solar Field #2 (South) would be approximately 554 acres in size. The total land disturbance (inside and outside of the site's fenceline) would be 1,944 acres. It would additionally require a new 12-inch diameter water supply pipeline approximately 4.6 miles in length, a new 230 kilovolt (kV)

transmission line approximately 0.75 mile in length, the rerouting of an estimated 1.6 miles of two existing transmission lines and a new 230kV switchyard. In addition, the proposed project would require access roads, a parking lot, a bio-remediation unit and a main office building. Please refer to Section B.1for a detailed description of the proposed project.

Construction of the RSPP would require an average of 405 employees over a 28-month construction period, with a peak workforce of approximately 633 employees during the11th month of construction (AECOM Environment 2009a). Operation of the RSPP would require an estimated workforce of 84 full-time employees.

Research shows that workers may commute as much as two hours from their place of residence rather than relocate for their employment (EPRI 1982). Portions of the Tulare, Inyo, Kern, San Bernardino and Los Angeles Counties fall within a two-hour driving distance of the project site. However, the vast majority of that portion of Inyo County which is within a two-hour commuting distance of the project site is made up of the China Lake Naval Weapons Center (CLNWC), and the remaining areas of Inyo County that are within a two-hour commuting distance are sparsely populated. Similarly, that portion of Tulare County which is within a two-hour commuting distance of the project site is comprised of Sequoia National Forest, which is also sparsely populated. As such, to focus the analysis on those population centers that are most likely to be affected by the RSPP, either directly or indirectly, the socioeconomics study area is comprised of Kern, Los Angeles and San Bernardino Counties. It is noted, though, that the project's impact on some socioeconomic attributes would be localized, such as in the case of law enforcement and emergency response services; as such, in those instances where the socioeconomics study area is centered on a smaller geographic area, it is specified below.

Demographic Characteristics

According to the California Department of Finance (DOF), California had an estimated population of 37,883,992 people as of January 1, 2008 and population of 38,292,687 people as of January 1, 2009; between 2008 and 2009 there was thus a population increase of 1.1% (DOF 2009a). As of January 1, 2009 Kern County had a population of 827,173 people, Los Angeles County has a population of 10,393,185 people and San Bernardino County had a population of 2,060,950 people; all three counties experienced population increases between January 2008 and January 2009, including a 0.8% increase in San Bernardino County, a 0.9% increase in Los Angeles County, and an 1.5% increase in Kern County (DOF 2009b).

Similar to the population increases that occurred between 2008 and 2009, the populations of the State and Kern, Los Angeles and San Bernardino Counties are expected to continue growing through 2050, as outlined in **Socioeconomics Table 2**.

Socioeconomics Table 2
Population Projections Through 2050

Location	Year					
	2000	2010	2020	2030	2040	2050
California	34,105,437	39,135,676	44,135,923	49,240,891	54,226,115	59,507,876
Percent Change from Previous Decade	___	+12.8	+11.3	+10.4	+9.2	+8.9
Kern County	665,519	871,728	1,086,113	1,352,627	1,707,239	2,106,024
Percent Change from Previous Decade	___	+23.7	+19.7	+19.7	+20.8	+18.9
Los Angeles County	9,578,960	10,514,663	11,214,237	11,920,289	12,491,606	13,061,787
Percent Change from Previous Decade	___	+8.9	+6.2	+5.9	+4.6	+4.4
San Bernardino County	1,721,942	2,177,596	2,581,371	2,958,939	3,309,292	3,662,193
Percent Change from Previous Decade	___	+20.9	+15.6	+12.8	+10.6	+9.6

Source: DOF 2009b
____ Data not available

At a local scale, for the years 2006 through 2008 the U.S. Census Bureau estimates that the City of Ridgecrest had a population of 27,613 people (U.S. Census Bureau 2009). For the year 2000 Census (the most recently available data), the estimated populations for the other cities and communities within an estimated 60 linear miles of the project site were as follows: Tehachapi - 10,957 people; California City - 8,385 people; Mojave - 3,836 people; Boron - 2,025 people; Inyokern - 984 people; Lake Isabella - 3,315 people; Kernville - 1,736 people; Wofford Heights - 2,276 people; Randsburg - 77 people; and, Johannesburg - 176 people (U.S. Census Bureau 2000).

Demographic Screening and Environmental Justice

Executive Order 12898, “Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations,” focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the United States Environmental Protection Agency (USEPA) and all other federal agencies (as well as State agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

According to the Council on Environmental Quality's "Environmental Justice: Guidance Under the National Environmental Policy Act," minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic (Council on Environmental Quality 1997).

For all siting cases, Energy Commission staff conducts an environmental justice screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in USEPA's National Environmental Policy Act (NEPA) Compliance Analysis" dated April 1998, which defined minority populations as either:

- The minority population of the affected area is greater than 50% of the affected area's general population; and
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

To detect poverty, the U.S. Census Bureau uses a set of money income thresholds that vary by family size and composition to detect poverty. If a family's total income is less than that family's established threshold, then each individual within that family is considered to be below-poverty-level. The definition of poverty counts income before taxes and excludes capital gains and non-cash benefits (such as public housing, Medicaid and food stamps) (U.S. Census Bureau 1999). For the U.S. Census Bureau year 1999, which applies to the data associated with the year 2000 U.S. census count, the national poverty thresholds for income for the 48 contiguous states were as follows:

- Family of 1: $8,501
- Family of 2: $10,869
- Family of 3: $13,290
- Family of 4: $17,029
- Family of 5: $20,127
- Family of 6: $22,727
- Family of 7: $25,912
- Family of 8: $28,967
- Family of 9 or more: $34,417

The steps recommended by the above-referenced guidance documents to assure compliance with Executive Order 12898 are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and, (3) if warranted, a detailed examination of the distribution of impacts on segments of the population.

Although the U.S. Census Bureau has prepared and published some data sets for race and income for the years 2006 through 2008, such data is not available for all regions of the country or for the entire State of California. As such, to ensure a consistent data set for the evaluation of minority and below-poverty-level populations, staff's screening process relies on Year 2000 U.S. Census Bureau data.

Minority Populations

Socioeconomics Table 3 provides the demographic profile for race/ethnicity for Kern, Los Angeles and San Bernardino Counties, as well as the City of Ridgecrest and the Inyokern U.S. Census Bureau Census Designated Place (CDP), which are the two closest population centers to the project site. Overall, the counties themselves have similar race/ethnicity profiles, the exception being that Los Angeles County has greater Asian and Hispanic/Latino (of any race) populations and a correspondingly smaller White population in comparison to the other two counties. At a local level, Ridgecrest and Inyokern also have similar race/ethnicity profiles with the exception of Inyokern

having smaller Black or African American and Hispanic/Latino (of any race) populations and a larger American Indian or Alaskan Native population when compared to Ridgecrest. The counties, as a whole, have appreciably higher minority populations than Ridgecrest and Inyokern. The City of Ridgecrest has a total minority population of 23.5% and Inyokern has a total minority population of 16.2%.

Socioeconomics Table 3
Demographic Profiles by Race/Ethnicity

Race/Ethnicity	Kern County	Los Angeles County	San Bernardino County	City of Ridgecrest	Inyokern CDP[1]
Total Population With Persons of Hispanic or Latino Origin (Any Race) Incorporated					
White					
• Number of Persons	407,581	4,637,062	1,006,960	20,446	863
• Percent of Population	61.6	48.7	58.9	82.0	87.7
Black of African American					
• Number of Persons	39,798	930,957	155,348	879	4
• Percent of Population	6.0	9.8	9.1	3.5	0.4
American Indian or Alaska Native					
• Number of Persons	9,999	76,988	19,915	270	48
• Percent of Population	1.5	0.8	1.2	1.1	4.9
Asian					
• Number of Persons	22,268	1,137,500	80,217	967	22
• Percent of Population	3.4	11.9	4.7	3.9	2.2
Native Hawaiian/Other Pacific Islander					
• Number of Persons	972	27,053	5,110	144	0
• Percent of Population	0.1	0.3	0.3	0.6	0.0
Some Other Race					
• Number of Persons	153,610	2,239,997	355,843	1,229	10
• Percent of Population	23.2	23.5	20.8	4.9	1.0
Two or More Races					
• Number of Persons	27,417	469,781	86,041	992	37
• Percent of Population	4.1	4.9	5.0	4.0	3.8
Total Population - Number of Persons	661,645	9,519,338	1,709,434	24,927	984
Total Population - Percent[2]	100	100	100	100	100
Total Population Minority and Non-Minority Populations					
Minority Populations					
Hispanic or Latino (Of Any Race)					
• Number of Persons	254,036	4,242,213	669,387	3,001	64
• Percent Total Population	38.4	44.6	39.2	12.0	6.5
Other Race - Not Hispanic or Latino or White Alone					
• Number of Persons	80,419	2,317,511	287,825	2,859	95
• Percent Total Population	12.1	24.3	16.8	11.5	9.7
Total Minority Population					
• Number of Persons	334,455	6,559,724	957,212	5,860	159
• Percent Total Population	50.5	68.9	56	23.5	16.2
Total Non-Minority Population (White Alone)					
• Number of Persons	327,190	2,959,614	752,222	19,067	825
• Percent Total Population	49.5	31.1	44	76.5	83.8
Total Population - Number of Persons	661,645	9,519,338	1,709,434	24,927	984
Total Population - Percent[2]	100	100	100	100	100

Source: U.S. Census Bureau, 2000

[1] CDP: Census Designated Place: a statistical entity defined for each decennial census according to U.S. Census Bureau guidelines, comprising a densely settled concentration of population that is not within an incorporated place, but is locally identified by a name. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines. Beginning with Census 2000 there are no size limits.

[2] Rounding errors to the nearest tenth may occur, as provided by the U.S. Census Bureau.

Socioeconomics Figure 1 provides, at a U.S. Census Bureau block level, the minority populations within a six-mile radius of the project site. The total population within a six-mile radius of the project site is 29,383 persons, with a total minority population of 6,405 persons, or 21.8% (rounded). As such, the minority population of the total population within six-miles of the project site is not greater than 50%. Similarly, the minority population within a six-mile radius of the project site is substantially less than the minority populations of the tri-county region and falls within the range of the minority populations of Ridgecrest and Inyokern; therefore, the minority population is not considered to be meaningfully greater than the minority population percentage of the general population.

Below-Poverty-Level Populations

Socioeconomics Table 4 provides the total number and percent of individuals and families that fall below-poverty-level for Kern, Los Angeles and San Bernardino Counties, as well as the City of Ridgecrest and the Inyokern CDP.

Socioeconomics Table 4
Below-Poverty-Level Population Profiles

Below-Poverty-Level Population Attribute	Kern County	Los Angeles County	San Bernardino County	City of Ridgecrest	Inyokern CDP[1]
Total Population	661,645	9,519,338	1,709,434	24,927	984
Number of All Persons Below-Poverty-Level[2]	130,949	1,674,599	263,412	3,042	196
Percent of All Persons Below-Poverty-Level[3]	20.8	17.9	15.8	12.3	20.5
Total Number of Families	157,723	2,154,311	407,205	6,801	248
Number of All Families Below-Poverty-Level	26,467	311,226	51,186	691	26
Percent of All Families Below-Poverty-Level	16.8	14.4	12.6	10.2	10.5

Source: U.S. Census Bureau, 2000

1 CDP: Census Designated Place: a statistical entity defined for each decennial census according to U.S. Census Bureau guidelines, comprising a densely settled concentration of population that is not within an incorporated place, but is locally identified by a name. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines. Beginning with Census 2000 there are no size limits.

2 Weighted average (per data available from U.S. Census Bureau).

3 Percent of persons below-poverty-level versus total population varies between 0.1 and 1.0% due to weighted averages. Total percent of all persons below-poverty-level is derived from U.S. Census Bureau data.

As indicated in **Socioeconomics Table 4**, population percentages for all persons falling below-poverty-level for Kern, Los Angeles and San Bernardino Counties range between 15.8-20.8%, and the percent of all families falling below-poverty-level ranges between 12.6-16.8%. For the City of Ridgecrest and Inyokern, the percentages of all persons falling below-poverty-level are 12.3 and 20.5, respectively; within Ridgecrest 10.2% of all families fall below-poverty-level and within Inyokern 10.5% of all families fall below-poverty-level.

Within a six mile radius of the project site, year 2000 U.S. Census data was used at a census block group level to detect the below-poverty-level population. At a census block group level, approximately 12.6% of the population was found to be below-poverty-level, consistent with range provided in **Socioeconomics Table 4**. The number of individuals within a six-mile radius of the project site falls below 50% of its total population; additionally, the percent of individuals falling below-poverty-level in this area is less than the percentages for Kern, Los Angeles and San Bernardino Counties and Inyokern, and is not considered to be meaningfully greater than the below-poverty-level percentage for Ridgecrest (12.6 versus 12.3%).

Employment Characteristics

The preliminary estimates for November 2009 indicate that California had a total labor force of 18,314,700 people, with 16,084,300 persons employed, 2,230,400 persons unemployed, and an unemployment rate of 12.2% (EDD 2009a). **Socioeconomics Table 5** provides the preliminary employment and unemployment estimates for Kern, Los Angeles and San Bernardino Counties as of November 2009.

Socioeconomics Table 5
Preliminary Employment Estimates for Kern, Los Angeles and San Bernardino Counties (November 2009)

County	Labor Force	Employment	Unemployment	Unemployment Rate (Percent)
Kern County	375,800	319,100	56,700	15.1
Los Angeles County	4,916,900	4,317,700	599,200	12.2
San Bernardino County	870,800	750,300	120,500	13.8

Source: EDD 2009a

As of March 2008, the three industries employing the greatest number of people in Kern County included: government; trade, transportation and utilities; and, farming (EDD 2008). For the same time period, the three industries employing the greatest number of people in both Los Angeles County and San Bernardino County included trade, transportation and utilities, professional and business services, and government (EDD 2008). **Socioeconomics Table 6** provides the number of people employed, by trade, for these three counties.

Socioeconomics Table 6
Employment by Trade for Kern, Los Angeles and San Bernardino Counties

Industry	Kern County[1]		Los Angeles County[1]		San Bernardino County[1]	
	Persons Employed[2]	Percent of All Employed	Persons Employed[2]	Percent of All Employed	Persons Employed[2]	Percent of All Employed
Farming	58,700	19.7	6,900	0.2	13,800	1.1
Mining and Logging	10,900	3.7	4,400	0.1	1,200	0.1
Construction	15,900	5.3	142,000	3.5	85,100	7.0
Manufacturing	14,000	4.7	429,000	10.5	103,600	8.5
Trade, Transportation & Utilities	44,100	14.8	798,400	19.6	289,700	23.8
Information	2,900	1.0	215,800	5.3	14,300	1.2
Financial Activities	8,900	3.0	230,600	5.7	45,000	3.7
Professional & Business Services	25,300	8.5	580,800	14.3	135,400	11.1
Educational & Health Services	25,800	8.7	510,800	12.6	133,200	10.9
Leisure & Hospitality	21,400	7.2	396,400	9.7	125,400	10.3
Other Services	7,200	2.4	145,900	3.6	39,800	3.3
Government	62,600	21.0	607,000	14.9	231,200	19.0
Total - All Industries	297,700	100	4,068,000	100	1,217,700	100

Source: EDD, 2008
1 Data for Kern County: Bakersfield Metropolitan Statistical Area; data for Los Angeles County: Los Angeles-Long Beach-Glendale Metropolitan Statistical Area; data for San Bernardino County: Riverside-San Bernardino-Ontario Metropolitan Division.
2 Data not adjusted for seasonality. Benchmark March 2008 data.

At a local level, the ten principal employers within the Ridgecrest area include: the CLNWC (approximately 3,213 civilian employees and 880 military personnel); Searles Valley Minerals (approximately 625 employees); Sierra Sands Unified School District (approximately 620 employees); Ridgecrest Regional Hospital (approximately 340 employees); Wyle Laboratories (approximately 280 employees); SA-Tech (approximately 187 employees); WalMart (approximately 184 employees); Cerro Coso Community College (approximately 175 employees); Desert Area Resources & Training (approximately 164 employees); and, AltaOne Federal Credit Union (approximately 161 employees) (Ridgecrest Chamber of Commerce 2009).

Housing

Permanent and Temporary Housing

Permanent housing estimates as of January 2009 for the tri-county socioeconomics study area are presented in **Socioeconomics Table 7**. The total number of housing units ranged between 3,418,698 for Los Angeles County and 279,769 units for Kern County, with vacancy rates ranging between 4.21% and 11.57%.

Socioeconomics Table 7
Housing Units and Vacancy Rates, January 2009

County	Total Units	Single Family	Multiple Family	Mobile	Number Occupied	Vacancy Rate (Percent)
Kern County	279,769	204,124	49,378	26,267	252,246	9.85
Los Angeles County	3,418,698	1,891,862	1,470,122	56,714	3,274,667	4.21
San Bernardino County	690,234	515,492	129,712	45,030	610,352	11.57

Source: DOF, 2009c

At a local scale, within an estimated 60 linear mile radius of the project site, there are eight principal population centers, including Ridgecrest, Tehachapi, Inyokern, California City, Mojave, Boron, the Lake Isabella/Kernville/Wofford Heights area and the Randsburg/Johannesburg area. For these locations, California Department of Finance housing data (January 2009) is available for the incorporated cities of Ridgecrest, Tehachapi and California City. Combined, these cities have a total of 20,732 permanent housing units, with 18,496 units occupied and vacancy rates of 14.49% (California City), 8.52% (Ridgecrest) and 13.02% (Tehachapi) (DOF, 2009c).

Within the immediate vicinity of Ridgecrest there are 16 hotels with property information available, as well as several hotels and extended-stay facilities for which visitor capacity is not available. The 16 hotels for which information was available have a combined accommodation capacity of approximately 986 rooms and suites (Discover Kern County: California's Golden Empire 2009 and Tripadvisor 2009). In addition, the Navy Gateway Inn & Suites provides visitor quarters for the CLNWC (NAWCWD 2009). Within an approximate 60 linear mile radius of the project site, but not including the Ridgecrest area, there are over 35 hotels, motels and other lodging accommodations; the hotels for which information was available via internet searches have a combined capacity of 443 rooms and suites (Google Earth 2009, Tripadvisor 2009).

Property Values

Beginning in mid-to-late 2006 and early 2007, a decline in residential property values began to occur throughout California; it appears, though, that home property values in several counties started stabilizing in the first through third quarters of 2009 (California Association of Realtors 2009, City-Data.com 2009). As related to multi-family residential units, staff could not identify multiple data sources that consistently categorized owner-owned housing units in the same manner, and thus could not establish the 2008 or 2009 value of these types of residential homes with confidence. Additionally, staff conducted an extensive review of numerous real estate and demographic/housing data

sources for 2008 and 2009 owner-owned, single-family residential home values and found a substantial amount of variation between the data sources. However, based upon the data sources reviewed, staff concludes that the data presented in **Socioeconomics Table 8** provides a reasonable range of estimates for the value of owner-owned, single-family residential homes. As available, data for the ten principal population centers within a 60 linear mile radius of the proposed project site is included in **Socioeconomics Table 8**.

Socioeconomics Table 8
Range of Estimated Median Value of Owner-Owned Residential Homes

Location	Housing Type		
	House or Condominium 2008[1]	New and Existing Single Family Homes and Condominiums 2008[2]	Owner-Occupied Homes 2006-2008[3]
Kern County	$222,400	$190,000	$244,000
Ridgecrest	$170,407	$180,000	$190,600
Tehachapi	$216,430	$240,000	N/A
California City	$200,508	$120,000	N/A
Mojave	$138,565	$75,000	N/A
Boron	N/A	$75,000	N/A
Inyokern	$167,173	$49,500	N/A
Lake Isabella	$145,530	$146,250	N/A
Kernville	$274,144	$322,500	N/A
Wofford Heights	$162,447	$230,000	N/A
Randsburg/Johannesburg	N/A	N/A	N/A
Los Angeles County	$525,100	$400,000	$564,900
San Bernardino County	$331,400	$225,000	$366,600

[1] Source: City-Data.com 2009
[2] Source: DQNew.Com Real Estate News and Data 2009.
[3] Source: U.S. Census Bureau 2009
NA Data not available

Public Services

Physical impacts to public services and facilities are usually associated with population in-migration and growth in an area, which increases the demand for a particular service, leading to the need for expanded or new facilities. Therefore, public services data for law enforcement, hospitals and emergency response services, schools, and parks and recreation are provided below. The analysis of impacts related to landfills is addressed in **WASTE MANAGEMENT** and impacts associated with waste water and water supply services is discussed in **SOIL AND WATER RESOURCES**.

Law Enforcement

Law enforcement and police protection in the proposed project area falls under the authority and jurisdiction of the Kern County Sheriff's Office. The closest Sheriff's station to the proposed project site is the Ridgecrest Substation, located at 128 East Coso Street (Kern County Sheriff's Office 2009). The Ridgecrest Substation provides law enforcement services to the residents of Ridgecrest, China Lake Acres, Inyokern and Walkers Pass, as well as the historic mining communities of Garlock, Randsburg, Johannesburg, and isolated mining camps in the El Paso Mountains south of Inyokern (Kern County Sheriff's Office 2009). The Ridgecrest Substation has one sergeant, one senior deputy sheriff, and eleven deputy sheriffs. The deputies handle patrol duties and provide security to the two Ridgecrest Superior Courts; the Ridgecrest Jail is also staffed with one senior detention deputy sheriff and four detention deputy sheriffs (Kern County Sheriff's Office 2009). The Ridgecrest Substation is additionally supported by an unpaid volunteer reserve organization that includes nine active reserve deputies (Kern County Sheriff's Office 2009).

The proposed project area is also within the boundaries of the California Highway Patrol's (CHP's) Inland Division, and adjacent to the boundaries of the CHP's Central Division (CHP 2009a and 2009b). The Inland Division has 11 Area Offices, nine Resident Posts and one Transportation Management Center; it is manned by approximately 602 uniformed officers and 196 non-uniformed personnel (CHP 2009a). As related to the proposed project site, the closest Area Office is the Mojave Area Office, located at 1365 Highway 58 in Mojave (CHP 2009a). The Central Division has 15 Area Offices, six Resident Posts, and two Commercial Inspection Facilities; the Division has a staff of approximately 667 uniformed officers and 226 non-uniformed personnel (CHP 2009b). The closest Central Division facility to the proposed project site is the Bakersfield Area Office, located at 4040 Buck Owens Boulevard in Bakersfield (CHP 2009b).

Fire Protection

Fire protection for the proposed project area is provided by the Kern County Fire Department (KCFD). The KCFD serves the unincorporated areas of Kern County and the cities of Arvin, Delano, Maricopa, McFarland, Ridgecrest, Shafter, Taft, Tehachapi and Wasco (KCFD 2009). The KCFD has 46 fire stations throughout Kern County and additionally has 14 Mutual Aid Agreements with neighboring fire suppression organizations to further strengthen its emergency response services (KCFD 2009). The KCFD is staffed by an estimated 546 uniformed personnel, 157 on-duty strength personnel, 79 non-uniformed (civilian) personnel, and 100 extra help personnel (KCFD 2009). The KCFD provides: fire suppression; emergency medical services; hazardous materials mitigation; fire prevention; rescue; air operations; training and public education; arson investigation; and, apparatus maintenance (KCFD 2009). **Socioeconomics Table 9** lists the KCFD closest stations to the proposed project site and their respective addresses and response areas. Please refer to the **WORKER SAFETY AND FIRE PROTECTION** section of this document for a comprehensive analysis of safety measures.

Socioeconomics Table 9
Kern County Fire Department Stations Servicing the Proposed Project Area

Station Name/Number	Address	Response Area (Square Miles)
Ridgecrest Heights, No. 77	815 West Dolphin Avenue Ridgecrest	60
Ridgecrest, No. 74	139 East Las Flores Ridgecrest	8
Inyokern, No. 73	6919 Monache Mountain Avenue Inyokern	431
Randsburg, No. 75	26804 Butte Avenue Randsburg	317

Source: KCFD 2009

Hospitals and Emergency Medical Response

The proposed project area falls under an "Exclusive Operating Area" for emergency medical response services that are provided by Liberty Ambulance Service (Kern County Emergency Medical Services Department 2009). The base of operations for Liberty Ambulance Service within the proposed project area is located at1325 West Ridgecrest Boulevard in Ridgecrest (Kern County Emergency Medical Services Department 2009). Liberty Ambulance Service provides ambulance services and medical monitoring and communications, and transports patients to an appropriate hospital based upon injury type and the availability of space/capacity at local hospitals and medical care facilities (AECOM Environment 2009a).

Within an estimated 60 linear miles of the proposed project site there are three hospitals. **Socioeconomics Table 10** provides a summary of these facilities and their proximity to the project site.

Socioeconomics Table 10
Hospitals within an Approximate 60 miles of the Project Site

Facility	Proximity to Project Site (Linear Miles)	Summary of Available Services
Ridgecrest Regional Hospital	7	Licensed 80-bed facility, including four in intensive care beds. Medical services include: cardiopulmonary and respiratory care; critical care; emergency care services; home health; clinical laboratory; maternal/child/family care; surgical and outpatient services; radiology; rehabilitation services; and, telemedicine.
Tehachapi Hospital	54	Licensed 24-bed ambulance receiving hospital. Medical services include: emergency and acute care services; long-term care; ultrasound; mammography; radiology; clinical laboratory; respiratory therapy; and, pediatric care.
Kern Valley Hospital	37	Licensed 74-bed ambulance receiving hospital, including three intensive care beds. Medical services include: emergency and acute care services; clinical laboratory; pharmacy; radiology; rehabilitation services; respiration therapy; and rural health care.

Sources: Ridgecrest Regional Hospital 2009; Tehachapi Valley Healthcare District 2009; Kern Valley Healthcare District 2009; Google Earth 2009; AECOM Environment 2009a.

In addition to the above, within an estimated 70 linear miles of the project site there are numerous other licensed hospitals with emergency and acute care services and in- and out-patient services including, but not limited to, the Barstow Community Hospital (Barstow), Antelope Valley Hospital and Medical Center (Lancaster), and Kern Medical Center, Bakersfield Memorial Hospital and Mercy Hospital (Bakersfield) (AECOM Environment 2009a, Google Earth 2009).

Schools

Public education services in the project area are provided by the Sierra Sands Unified School District (SSUSD). As of July 2009 the SSUSD had a total student enrollment of 5,509 students and operated six elementary schools (Kindergarten [K] through 5th Grade), two middle schools (6th through 8th Grades), one high school, one continuation high school (9th through 12th Grades) and one community day school (8th through 12th Grades) (AECOM Environment 2009a, California Department of Education 2009). **Socioeconomics Table 11** provides a summary of the schools and student enrollment of the SSUSD.

Socioeconomics Table 11
Summary of School and Enrollment of the Sierra Sands Unified School District

School Name	Grades	Location	Student Enrollment
Faller Elementary	K-5	1500 Upjohn Avenue, Ridgecrest	490
Gateway Elementary School	K-5	501 S. Gateway Boulevard, Ridgecrest	505
Inyokern Elementary School	K-5	6601 Locust Avenue, Inyokern	203
Las Flores Elementary School	K-5	720 Las Flores Avenue, Ridgecrest	477
Pierce Elementary School	K-5	674 N. Gold Canyon, Ridgecrest	378
Rand Elementary School	K-5	37400 Saint Elmo Street, Johannesburg	8
Richmond Elementary School	K-5	1206 Kearsarge Avenue, Ridgecrest	447
James Monroe Middle School	6-8	340 West Church Avenue, Ridgecrest	545
Murray Middle School	6-8	921 E. Inyokern Road, Ridgecrest	683
Burroughs High School	9-12	500 French Avenue, Ridgecrest	1,623
Mesquite High School	9-12	140 Drummond Avenue, Ridgecrest	144
Sierra Sands Community Day School	8-12	348 Rowe Street	6

Source: AECOM Environment 2009a, California Department of Education 2009

Parks and Recreation

Regionally, the project site falls within the boundaries of the California Desert Conservation Area and is managed by the BLM's Ridgecrest Field Office. The Ridgecrest Field Office is responsible for the management of thousands of miles of trails and access routes for 4 wheel-drive vehicles, all terrain vehicles, motorcycles, mountain bikes, equestrian use and hiking, as well as 16 Wilderness Areas, two Wilderness Study Areas, and 19 Areas of Critical Environmental Concern (BLM, 2008). According to the BLM's Ridgecrest Field Office internet site, the top ten points of interest surrounding the project site include Fossil Falls, the Owens Peak Wilderness, Short Canyon, Trona Pinnacles National Natural Landmark, the Rademacher Hills Trail System, the Spangler,

Dove Springs and Jawbone Off Highway Vehicle (OHV) areas, the Desert Tortoise Natural Area and Watchable Wildlife Area, and Pacific Crest National Scenic Trail (traversing both BLM and U.S. Forest Service lands) (BLM 2009).

At a regional scale the project area is also situated east/southeast of Sequoia National Forest, which provides for a variety of recreational activities including trails for hiking, backpacking, horseback riding, Off Highway Vehicles (OHVs) and mountain biking, developed and dispersed campgrounds, boating, fishing, water-skiing, swimming, whitewater rafting, kayaking, downhill skiing and snowboarding, cross-country skiing, snowshoeing and snowmobiling (U.S. Forest Service 2009). At further distances (e.g., greater than a 60-mile linear radius), the project area is also surrounded by Death Valley National Park to the northeast, and Kings Canyon and Sequoia National Parks to the northwest.

State recreational facilities within an estimated 60 linear mile radius of the project site include Red Rock Canyon State Park, located approximately 25 miles northeast of Mojave, and Tomo-Kahni State Historic Park, accessed from the Tomo-Kahni Resource Center in Tehachapi (California State Parks 2009).

At a local scale, the project site itself is considered "multi-use" land by the BLM and falls within the boundaries of the West Mojave Off-Road Vehicle Designation Project (AECOM Environment 2009a, BLM 2010). Within the project footprint there are designated OHV trails and the project site is used for organized equestrian and OHV group events as well as mountain biking, horseback riding, hiking, running, camping, rock hounding/mineral collection, hunting and target shooting, and wildlife and wildflower observation (AECOM Environment 2009a). Recent BLM visitation statistics for the project site were not available; however, the El Paso Wilderness Area is located approximately two linear miles southwest of the project site (BLM 2009). The most common recreational activities within this area include hunting upland birds, OHV trail use, camping, viewing cultural resources sites, camping, hiking and target practice (AECOM Environment 2009a). Additionally, the Boral Corral Pit, located west of the project site is commonly used by the general public for recreational purposes, including rock hounding and target practice (AECOM Environment 2009a). For the year October 1, 1007 through September 30, 2008, recreational visitor days for four sites within the El Paso Management Area ranged between 17 (Dispersed - El Paso Mountains [driving for pleasure]) and 12,002 (Dispersed - El Paso Mountains [camping]) (AECOM Environment 2009).

As noted previously, the closest population center to the project site is the City of Ridgecrest. Public recreational facilities and parks within Ridgecrest include: Freedom Park (19.8 acres); Helmers Park (5 acres); James M. Pearson Memorial Park (4.5 acres); the Kerr McGee Community Center (gymnasium, two racquetball courts, fitness equipment room, aerobics room, showers, lockers, preschool, banquet rooms, meeting rooms and kitchen; the Kerr McGee Youth Sports Center (11.7 acres of various playing fields); Leroy Jackson Park and Leroy Jackson Park Sports Complex (over 56 acres of park and playing fields); Ridgecrest Senior Center; Ridgecrest Skate Park; Sergeant John Pinney Memorial Pool; and, Upjohn Park (6 acres) (City of Ridgecrest 2009). Please refer to the **LAND USE, RECREATION, AND WILDERNESS** section of this document for a complete analysis of impacts and proposed mitigation for recreation.

Fiscal Revenue

The primary taxing agency applicable to the proposed project is Kern County. Kern County's fiscal year extends from July 1st of one year to June 30th of the following year; as of July 23, 2008 (near the end of fiscal year 2008), Kern County's net assets equaled approximately $1.68 billion, which represents a net increase of approximately $73 million in comparison to the end of fiscal year 2007, which had net assets of approximately $1.58 billion (County of Kern, 2008a).

Socioeconomics Table 12 provides a summary of Kern County's revenues and expenditures for 2008-2009 fiscal year. As indicated in **Socioeconomics Table 12**, intergovernmental revenues (41%), taxes (22%), and other financing sources (14%) ranked first through third, respectively, as Kern County's greatest sources of revenue (County of Kern 2008b). For the same fiscal year, public protection (37%), public assistance (27%) and health and sanitation (15%) ranked first through third, respectively, for Kern County's greatest expenditures (County of Kern 2008b).

Socioeconomics Table 12
Summary of Kern County Revenues and Expenditures for Fiscal Year 2008-2009

Revenues & Expenditures	Amount	Percent of Total
Revenues		
Taxes	$373,326,922	22%
Licenses, Permits and Franchises	$20,197,021	1%
Fines, Forfeitures and Penalties	$23,477,539	1%
Revenue from Use of Money and Property	$24,694,654	1%
Intergovernmental Revenues	$669,248,787	41%
Charges for Services	$167,310,921	10%
Miscellaneous Revenues	$18,416,656	1%
Other Financing Sources	$243,580,766	14%
Balances from Prior Year	$126,871,128	8%
Cancellation of Prior Year Reserves/Designations	$15,840,075	1%
Revenues Total	$1,682,964,469	100%
Expenditures		
General Government	$153,422,702	9%
Public Protection	$615,633,104	37%
Public Ways and Facilities	$83,051,389	5%
Health and Sanitation	$247,558,856	15%
Public Assistance	$461,103,573	27%
Education	$10,466,703	1%
Recreation and Cultural Services	$14,748,928	1%
Debt Service	$8,542,697	1%
Appropriations for Contingency-General Purpose	$12,655,364	1%
Provisional for Reserves/Designations	$75,781,153	5%
Expenditures Total	$1,682,964,469	100%
Revenues Minus Expenditures Total	$0	---

Source: County of Kern 2008b

C.8.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff reviewed the RSPP socioeconomics section of the AFC (AFC Section 5.11), the applicant's data adequacy supplement to the socioeconomics section of the AFC, dated October 26, 2009 (AECOM Environment 2009b), and collected and reviewed other socioeconomic data from various governmental agencies, trade associations, and other public and private organizations and entities to form the following socioeconomic impact analysis and conclusions.

Construction

Population and Employment

It is anticipated that construction of the proposed RSPP would start in December 2010 and require 28 months to complete, with commercial operation beginning in mid 2013. It is estimated that the average construction workforce would be 405 persons, and that a peak construction workforce of 633 persons would occur in the 11th month of construction.

As noted in Section C.10.4.1, research shows that construction workers may commute as much as two hours one way from their place of residence rather than relocate for employment purposes (EPRI 1982). Staff accepts this assumption and the applicant's estimate that the project's construction work force would be drawn in large part from the local area (e.g., Ridgecrest and Kern County), and to a more limited extent from Los Angeles and San Bernardino Counties (AECOM Environment 2009a). Construction workers beyond a two-hour commute of the project site would likely relocate temporarily, but would be expected to return to their homes on the weekends as construction of the project would not provide a permanent source of employment.

Socioeconomics Table 13 provides the estimated maximum number of construction workers, by occupation/trade, that would be required for construction of the RSPP and the projected number of construction workers, by occupation/trade within Kern, Los Angeles and San Bernardino Counties.

Socioeconomics Table 13
Project Construction Workforce Requirements by Occupation/Trade and Projected Available Construction Workforce by Occupation/Trade for Kern, Los Angeles and San Bernardino Counties

Occupation/Trade	Maximum Number of Workers Needed[1]	Projected Available Workforce 2006 and 2016[2]		
		Kern County[3]	Los Angeles County[3]	San Bernardino County[3]
Surveyor	19	160-210	940-1,060	580-700
Operator[4]	84	1,500-1,570	4,410-4,780	4,790-5,460
Laborer	145	4,860-5,570	31,330-34,810	27,930-32,080
Truck Driver[4]	30	7,290-8,590	64,420-72,460	34,210-39,980
Oiler[4]	10	840-970	9,260-9,960	5,090-5,950
Carpenter	60	2,740-3,060	28,070-30,050	28,850-32,390
Boilermaker	11	110-130	1,700-1,750[4]	980-1,040[4]
Paving Crew	23	100-110	790-870	630-720
Pipefitter[4]	231	1,340-1,530	12,090-12,900	4,630-5,330
Electrician	84	2,350-2,580	13,040-13,700	6,740-7,600
Cement Finisher[4]	86	990-1,100	4,150-4,530	4,110-4,690
Ironworker	30	250-260	1,700-1,750[4]	980-1,040[4]
Millwright	17	130-160	200-210	160-190
Tradesman	48	19,190-21,310	143,280-153,890	116,810-132,160
Project Manager[4]	3	12,170-13,840	178,500-191,400	43,830-49,700
Construction Manager	3	1,050-1,250	10,320-11,670	4,380-5,110
Asst. Project Manager[4]	3			
Support[4]	3	2,460-2,820	15,490-16,440	10,990-12,380
Support Assistant[4]	3			
Engineer	10	4,230-4,720	54,350-57,020	7,280-8,580
Timekeeper	3	460-480	5,710-5,680	2,220-2,330
Administrator[4]	6	6,290-6,780	150,520-161,930	72,290-81,160
Welder[4]	1	1,110-1,430	8,410-8,890	3,960-4,640

1 Maximum number of a specific type of tradesmen needed in any given single month for the entire 28-month construction period (Source: AFC Table 5.11-15).

2 Projections range between 2006 and 2016, with the first number in each County column representing the 2006 projection and the second number representing the 2016 projection (EDD, 2009b).

3 Data for Kern County: Bakersfield Metropolitan Statistical Area; data for Los Angeles County: (Los Angeles-Long Beach-Glendale Metropolitan Division; data for San Bernardino County: Riverside-San Bernardino-Ontario Metropolitan Statistical Area (EDD 2009b).

4 For those occupations where multiple trades are grouped together, or a specific occupational category for the workers listed in AFC Table 5.11-15 could not be identified, the following occupational categories, as used by the California Employment Development Department, were applied:

Occupation/Trade	Code(s)	Occupational Title
Operators	47-2073	Operating Engineers and Other Construction Equipment Operators
Truck Drivers	53-3032	Truck Drivers, Heavy and Tractor-Trailer
	53-3033	Truck Drivers, Light or Delivery Services
Oiler	47-4000	Other Construction and Related Workers
	47-4099	Construction and Related Workers, All Other
Pipefitter	47-2152	Plumbers, Pipefitters, and Steamfitters
Cement Finisher	47-2051	Cement Masons and Concrete Finishers
Project Manager	11-3000	Operations Specialties Managers
	11-9000	Other Management Occupations
Asst. Project Manager,		
	47-1000	Supervisors, Construction and Extraction Workers
Support & Support Assistant	47-1011	First-Line Supervisors/Managers of Construction Trades
Administrator	43-6000	Secretaries and Administrative Assistants
	43-9199	Office and Administrative Support Workers, All Other
Welder	51-4121	Welders, Cutters, Solderers, and Brazers
Boilermaker	47-2221	Structural Iron and Steel Workers (Los Angeles & San Bernardino Counties)

Overall, with the exception of the project's demand for millwrights (3.47% of the total available trade-specific workforce), surveyors (1.13% of the total available trade-specific workforce), pavers (1.51% of the total available trade-specific workforce), pipefitters (1.28% of the total available trade-specific workforce) and ironworkers (1.02% of the total available trade-specific workforce), the project would require less than 1% of any given trade-specific workforce for the year 2006 projections. With all three counties combined, using the year 2016 projections, the project would place a maximum demand of approximately 3.04% of the millwright labor pool, 1.35% of the paving crew labor pool and 1.17% of the pipefitter labor pool; using this data set, the project would demand less than 1% of all other all other trade-specific workforces.

As noted previously, the project would require a maximum construction workforce of 633 persons in construction month 11. As shown in **Socioeconomics Table 6**, for the year 2008 Kern County had a construction workforce of 15,900 persons and Los Angeles and San Bernardino Counties has construction workforces of 142,000 persons and 85,100 persons, respectively; combined these three counties had a total construction workforce of 243,000 persons. As such, the maximum construction workforce required for the project would represent approximately 0.26% of the total construction labor pool. For Kern County's construction workforce alone, the maximum construction workforce required for the project would represent approximately 3.98% of the total construction labor pool, and for Los Angeles and San Bernardino Counties the project's maximum demand would represent approximately 0.46% and 0.74%, respectively, of each county's total construction workforce. Because the number of construction workers required for the project represents such a small portion of the total available construction labor force, both locally and regionally, no impacts to the employment distribution within the socioeconomics study would occur, either directly or indirectly.

According to the applicant's AFC data supplement for socioeconomics (AECOM Environment 2009b), it is estimated that during construction up to 25% of the total construction workforce may relocate temporarily to the project area; however, they would be expected to commute home on the weekends. Assuming a 25% relocation rate and an average construction workforce of 405 employees, the project could result in up to 101 workers staying in the local project area during the work week. Under the same 25% relocation rate, during the project's peak construction period in month 11, up to 158 construction workers could reside temporarily in the local project area. As noted in Section C.10.4.1, the City of Ridgecrest has an approximate population of 27,613 people; therefore, during construction the total net temporary increase in the local population would average 0.37% and peak at 0.57%. Because the net population increase would be temporary in nature (approximately 28 months) and less than 1% of the total local population, direct and indirect population impacts due to temporary in-migration would be less than significant or negligible.

Housing

Permanent and Temporary Housing

The proposed RSPP would be located on vacant land; therefore, construction of the project itself would not result in the physical removal or displacement of any housing

units that would require replacement elsewhere. Due to its temporary nature, the construction workforce needed for the project would not place a demand permanent housing; as such impacts on permanent housing are addressed under Operation.

During construction it is estimated that the average project workforce would be 405 persons, and that the peak project workforce would be 633 persons in construction month 11. During construction it is anticipated that approximately 101 construction workers would temporarily relocate to the project area, typically returning to their place of permanent residence on the weekends.

As outlined in Section C.10.4.1, for the City of Ridgecrest and the cities and communities within an approximate 60 linear mile radius of the project site combined, it is estimated that there are over 1,400 hotel, motel and extended-stay rooms and suites available for temporary lodging. Although the demand for temporary lodging within the immediate Ridgecrest area is high due to its proximity to the CLNWC, assuming an average occupancy rate of 75% (or 740 rooms and suites out of an available 986 rooms and suites) there would still be an estimated 246 lodging rooms available at any given time. This local capacity, in combination with temporary lodging capacity within an approximate 60-minute commute of the project site, would be sufficient to meet the temporary housing demands of project construction. No direct or indirect adverse impacts would occur.

Property Values

Declines in home property values are linked to numerous federal, State, regional and local variables, both individually and collectively, such as (but not limited to): recessions; short- and long-term population growth; increases and declines in the demand for goods and services; cost of living; unemployment rates; and, the availability of mortgage credit (Weiher 2009). Overall, real home property value declines tend to occur over long periods of time. Although recent (2006 - 2009) declines in real home property values due to the national recession have occurred over relatively short periods of time (as little as approximately 1.75 to 2.0 years), for the period 1975 to 2009 the duration of real home market price declines has occurred, at a national average, over a median period of 3.75 years (for cities) to 7.0 years (for states) (Weiher 2009). Due to the extended period over which home properties tend to decline (and recover), within the context of this analysis the assessment of property values is considered to be most appropriately placed under Operation, below.

Public Services

Law Enforcement

The Kern County Sheriff's Office, Ridgecrest Substation, provides police protection and public safety services within the project area. A security fence would be erected around the entire perimeter of the construction area, which would be expected to deter vandalism and theft. As outlined in Section C.10.4.1, the Ridgecrest Substation is manned by one sergeant, one senior deputy, eleven deputy sheriffs nine active reserve deputies. The area also falls under the jurisdiction and patrol of the CHP's Inland Division, which is manned by approximately 602 uniformed officers. Construction of the RSPP would not be expected to substantially impact criminal activity or other activities

requiring law enforcement. Additionally, the majority (75%, or an average of approximately 304 out of 405 persons) of the construction labor force would be expected to commute and would not result a long-term population increase that could compromise law enforcement officer ratios. As such, direct and indirect construction-related impacts would be less than significant.

Fire Protection

A Construction Fire Protection and Prevention Plan would be developed and followed throughout all phases of construction, including adherence to all construction fire prevention regulations identified in Title 8 of the California Code of Regulations (CCR) Section 1920 et seq.; additionally, the facility's permanent fire protection system would be put into use during construction as soon as practicable (AECOM Environment 2009a). Prior to the availability of this system, fire extinguishers and other portable firefighting equipment would be available on site. All applicable equipment and procedures used during construction would be California Occupational Safety and Health Administration (Cal/OSHA) compliant (AECOM Environment 2009a). Therefore, construction of the project would not be expected to result in a significant adverse impact, either directly or indirectly, to fire protection services. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information related to fire protection services.

Hospitals and Emergency Medical Response

As addressed in Section C.10.4.1, the project site falls within the response area of Liberty Ambulance Service, which, within the local area, operates out of Ridgecrest. Within a 60 linear mile radius of the project site there are three licensed hospitals that provide emergency and acute care services and in- and out-patient services, including the Ridgecrest Regional Hospital, and numerous other licensed hospitals and medical care facilities located within 70 linear miles of the project site.

During construction, workers would be exposed to several types of hazards that could result in both minor and severe injury due to such activities as heavy equipment operation, working with hazardous energy sources, electrical systems and flammable and combustible liquids, and exposure or overexposure to hazardous gases, vapors, dusts and fumes (AECOM Environment 2009a). During construction the average project workforce would be 405 workers and the peak workforce during month 11 would be 633 workers.

To minimize worker injuries, as part of project design, an Injury and Illness Prevention Plan would be developed and implemented and all workers would be required to adhere to it (AECOM Environment 2009a). Additionally an Emergency Action Program and Plan, Personal Protective Equipment Program and Safety Training Program would be implemented to minimize injuries and appropriately respond, as needed, to emergency medical situations. With full implementation of these plans and programs, and given the availability of medical and emergency medical response facilities and services within the local and regional project area, staff concludes that no significant adverse impacts, either directly or indirectly, would occur during construction. Impacts would be less than significant or none. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information related to hospitals and emergency medical response services.

Schools

As outlined in Section C.10.4.1, the project area falls within the boundaries of the SSUSD, which includes six elementary schools, two middle schools, one high school, one continuation high school and one community day school. During construction it is estimated that up to 101 workers could temporarily relocate to the project area; however, these workers would be anticipated to return to their place of permanent residency on the weekends and not relocate their families to the project area. Therefore, no impacts to the SSUSD's schools would be anticipated to occur during construction.

Education Code section 17620 authorizes school districts to levy a fee against construction within their districts. If implemented, the RSPP would be required to pay a school impact fee to the SSUSD. The school impact fee for non-residential projects in the SSUSD is $0.47 per square foot of new floor space. Based on a total square footage of 119,926 square feet, office and warehouse space, the project would be required to pay a total school impact fee of approximately $56,400 to the SSUSD (AECOM Environment 2009a). This one-time fee would be considered a direct beneficial impact.

Parks and Recreation

As discussed in Section C.10.4.1, the project site is located on lands managed by the BLM and falls within the boundaries of the West Mojave Off-Road Vehicle Designation Project; the proposed project site is also used for organized equestrian and OHV group events, mountain biking, horseback riding, hiking, running, camping, rock hounding and mineral collection, hunting and target shooting, and wildlife and wildflower observation. The project site is additionally an estimated two miles southwest of the El Paso Wilderness Area the Boral Corral Pit, also used for recreational purposes is located west of the project site. In addition, as outlined in Section C.10.4.1 there are several federal and State recreational facilities within an estimated one-hour commute of the project site and the City of Ridgecrest also operates several public parks and recreational facilities.

Construction activities would preclude use of the project site for recreational purposes. Closure of the site to recreational uses would be expected to cause increased recreational uses in other areas. However, due to the large number of public recreational areas (including OHV and multi-use trails) within the both the regional and local project area, increases in demand at other parks and recreational areas and facilities would not be expected to substantially degrade overall public recreational opportunities, niches, systems or experiences . Direct and indirect impacts would be adverse but less than significant. Please refer to the **LAND USE, RECREATION AND WILDERNESS** section of the PSA for an additional discussion of recreational resources and uses.

During construction the project would require an average workforce of 405 persons with up to 101 workers relocating to the project area in a temporary basis, typically returning to their permanent place of residency on the weekends. This minor and temporary increase in the local population would not be anticipated to appreciably increase the demand for federal, State or local recreational resources. Direct and indirect impacts due to the project's construction workforce would be less than significant or none.

Economic Impacts

Construction of the project would have an estimated total payroll of $53.3 million and an approximate annual payroll of $22.8 million (AECOM Environment 2009a). According to the applicant's data adequacy supplement to the socioeconomics section of the AFC (AECOM Environment 2009b), capital costs (or expenditures) for construction of the project would be an estimated one billion dollars, of which local construction expenditures would be expected to total $15,000,000 (or 1.5%) ($6.4 million annually) and non-local construction expenditures would be approximately $985,000,000 or 98.5%.

As noted previously, construction would be expected to create an average of 405 jobs, peaking at 633 direct jobs in construction month 11. These direct jobs would create both indirect and induced secondary employment. Indirect employment is defined as employment that is generated by a project's purchase of goods and services. Induced employment is defined as employment that is generated by the purchase of goods and services by the businesses that are indirectly supported by a project.

The applicant used the IMPLAN Professional™ to estimate economic impacts within Kern, Los Angeles and San Bernardino Counties. IMPLAN Professional™ is an economic impact modeling tool that uses region-specific input and output accounts by industry to estimate secondary impacts of economic stimuli (AECOM Environment 2009a). Secondary impacts include (1) indirect impacts that occur due to the purchase of goods and services by firms involved with project construction and operation, and (2) induced impacts, which result from household spending. Secondary impacts can occur in the form of employment, income, output, and taxes (AECOM Environment 2009a).

For the purpose of the economic model, the following project expenditures, in rounded values, were assumed: annual payroll ($22,841,795); and, annual local expenditures ($6,428,571) (AECOM Environment 2009a). Based on these assumptions, for the project's 28 month construction phase the economic model projected the following expenditures within, and revenues for, Kern, Los Angeles and San Bernardino Counties combined (in rounded values) (AECOM Environment 2009a):

- Direct Expenditures: $23,000,000
- Indirect Regional Revenues: $18,000,000
- Induced Regional Revenues: $18,000,000
- Total Annual Expenditures and Revenues: $59,000,000

Using the same assumptions, during construction the project would, on an annual basis, result in the following average number of jobs created within Kern, Los Angeles and San Bernardino Counties combined (AECOM Environment 2009a):

- Direct (Project) Jobs: 405 Workers
- Indirect Jobs: 204 Workers
- Induced Jobs: 229 Workers
- Total Jobs Created (Directly, Indirect and Induced): 838 Workers

The additional expenditures, revenues and jobs created in Kern, Los Angeles and San Bernardino Counties during project construction would result in beneficial impacts, both directly and indirectly, at regional and local scales.

Operation

Population and Employment

Operation of the project would require an estimated 84 permanent employees, including operations and power block routine maintenance staff, solar field project and maintenance staff, clerical and technical staff, and administrative and management staff. According to the applicant's AFC data supplement for socioeconomics (AECOM Environment 2009b), it is estimated that 63 of the project's permanent employees would be local and 21 would likely be hired from outside the local area. The local area includes those cities and communities within a 30-minute commute time of the project site, as well as all cities and communities in Kern County with populations over 20,000 individuals and all cities with populations over 40,000 individuals in Los Angeles and San Bernardino Counties that are within a two-hour drive time of the Project site. As shown in **Socioeconomics Table 5**, the total combined labor force for Kern, Los Angeles and San Bernardino Counties in November 2009 was 6,163,500 people, with an estimated 5,387,100 people employed and 776,400 people unemployed. The project's permanent demand on the combined labor force for the tri-county area would thus be 0.0014%. The project's demand on the combined labor force and distribution for the socioeconomics study area would be negligible; no direct or indirect impacts would occur.

It is anticipated that all of the project's operational employees would relocate to the project area. Research shows that operational workers will commute as much as one hour, or approximately 60 miles to a power plant site from their homes rather than relocate (EPRI 1982). The City of Ridgecrest has a population of approximately 27,613 people, and, as outlined in Section C.10.4.1, the estimated populations for the other local cities and communities within an estimated 60 linear miles of the project site are as follows: Tehachapi - 10,957 people; California City - 8,385 people; Mojave - 3,836 people; Boron - 2,025 people; Inyokern - 984 people; Lake Isabella - 3,315 people; Kernville - 1,736 people; Wofford Heights - 2,276 people; Randsburg - 77 people; and, Johannesburg - 176 people.

According to the U.S. Census Bureau 2006-2008 three year survey estimates, the average household size for an owner occupied home is 3.01 persons, and the average size for a rented home is 2.8 persons (U.S. Census Bureau 2009). Using an average of three persons per household, and assuming a "worst case" scenario of all 84 permanent employees relocating to within a one-hour commute of the project site, there would be an in-migration of approximately 252 people. For the City of Ridgecrest this would represent a permanent population increase of 0.9%. For Ridgecrest and the other communities and cities within 60 miles of the project site combined (a total population of 61,380 persons), the net population increase due to operation of the project would be 0.41%. A net population increase of less than 1%, within the direct vicinity of Ridgecrest and the larger 60 linear mile radius of the project site, would not result in significant adverse impacts; direct and indirect impacts would be less than significant or none.

Housing

Temporary and Permanent Housing

Operation of the project would require 84 permanent employees. Assuming a "worst case" scenario where all 84 employees relocate to within a one-hour commuting distance of the project site, and each employee has an average family (household) size of three persons, operational activities would result in the demand for a maximum of 84 housing units for an estimated 252 persons.

For Kern, Los Angeles and San Bernardino Counties combined, there are approximately 4,388,701 permanent housing units, with an estimated 4,137,265 occupied and 251, 436 unoccupied; the permanent housing rates for these counties are 4.21% for Los Angeles County, 9.85% for Kern County and 11.57% for San Bernardino County. Within a 60 linear mile radius of the project site there are an estimated 20,732 permanent housing units, with 18,496 units occupied, 2,236 units unoccupied, and vacancy rates range between 8.52% (Ridgecrest) and 14.49% (California City).

The traditional tool for measuring permanent housing demand is vacancy rates (California Department of Housing and Community Development [CDHCD] 2000). Low vacancy rates indicate a shortage of housing; high vacancy rates indicate a surplus. In general, the desirable housing vacancy rate in a community is considered to be 5.0% (CDHCD 2000). When vacancy rates drop below 5.0%, the demand for housing exceeds the supply of housing and when the rate rises above 5.0% the number of existing housing units generally exceeds demand. As indicated above, with the exception of Los Angeles County as a whole, the vacancy rates associated with the socioeconomics study area are well above the 5.0% threshold, and the vacancy rates within an estimated one-hour commute of the project site housing vacancy rates are also above the 5.0% threshold. Therefore, staff concludes that there would be no significant adverse impact, directly or indirectly, due to operation of the project. Impacts would be less than significant or none. The long-term permanent demand for housing under the operational phase would have a negligible, positive impact on the area’s housing stock that would not necessitate new construction (nor place any noticeable competitive demands on market) because of existing ample supply, and because the majority of operational staff are expected to be permanent residents of the three county area and would not contribute to incremental long-term demand for housing.

Property Values

The closest residential neighborhood to the project site is located approximately 0.75 to 1.0 mile east of the proposed project site, with other residential neighborhoods located approximately 2.5 to 3.25 miles northeast and north, respectively, of the project site (Google Earth 2009). No population projection data through the year 2040, which includes the timeframe for the RSSP's estimated operational life (30 years), is available for the City of Ridgecrest or Inyokern or China Lake Acres. However, between 2008 and 2009 the population of the City of Ridgecrest grew by 1.4% (DOF 2009a), and, as outlined in **Socioeconomics Table 2**, Kern County's population is anticipated to grow by 19.7% over the next decade, and by rates ranging between 18.9 and 20.8% between 2030 and 2050.

Based upon the anticipated population increase for Kern County over the next four decades, and the local area's relatively stable economic employment base due to its proximity the CLNWC, the City of Ridgecrest and the communities of Inyokern and China Lake Acres area would be reasonably expected to maintain their current rates of growth in the future. As such, existing local property values would not be expected to sharply decline solely in response to recent local economic and population conditions.

Energy Commission's 2003 Environmental Performance Report addressed property values as related to energy-related facilities (CEC 2003). Staff found that community members and land developers often express concern about facilities such as power plants and transmission lines reducing their property values. Rural residents often note that a proposed power plant or transmission line would ruin the view and overall scenic location of their homes, with a corresponding drop in property values. Similarly, developers of planned residential areas often express concern that their planned development projects would have little appeal and market value if an energy facility were built nearby. Staff concluded that while considerable anecdotal evidence has been put forward for such an impact, there is little solid evidence indicating actual impacts (CEC 2003).

In the Energy Commission's 2005 Environmental Performance Report of California's Electrical Generation System (CEC 2005) staff found that proximity impacts potentially affecting property values, as related to energy-related facilities, include health hazard risks to persons and obstruction of views. Staff noted that a number of studies cite several examples of proximity impact analyses, and that the findings of these studies "yield an equivocal conclusion" that energy facilities may result in negative economic impacts. However, in the 2005 Report staff also noted other studies found that no economic impacts occur in response to the placement and operation of power generating facilities; staff thus concluded that there is no clear and consistent association with diminished economic impacts to property values (CEC 2005). As related to solar facilities, in the 2005 Report staff found that "it is unknown at this time what effect large utility owned solar energy facilities would have on surrounding property values, as there are very few of these types of facilities in existence at this time" (CEC 2005).

Based upon the above, while there is a possibility that a significant adverse socioeconomic impact on property values could occur, definitive data does not exist for such an analysis. Therefore, it is not possible for staff to reach a conclusion on the RSPP's potential impacts on property values, either directly or indirectly.

Public Services

Law Enforcement

During operation the perimeter of the project's solar fields and support facilities would be secured with a combination of chain link and wind fencing. Chain link metal-fabric security fencing, 8 feet tall, with one-foot barbed wire or razor wire on top would be installed along the north and south sides, and thirty-foot tall wind fencing, composed of A-frames and wire mesh, would be installed along the east and west sides of each solar field (AECOM Environment 2009a). Security precautions would also include controlled access gates and lighting (AECOM Environment 2009a). Operation of the project would

require a permanent workforce of 84 persons, all of whom would be expected to live within a one-hour commuting distance of the project site and some of whom would be hired from the local area; as such, the permanent workforce needed for operation would not appreciably increase the local population (0.41% regionally and 0.9% locally) or trigger the need for additional law enforcement personnel. Therefore, staff concludes that there would be no significant adverse socioeconomic impacts, either directly or indirectly, on law enforcement resources due to operation of the RSPP. Impacts would be less than significant or none.

Fire Protection

Fire protection during operation would include measures relating to safeguarding human life, preventing personnel injury, preserving property, preserving wildlife, and minimizing downtime due to fire or explosion (AECOM Environment 2009a). The project's fire suppression systems would be subject to review and approval by the KCFD and designed by a California-registered Fire Protection Engineer (AECOM Environment 2009a). Fire protection equipment would also be installed and maintained in accordance with applicable National Fire Protection Association standards and recommendations and designed and operated in conformance with Uniform Fire Code requirements (AECOM Environment 2009a). The KCFD also would also perform routine fire and life safety inspections, including the review and approval of programs for regular equipment audits and servicing and for the training of employees in fire protection procedures. The facility would additionally be equipped with its own fire suppression water supply. Therefore, staff concludes that operation of the project would not result in significant adverse impacts to fire protection services, either directly or indirectly. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information regarding the project's fire prevention and suppression tactics and plans.

Hospitals and Emergency Medical Response

During operation the project would require 84 permanent employees. To minimize worker injuries, as part of project design, an Injury and Illness Prevention Plan would be developed and implemented (AECOM Environment 2009a). Additionally, operation of the project would include the development and implementation, as needed, of an Emergency Action Program and Plan and a Personal Protective Equipment Program and Safety Training Program to minimize the potential for injuries and appropriately respond to emergency medical situations. With full implementation of these plans and programs in conjunction with the availability of medical and emergency medical response facilities and services within both the local and regional project area, no significant adverse impacts, either directly or indirectly, would occur. Please refer to **WORKER SAFETY AND FIRE PROTECTION** for additional information regarding the project's worker safety plans and protocols.

Schools

During operation the project would require 84 permanent employees. Assuming a "worst case" scenario of all 84 employees relocating to the immediate Ridgecrest area, and an average of one to two school-age children per permanent employee, enrollment of the SSUSD would increase by 84 to 168 students. The SSUSD has confirmed that it currently has excess student capacity, and is in the process of modernizing its existing

facilities; the SSUSD has indicated that the project's potential increase in student size due to project operation could be readily accommodated (Burson 2010). As such, no impacts, either directly or indirectly, would occur to the SSUSD due to operation of the project.

Parks and Recreation

During operation, a permanent workforce of 84 persons would be required. Using an average of three persons per household, and assuming that all 84 permanent employees relocate to within a one-hour commute of the project site, there would be an in-migration of approximately 252 people. For the City of Ridgecrest this would represent a permanent population increase of 0.9%. For Ridgecrest and the other communities and cities within 60 miles of the project site combined (a total population of 61,380 persons), the net population increase due to operation of the project would be 0.41%. A permanent population increase of less than 1% is not considered a substantial amount of growth. As such, staff concludes that at both local and regional scales, operation of the project would not place an appreciable demand on federal, State or local public recreational areas, opportunities or facilities as related to Socioeconomics. No significant adverse impacts, directly or indirectly, would occur. Please refer to refer to the **LAND USE, RECREATION AND WILDERNESS** section of the PSA for an additional discussion of recreational resources and uses.

Fiscal Effects

During operation the project would be expected to result in annual regional purchases of approximately $2.7 million for materials, supplies, equipment and services (AECOM Environment 2009a). Based upon the results of the project's economic modeling, during operation the project would be expected to result in the following annual expenditures within, and revenues for, Kern, Los Angeles and San Bernardino Counties combined (in rounded values) (AECOM Environment 2009a):

- Direct Expenditures: $3,000,000;
- Indirect Regional Revenues: $4,000,000;
- Induced Regional Revenues: $3,000,000; and,
- Total Annual Expenditures and Revenues: $10,000,000

Assuming a sales tax rate of 8.25%, as is applied within Kern County, these project-related operational expenditures would generate approximately $220,000 in annual sales tax revenue (AECOM Environment 2009a). The 8.25% Kern County sales tax is divided into 7.25% for the State and 1.00% for Kern County.

In addition to the above, operation of the project would be expected to result in the creation of 154 jobs annually, including 84 direct project jobs, 38 indirect jobs, and 32 induced jobs (AECOM Environment 2009a).

The proposed project's property value is estimated to be approximately $1 billion (AECOM Environment 2009a). However, the RSPP is expected to be 100% property tax exempt as part of Section 73 of the California Revenue and Tax Code for solar systems. Although the U.S. Department of the Interior's Payment in Lieu of Taxes program does

provide Kern County with funding for "normal and customary" response for police and fire protection and emergency response, because the project site is located on federal land managed by the BLM and it is exempt from local property taxation (Oviatt 2010).

Project Closure and Decommissioning

The planned operational life of the RSPP is 30 years; however the Applicant has indicated that the facility could operate for a longer or shorter period of time, depending on economic conditions and other circumstances (AECOM Environment 2009a). The Applicant has additionally indicated that closure of the facility could range between the "mothballing" of all equipment and structures to their complete decommissioning and removal (AECOM Environment 2009a). Although no specific plans are yet in place for permanent closure, the Applicant has committed to 24-hour security surveillance of the site following facility shut-down and the preparation of Project Decommissioning Plan for review and approval by the California Energy Commission and BLM that would include site restoration and revegetation, facility component recycling, the resale of unused materials, collection and disposal of hazardous wastes and conformance with all applicable LORS (AECOM Environment 2009a). Due to the lack of any specific plans for permanent closure at this time, for the purposes of this analysis staff has assumed a scenario somewhat similar to construction, wherein an average decommissioning and removal workforce of approximately 405 employees would be needed for up to 28 months. As with construction it is additionally assumed that this workforce would be drawn from Kern, Los Angeles and San Bernardino Counties.

Population and Employment

Socioeconomics Table 2 and **Socioeconomics Table 13** provide, respectively, population projections through the year 2050 and employment projections, by construction/decommissioning trade, through the year 2016. Both population and employment would be anticipated to continue to grow in the reasonably foreseeable future.

As with construction it is estimated that 25% of total decommissioning and closure workforce may relocate temporarily to the local project area; however, they would be expected to commute home on the weekends. Assuming a 25% relocation rate and an average construction workforce of 405 employees, the project could result in up to 101 workers staying in the local project area during the work week. As noted in **Socioeconomics Table 2**, in the year 2040 Kern County is anticipated to have a population of 1,707,239. Although population projections for the year 2040 for the City of Ridgecrest are not available, assuming an average growth rate of 21% per decade (the average growth rate for Kern County between 2010 and 2040) and a base 2000 population of 27,613, in the year 2040 Ridgecrest would have a population of approximately 59,191 people. Therefore, decommissioning and closure would increase the population in the vicinity of Ridgecrest by 0.2%. Because this population increase would be temporary in nature (no more than an estimated 28 months) and less than 1% of the total population, direct and indirect population impacts due to temporary in-migration would be less than significant or none.

Construction workforce projections for the year 2040 are not available. However, based upon the data provided in **Socioeconomics Table 13**, the average projected rate of

growth for construction workers over the 2006 to 2016 period is approximately 11%. Although the trade-specific types of workers for decommissioning and closure would not be expected to be the same as for construction, using the base construction workforce data provided in **Socioeconomics Table 6**, and an average increase in the construction workforce of 11% per decade, for the year 2040 the available construction workforce for Kern, Los Angeles and San Bernardino Counties would be approximately 332,334 people combined. Assuming an average workforce of 405 employees, closure and decommissioning would thus represent approximately 0.1% of the total tri-county projected construction workforce. For Kern County alone the workforce needed for decommissioning would be approximately 1.8% of the total projected construction workforce and 0.2 and 0.3% of the projected construction workforce alone for Los Angeles and San Bernardino Counties, respectively. As such, it is projected that there would be sufficient workforce available for full facility closure and decommissioning. No direct or indirect impacts would occur.

Housing

As with construction, the majority of the decommissioning and closure workforce would be anticipated to commute to the project site. However, it has been assumed that up to 101 workers may temporarily relocate to the project area during the work week for up to 28 months. As noted above, the tri-county area is projected to grow over the next four decades, and it is reasonably assumed that Ridgecrest and the other cities and communities within a one-hour commute of the project site will grow as well. As addressed for project construction, there is currently adequate temporary housing in the project area to accommodate an in-migration of up to 101 workers, and the availability of future temporary housing would be expected to be maintained or expand. Therefore, no direct or indirect impacts to either temporary or permanent housing would occur due to closure and decommissioning.

Although it is not possible for staff to reach a conclusion regarding the RSPP's potential impacts on property values, full closure and decommissioning of the facility would revert the project site back to its existing conditions. In a fully restored but undeveloped state, staff would not expect that the project site would affect property values, either directly or indirectly. No impacts would be anticipated to occur.

Public Services

As addressed above, the local and regional populations of the project area are anticipated to grow over the projected operational lifetime of the RSPP. For the purposes of this analysis, it is reasonably assumed that public services as related to law enforcement, fire protection, hospitals and emergency medical response services, schools and public parks and recreation would be able to expand as needed to accommodate future population growth. Decommissioning and closure of the project would be similar to construction-related activities and, under current conditions, construction of the project would not result in any direct or indirect significant adverse impacts to public services. As such, the activities and workforce required for decommissioning and closure would not be expected to significantly impact future levels of public services. Following the completion of all decommissioning and closure activities there would be no demand placed on public services. Direct and indirect impacts would be anticipated to be less than significant or none.

Fiscal Effects

Staff cannot speculate as to the long-term economic and fiscal effects that closure and decommissioning activities would have on the socioeconomics study area because future conditions are unknown. However, upon permanent closure the beneficial fiscal impacts of the project, such as worker payroll and project expenditures and associated sales taxes would no longer occur.

C.8.4.3 CEQA LEVEL OF SIGNIFICANCE

As addressed in Section C.10.4.2, direct and indirect socioeconomic impacts associated with implementation of the proposed project would be less than significant or none.

C.8.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project site. This alternative would eliminate land disturbances by approximately 42%. It would consist of 167 solar collector array loops occupying approximately 1,135 acres of land.

The Northern Unit Alternative would transmit power to the grid through the planned Southern California Edison 230-kV substation. As with the proposed project, the power block would remain north of Brown Road, and would include all operational power facilities, structures, transmission lines and related electrical system, as well as potable and treated water tanks and auxiliary equipment. The transmission line alignment for this alternative would be 3,900 feet, and would connect to a switchyard adjacent to the existing SCE 230kV transmission line. In addition, the site would require access roads, a parking lot, a bio-remediation unit and a main office building, all of which would be north of Brown Road. This alternative's water supply pipeline would remain at the same location as under the proposed project.

C.8.5.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomic resources and attributes, the local and regional setting for the Northern Unit Alternative would be that same as described in Section C.10.4.1 for the proposed project.

C.8.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This alternative would reduce the project site by an estimated 42%, and would also result in a 58% reduction in the amount of electricity generated. In comparison to the propose project, this alternative's smaller facility size and output would be expected to require a smaller construction workforce and shorter timeline construction, a smaller operational workforce, and a smaller decommissioning and closure workforce and shorter closure schedule. Therefore, there would be a corresponding reduction in the number of people temporarily or permanently added to the local population base, less demand on local and regional employment pools, less need for temporary and permanent housing, and less demand for public services. Additionally, it would be

expected that there would be less contribution to direct, indirect and induced expenditures and revenues, including government revenues generated from sales taxes.

As discussed in section C.10.4.2, the proposed project would not result in any significant adverse impacts on socioeconomic resources and attributes, either directly or indirectly. Because the Northern Unit Alternative would result in a proportionately smaller facility, its construction, operation and closure would decrease the magnitude and/or duration of the proposed project's impacts to socioeconomic resources and attributes. As such, under this alternative no significant adverse socioeconomic impacts would occur, either directly or indirectly. However, as noted above, this alternative would result in correspondingly smaller fiscal benefits due to its reduced size.

C.8.5.3 CEQA LEVEL OF SIGNIFICANCE

As discussed above in Section C.10.5.2 and similar to the proposed project, impacts to socioeconomic resources and attributes resulting from implementation of the Northern Unit Alternative would be less than significant or none.

C.8.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project site. The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. It would occupy approximately 826 acres of land.

The Southern Unit Alternative would transmit power to the grid through the proposed project's planned substation. The power block, spanning approximately 18 acres, would remain north of Brown Road and would include all operational power facilities, structures, transmission lines and related electrical systems, potable and treated water tanks, and auxiliary equipment. The proposed transmission line alignment would be 3,900 feet and would connect to the proposed switchyard adjacent to the SCE's existing 230kV transmission line. In addition, the site would require access roads, a parking lot, a bio-remediation unit and a main office building all of which would be north of Brown Road. This alternative's 16.3-acre water line would remain at the same location as under the proposed project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines.

C.8.6.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomic resources and attributes, the setting and existing conditions of the Southern Unit Alternative would be identical to those described for the proposed project, as provided in Section C.10.4.1.

C.8.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This alternative would be smaller in site size and generate less electricity than either the proposed project or the Northern Unit Alternative. As such, this alternative would result in a comparable reduction in the number of workers needed for construction, as well as a shortened construction schedule, a smaller operational workforce, a reduced closure and decommissioning workforce and shortened schedule for closure and

decommissioning. The reduction in this alternative's need for temporary and permanent employees would decrease short- and long-term additions to the local population base, place less demand on local and regional employment pools, lessen the need for temporary and permanent housing, and lessen the demand for public services. Additionally, it would be anticipated to result in a reduction of direct, indirect and induced expenditures and revenues, including government revenues generated from sales taxes.

As addressed in Section C.10.4.2, implementation of the proposed project would not result in any significant adverse socioeconomics impacts. Due to its smaller scale in terms of size and power output, implementation of the Southern Unit Alternative would have a correspondingly smaller influence on the magnitude and/or duration of identified socioeconomics impacts in comparison to the proposed project. Consequently, the Sothern Unit Alternative would not result in any significant adverse socioeconomic impacts. It is noted, however, that this alternative, in comparison to the proposed project, would have correspondingly smaller direct, indirect and induced fiscal benefits due to its reduced size.

C.8.6.3 CEQA LEVEL OF SIGNIFICANCE

As discussed in Section C.10.6.2, above, and similar to the proposed project and Northern Unit Alternative, impacts to socioeconomic resources and attributes resulting from the Southern Unit Alternative would be less than significant or none.

C.8.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. It would occupy approximately 1,760 acres of land, including an estimated 755 acres north of Brown Road and 685 acres south of Brown Road. It would require a shorter transmission interconnection (1,250 feet) in comparison to the proposed project's interconnection of 3,900 feet.

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including a main office building, power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building. In contrast to the proposed project, the bioremediation unit would be located north of Brown Road, within the proposed project's footprint. The power block and ancillary facilities would be located south of Brown Road as would the transmission line and switch-yard. The Original Proposed Project Alternative would also require relocation of the two existing SCE transmission lines.

C.8.7.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomic resources and attributes, the setting and existing conditions for this alternative would be identical to those described for the proposed project, as provided in Section C.10.4.1.

C.8.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The nominal output of this alternative is identical to the proposed project; additionally, its physical size is only slightly less than the proposed project and its related transmission, integration and water supply needs are nearly the same as proposed project. As such, this alternative's construction, operational and decommissioning and closure requirements would be essentially the same as for the proposed project. Consequently, its socioeconomic impacts on population and employment, housing and property values, public services and local fiscal revenues would be anticipated to be nearly identical to the proposed project.

As addressed in Section C.10.4.2, implementation of the proposed project would not result in any significant adverse socioeconomic impacts. As implementation of this alternative would be nearly the same as the proposed project, its associated impacts on socioeconomic resources and attributes would be essentially the same. Direct and indirect impacts would be less than significant or none.

C.8.7.3 CEQA LEVEL OF SIGNFICANCE

As discussed in Section C.10.7.2, above, and similar to the proposed project, impacts to socioeconomic resources and attributes resulting from the Original Proposed Alternative would be less than significant or none.

C.8.8 NO PROJECT/NO ACTION ALTERNATIVE

Under the No Project/No Action Alternative the RSPP would not be implemented. There would be no grading of the site, no land disturbance and no and no installation of power generation and transmission equipment.

C.8.8.1 SETTING AND EXISTING CONDITIONS

For the purposes of socioeconomics, the setting and existing conditions for this alternative would be identical to those described for the proposed project, as provided in Section C.10.4.1.

C.8.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Under the No Project/No Action Alternative no project-related activities would occur and there would be no corresponding effects on any socioeconomic attributes of the project area, either locally or regionally. As such, no impacts would occur; existing conditions, as described in Section C.10.4.1 would not change. It is noted, however, that under the No Project/No Action Alternative none of the beneficial fiscal effects associated with implementation of the proposed project would occur.

C.8.8.3 CEQA LEVEL OF SIGNIFICANCE

As noted in Section C.10.8.2, under the No Project/No Action Alternative no impacts to socioeconomic resources and attributes would occur.

C.8.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROEJCT

As outlined in Sections C.10.4 through C.10.8, none of the project alternatives, including the proposed project, would result in significant adverse impacts to socioeconomic resources and attributes; all direct and indirect impacts would be less than significant or none.

The magnitude and duration of the potential impacts associated with the proposed project and the Original Proposed Project Alternative would be nearly the same, as their implementation would require very demands and activities for construction, operation and closure. Because these two alternatives would be almost of the same size and generate equal amounts of energy, their direct, indirect and induced fiscal benefits, in terms of local and regional revenues and sales taxes due to project-related purchases would also be substantially the same. There would be no appreciable difference between these two alternatives.

The Northern Unit Alternative and the Southern Unit Alternative represent smaller versions of the proposed project and the Original Proposed Project Alternative. As such, their associated effects on local and regional socioeconomic variables, including population and employment, housing and public services would be proportionately reduced in terms of magnitude and duration. For example, a decrease in the time needed for completion of construction and a smaller construction workforce would result in a smaller number of people temporarily relocating to the project area, thereby decreasing demands on temporary housing. Due to the reduced site size and operational output of these alternatives, there would also be, in comparison to the proposed project and the Original Proposed Project Alternative, a corresponding reduction in the direct, indirect and induced fiscal benefits of the project. Because the Southern Unit Alternative is slightly smaller in size, in terms of both physical breadth and output, it would be anticipated to have slightly lessened effects on socioeconomic resources and attributes, as related to magnitude and duration, in comparison to the Northern Unit Alternative.

The No Project/No Action Alternative would not result in any adverse or beneficial impacts to socioeconomic resources and attributes. Existing conditions of the project area, both locally and regionally, would remain the same. It is noted, however, that if one of the project alternatives is not implemented, other renewable and non-renewable power plants would have to be constructed to serve the demand for electricity. Although staff cannot predict the location of these other facilities or what their construction, operational and closure requirements would be, it can be reasonably assumed that they would likely result in similar types of impacts to socioeconomic resources as the proposed project and the Northern Unit, Southern Unit and Original Proposed Project Alternatives. If the No Project/No Action Alternative were to be implemented, there would also be no net contribution to the State's mandated renewable energy portfolio.

Socioeconomics Table 14 provides a summary comparison of the project alternatives.

Socioeconomics Table 14
Comparison of Proposed Project and Alternatives

Impact	Proposed Project (250MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250MW)	No Action/No Project
Induce Substantial Population Growth	Less than significant impact or none. Construction and closure would result in a population increase of 0.37 to 0.57% temporarily. Operation would result in an estimated maximum population increase of 0.41%.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of impacts.	Same as proposed project.	No impact.
Displace Substantial Numbers of People and/or housing	Less than significant impact or none. Construction, operation and closure would not displace any people or housing. Adequate temporary and permanent housing capacity exists in project area to accommodate construction, operation and closure.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of impacts.	Same as proposed project.	No impact.

Impact	Proposed Project (250MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250MW)	No Action/No Project
Adversely Impact Acceptable Levels of Public Service	Less than significant impact or none. Adequate capacity/service levels exist to accommodate construction, operation and closure.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of impacts.	Same as proposed project.	No impact.
Substantially Change Local Employment	Beneficial impact. Construction, operation and closure would not exceed or substantially burden existing or projected available labor pools. Temporary and permanent workforces would positively impact local and regional employment rates.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities needed would proportionately lessen the duration and magnitude of beneficial impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of beneficial impacts.	Same as proposed project.	No impact. No beneficial impacts to local and regional employment rates would occur.
Substantially Change Local Business or Government Revenues	Beneficial impact. Construction, operation and closure would substantially contribute to local business and government revenues.	Same as proposed project; however, due to reduced size, the construction, operational and closure workforces and activities would proportionately lessen the duration and magnitude of impacts.	Same as proposed project and Northern Unit Alternative; however, due to increasingly reduced size, the construction, operational and closure workforces and activities needed would proportionately further decrease the duration and magnitude of beneficial impacts.	Same as proposed project.	No impact. No beneficial impacts to local business and government revenues would occur.

C.8.9 CUMULATIVE IMPACTS

Cumulatively considerable impacts address the incremental effects of an individual project that are significant when viewed in connection with the effects of other past, current projects, and probable future projects (California Code Regulation, Title 14, section 15130). Per NEPA's regulations, cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7).

There is the potential for substantial future development throughout southern California and the high desert region. This section first defines the geographic area over which cumulative impacts related to socioeconomic resources could occur. The analysis itself then describes the potential for cumulative impacts to occur as a result of implementation of the RSPP project along with the listed local and regional past, present and reasonably foreseeable projects identified within cumulative project area for socioeconomic resources. The analysis of cumulative impacts is based on information provided in Section B.3, Cumulative Scenario, including:

- **Cumulative Impacts Table 1A**, Renewable Energy Projects in the BLM California Desert District;
- **Cumulative Impacts Table 1B**, Renewable Energy Projects on State and Private Lands in California Desert District Counties ;
- **Cumulative Impacts Table 2**, Existing Projects in the Ridgecrest Area;
- **Cumulative Impacts Table 3**, Future Foreseeable Projects in the Ridgecrest Area;
- **Cumulative Impacts Figure 1**, Renewable Energy Applications in the California Desert District;
- **Figure Cumulative Impacts 2**, Renewable Energy Applications in the Ridgecrest District Area; and,
- **Cumulative Impacts Figure 3**, Existing and Future/Foreseeable Projects in the Ridgecrest Area.

C.8.9.1 GEOGRAPHIC EXTENT

The proposed project is located in northeastern Kern County, and its construction and operational workforces would be expected to be drawn largely from Kern, Los Angeles and San Bernardino Counties. Permanent workers over an estimated 30 year project lifetime would be anticipated to reside within a one-hour commuting distance of the project site, and approximately 75% of the workers needed for construction would be expected to live and reside within a daily commuting distance of the project site; as addressed in Section C.10.4.2, the existing labor force for the tri-county area can readily accommodate these assumptions.

As illustrated in **Cumulative Impacts Figures 1** and **2**, the majority of renewable energy projects proposed in the high desert region (including portions of both the BLM California Desert District and the BLM Ridgecrest District Area) are located in Kern and San Bernardino Counties. For the same region, the majority of renewable energy

projects located on private and State lands are located in Kern, Los Angeles and San Bernardino Counties, as listed in **Cumulative Impacts Table 1B**.

At a local scale, nine existing and future development projects have been identified, the largest of which is the China Lake Naval Weapons Air Center Base Realignment and Closure (BRAC) project, which could create 4,085 new jobs and the construction of potentially up to 2,700 new homes to accommodate growth. Similar to the proposed project, the effects of these projects would be expected to impact most directly the Ridgecrest area and Kern, Los Angeles and San Bernardino Counties.
Because the proposed project's direct and indirect effects are anticipated to have the greatest influence over the socioeconomic resources and attributes of Kern, Los Angeles, and San Bernardino Counties, and because the other past, present and reasonably foreseeable projects outlined in **Cumulative Impacts Tables 1A** though **3** and **Cumulative Impacts Figures 1** though **3** would also be expected to draw upon the same socioeconomic resources and attributes of Kern, Los Angeles and San Bernardino Counties, the study area for this cumulative impact analysis is the same as for the proposed project and its alternatives, as addressed in Sections C.10.4 through C.10.8.

C.8.9.2 CUMULATIVE IMPACT ANALYSIS

Existing Cumulative Conditions

Cumulative Impacts Table 2 provides the past and present (existing) projects identified within the vicinity of Ridgecrest. In addition to **Cumulative Impacts Table 2** it is noted that the City of Ridgecrest is currently experiencing significant hotel construction; however, these development projects are expected to be completed in early to mid-2010 and prior to the potential start date of the RSPP. Therefore, they have not been included in **Cumulative Impacts Table 2**.

As addressed in Section C.10.4.2, the proposed project would not have direct or indirect significant adverse impacts on socioeconomic resources and attributes, either locally or regionally. For the purposes of the project's impact analysis, the existing operations of the CLNWC have been considered and the additional hotels that are currently either under construction or near completion in the Ridgecrest area would further expand the availability of temporary housing, thereby further reducing the proposed project's incremental demand on temporary housing resources during construction and closure.

The proposed project's incremental contribution to population growth, employment, housing, public services would be less than significant or none, and its incremental contribution to local business and government revenues would be beneficial. Therefore the proposed project would not have the potential to combine with other past and present projects in a manner that would create cumulatively significant adverse impacts.

Future Foreseeable Projects

Cumulative Impacts Tables 1A, **1B** and **3** and **Cumulative Impacts Figures 1**, **2** and **3** provide the future foreseeable projects identified for the proposed project. Within the entire BLM California Desert District there a total of 124 solar and wind energy projects have been proposed for construction and operation. Of this total, 21 are proposed within

the BLM Ridgecrest District. On private and state lands 24 renewable energy projects are proposed in Kern, Los Angeles and San Bernardino Counties, including seven solar and six wind energy projects in Kern County, four solar energy projects in Los Angeles County, four solar and two wind energy projects in San Bernardino County and one solar energy project that would be located on lands within both Kern and Los Angeles Counties. Within an estimated 22-mile radius of the proposed project site, there are nine proposed future projects, including one solar energy project (in addition to the proposed project), three wind energy projects, the BRAC project, a waste water treatment plant, two highway improvement projects and one large commercial (retail) development project.

For the same reasons as described for the proposed project, it is assumed that the other future foreseeable future projects within the cumulative impacts study area could be constructed, operated and decommissioned by the available existing and projected population and workforce of Kern, Los Angeles and San Bernardino Counties (please refer to **Socioeconomics Tables 2**, **5**, **6** and **13**). Therefore, at a regional scale, the combined increase in population growth due to implementation of all foreseeable future projects would be less than significant. At a local scale, the BRAC project would induce substantial population growth in the Ridgecrest area; however, the proposed project's incremental contribution to this combined growth would be less than 1% of the total existing population and therefore less than significant.

The future projects listed in **Cumulative Impacts Tables 1A**, **1B** and **3** would be located primarily on lands that are currently undeveloped, and thus would not displace substantial numbers of people or housing. Although the BRAC project would result in a substantial increase to the local population, it would also include the construction of new housing to meet demand. Therefore, less than significant housing impacts would be anticipated to occur. As addressed in Section C.10.4.2, the proposed project would not displace any existing homes or people. Therefore, it would not incrementally contribute to any cumulative housing impacts.

In May 2008 Kern County completed a Capital Improvement Plan (CIP) (MuniFinancial 2008) that presents the County's "best current understanding of the new public facilities that will be needed to serve...projected development through 2030." The CIP is considered a "working document" that will need to be reviewed and revised on a regular basis as Kern County’s public services and related facilities and infrastructure require change (MuniFinancial 2008). The CIP addresses County-wide public protection facilities, Sheriff patrol and investigation facilities, library facilities, animal control facilities, park facilities, fire facilities, waste management facilities, public health facilities, and general government facilities and their respective needs for improvement in response to population growth and demand (MuniFinancial 2008).

As addressed in Section C.10.4.2, staff has not identified any project-related significant adverse impacts to public services, including police and fire protection and emergency response services. In addition, the CIP does not indicate any specific plans or needs for improvement to public services or related infrastructure or facilities within the Ridgecrest area.

The Kern County Planning Department has indicated that its public services and related facilities and infrastructure are currently underfunded and would be significantly and adversely impacted by all new development in the future, including industrial development (Oviatt 2010). The Kern County Planning Department has additionally noted that for those future projects that would be located on federal lands, the impacts to Kern County's public services would be further exacerbated because they are exempt from local property taxes and thus do not provide local government revenues. The same type of property tax exemptions would apply to those elements of the BRAC project that are located within the boundaries of the CLNWC and those renewable energy projects located on federal lands. Although the Kern County Planning Department has noted that the BLM, through the U.S. Department of the Interior's Payment in Lieu of Taxes program, does provide funding for "normal and customary" fire and police protection and emergency response services, the county does not believe that this funding alone would adequately address the potential public services demands of industrial development on federal lands (Oviatt 2010).

The Kern County Planning Department has recommended the Energy Commission propose a condition of certification that would account for the RSPP's direct and indirect incremental contribution to impacts on public facilities and related public services. Kern County Planning Department recommends a condition of certification that would include a payment of $28,646,937 for public, law, and fire protection based on an estimated cost of $576.88 per each 1,000 square feet of the proposed project’s development.

At this time, staff does not have adequate information from Kern County to substantiate its concerns regarding the project’s potential to impact public services and facilities. Finally, in addition to staff’s conclusions that the proposed project would have no project-related significant adverse direct, indirect, or cumulative impacts to public services, police and fire protection and emergency response services, staff cannot impose a condition of certification on the project because Kern County has not shown how the developer fee would directly be related to the impacts of the proposed development giving rise to the fee, thereby ensuring the nature of the fee is proportional to the potential impacts of the proposed project.

Although several of the projects outlined in **Cumulative Impacts Tables 1A**, **1B** and **3** would be located on federal lands and thus exempt from local property taxes, similar to the proposed project, they would all result in temporary and long-term direct, indirect and induced local business revenues and government revenues generated from sales tax and employment. Therefore, combined cumulative impacts related to fiscal resources would be beneficial, as would the proposed project's contribution to them.

C.8.9.3 CUMULATIVE IMPACT CONCLUSION

The proposed project would not directly or indirectly cause or incrementally contribute to any significant adverse cumulative impacts related to population, employment, housing or business or government revenues.

C.8.10 COMPLIANCE WITH LORS

Staff has considered minority and below-poverty-level populations as identified in **Socioeconomics Figure 1** and **Socioeconomics Tables 3** and **4**, and has found no significant adverse impacts on any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the California Environmental Protection Agency's (Cal EPA's) Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions due to the project, including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions, would not experience any significant chronic or cancer health risk as a result of that exposure. Staff believes that it has incorporated every conservative assumption called for by State and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct, indirect or cumulatively significant adverse public health and safety impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with the proposed project or the alternatives addressed in this analysis. Please refer to **AIR QUALITY** and **PUBLIC HEALTH AND SAFETY** for additional information regarding this analysis and conclusion.

Staff concludes that construction and operation of the RSPP would be in compliance with all applicable and adopted LORS regarding long-term and short-term project impacts. Given the RSPP's projected 30-year life span, staff cannot speculate about LORS compliance for facility closure and decommissioning activities.

C.8.11 NOTEWORTHY PUBLIC BENEFITS

As outlined in Section C.10.4, the proposed project would result in local business and government revenues, which would be considered noteworthy overall economic benefits. **Socioeconomics Table 15** provides a summary of these benefits.

Socioeconomics Table 15
Noteworthy Economic Benefits

Project Construction	**Estimated Dollars (Rounded)**
Total Construction Payroll	$53,300,000
Annual Construction Payroll	$22,800,000
Annual Local Expenditures	$6,400,000
Total Annual Sales Tax Revenue	$530,000
Annual State Sales Tax Revenue	$466,000
Annual Kern County Sales Tax Revenue	$64,000
Direct Construction Expenditures for Kern, Los Angeles and Kern Counties (Annually)	$23,000,000
Indirect Regional Revenues (Annually)	$18,000,000
Induced Regional Revenues (Annually)	$18,000,000
Total Annual Impact	$59,000,000
Direct Jobs Created	405 Workers
Indirect Job Created	204 Workers
Induced Jobs Created	229 Workers
Total Jobs Created	838 Workers
Project Operation	**Estimated Dollars (Rounded)**
Annual Operational Payroll	$2,600,000
Annual Local Expenditures	$2,700,000
Total Annual Sales Tax Revenue	$222,000
Annual State Sales Tax Revenue	$195,000
Annual Kern County Sales Tax Revenue	$27,000
Direct Construction Expenditures for Kern, Los Angeles and Kern Counties (Annually)	$3,000,000
Indirect Regional Revenues (Annually)	$4,000,000
Induced Regional Revenues (Annually)	$3,000,000
Total Annual Impact	$10,000,000
Direct Jobs Created	84 Workers
Indirect Job Created	38 Workers
Induced Jobs Created	32 Workers
Total Jobs Created	154 Workers
School Impact Fee (Sierra Sands Unified School District)	$56,4000

The RSPP is expected to be 100% property tax exempt as part of Section 73 of the California Revenue and Tax Code for solar energy generating systems. Additionally, the RSPP would be located on federal lands managed by the BLM, which is also exempt from local property taxes.

C.8.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

Staff proposes no conditions of certification/mitigation measures.

C.8.13 CONCLUSIONS

Staff concludes that construction, operation and closure of the RSPP would not result in any direct or indirect unavoidable significant impacts or significant adverse impacts to socioeconomic resources. For the purposes of this analysis, these resources include population and employment, housing and public services (law enforcement, fire protection, hospitals and emergency medical response, schools and public parks and recreation) and fiscal revenues.

Staff additionally concludes that the project's construction, operation and closure would have beneficial impacts on local business revenues and would also generate sales-tax related revenues for the state and affected local jurisdictions.

Staff has confirmed that within a six-mile radius of the proposed project site there are "pockets" of minority and below-poverty-level populations that qualify as environmental justice populations; however, staff has not identified any direct, indirect or cumulatively significant adverse public health and safety impacts to such populations. Given the absence of any significant health impacts, no disparate health impacts have been identified.

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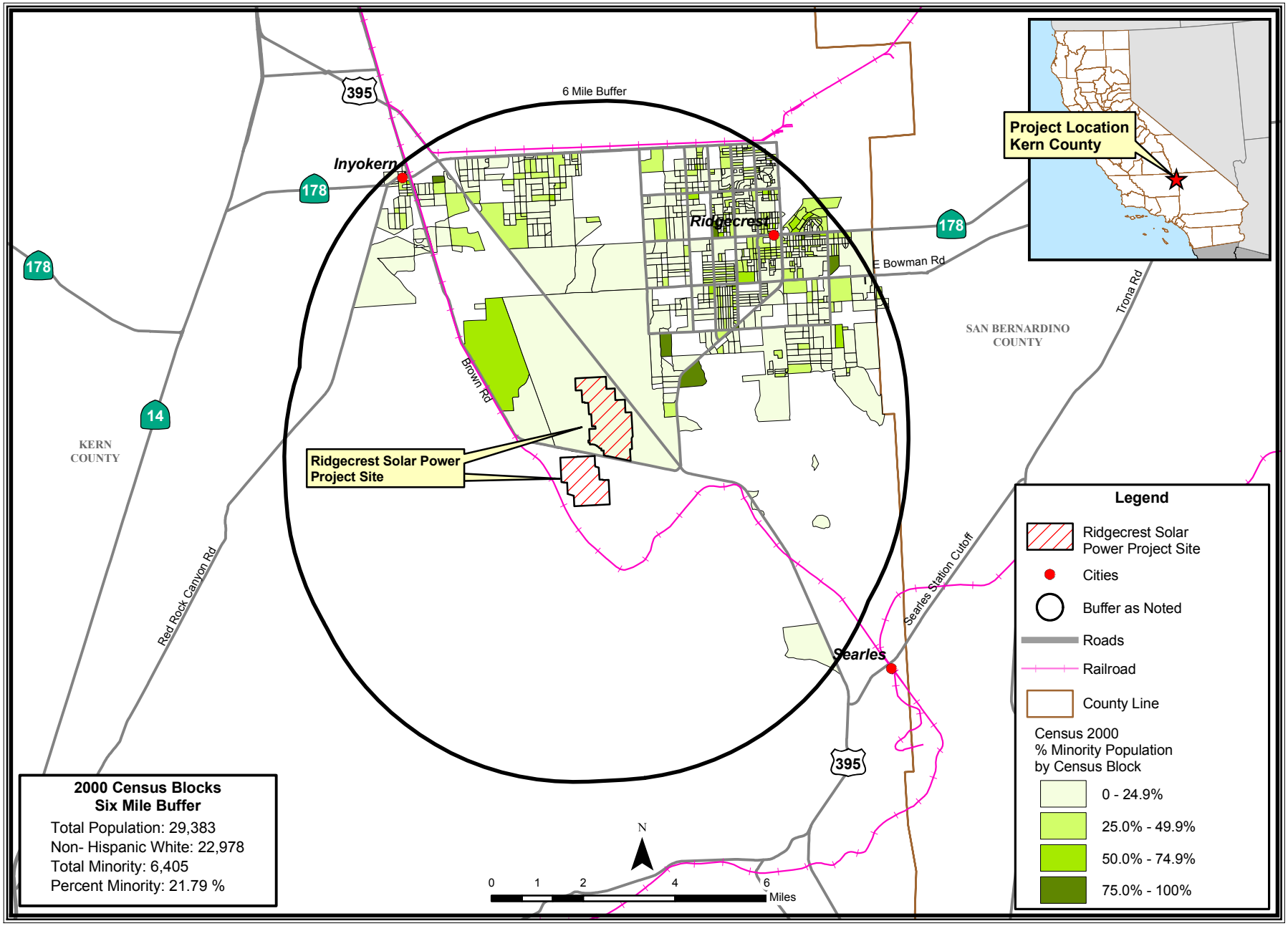
SOCIOECONOMICS - FIGURE 1

Ridgecrest Solar Power Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



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

SOURCE: Tele Atlas Data & Solar Millennium LLC - Census 2000 PL 94-171 Data - Matrix PL2

C.9 SOIL AND WATER RESOURCES

Testimony of Michael Donovan P.G., C.Hg., Michael Daly P.E.,
and John R. Thornton P.E.

C.9.1 SUMMARY OF CONCLUSIONS

With the information provided to date, California Energy Commission staff has determined that construction, operation, and decommissioning of the proposed Ridgecrest Solar Power Project (RSPP or proposed Project) could potentially impact soil and water resources. Where these potential impacts have been identified, Energy Commission staff, under the California Environmental Quality Act (CEQA) and Energy Commission regulations, has proposed mitigation measures as Conditions of Certification to reduce identified impacts to levels that are less than significant. The mitigation measures, as well as specifications for laws, ordinances, regulations and standards (LORS) conformance, are included herein as Conditions of Certification address the CEQA requirements for the Energy Commission's analysis and BLM's needs for a National Environmental Policy Act (NEPA) analysis. Staff's conclusions based on analysis of the information submitted to-date are as follows:

1. The proposed Project would be located on an alluvial fan where flash flooding and mass erosion could impact the Project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users. A Draft Drainage, Erosion, and Sedimentation Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. Based on these factors, the proposed Project could result in impacts that would be significant with respect to CEQA significance criteria specified herein and NEPA significance criteria specified in 40 CFR 1508.27. Therefore, Conditions of Certification have been developed that define the requirements for reports, plans, monitoring, and inspection, as well as standards and procedures for implementing Best Management Practices during construction and operations.

2. The proposed Project would be located in an area with no designated entity responsible for maintaining integrity of the rerouted channels. Commission staff believes the Applicant should be required to establish a Channel Maintenance Program as indicated in Condition of Certification **SOIL&WATER-12**.

3. The project applicant proposes to use groundwater supplied by the Indian Wells Valley Water District (IWVWD). Water from IWVWD wells will be piped to an existing tank and transmitted via pipeline that will be built by the RSPP to the Project site. The IWVWD and the Project owner signed a Water Supply Agreement on October 29, 2009. IWVWD also issued a Will Serve Letter for water service. Water will be supplied to the project site from the Ridgecrest Heights B Zone water storage tank. A 16 inch diameter pipeline from the water storage tank shall be constructed in China Lake Boulevard southerly to Brown Road then westerly to the Project site. The

Project owner is responsible for the design, permitting and construction of all necessary facilities. IWVWD is in the process of annexing the Project site.

This analysis indicates that the IWVGB is already significantly overdrafted and the Projects pumping will exacerbate the overdraft condition. The Applicant has proposed a mitigation to offset the proposed construction and operation water demands. Condition of Certification **SOIL&WATER-2** and **3**, is expected to reduce the impact of the Project's water demand on the IWVGB to below the level of significance.

C.9.2 INTRODUCTION

The proposed action evaluated within this Staff Assessment (SA)/Draft Environmental Impact Statement (DEIS) is the construction and operation of the Ridgecrest Solar Power Project (RSPP, referred to herein as the Project), a proposed solar-thermal electricity generation facility located on public lands managed by the BLM in Kern County, California. The SA/DEIS represents a joint environmental review document developed by the CEC and BLM to evaluate potential impacts associated with the proposed action.

Solar Millennium, LLC proposes to construct, own, and operate the Project. The Project is a concentrated solar thermal electric generating facility with a 250 megawatt (MW) nominal capacity.

The Applicant has applied for a right-of-way (ROW) grant from BLM ROW for approximately 3,995 acres of relative flat desert terrain. The total area within the ROW that will be disturbed by Project construction and operation will be about 2,002 acres including existing transmission line relocation. The area inside the Project's security fence, within which all Project facilities will be located, will occupy approximately 1,454 acres of the ROW (SM, 2010a).

This SA/DEIS examines engineering, environmental, public health and safety aspects of the proposed project, based on the information provided by the applicant and other sources available at the time the SA/DEIS was prepared. The SA/DEIS contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by CEQA, as well as analyses required as part of an EIS prepared under the NEPA.

C.9.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Significance criteria are based on those listed in CEQA Appendix G. Hydrology and water resources impacts would be significant if the project would:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a

lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation onsite/offsite.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding onsite/offsite,
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade surface water or groundwater quality
- Place structures within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.

C.9.4 PROPOSED PROJECT

C.9.4.1 WATER USE

Construction

The Applicants propose to construct one generating unit over the course of 28 months. Total water consumption over the 28 months is anticipated to be 1,470 acre-feet (af). Water will be purchased from the Indian Wells Valley Water District (IWVWD) and trucked to the Project site. Water will be required for the following consumptive uses:

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

The predominant use of water will be for grading activities, which will have a steady rate of work each month. The grading schedule for the site has been spread to cover the total construction period. This will mean that water use will be steady and without definable peaks. Average water use at the site is estimated to be about 561,000

gallons (1.7 af) per working day. Total construction water use for the duration of Project construction is estimated to be about 478 million gallons (1,470 af). Construction water will be sourced from IWVWD. Potable water during construction will be brought on site in trucks and held in day tanks.

Operation

The Project will use about 150 acre-feet per year (afy) of groundwater from the IWVWD for operational supply. This represents about 1.6% of the IWVWD's total annual production. Assuming continuous uninterrupted supply and continuous usage, a yearly volume of 150 af equates to an average pumping rate of about 90 gallons per minute (gpm). Peak water usage during the summer months is about 190,500 gallons per day (gpd) or about 130 gpm assuming continuous pumping. Water use during the winter months is estimated to be about 40,700 gpd or a pumping rate of about 30 gpm, assuming continuous use. Over the Project's 30-year life, water use will total about 4,500 af.

Water supplied by IWVWD will be used for:

- Solar mirror wash water to maintain solar collector efficiency,
- Domestic potable uses include drinking water, showering, toilets, hand washing, etc,
- Power cycle makeup water to supply the steam driving the steam turbine generators (this water is recycled and thus is not actually consumptive use),
- Ancillary equipment heat rejection, for cooling generators, pumps and other equipment, and
- Dust suppression.

Soil and Water Table 1 presents the anticipated water requirements associated with various uses for each month of the year. Estimates for water usage are based on:

- Solar mirror washing – experience at other locations with similar climatic conditions,
- Power cycle makeup water and ancillary heat rejection – expected monthly power production rates,
- Domestic potable use – number of employees and number of hours expected to be worked during the year (an average consumption of 37 gallons per person per day was assumed), and
- Dust suppression

Soil and Water Table 1
Estimated Water Usage – Total Project

Flow	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
gpm (average)	28.25	60.48	82.80	113.71	127.20	128.07	118.55	118.48	104.73	74.75	57.95	48.68
Acre-Feet	3.97	8.29	11.34	15.58	17.43	17.54	16.24	16.23	14.35	10.24	7.94	6.67

Source: SM 2009a

Water from the wells will be piped to an existing tank and transmitted via pipeline that will be built by the RSPP to the Project site. The well locations are shown on **Soil and Water Figure 1. Soil and Water Table 2** is a summary of the available information on these wells. The wells are currently used by the IWVWD as water supply wells for the district. Additional details for these wells are provided in SM 2009a, Appendix J.

Soil and Water Table 2
Completion Data for Water Supply Wells

Well Number	Well Construction		Screen Interval		Pumping Rate
	Ground Surface (ft msl)	Total Depth (ft bgs)	Top (ft bgs)	Bottom (ft bgs)	(gpm)
Well 18	2,540	1,020	560	1,000	470
Well 33	2,540	1,020	560	1,000	816
Well 34	2,570	955	550	865	1200
			895	935	

From the information provided, the total depth of the onsite wells range from 955 to 1,020 feet bgs. Wells vary from 16 to 20 inches in diameter and are gravel packed and screened from depths below 560 to 895 feet to the total depth of each well. The most recent water levels were collected during the annual groundwater sampling conducted by the IWVWD in 2008. The data collected during this effort indicates that the saturated thickness in these wells is between about 1,500 feet depending on the total depth of the well. The information provided by the IWVWD reveals that three wells are pumped at rates between 470 to 1,200 gpm (SM 2009a)

C.9.4.2 SETTING AND EXISTING CONDITIONS

Physiography

The Project site is located in the Indian Wells Valley, in Kern County, California. The Project site is immediately south of U.S. Highway 395 approximately five miles southwest of the city of Ridgecrest. The Indian Wells Valley is located in the southern end of the Basin and Range Province east of the Sierra Nevada, south of the Coso range, north of the El Paso Mountains, and west of the Argus Range. Indian Wells Valley is also situated between the Sierra Nevada Fault Zone to the west and the El Paso and Garlock faults to the south. The Valley is characterized by a broad alluvial basin of Cenozoic-age sedimentary and volcanic material overlying older plutonic and

metamorphic rocks. Quaternary lacustrine deposits are also found in the region as a result of playas in the northeastern portion of the valley (**Soil and Water Figure 2**). Indian Wells Valley is underlain with alluvial deposits up to 2,000 feet thick.

The Project site is located in the Mojave Desert which is classified as a “high desert”. It is a transition between the “hot” Sonoran Desert to the south and the “cold” Great Basin Desert to the north. Characteristic of a desert climate, the Mojave Desert has extreme daily temperature changes, low annual precipitation, strong seasonal winds, and mostly clear skies. The average annual precipitation is less than five inches with over 77% of the precipitation occurring between November and March. There is, however, a summer thunderstorm season from July to September with violent heavy precipitation that occasionally produces flash flooding. May and June are usually the driest months.

The Project site is located in the southeast portion of Indian Wells Valley. Topography at the site is relatively flat and slopes gently downward in a northwest direction at a gradient of approximately 0.2%. Ground surface elevations range from approximately 2,890 feet above mean sea level (msl) in the southeast to 2,580 feet above msl in the northwest. The Project site is bisected by a concealed, inactive fault. The fault shows evidence of displacement during the late Quaternary time, most likely during the Pleistocene. The inactive fault trends northwest and is located in the southern half of the site.

Topography at the RSPP site slopes gently away from the El Paso Mountains from the south to the north-northwest across the site. The topography shows an average slope of about one foot in 80 feet (1.2%) on the west side of the central drainage (El Paso Wash) crossing the Project site. There are steeper grades east of the El Paso Wash on the Project site. Grades of 1.5% to 2.3% to the north and northwest are measured from an unnamed topographic high on the eastern boundary of the Project site.

Climate and Precipitation

The climate in the Basin and Range province is characterized is dry and arid and characterized by low precipitation. The region experiences a wide variation in temperature, with very hot summer months with mean maximum temperatures exceeding 100 degrees Fahrenheit (°F) occurring in July and August and cold dry winters with mean maximum temperatures in the 60s °F and lows in the 30s °F occurring in December. The average annual precipitation in the Project area is less than five inches with over 77% of the precipitation occurring between November and March with January being the wettest month. May and June are usually the driest months.

Annual precipitation in Indian Wells Valley ranges from four to six inches. **Soil and Water Table 3** presents the average monthly and annual minimum and maximum temperatures and total precipitation from 1940 to 2008, collected from a gauging station in Inyokern (Station 044278), about seven miles northwest of the Project. Average annual precipitation is approximately 4.22 inches based on 68 years of record.

Soil and Water Table 3
Inyokern, California Climate and Precipitation Summary[1]
1940 through 2008

Climate	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual[2]
Ave. Max. Temp (°F)	59.6	64.9	70.4	77.8	87.0	96.8	102.7	101.3	94.2	83.3	69	59.7	80.6
Ave. Min. Temp (°F)	30.7	34.6	38.8	44.5	52.9	60.5	66.2	64.6	58.1	48.2	37.3	59.7	47.2
Ave. Total Precip (in)	0.74	0.97	0.57	0.17	0.07	0.02	0.17	0.23	0.21	0.	0.39	0.59	4.22

Notes: [1] Source - Western Regional Climate Center, http://www.wrcc.dri.edu/ (Climate Station 044278 – Inyokern, CA)
[2] Refers to the annualized average of monthly temperature and precipitation values.

Key:
Ave—Average Max—Maximum Temp—Temperature °F - degrees Fahrenheit Precip—Precipitation in Inches

Source: SM 2009a

Soils

The Project is located in an undeveloped area with few agricultural activities ongoing at the site. The Project site has no history of intensive agricultural use (though it has had grazing authorized by BLM permits), nor has it been mapped for agricultural purposes or had any special agricultural land use designations applied under the Farmland Mapping Act or the Williamson Act. Thus, the Farmland Mapping Act and Williamson Act do not apply to the Project, and are not discussed further.

The ground surface in the region of the Project generally slopes gently downward to the northwest at a gradient of approximately 0.2%. Ground surface elevations at the Project site range from approximately 2,820 feet above mean sea level (msl) in the southeast to 2,580 feet above msl in the northwest. A steeper grade of 8% is present along the eastern side of the Project at the rock outcrops in Section 25, T27S R39E. Because of the high temperatures, low precipitation, and permeable soils, local drainage is intermittent and occurs as dry washes. In areas where the topography is flat, soils range in texture from very sandy to sandy loams and loamy sands. There is an absence of adjacent uplands to introduce surface runoff; discrete channels have not formed. Coarse-textured soils exhibit high infiltration rates, indicating that most precipitation infiltrates immediately into the ground.

Soil survey maps are not available from the NRCS Soil Survey website so the Applicant commissioned a reconnaissance soil survey for the Project. Wasco sandy loam is considered to be representative of the soils at the Project site. It is a component of the Wasco-Rosamond-Cajon Association that was mapped in the majority (95%) of the site. Only 5% of the site is underlain by the Trigger-Sparkhule-Rock Outcrop Association **(Soil and Water Figure 3)**. The Wasco-Rosamond-Cajon Association is characterized by soils with high sand percentage (greater than 70%) and is highly susceptibility to wind erosion. Detailed soil descriptions were developed from the borings, test pits, and site reconnaissance conducted during the preliminary geotechnical investigation. Soil characteristics including depth, texture, drainage, permeability, and erosion hazard of individual soil mapping units are included in **Soil and Water Table 4**. Land capability

classification is an indicator of the soils primary limitations for revegetation. Soil types on the plant site include VIIs and VIIc Capability Subclasses, which means the soils have very severe limitations that make them unsuitable for cultivation.

Soil and Water Table 4
Soil Mapping Unit Descriptions and Characteristics

Map Unit	Description
Wasco	Wasco Series - Sandy Loam - Formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources - Well drained - Slopes range from 0-5% - Negligible or very low runoff - Moderately rapid permeability - Slight hazard of wind erosion - Capability Subclass VIIs and/or VIIc - Taxonomic Class: Coarse-loamy, mixed, superactive, nonacid, thermic Typic Torriorthents
Rosamond	Rosamond Series – Fine Sandy Loam - Formed in material weathered mainly from granitic alluvium - Well drained - Slopes range from 0-2% - Medium runoff - Moderate to moderately slow permeability - Moderate hazard of wind and water erosion - Capability Subclass VIIe - Taxonomic Class: Fine-loamy, mixed, superactive, calcareous, thermic Typic Torrifluvents
Cajon	Cajon Series - Sand - Formed in sandy alluvium from dominantly granitic rocks - Somewhat excessively drained - Slopes range from 0-15% - Negligible to very low runoff - Rapid permeability; sandy loam surface textures have moderately rapid over rapid permeability - Slight hazard of wind erosion - High hazard of water erosion - Capability Subclass VIIIs and/or VIIe - Taxonomic Class: Mixed, thermic Typic Torripsamments
Trigger	Trigger Series - Gravelly Sandy Loam - Formed in material weathered from hard sedimentary rocks - Well drained - Slopes range from 5-50% - Medium to rapid runoff - Moderately rapid permeability - Taxonomic Class: Loamy, mixed, superactive, calcareous, thermic Lithic Torriorthents
Sparkhule	Sparkhule Series – Gravelly Sandy Loam - Formed in residuum from volcanic or granitic rocks - Well drained - Soils are on rock pediments and hill with slopes ranging from five to 50% - High to very high runoff - Moderately slow permeability - Taxonomic Class: Loamy, mixed, superactive, thermic Lithic Haplocalcids

Source: SM 2009a

Site soils were described during a reconnaissance-level geotechnical assessment conducted for the site. General observations indicated that soil textures at the site ranged from coarse sands to sandy clay loams, but were predominantly sandy loams.

This was confirmed by the laboratory textural analysis conducted for soil samples collected at the site. The soils were formed in alluvial deposits from the surrounding mountains. The vegetation at the site is dominated by predominantly creosote bush, with other low brush, cacti, annual forbs, and some introduced grasses in places. The ground surface at the site ranged from scattered small stones to significant coverage by fine gravels (SM, 2009a).

Geology

The Project site is located within Indian Wells Valley, which is in the southern end of the Basin and Range Province east of the Sierra Nevada, south of the Coso range, north of the El Paso Mountains, and west of the Argus Range. Indian Wells Valley is also situated between the Sierra Nevada Fault Zone to the west and the El Paso and Garlock faults to the south. The Valley is characterized by a broad alluvial basin of Cenozoic-age sedimentary and volcanic material overlying older plutonic and metamorphic rocks (**Soil and Water Figure 4** and **Soil and Water Figure 5**). Quaternary lacustrine deposits are also found in the region as a result of playas in the northeastern portion of the valley. Indian Wells Valley is underlain with alluvial deposits up to 2,000 feet thick. The Project site is underlain by three stratigraphic units: Jurassic age basement complex, Quaternary and Tertiary age Black Mountain Basalt and Quaternary alluvium of Holocene age. A basement complex of Jurassic, undifferentiated plutonic, hypabyssal, and metamorphic rocks outcrop in the eastern portion of the site. The basement complex forms a basin in which the Tertiary and Quaternary age deposits are found. The Black Mountain Basalt is thought to be of late Pliocene and Pleistocene age and consists of olivine basalt flows that are more than 100 feet thick in some places. An unconformity is formed at the boundary of the Black Mountain Basalt and the overhead Tertiary age continental deposits that comprise the Goler and Ricardo Formations. Surficial Quaternary alluvium sits atop the Tertiary continental deposits.

The majority of the Project site is underlain by Quaternary alluvium and alluvial fan deposits of Holocene age. These deposits consist of unconsolidated moderately to well-sorted gravel, sand silt, and clay. These deposits are derived as alluvial fans from the surrounding mountainous regions and may include fluvial deposits.

Regional Tectonic Setting

The Project site is located in seismically active Southern California, a region that has experienced numerous earthquakes in the past. A review of the AP Earthquake Fault Zone maps and the Kern County Online Mapping System Faults and Fault Zones layer indicate that there are no AP fault zones present within the Project boundaries; however there are three AP fault zones within a 10-mile radius of the center of the Project site. The closest of these AP fault zones is the Little Lake Fault Zone which is located approximately 6.6 miles northeast of the site. Two segments of the Airport and Little Lake Fault Zone are located to the north and northwest of the Project site, approximately 10 miles from the center of the site.

An unnamed buried fault trace has been mapped as trending northwest-southeast across the center of the site. Based on personal communication with Glenn Harris (BLM Ridgecrest office), site features, and observations made during a July 2009 field reconnaissance (SM 2009a), the more probable location of the unnamed fault is just north of, and parallel to Brown Road, and trends roughly east-west (**Soil and Water**

Figure 6). This fault has not been mapped by the United States Geological Survey (USGS) as a Quaternary (sufficiently active) fault, and is not listed by the EQFAULT program as a fault potentially affecting the site.

Hydrogeology

The Project site is within the South Lahontan Hydrologic Region, which covers about 33,100 square miles of eastern California. The South Lahontan Hydrologic Region is bound to the west by the crest of the Sierra Nevada; to the north by the watershed divide between Mono Lake and East Walker River drainages; to the east by the California-Nevada border; and to the south by the crest of the San Gabriel and San Bernardino mountains and the divide between watersheds draining south toward the Colorado River and those draining to the north. The South Lahontan Hydrologic Region includes the Owens, Mojave, and Amargosa River systems, the Mono Lake drainage system, and numerous other internally drained basins.

Groundwater Basins

The South Lahontan Hydrologic Region is subdivided into 76 groundwater basins that cover approximately 18,100 square miles. The IWVGB is located in the west-central portion of the South Lahontan Hydrologic Region and is bounded to the east by the Argus Range, to the south by the El Paso Mountains; to the west by the Sierra Nevada Range; and to the north by the Coso Range. Other groundwater basins that are adjacent to the IWVGB include the Coso Valley Groundwater Basin to the north, the Rose Valley Groundwater Basin to the northwest, the Searles Valley Groundwater Basin to the east, and the Fremont Valley Groundwater Basin to the southwest (**Soil and Water Figure 2**).

The lowest point of the IWVGB is China Lake at an elevation of 2,150 feet above mean sea level (msl). The topography of the Project site is characterized by low relief and elevations that gently slope toward China Lake at grades between 1% and 3%. China Lake is approximately 12 miles to the northeast of the Project site. Two smaller playas, Mirror and Satellite Lakes, are south of China Lake in the east-central portion of the valley and are the primary surface water and groundwater discharge points. Surface elevations in the valley floor range from approximately 2,153 above msl in the northeast to 2,400 feet above msl in the southwest.

Groundwater beneath the plant site and surrounding area is contained within the IWVGB. This basin encompasses an area of about 597 square miles or 382,000 acres. Water resources, their occurrence and use are complicated issues within the region. In this desert environment, groundwater provides an important resource for domestic, agricultural, commercial and industrial use. Groundwater is the sole source for municipal, agricultural, and domestic water supply in the Indian Wells Valley Groundwater Basin (IWVGB).

The IWVGB is not an adjudicated basin. In 1995, the major water service providers and stakeholders in the IWVGB formed the Indian Wells Valley Cooperative Groundwater Management Group and published the Cooperative Groundwater Management Plan. Participants in the plan include the IWVWD, the China Lake Naval Air Weapons Station (NAWS), the BLM, Searles Valley Minerals, the Kern County Water Agency, City of

Ridgecrest, Inyokern Community Services District, Eastern Kern County Resources Conservation District, Indian Wells Valley Airport, Quist Farms, and Kern County, and stakeholders. The plan outlines seven objectives with the intent to extend the useful life of the groundwater resources to meet current and foreseeable future needs. The seven management objectives are as follows:

1. Limit additional large scale pumping in areas that appear to be adversely impacted. Under this objective, no signatory producing water will increase its annual production of water from the groundwater depression in the area in T26S R40E Sections 29, 30, 32, and parts of sections 31, and 33; and T27S R40E Sections 4, 5, and northern part of Section 9; and T26S R39E part of Section 25. This applies to extractions greater than 5 afy.

2. Distribute new groundwater extraction within the Valley in a manner that will minimize adverse effects to existing groundwater conditions (levels and quality), and maximize the long-term supply within the IWV. Under this objective, the participants will consider developing wells in the outlying areas of the IWV.

3. Aggressively pursue the development and implementation of water conservation and education programs. Under this objective, the Signatories have collectively developed a written policy regarding water conservation (Water Conservation Public Advisory) and will continue to develop water conservation guidelines and education programs.

4. Encourage the use of treated water, reclaimed water, recycled, gray and lower quality water where appropriate and economically feasible. The Signatories will consider the use of non-potable water, such as treated sewage effluent or poor quality sources, for appropriate re-use applications.

5. Explore the potential for other types of water management programs that are beneficial to the IWV. Under this objective, the Signatories will consider projects such as water transfers, water banking, water importation, groundwater replenishment, and other programs that will enhance or prolong groundwater reserves in the IWV.

6. Continue cooperative efforts to develop information and data which contributes to further defining and better understanding the groundwater resources in the IWV. Under this objective, the Signatories will continue to efforts to gather data and analyze projects focusing on groundwater recharge, discharge, storage, quality, transmissivity, and storativity with respect to groundwater resources of the IWV.

7. Develop an interagency management framework to implement objectives of this Plan. This objective lists the Signatories to the Plan and provides for the further development of this cooperative agreement to define the roles, responsibilities, rights, and obligations of all participants. It also affords the opportunity to enlist new members and provides the administrative framework for implementing applicable elements of this Plan.

The Cooperative Groundwater Management Group is a public water data-sharing group consisting of most of the major water producers, other government agencies, and

concerned citizens in the Valley. In the past, efforts by the individuals or agencies involved were often, for lack of communication, duplicated by another. This group was formed to coordinate efforts, share data, and avoid the redundancy of effort. A technical sub group continually reviews and monitors the ongoing efforts to better understand the local water resources. This group is also responsible for an extensive well monitoring program and a water recharge study. Numerous studies have been conducted to better understand the groundwater resource in the Valley and provide information to be used to manage the groundwater resource. Rain and stream gages have been placed in strategic locations in the basin, and over 100 wells are monitored.

Groundwater Inflow/Outflow

The water budget inflows for the Valley consist of mountain front recharge, subsurface inflow from the Rose Valley Basin and Coso Valley Basin, and infiltration of surface flows through Little Lake Gap. The only outflows are through groundwater pumping and evapotranspiration from the playa areas. Generally, groundwater flow directions throughout Indian Wells Valley are directed towards the China Lake playa just north of Ridgecrest. Groundwater flow direction on the Project site trends northeast towards the playa. In the region, groundwater elevations range from approximately 2,150 feet above msl to 2,350 feet above msl. Beneath the Project plant site groundwater flows to the northeast towards Ridgecrest and ranges from approximately 2,250 feet above msl and 2,350 feet above msl.

The IWVGB is virtually closed, and there is limited groundwater underflow to or from adjacent valleys. As a closed basin, surface drainage does not “exit” the basin and flow from the surrounding mountains drain toward China Lake, or other small playas in the area. Evapotranspiration (ET) from the playa areas was the primary outflow from the IWVGB until the about 1950s or 1960s. At this time, groundwater pumping began to exceed ET rates. Prior to this time, ET from the China Lake area (playa) was the primary outflow of groundwater from the IWVGB. Current groundwater pumping rates have intercepted water flowing east towards the playa, reducing the amount of ET from the IWVGB.

The current conceptual model for the hydrogeologic system in the IWVGB is that the basin is closed and that the bulk of groundwater inflows are primarily from the mountain front recharge from the Sierra Nevada and subsurface inflow from the north and north-central portions of the IWVGB. Recharge to the IWVGB is derived from the infiltration of precipitation and runoff from the Sierra Nevada and anthropogenic recharge. Anthropogenic recharge is recharge that occurs from excess water applied for domestic or agricultural irrigation, or from wastewater treatment system percolation ponds. The estimates of total basin recharge have varied from 9,000 to 11,000 afy. Brown and Caldwell estimated total mountain front recharge into the basin to be 9,400 afy (SM 2009a).

Recharge to the IWVGB is also derived from underflow from the Rose Valley Basin and the Coso Valley Basin. Subsurface inflow from the Rose Valley Basin occurs through the Little Lake Gap and possibly from underneath or through the basalt flow located approximately five miles east of the Little Lake Gap. Based on available information,

recharge through subsurface inflow from the Rose Valley Basin is estimated to be between a few hundred to between 2,000 and 3,000 afy. Subsurface inflow from the Coso Valley Basin is believed to be very low.

In addition, during wet years, some surface flow enters the IWVGB through the Little Lake Gap; however, this flow is anomalous and intermittent and is not included in the long-term water balance calculation.

Groundwater in the IWVGB is used for municipal, domestic, industrial and agricultural purposes. The principle entities pumping groundwater are the IWVWD, China Lake NAWS, and the Searles Valley Minerals Company, which uses water to support mining operations in the adjacent Searles Valley. In 2007 – the latest year for which this data was available, groundwater pumping in the IWVGB was about 25,000 afy. Municipal and agricultural uses account for 32% each, industrial uses account for 12% and miscellaneous private well owners account for 24% of the total production. Less well documented groundwater pumping is conducted by smaller water providers and domestic wells used both for potable use and domestic irrigation. In 1993, the USBR estimated there were 3,000 private wells in the IWVGB with approximately 550 of those operational and producing approximately 2,099 afy of groundwater. In 1996, the residential groundwater pumping was estimated to be 1,728 afy. The Indian Wells Valley Groundwater Cooperative Management Group estimated in 1997, there were 670 individual domestic wells and 120 residential cooperative wells (SM 2009a).

A conceptual basin-scale groundwater budget was developed that included inflows from mountain front recharge, subsurface inflow, and infiltration from surface flows thru Little Lake Gap; and outflows from groundwater pumping and ET from the playa. Prior to the onset of extensive pumping in the 1950s, groundwater flow was generally radial directed toward the playa, where it flowed upwards vertically through semi-confining layers and evaporated. The conceptual basin water budget for assumed steady state conditions in 1920 was approximately 11,000 AFY of total inflow and outflow (including 1,000 AFY of groundwater pumping).

Brown and Caldwell has developed a three-dimensional, MODFLOW-2000-based, finite difference, numerical groundwater flow model for the IWV using common format project databases and a fully integrated combination of 3 software packages, including GIS, EVS, and a MODFLOW modeling interface. The IWVGB numerical groundwater flow model has four layers and a uniform cell spacing of one-quarter mile. The active groundwater flow domain covers approximately 450 square miles and extends to a maximum depth of 2,000 feet bgs. The model was used to simulate historical groundwater elevations, natural water budget components, and pumping from 1920 to 2006.

During the model calibration process, the aquifer material properties, recharge, subsurface inflow and ET were varied in an effort to best match available measured historical water level data. In general, the model results simulate the historical water levels very well for the early years (including 1920 and 1953), with greater deviations from observed conditions in later years (including 1985 and 2006). A review of the 2006 model residuals shows that simulated model water levels are locally overestimated in the vicinity of Ridgecrest (most likely due to intense local pumping depressions), and

underestimated immediately south of the playa (due to local shallow perched conditions). Based upon a thorough set of quantitative calibration criteria, the basin-wide distribution of model water levels was deemed appropriate to use the model for future predictive simulations and planning purposes.

One of the most significant results of the IWVGB Groundwater Flow Model and Hydrogeologic Study has been the estimation and refinement of the basin water balance (**Soil and Water Table 5**). Additionally, the amount of groundwater pumping in excess of natural basin inflows, or overdrafting of the regional groundwater system, was estimated. Total simulated outflows increase dramatically from both the 1920 (steady state) and 1953 time periods due to large increases in total estimated groundwater pumping. This has occurred in spite of the continued decline of simulated ET as groundwater pumping in the southern and western portions of the basin captured an increasing amount of groundwater flow before it reaches and evaporates at the playa. The simulated decline in ET flux over the modeled time frame does offset some of the increase in pumping, however, a comparison of storage versus basin groundwater pumping suggests that over 80% of present day pumping is derived from aquifer dewatering. The model calibration process also indicated that much less recharge was occurring from the El Paso Sub-Basin than previously postulated, which in part explains the steep drop in water levels between the El Paso Sub-Basin and the southwest area of the main IWVGB. Since approximately 1980, the annual change in groundwater storage (overdraft) has averaged approximately 20,000 AFY and is estimated to total approximately 900,000 acre-feet since 1920, the bulk of which has occurred since the 1950s.

Soil and Water Table 5
Estimated Balance for Indian Wells Valley Groundwater Basin

Inflow/Outflow	Estimated Quantity (afy)
INFLOWS	
Mountain Front Recharge	9,500
Groundwater Subsurface Inflow (Rose Valley & Coso Valley Basins)	1,500
Inflow Sub-Total	11,000
OUTFLOWS	
Evapotranspiration (ET)	-4,000 to -8,000
Groundwater Extraction	-24,336
Outflow Sub-Total	-28,336 to -32,336
BASIN BALANCE	**-17,336 to -21,336**

Source: Derived from SM 2009a, Appendix J, Brown and Caldwell

Water-Bearing Units

Recent studies have led to a better understanding of the hydrogeology of the IWVGB. A comprehensive groundwater monitoring program for Indian Wells Valley was

undertaken by the Indian Wells Valley Cooperative Groundwater Technical Advisory Committee and Geochemical Technologies Corporation (Groundwater Management Group) culminating in a final report that was published in March 2008. Through a local groundwater assistance program (AB 303 Grant), eight wells were installed and sampled to provide data in Indian Wells Valley where historical groundwater data was lacking. The Groundwater Management Group study also included the sampling of 46 wells for water quality parameters including: general chemistry, general physical parameters, stable and radio-isotopic parameters. Details of this study were used to develop the hydrogeology of the IWVGB described below.

In 2009, a report was published that focused on a groundwater flow model and hydrogeologic study of the IWVGB. The study was performed for the IWVWD by Brown and Caldwell. Using existing data and previous studies by the USGS, United States Bureau of Reclamation (USBR), and studies conducted for China Lake NAWS, four key hydrostratigraphic features were identified that were critical to understanding the basin-wide water budget and in developing the hydrogeologic conceptual model. These features include: the existence of a north-south fine-grained sediment plug in the west-central basin, an east-west high permeability gravel zone in the Ridgecrest-Inyokern area, high groundwater gradient between the neighboring El Paso Sub-basin and the southwest area of the IWVGB, and playa ET losses and changes over time. The groundwater flow model led to the estimation and refinement of the water budget for the IWVGB that concluded that groundwater storage in the aquifer has been in overdraft condition averaging approximately 20,000 afy and totaling about 900,000 af since 1920. Most of which has occurred since the 1950s.

The Indian Wells Valley is composed of two broad geologic units, igneous, metamorphic and continental rocks and unconsolidated deposits (**Soil and Water Figures 4** and **5**). The igneous and metamorphic rocks consist of Mesozoic age rocks, which form the basement complex (Sierra Nevada Batholith); Tertiary continental deposits; and Miocene volcanic rocks. The Mesozoic basement complex exists below 2,000 feet to as much as 6,000 feet of alluvial fill, underlie the groundwater basin, and crop out in the surrounding hills. The Tertiary continental deposits overlie the basement complex and fill the valley to approximately 1,000 feet below ground surface. Miocene volcanic rocks crop out along the perimeter of the basin, more specifically, near the El Paso and Coso Mountains. The consolidated rocks are nearly impermeable except for areas where fracturing or weathering has occurred. These rocks are believed to yield little water to the overlying alluvial aquifer system.

The unconsolidated deposits are composed of Quaternary-age fan, lacustrine, alluvium, playa, and sand-dune deposits. The unconsolidated deposits achieve a maximum thickness of approximately 2,000 feet near the west-central part of the valley. Wells exceeding 7,000 feet have been drilled in the valley; however, sediments below 2,000 feet were observed to be consolidated Pliocene and Miocene continental deposits and are not considered to be water producing. Unconsolidated deposits vary throughout the valley, but in general, deposits consist of gravel, sand, silt, and clay, with the percentage of silt and clay increasing toward the central and eastern parts of the valley. Holocene sedimentation has been dominated by sand and gravel deposited in steep alluvial fans to gentle alluvial plain settings, and by silt and clay deposited primarily in dry, ephemeral lakes.

Previous investigations have divided the unconsolidated Quaternary deposits into two main aquifers: the shallow aquifer and the deep aquifer. The shallow and deep aquifers are different in quality and aerial extent, and are separated by the lacustrine aquitards over the eastern part of the valley. The shallow aquifer extends from China Lake westward to the center of the valley and from the area south of Airport Lake southward to the community of China Lake. Sediments of the shallow aquifer are as much as 300 feet thick and generally do not yield water readily. Water quality of the shallow aquifer is characterized by high concentrations of total dissolved solids. The deep aquifer is confined or partly confined by the lacustrine sediments of the shallow aquifer. In the past, water from the shallow aquifer was used only for fire protection and maintenance of a few buildings on China Lake NAWS.

The deep aquifer occurs beneath the shallow aquifer on the east side of the valley; however, the thickness of the deep aquifer is uncertain due to a lack of data. Wells drilled in the Intermediate Wellfield area between Inyokern and Ridgecrest indicate that the base of the deep aquifer is at least 1,750 feet bgs. The deep aquifer is the sole drinking water supply in the valley and is used by the China Lake NAWS, public water districts, private well owners, industry, and agricultural users.

A recent study by Brown and Caldwell (SM 2010a) identified four hydrostratigraphic features in the IWVGB. The features are: 1) Fine-Grained Sediment Plug, 2) Gravel Zone, 3) High Gradient, and 4) Playa. **Soil and Water Figure 6** shows the location of these features.

- The Fine-Grained Sediment Plug is located approximately three to four miles east of the Sierra Nevada mountain front and trends north-south. The upper contact of this feature begins at depth of approximately 340 feet bgs and sediments may be as much as 1,340 feet thick. The areal extent of this deposit is not well defined due to limited borehole data.
- The Gravel Zone is a west-east trending area of coarse-grained high permeability sediments. This area is located from the mouth of Indian Wells Canyon to approximately the northwest portion of Ridgecrest, extends approximately two miles north-south, and fines to the east. This region is referred to as the Inyokern and Intermediate Areas and contains high volume production wells. Wells within the Ridgecrest city limits are believed to be associated with this Gravel Zone; however, wells in this area have a higher percentage of fines and, therefore, their groundwater production is lower than the wells to the west.
- The High Gradient area extends from the El Paso sub-Basin into the main IWVGB near the southwestern portion of the valley. Groundwater gradients in this area have been measured at approximately 100 feet per mile. Brown and Caldwell proposed that the high gradient may be caused by a combination of a narrowing of the area available for flow and the influx of recharge from Freeman Canyon. In addition, the high hydraulic gradient could be related to a change in aquifer transmissivity from the narrows to the high permeability zone to the north.
- The Playa feature identified by Brown and Caldwell is located in the area of China Lake. The thickness of these sediments is not known, but is likely several tens of

feet thick. Deposits are highly micaceous silt, sandy silt, and fine sand with occasional plastic clays. Shallow water beneath China Lake is highly saline and unfit for most uses.

The majority of the wells in the IWVGB are located northeast of the Project in the City of Ridgecrest and are located within the IWVWD (**Soil and Water Figures 1** and **7**). It is important to note that while there is one well (27S/39E-35B001M) on the plant site and a nearby well approximately one mile to the west of the site, no lithologic information could be obtained as the well logs were unavailable for review.

Groundwater Occurrence and Flow

Prior to pumping, groundwater within the IWVGB flowed toward the China Lake playa, the area of lowest altitude in the Indian Wells Valley (2,153 feet above msl). As discussed above, the IWVGB is considered to be a virtually closed basin; with the majority of the water flowing into the basin remaining within the basin. Groundwater subsurface inflow is believed to enter the IWVGB from the Rose Valley and the Coso Groundwater Basins. Conservative estimates of potential subsurface inflow from Rose Valley Groundwater Basin range from a few hundred to between 2,000 and 3,000 afy. Based on the dry nature of the region and the absence of alluvial fill in the Coso Groundwater Basin, estimates for the subsurface outflow coming from the IWVGB are thought to be “very low”. Subsurface outflow out of the IWVGB has been hypothesized; however, this has not been formally documented and is considered insignificant. The other natural mechanism for groundwater to exit is through evaporation. ET rates at China Lake prior to pumping (1920s) in the valley were estimated at approximately 8,000 to 11,000 afy. In the 1960s, groundwater flow and ET rates began to decrease due to excessive groundwater pumping that caused lowering of the groundwater table and regional cones of depression. ET is largely absent from the playa area due to interception of the groundwater by pumping wells. If groundwater levels continue to drop near the playa area, ET will eventually cease (SM 2009a).

Groundwater in the deep aquifer of the IWVGB is reportedly contained under generally unconfined conditions, except in the vicinity of China Lake, where silt and clay lenses, lake deposits, and playa deposits locally create confined conditions (see **Soil and Water Figure 8**). The shallow aquifer does not yield water freely to wells and consists of poor quality water. Wells in the deep aquifer yield more than 1,000 gallons per minute (gpm), with some wells up to 2,000 gpm. This aquifer is used as the primary aquifer due to the better water quality.

The depth to groundwater below the southern portion of the site, measured in 1959 from the one onsite well (Glenn Harris with the BLM reported that the old onsite well site was discovered during cultural resource surveys of the site), is estimated to be approximately 230 feet bgs. That same year groundwater was measured at 451 feet bgs in a well approximately one mile west of the northern portion of the Project (**Soil and Water Figure 7**). The difference in the depth to groundwater in these two wells is approximately 220 feet. One possible explanation for the difference in groundwater elevations is that there is a groundwater barrier across the Project site, more specifically, a fault. Kunkel and Chase (1969) reported a probable groundwater barrier approximately two miles south of Inyokern in the southwest portion of the Valley. This description appears to be in the general area of the Project site and corresponds to the

general area of an unnamed, inactive fault that crosses the center of the site (**Soil and Water Figure 7**). This fault location and trend runs between the two wells described above and appears to be acting as a groundwater barrier, thus explaining the difference in groundwater depths observed in the two wells.

Historic water level data for selected wells within the IWVGB are provided in the AFC (SM 2009a Appendix J.1.) and illustrated in **Soil and Water Figures 9** through **11**, the figures show groundwater level contours from selected wells within the IWVGB from 1920, 1985, and 2006, respectively. Between 1920 and 1985, groundwater levels dropped throughout the Valley and are reflective of pumping within the City of Ridgecrest and west in the direction of Inyokern. The lowering of groundwater levels is again evident in the 2006 groundwater elevation map where an increase in the effects of pumping continued to lower groundwater levels and caused a cone of depression beneath the City of Ridgecrest.

Current depth to groundwater west of the eastern Project boundary and north of Brown Road (based on 2006 data) is estimated at 480 feet below the ground surface. The contours show that groundwater flows in a radial pattern toward China Lake and toward the cone of depression beneath the City of Ridgecrest. Based on regional groundwater trends and topography, groundwater flow beneath the plant site is expected to flow to the northeast towards the cone of depression.

Prior to China Lake NAWS operations (late 1940s), the primary use for groundwater in the IWVGB was for mining operations in the adjacent Searles Valley and to a much lesser extent for irrigation of agriculture. Between 1920 and 1937, annual groundwater pumping increased from 1,000 af to slightly less than 2,000 af. By 1950 pumping had increased to 6,000 af and by the early 1960s, groundwater pumping had exceeded the natural recharge and subsurface inflow of the IWVGB. At that time, total inflow into the basin was estimated to be between 9,000 to 11,000 afy. Currently, groundwater pumping within the IWVGB is estimated to total approximately 25,000 afy. With groundwater pumping increasing over the years, lowering of water levels are apparent throughout the valley; however, the natural flow of the basin continues to be toward China Lake.

Aquifer Characteristics

Properties used to define the aquifer characteristics include hydraulic conductivity, transmissivity, and storativity. Hydraulic conductivity is the property of the aquifer material to transmit water, and is expressed in units of feet per day (ft/d). Transmissivity is the hydraulic conductivity multiplied by the thickness of the sediments capable of storing water, and is expressed in units of gallons per day per foot or feet squared per day (ft^2/d). Storativity refers to the volume of water an aquifer releases or takes into storage per unit surface area of the aquifer per unit change in head.

In the development of a groundwater flow model and hydrogeologic study for the IWVGB, Brown and Caldwell used hydraulic conductivity values ranging from 0.1 ft/d to 100 ft/d. These values were based on geologic logs, pre-existing groundwater modeling studies, and interpretations based on local geology, depositional environments, and groundwater flow regime. The model showed that the areas with the highest hydraulic

conductivities are generally located immediately east of the Sierra Nevada. Areas of the IWVGB with lower hydraulic conductivities are localized and distributed throughout the Basin.

Published aquifer testing data report transmissivity values from of less than 1,400 ft^2/d to 36,800 and 44,000 ft^2/d to 155,000 ft^2/d. Both sets of values were based on aquifer testing and geologic data. The Brown and Caldwell (2009) model used storativity ranges of 0.05 to 0.15. Reported well yields in the lower aquifer are more than 1,000 gpm and some wells consistently yield more than 2,000 gpm. The IWVGB has an estimated storage capacity of about 2,200,000 af and 5,120,000 af. The calculated storage of 2,200,000 af is based on 1921 water levels as a steady state limit and 200 feet below this level as the economically feasible limit to extract groundwater (SM 2009a).

Groundwater Quality

The groundwater quality in Indian Wells Valley varies throughout the Basin. According to the CDWR (2009), TDS ranges from less than 600 mg/L to more than 1,000 mg/L. Analyses of water from ten public supply wells in the IWVGB show that TDS content ranges from 220 to 720 mg/L. In general, the highest quality water is in the deep aquifer (Groundwater Management Group 2008). TDS concentrations for wells in the IWVGB were mapped by the Indian Wells Valley Cooperative Groundwater Management Group. Groundwater considered to have the best quality (TDS of 500 mg/L or lower) is found in the southwestern part of the Valley and the western part of the Valley along the area of recharge.

A review of the water quality data for the IWVGB shows that eight major types of groundwater quality occur in the Basin:

- Alpine waters, characteristically calcium-sodium-magnesium-bicarbonate. These are characteristic of the Sierra Nevada.
- Sodium-chloride waters, characteristic of China Lake, southeastern parts of the City of Ridgecrest, and the Coso Geothermal Area.
- Sodium-carbonate waters, principally occurring in the southwestern part of Indian Wells Valley.
- Sodium-bicarbonate waters, occurs in an extensive horseshoe-shaped area in the north and southwestern parts of the basin.
- Sodium-bicarbonate-chloride waters, east of the horseshoe area and may represent mixing of easterly moving groundwater with the groundwater of the China Lake Playa.
- Sulfate waters from geothermal areas, mineralized areas, and sewage pond seepage.
- Calcium-(sodium-magnesium)-bicarbonate-chloride-sulfate waters, these probably represent a mixture of Alpine and Coso geothermal waters.
- “Waters of the well fields. Usually sodium-calcium, but sometimes calcium-sodium-bicarbonate-chloride waters. These could represent Alpine waters concentrated by ET mixed with sodium chloride geothermal leakage”.

A review of the water quality data for the ten wells pumped for the IWVWD water supply shows the following:

- TDS concentrations (280 to 5,640 mg/L) generally exceeded the recommended standard of 500 mg/L, for a drinking water resource in California.
- Arsenic was reported in general water quality data for 2008 at concentrations between 0.0024 – 0.025 mg/L. Some concentrations exceeded the primary State and Federal Maximum Contaminant Level (MCL) for Arsenic (0.010 mg/L). The IWVWD began compliance testing for arsenic in December 2007. At that time, three wells were placed on quarterly monitoring. Two wells violated the MCL based on samples collected in March, July, and October 2008. Arsenic is a naturally occurring element commonly found in drinking water sources in California.
- Boron concentrations range from 0.18 mg/L to 1.2 mg/L. Boron was reported in two District wells at concentrations of 1.2 mg/L and 1.1 mg/L. The Action Level for boron is 1.0 mg/L. The Action Level is the concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

The IWVWD serves the City of Ridgecrest and the surrounding areas. Ten wells are pumped by the IWVWD for their water supply and these wells are tested regularly for the presence of radioactive, biological, inorganic, volatile organic, and synthetic organic compounds. The results of the 2008 Annual Water Quality Report are presented on **Soil and Water Table 6**. This table also presents the analytical results for three wells that are proposed to be pumped for the Project water supply and are located approximately four miles from the center of the Project site. Given the long screen interval for these wells, these data likely represent an average water quality of the more permeable sediments over the screen interval.

Soil and Water Table 6
Summary of Water Quality Data (all values reported in mg/L)

Analyte	IWVWD Wells[1]	Proposed Project Supply Wells[2]		
	General Water Quality	Well 18	Well 33	Well 34
Arsenic	0.0024 – 0.025	ND	ND	0.004
Bicarbonates (HCO3)	87 – 150	150	140	140
Boron	0.180 – 1.20	0.26	0.29	0.29
Calcium	7.5 – 68	36	36	38
Chloride	21 – 210	25	30	31
Fluoride	0.43 – 1.20	0.94	0.73	0.62
Magnesium	ND	4.8	5.1	6.3
Nitrate (N)	6.5	1.7	1.8	2
Sodium	35 - 180	41	41	49
Sulfate	ND	43	43	46
Total Hardness (CaCO3)	21 - 250	110	110	120
Total Dissolved Solids (TDS)	220 – 720	290	280	290
Uranium (in pCi/L)	2.1 – 6.1	NS	NS	NS
Gross Alpha Particle Activity (in pCi/L)	0.8 – 7.8	NS	NS	NS
Vanadium	ND - .04	0.014	0.012	0.016
pH	7.2 – 9.0	7.8	7.9	7.2

Key:
mg/L – milligrams per liter ND – not detected at the practical quantification limit shown NS – not sampled
1 - IWVWD, 2008.
2 - Data provided by the IWVWD.

Source: SM 2009a

Indian Wells Valley Water District (IWVWD)

The Project site is adjacent to the IWVWD (**Soil and Water Figure 2**), which serves customers in Ridgecrest and the surrounding areas. Water from the IWVWD comes from ten wells that draw from the Indian Wells Valley aquifer. Water is pumped from the wells to ten water reservoirs with a combined storage capacity of about 16.6 million gallons. In the summer months when water demand is highest, the average monthly water use in the district is about 360 million gallons (1,105 af). During the winter months when water demand is lowest, the average monthly water use is 125 million gallons (384 af).

The IWVWD and the Project owner signed a Water Supply Agreement on October 29, 2009 (**SOIL AND WATER APPENDIX A**). IWVWD also issued a Will Serve Letter (SM 2009d Attachment Water-D) for water service. Water will be supplied to the project site from the Ridgecrest Heights B Zone water storage tank. A 16 inch diameter (originally 12 inch diameter) pipeline from the water storage tank will be constructed in China Lake

Boulevard southerly to Brown Road then westerly to the Project site. The Project owner is responsible for the design, permitting and construction of all necessary facilities. IWVWD is in the process of annexing the Project site (SM 2009d). **Soil and Water Figure 12** illustrates the proposed annexation. .

Surface Water Hydrology

The project site lies on the southern edge of the Indian Wells Valley and north of the El Paso Mountains. The general stormwater flow pattern is from the higher elevations in the mountains located approximately 6 miles south to the lower elevations in Indian Wells Valley to the north. The stormwater from the project site flows northeast to China Lake which is a depression in the Indian Wells Valley with no identifiable outlet.

The extents of the overall watershed impacted by the project was delineated utilizing existing USGS quadrangle maps and are shown on figure **Soil and Water Figure 13.** The figure was taken directly from the Project Drainage Report (SM 2010a). Off-site flows impacting the Project site are from a large watershed area to the south which covers approximately 37 square miles. The majority of the watershed impacting the upstream project boundary has been divided into three major sub-basins. The largest sub-basin flows to El Paso Wash and drains approximately 22 square miles from the El Paso Mountains and exits the mountains to the south of the site. El Paso wash crosses Brown Road inside the property boundary at two low points in the road. The second largest of the main sub-basins drains to an unnamed wash and covers approximately 9.2 square miles south and east of the Project. The sub-basin includes drainage areas both east and west of the U.S. Highway 395 (Three Flags Highway). Drainage water crosses U.S. Highway 395 at several points in both east-west and west-east directions, hydraulically connecting all the catchments in this drainage area. The smallest of the three main sub-basins drains to an unnamed water course and drains approximately 4.2 square miles south and west of the project site. The main watercourse associated with this sub-basin crosses the southwest section of the Project site continuing in a northwest direction toward Brown Road.

Peak discharges for each sub-basin were calculated using the HEC-HMS software package and methodology which generally followed the guidelines presented in the Kern County Hydrology Manual.

Review of the Curve Number (CN) used for the pre-development analysis indicated some of the values may not reasonable for the Project area. The pre-development soils map provided in the Project Drainage Report (SM 2010a) shows a discreet area which has been assigned a CN value of 95. This area coincides exactly with the Project boundary. This CN value is significantly out of the range of values provided for in the Kern County Hydrology Manual which reports a maximum CN value of 94 for what is described as “rockland, eroded and grade land.” The undeveloped project site does not meet these criteria and should have been assigned a value of more consistent with the surrounding areas which have a CN ranging from 75 to 81. The result of using this approach is that the pre-development discharges may appear to be too high when compared to post-development conditions.

Discussions with the applicant indicate that the CN of 95 used in the existing conditions analysis was based on results of the preliminary geotechnical analysis. These results

indicate moderate to very dense soils at all test locations. Estimates of hydraulic conductivity were provided based on sieve analysis results. However, actual infiltrometer tests were not completed. Any significant deviation from the accepted regional values will require site specific infiltration testing and detailed explanation of the correlation between the test results and the proposed CN value. In the absence of this data, values consistent with the Kern County Hydrology Manual should be utilized.

Staff has modified the existing conditions HEC-HMS model as provided by the applicant to reflect a regionally accepted CN value of 81 for all onsite watersheds in the undeveloped condition. Initial abstraction values were also modified to be consistent with the revised CN values. The results of the peak discharge analysis for the three main sub-basins impacting the upstream property boundary are summarized in **Soil and Water Table 7*.***

Soil and Water Table 7
Summary of Offsite Peak Discharges

Sub-basin ID	Sub-basin Area (Sq. Mi.)	Q100 (cfs) (HEC-HMS)	Q100 (cfs) (Regression)*
E1a	4.2	1,978	2,288
E2c	20.8	6,682	6,901
E3a	9.2	3,961	3,930

*The regional regression equation used in the analysis above was taken from the U.S. Geological Survey Open File Report 93-419 (1994), as provided in the Caltrans Highway Design Manual. The equation provided was $Q_{100}=850AREA^{0.69}$ for Region 10.

For this analysis, a comparison was made between the discharge data provided as part of the Project Drainage Report and discharges obtained using the appropriate USGS Regional Regression Equation for the region. The purpose of the comparison was to provide some insight into the reasonableness of the calculated discharges when compared to some other regionally accepted methodology. Overall, the reported pre-development discharges from both sources are very well correlated as reported in the Project Drainage Report (SM 2010a).

Dry Washes

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

Storm Water Flow

Storm water flow across and adjacent to the project occurs in a network of generally shallow alluvial channels which converge into more defined drainages such as El Paso Wash and North Ridgecrest Wash. The effective FIS mapping for these washes was overlain on the current project topography and found not to correlate well with current conditions. This situation is typical as effective FIS maps for approximate Zone A floodplains are often based on USGS quadrangle maps and not detailed topography.

The applicant has completed a revised existing conditions HEC-RAS model on El Paso Wash and North Ridgecrest Wash in order to have floodplain mapping which is based on the best available data.

The revised mapping for El Paso Wash was used to prepare a project site plan which avoids the 100-year flood limits. Revised mapping for North Ridgecrest Wash was used to show the area of the floodplain which will be filled within the project limits. Flows from this wash will be diverted around the site and released back to the natural floodplain just downstream of the property. The applicant has prepared a draft Conditional Letter of Map Revision (CLOMR) application for both El Paso Wash and North Ridgecrest Wash. The CLOMR will be submitted to FEMA for approval prior to construction. This document presents the updated existing conditions floodplain modeling as well as the proposed changes to the floodplains based on the proposed site improvements.

Surface and Groundwater Beneficial Uses

The Water Quality Control Plan (Plan) for the Lahontan Region Water Quality Control Board (LRWCQB) establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Plan describes implementation plans and other control measures designed to ensure compliance with state-wide plans and policies, and provides comprehensive water quality planning. The following chapters of the Plan are applicable to determining appropriate control measures and cleanup levels to protect beneficial uses and to meet the water quality objectives: Chapter 2, Beneficial Uses; Chapter 3, Water Quality Objectives; and the sections of Chapter 4, Implementation, entitled “Point Source Controls” and “Non-Point Source Controls.”

- Beneficial Uses: Chapter 2 of the Water Quality Control Plan describes beneficial uses of surface and ground waters. The beneficial uses of surface waters of Indian Wells Valley (Hydrologic Unit No. 624.00) are municipal and domestic supply, agricultural supply, groundwater recharge, freshwater replenishment, water recreational purposes, wildlife habitat support, and warm freshwater habitat support. The beneficial uses of ground waters of the IWVGB are municipal and domestic supply, agricultural supply, industrial service supply, and freshwater replenishment.
- Water Quality Objectives: Region-wide numeric and narrative objectives for general surface waters are described in Chapter 3 of the Water Quality Control Plan under the “Water Quality Objectives for Surface Water” and region-wide objectives for groundwater under the “Water Objectives for Ground Water.”
- Waste Discharge Requirements: Chapter 4 of the Water Quality Control Plan describes the measures that are to be implemented to protect the beneficial uses and to achieve the water quality objectives of the Plan. The chapter discusses general control actions and describes the Region’s Nonpoint Source Program. Specific types of activities and their related control actions are discussed including Waste Discharge Prohibitions, Stormwater Runoff, Erosion, and Sedimentation, Land Development, Groundwater Protection & Management, and Mining, Industry, and Energy Production.

- Section 13243: Under this section, the Regional Water Boards are granted authority to specify conditions or areas where the discharge of waste will not be permitted. The discharge of designated waste can only be discharged to an appropriately designed waste management unit.

The Lahontan RWQCB is evaluating the proposed discharge of fill material, including structural material and/or earthen wastes into waters of the State and will provide the Energy Commission with Waste Discharge Requirements (WDRs) which will be incorporated into Staff's Conditions of Certification. The Lahontan RWQCB considers WDRs necessary to adequately address potential and planned impacts to waters of the State and to require mitigation for these impacts to comply with the water quality standards specified in the Water Quality Control Plan for the Lahontan Region – North and South Basins.

WDRs from the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation and land farming techniques) HTF-impacted soil. The Applicant has prepared a draft ROWD application and the draft application was submitted to the Lahontan RWQCB. The Lahontan RWQCB is evaluating the ROWD application and will provide the Energy Commission with WDRs, which will be incorporated into Staff's Conditions of Certification.

C.9.4.3 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The direct potential effects of the Project on local water resources are those associated with using groundwater for construction (specifically for demands during site grading) and with the plant's operational process water demand. No surface water will be used, though Project construction and operation may have an effect on the ephemeral washes traversing the site.

Potential impacts on water resources during construction and operation include drawdown and related impacts, depletion of water resources, water quality impacts, erosion, and drainage impacts.

Soil Erosion

Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the Project site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport) at present.

Environmental impacts associated with the construction and operations are discussed in the following sections. CEQA significance criteria were developed based on California CEQA Guidelines and evaluated using professional judgment. Impacts would be considered significant if:

- Substantially increased wind or water-induced soil erosion occurred as result of Project construction or operation,
- Substantially increased sedimentation occurred in areas adjacent to construction areas,

- Prime Farmlands, Farmlands of Statewide Importance, or Unique Farmlands were lost, or
- Construction activities were to occur in areas of high erosion susceptibility and the disturbed areas were left exposed and not properly stabilized.

Grading of the Project site will result in a less than 2% slope downward from the east to the west on the northern part of the project (east of El Paso Wash) and less than 1% slope downward from the east to the west on the southern part of the project (west of El Paso Wash). Earthwork associated with the Project will include excavation for foundations and underground systems, and the total earth movement that will occur is approximately 7,500,000 cubic yards. Cut and fill will be balanced on site and there will be no need to either import or export earthen material.

The vast majority of the Project grading and excavation will occur on the Project site with only minor excavation needed for installation of the water pipeline. Known soil types that will be affected are listed in **Soil and Water Table 4**. The runoff potential of these soils is negligible to very high, the water erosion hazard is slight to moderate, and the wind erosion hazard is moderate to high.

During construction, the Project site area and offsite linear facilities will be disturbed. At that time, the surface of the disturbed areas will be devoid of vegetation and there will be the highest potential for erosion, as well as associated effects including soil loss and increased sediment yields downstream from disturbed areas. With the implementation of BMPs contained in the SWPPP and DESCP, such as straw bales, silt fences, and limiting exposed areas, the impacts of soil erosion during construction should be less than significant. Site grading will be balanced on site; there will be no import or export of fill material.

Construction and Operation

Water Erosion

The runoff designations for the soils affected during site grading are negligible to moderate for the Wasco-Rosamond-Cajon Association which comprises over 95% of the project site, and moderate to very high for the Trigger-Sparkhule-Rock Outcrop Association. Permeability in the Wasco-Rosamond-Cajon Association is moderately slow to moderately rapid. Detailed infiltration test results are presented in the Preliminary Geotechnical Investigation Report in Appendix B of the AFC (SM 2009a). A more detailed discussion of surface water conditions at the Project site is included in Section 5.17, Water Resources of the AFC (SM 2009a).

The potential for soil loss by water erosion (sheet and rill erosion) was estimated Solar-Millennium (SM, 2010a) using the Universal Soil Loss Equation for pre-development, construction conditions and operational conditions. Soil data has been collected and surveys have been conducted to estimate the soil loss at the Project site. Soil loss estimates due to water erosion for the undisturbed site conditions are 0.48 tons per acre per year (t/ac/yr) and for disturbed site conditions are 0.8 t/ac/yr (SM 2009a). During operation soil loss due to water erosion is estimated to be 0.73 t/ac/yr (SM 2010a). Water erosion from sheet and rill erosion under the present undisturbed conditions can

be considered minimal. High infiltration rates, flat slopes, and low rainfall contribute to the low water erosions rates. It should be noted that when soils are disturbed (i.e., during construction) erosion rates may increase slightly which may pose a potential impact. During construction, the bulk density of soils will increase due to compaction from heavy equipment, reducing the erosion rates during the operational scenario. Compaction of the soil will decrease soil infiltration rates potentially causing greater runoff, especially during high intensity, short duration rainfall events. However, the soils can be adequately protected with the implementation of proper BMPs.

Wind Erosion

The potential for soil loss by wind erosion was estimated by Solar-Millennium (SM, 2009a) using the Wind Erosion Prediction System (WEPS) for pre-development (undisturbed) and during construction conditions. The soils on the Project plant site have a moderate to high hazard for wind erosion. The results of the geotechnical investigation and reconnaissance soil survey provided a detailed determination of wind erosion susceptibility (SM 2009a, Appendix B). Under current conditions, the soil loss from wind erosion is estimated to be about 135 t/ac/yr for undisturbed conditions. The WEPS model is designed for agricultural fields and the Applicant did not account for the shrub plant community on site or soil crusts that tend to reduce or eliminate wind erosion. The Wasco and the Cajon soil series (which make up more than 90% of the site) both indicate only a slight wind erosion hazard. Consequently, the pre-development (undisturbed) soil erosion estimate could be slightly high. Regardless, construction activities would increase the potential for soil loss, and the estimate of soil loss during this period is about 140 t/ac/yr for disturbed conditions which would be a CEQA significant impact without implementation of control measures and BMPs as described in the SWPPP and DESCP. Implementation of Conditions of Certification **SOIL&WATER-1** and **2**, and **SOIL&WATER-8** through **12** that includes a SWPPP, DESCP and use of BMPs to control wind erosion would reduce the impact to below the level of significance.

For operational conditions soil loss from wind erosion is estimated to be about 64 t/ac/yr. Soil loss during operational conditions was calculated with consideration of the increased bulk density of the soils achieved during construction and of the application of water for dust control and mirror array washing.

Modeling the potential for wind erosion and air borne dust utilizing the WEPS model (SM, 2009a) indicates that even under present undisturbed conditions soil losses exceed the soil loss tolerances on an annual basis and, more significantly, loft PM_{10} dust particulates. The computed values are in excess of 100 tons/ac/year, with PM_{10} values in excess of 8 t/ac on an annual basis. These losses may possibly increase if large areas are stripped of the native cover and left bare for long periods or pulverized during construction. Best Management Practices for the re-establishment of native vegetation and dust control are recommended (see Section C.2, Biological Resources).

As discussed in Section C.1, Air Quality, by its nature, a solar thermal project must keep dust to a minimum, as a film on the collectors of the solar array will reduce their efficiency for power production. Dust control will be achieved by a combination of soil

stabilizers, water from the collector washing and waste cooling water, and compaction of the driving surface over time. Therefore, operational controls designed to control dust are expected to reduce the overall soil erosion in the area.

Mitigation

Construction and operation of the Project could result in significant impacts related to water erosion of soils. Implementation of BMPs and condition of certification would reduce the impacts to insignificant. Implementation of Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-8 through 12** described in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below, would ensure there would be minimal potential for impacts to soils related to water and wind erosion.

Groundwater Balance

There is concern that the amount of groundwater used for both construction and operations would contribute to the groundwater basin overdraft conditions. Groundwater overdraft is "the condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions." (CDWR, 1998).

Construction and Operation

As previously stated, the IWVGB is already significantly overdrafted and the Project's water use delivered to the Project site from the IWVWD (from groundwater wells located in the IWVGB) will exacerbate the overdraft condition. The Applicant has proposed a mitigation plan to offset the proposed construction and operation water demands with a plan for offsetting the Project's construction and operations water demands.

Mitigation

The mitigation plan identifies possible offset options within the Basin, and evaluates their feasibility of implementation, as well as provides the required offset in a reasonable time frame. The proposed plan is included in **SOIL AND WATER APPENDIX B**. From the feasibility study, a plan is presented wherein multiple options are proposed that will address the timely implementation of the full offset volume for construction and operational water supply.

From the feasibility study of potential options, the following were selected to be the initial focus of the water conservation offset plan:

- Water Supply through the LADWP;
- Xeriscaping ("cash for grass") of residential and commercial landscaped areas; and
- Fallowing of agricultural land within the Basin.

Options such as low-flow irrigation and tamarisk removal will be considered as necessary depending on the outcome of the implementation of the construction water supply through the LADWP aqueduct, xeriscaping program through the IWVWD, or agricultural fallowing. These options may be implemented to make up the difference should one or more of the primary options not be realized.

The above portfolio of mitigation measures either solely or in combination is expected to provide enough water to meet the required offset of 215 afy which equates to the average water annualized water demand for the project(1,500af over 28 months and 150afy during operation). **Soil and Water Table 8** summarizes the contribution expected from each measure.

Soil and Water Table 8
Summary of Water Savings Potential - Primary Water Offset Options

Offset Option	Potential Water Savings
Water Supply through the LADWP Aqueduct	1,500 af for construction water only.
Xeriscaping of Residential and Commercial Properties	215 afy, assuming 56 gallons per square foot savings by replacing turf with xeriscape. At this savings rate about 29 acres of turf would need to be converted; 29 acres represents about 6% of the estimated acreage (485 acres) in the City.
Fallowing of Agricultural Land	215 afy, assuming fallowing of alfalfa and a water use rate of 5.1 afy/acre. At this usage rate, about 42 acres are required on an annual basis; 42 acres is about 4% of the more than 970 acres of alfalfa grown within the Basin. Much of this acreage is farmed along Brown Road.

The Applicants are pursuing all the options indicated above equally as viable alternatives to further understand their implementability in meeting the Project construction start date and water offset requirement. Should one or more options prove to be feasible, a multi-option approach may be undertaken and the plan will be updated to reflect apportionment of the water supply between one or more options.

Supply from the LADWP Aqueduct

Access to the aqueduct would provide water from outside the Basin to offset water supply for construction of the Project. The application and approval process requires initial approval of the Project as a “public works” project through an initial contact with the Aqueduct Manager in Bishop, California. Following approval by the Aqueduct Manager, the application process is managed by the LADWP Bishop Real Estate Office and the Mojave Superintendant, who will establish the terms and requirements of the agreement, location of the connection, size of connection and required service.

Xeriscaping of Residential Landscapes

The IWVWD is currently in the process of developing a Cash for Grass Rebate Program for the City of Ridgecrest. The program consists of converting residential and commercial areas landscaped with grass/turf and replacing them with xeriscape. The Applicant through conversations with the IWVWD (**SOIL AND WATER APPENDIX B**) indicates the IWVWD plans to model their program after the cash for grass program by the Alliance for Water Awareness and Conservation (AWAC). The AWAC cash of grass program details are summarized in **SOIL AND WATER APPENDIX B**.

The Project would underwrite a portion of the xeriscaping program as planned by the IWVWD to the 625 homes needed to offset the water supply. In providing this support, the Project would offer financial incentives to the property owners within the City to convert their landscape. The administration and monitoring of the implementation would be performed by the IWVWD. Initial discussions between RSPP and the IWVWD are reported to have begun to determine how the Project can participate in the implementation of the cash for grass program.

Land Fallowing Program

The fallowing program would focus on alfalfa crops that are grown by Brown Road Farming on over 970 acres of farmland north of Inyokern, approximately 12 to 16 miles north of the Project site. The proposed plan would be similar to the agricultural land fallowing program that is currently in use by the Palo Verde Irrigation District (PVID) in the County of Riverside and the City of Blythe in the Palo Verde Mesa Groundwater Basin.

A land fallowing program would include some or all of the following elements:

- Meet with the Brown Road Farming landowner(s) and determine if they would be willing to participate in the fallowing program;
- Establish a “water factor per acre” to determine the acreage of land that will need to be fallowed to obtain the required volume of water. For the Basin, a determination should be made on using a single “water factor per acre” or using one that is crop specific for the Ridgecrest area. (For the South Lahontan Basin area, which includes the Indian Wells Valley Groundwater Basin, the average alfalfa crop water use is about 5.1 afy per acre [CDWR 1986]).
- Develop contracts/lease agreement with the property owner.

The proposed land fallowing program would include the IWVWD in the agreement in that water use would be monitored on a monthly and annual basis by the IWVWD to ensure that the annual water use by the grower does not exceed the negotiated water offset amount.

To ensure that land fallowed for water use offsets remains fallowed, a monitoring program will be implemented. The IWVWD does not provide water for irrigation to all growers; therefore, there are no meters or other means for monitoring water use other than visual inspection of the properties to ensure that they are not being irrigated. The monitoring program would consist of site visits on a regular or periodic basis to visually verify that properties participating in the fallowing program are complying with their contract requirements. Visual verification can be through site visits and/or review of aerial photography.

Groundwater Water Levels

The project has the potential to lower groundwater levels as a result of water production during both construction and operations. The lowering of groundwater levels could have a significant impact if the lowering of the groundwater levels impacts existing water wells in the basin.

Drawdown imposed by a well on another nearby pumping well can have adverse affects on the performance of that well and is referred to as interference drawdown or well interference. Specific potential adverse affects evaluated in this study include the following:

1. Interference drawdown can result in the water level of an aquifer being drawn down below the screen of the well (*i.e.*, the well goes dry);

2. Interference drawdown can result in the water level of an aquifer being drawn down to a point where the affected well's capacity to pump water is decreased and the well can no longer produce the amount of water that is needed for a particular use, or the well is at risk of becoming damaged and unusable over time due to exposure of the well's screen above the water table and resulting corrosion;

3. Interference drawdown can result in the water level in the affected well being drawn down to near the intake of the well's pump, requiring lowering of the pump intake in order for the well to remain operational; and/or

4. Interference drawdown can cause a decrease in groundwater level in the affected well such that the well and pump can continue to operate and produce adequate amounts of water, but pumping must occur at either greater frequency or duration, and/or water must be lifted to a greater height, resulting in greater operational and maintenance costs.

The extent and type of well interference experienced by an affected well is dependant on hydrogeologic conditions in the aquifer as well as the characteristics of the affected well. These include the following:

- The amount of interference drawdown that is applied (which varies with the distance of the impacted well from the Project well(s);
- The depth and screened interval of the affected well;
- The thickness of saturated sediments penetrated by the affected well;
- Local variations in the transmissivity of the saturated sediments in which the affected well is completed, if any;
- The condition and efficiency of the affected well;
- The affected well's pump specifications, including its rating curve, the depth at which the pump intake is set, and the resulting pumping water level in the well during operation; and
- The minimum required water production rate of the well.

Construction and Operation

Three wells, No. 18, 33 and 34 **(Soil and Water Figure 1)** that are operated by the IWVWD, all with the capacity to pump at about 1,200 gpm, are proposed to provide water for the Project. The wells may be used in rotating fashion though the period of rotation is not known. Therefore, to assess impacts one well was selected to provide the water for both construction and operation. Well No. 18 was selected to evaluate impacts from pumping to deliver water to the Project, since as at this time, the well is operated at

about 470 gpm and it has a reported capacity of 1,200 gpm. This well has more available capacity by comparison to wells No. 33 and No. 34, which according to the IWVWD are pumping at about 816 gpm and 1,200 gpm, respectively. It is also important to note that all IWVWD wells proposed for water supply are screened in Layer 2 of the model.

The calibrated model was used to provide an assessment of the changes in the cone of depression over a base line condition from pumping at IWVWD Well No. 18, and how the project pumping might impact adjacent water supply wells during the construction and operational periods.

Construction and operation activities are expected to take place over a period of approximately 28 months and 30 years, respectively. As noted above, among the available three IWVWD wells, Well No. 18 was used for the simulation, because of its high capacity and low pumping rate at the time of this report. The current pumping rate of Well No. 18 is 470 gpm. The pumping rate of the well will increase to 860 gpm (390 gpm addition for continuous construction water supply), or 561,600 gallons per day (gpd) (average) during 2.33 years (28 months) of construction period and 560 gpm (90 gpm addition for continuous operational water supply) or 129,600 gpd (average) during 30 years operational period.

Two simulations were conducted: one for a baseline scenario and another predictive scenario, one each for construction and operational supply. Before using the model for a baseline scenario, the model ran with default parameters to the time before construction (assumed to be December 31, 2010). The model continues through 28 months of construction followed by 30 years of operation with default pumping for all wells shown as operational in the model including Well No. 18 (i.e., 470 gpm). The predictive scenarios only changed the pumping rate in Well No. 18, and did not change the default rate for the wells within the IWVWD model.

The predictive scenarios ran with calibrated hydraulic parameters, but with a pumping rate of 860 gpm during the 28 month construction period and 560 gpm during the 30 year operation period. The predictive results of the drawdown (contour intervals of 10 feet and 5 feet) at the pumping well and of the drawdown distance are provided on the **Soil and Water Table 9**. The drawdown contours showing the cone of depression for baseline scenario and predictive scenario are shown on **Soil and Water Figures 14** through **18**. The following is a summary of the results from the predictive scenarios:

- The maximum drawdown at the well pumping and the distance to the 5-foot contour from pumping well (Well No. 18) at the end of the construction period at a pumping rate of 860 gpm with calibrated K and S is about 21 and 9,600 feet, respectively.
- The maximum drawdown at the well pumping and the distance to the 5-foot contour from pumping well (Well No. 18) at the end of the operational period at a pumping rate of 560 gpm with calibrated K and S is about 51 and 21,800 feet, respectively.

Compared to the baseline scenario, there is only an additional 2 feet drawdown at the well during the construction period and no discernable increase of drawdown during the operational period due to a very low pumping rate for the Project and a very small change in the baseline condition at Well No. 18. Similarly, there was not a significant

change in the diameter of the cone of depression over the baseline condition by comparison to operational supply. By comparison to the distance to the 5 foot contour, the proposed construction water supply expanded the cone of depression about 15% over the baseline condition during the proposed 28 month period of pumping.

A sensitivity analysis was also conducted to evaluate the response in the model prediction when varying key model variables. Two simulations were conducted for this purpose. Sensitivity Analysis 1 was based on the model calibrated K and low specific yield (25% calibrated value) and storativity (10% calibrated value) **(Soil and Water Table 9).** Sensitivity Analysis 2 was based on the low K (10% calibrated value) and low S (specific yield/storativity coefficient) **(Soil and Water Table 9)**. All IWVWD wells proposed for water supply are screened in Layer 2. For the sensitivity analysis, hydraulic parameters for all layers were adjusted except for Layer 4.

As shown in **Soil and Water Table 9**, Sensitivity Analysis 1 with a low specific yield and storage coefficient and calibrated hydraulic conductivity would result in minimal drawdown increases at the well with only an additional 3 feet drawdown at the end of the construction period and an additional 7 feet at the end of the operational period. Sensitivity Analysis 2 produces large drawdown increases at both the end of the construction period and the operational period. This is understandable because one order of magnitude lower K was used in this simulation.

As stated in the model report (SM 2009a, Appendix J, Brown and Caldwell, 2009), some uncertainties remain in the specific magnitude of each inflow and outflow component over various time periods. In addition, the spatial distribution of hydrogeologic properties also remains somewhat uncertain.

Soil and Water Table 7
Results of Numerical Groundwater Flow Modeling Proposed Construction and Operational Water Supply
Ridgecrest Solar Power Project Kern County, California

SCENARIO	Pumping Rate Construction/ Operation (1)	Period Construction/ Operation	Hydraulic Conductivity	Specific Yield and Storativity	END OF CONSTRUCTION			END OF OPERATION		
					MAXIMUM drawdown in the Pumping Well	DISTANCE to a Drawdown of 10 Feet	DISTANCE to a Drawdown of 5 foot	MAXIMUM drawdown in the Pumping Well	DISTANCE to a Drawdown of 10 Feet	DISTANCE to a Drawdown of 5 foot
	(gpm)	(year)	(ft/day)	--	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
BASELINE CONDITION (see Soil and Water Figure 14)	470	2.33/30	Layer 1: 5 Layer 2: 20 Layer 3: 0.5 Layer 4: 5	Layer 1: 0.15 - 1.0e-5 Layer 2: 0.12 -1.0e-5 Layer 3: 0.1 - 1.0e-4 Layer 4: 0.1 - 5.0e-5	19	1,520	8,320	51	21,800	23,400
CALIBRATED MODEL - No change in K and S (see Soil and Water Figure 15)	390/90 (860/560)	2.33/30	Layer 1: 5 Layer 2: 20 Layer 3: 0.5 Layer 4: 5	Layer 1: 0.15 - 1.0e-5 Layer 2: 0.12 -1.0e-5 Layer 3: 0.1 - 1.0e-4 Layer 4: 0.1 - 5.0e-5	21	3,160	9,600	51	21,800	23,400
SENSITIVITY ANALYSIS 1 Calibrated K and low S	390/90 (860/560)	2.33/30	Layer 1: 5 Layer 2: 20 Layer 3: 0.5 Layer 4: 5	Layer 1: 0.0375 - 1.0e-6 Layer 2: 0.03 - 1.0e-6 Layer 3: 0.025 - 1.0e-5 Layer 4: 0.1 - 5.0e-5	24	5,600	13,300	59	22,300	23,900
SENSITIVITY ANALYSIS 2 Low K and Calibrated S	390/90 (860/560)	2.33/30	Layer 1: 0.5 Layer 2: 2.0 Layer 3: 0.05 Layer 4: 5	Layer 1: 0.0375 - 1.0e-6 Layer 2: 0.03 - 1.0e-6 Layer 3: 0.025 - 1.0e-5 Layer 4: 0.1 - 5.0e-5	245	4,535	14,500	241	15,400	16,600

NOTES

1 Pumping rate reported for Indian Wells Valley Water District Well No. 18. Values in parentheses are the proposed rates including construction and operational water requirements 390/90 gpm respectively.

2 Calibrated groundwater model values for hydraulic conductivity, specific yield and storativity.

3 Sensitivity analysis - varied specific yield in layers 1, 2 and 3 by 25% (lower)

4 Sensitivity analysis - varied hydraulic conductivity in layers 1, 2 and 3 by 10% (lower)

SM 2009a, Appendix J

Mitigation

Groundwater levels near IWVWD water supply wells that supply water to the project will decline during the Project construction and operation. Local decline of groundwater levels within the cone of depression could affect nearby wells. However, groundwater is being supplied by IWVWD (water purveyor) under a basin management program. Consequently, any impacts related to groundwater level changes would be managed as part of the overall groundwater management of the IWVGB. Condition of Certification **SOIL&WATER-2** ,**-3** and **-4**, provided in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below, are expected to minimize impacts to related to withdrawal of groundwater by the Project owner using water conservation offsets to below the level of significance.

Groundwater Quality

Construction

Operation of the Project has the potential to impact water quality through improper storage and use of materials and the existence of an unsecured well that may act as a conduit to groundwater at the site. Given the distance to the groundwater table (200-400 feet bgs) and the proposed implementation of a hazardous material management plan during construction (see Section C.4), the proposed measures are expected to minimize impacts to groundwater quality to below the level of significance. With respect to the existing well at the site, the Project owner shall secure the well to prevent unauthorized access and either complete a monitoring well or destroy the well in accordance with **SOIL&WATER-13**. If a monitoring well is completed, the well shall be incorporated as part of the groundwater monitoring, mitigation and reporting listed in **SOIL&WATER-6** provided in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below.

Mitigation

Water quality will be protected during construction through implementation of the SWPPP and DESCP for construction and operations. Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-6**, provided in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below, are expected to minimize impacts to groundwater quality below the level of significance.

Operation

RO Brine for Dust Control

The RSPP proposes to control dust generated by site activities by application of RO concentrate (brine) water to unpaved road surfaces in the Project. A total of about 61,300 linear feet of unpaved road are planned where brine water will be applied for dust control. These roads are planned to be about 24 feet wide and as such represent about 1,471,200 square feet or about 1.9% of the operational Project area. To estimate water quality impacts from the discharge of brine, it was assumed that dust control using brine water would not include unpaved surfaces between the solar panels, as

these areas will be routinely wetted through application of high quality water for mirror washing. A total of 10 acre-feet annually of brine water are expected to be needed for dust suppression (SM 2009a).

High rates of evaporation at the site coupled with an assumption of minimal soil erosion are expected to result in the deposition of brine salts on the unpaved road surfaces. The brine salts have a potential to impact either underlying groundwater quality or surface water quality through runoff from the site. Groundwater could be impacted if the brine salts infiltrate though the unsaturated zone to the groundwater. Surface water could be impacted if the brine salts accumulated at the surface then dissolved into stormwater that leaves the site.

Because the annual evaporation rate (~111 inches/year) in the area of the Project site greatly exceeds the planned volume of water applied to the unpaved roads plus the average annual precipitation, minimal to no infiltration is expected in these areas. As such, there is not a complete path for the brine salts to reach groundwater and groundwater quality is not expected to be impacted by the practice of applying RO brines for dust suppression. There is thus, no potential for impact to groundwater through direct infiltration below the site.

The accumulation of brine salts on unpaved road surfaces has been conservatively modeled based on assumptions of rapid dissolution and transport without infiltration during storm events. Assuming that the annual deposition of salts from the brine water is completely dissolved in a one year storm event, the resulting TDS concentration at the RSPP outfall from the solar fields mixing with the run on stormwater is estimated to be 279 mg/L. This TDS concentration is within the regional groundwater concentrations and significantly below the State of California Drinking Water Standard (500 mg/L), and is within the range of TDS concentrations reported for the Indian Wells Valley Groundwater Basin (220 mg/L – 720 mg/L) should water infiltrate downstream of the RSPP.

Land Treatment Unit

The material that will be placed in the Land Treatment Unit (LTU) consists of soil that is impacted with Therminol® VP1 HTF as a result of minor leaks or spills that occur during the course of daily operational or maintenance activities. At ambient temperatures, HTF is a highly viscous material that is virtually insoluble in water. Operation of an LTU is not expected to impact surface water or groundwater quality beneath the site. The LTU will be surrounded on all four sides by berms that will protect the LTU from surface water flow. Because of the viscous and insoluble nature of HTF, it is not likely to mobilize from the soil downwards to the water table.

The LTU will be constructed with a 2-foot-thick clay layer on the floor on top of 3-feet of compacted native soil (SM, 2010a) that will serve as a protective barrier to the downward movement of contaminants from the LTU. Moreover, should any contaminants escape the LTU, the water table is approximately 480 feet beneath the LTU. In summary, because of the viscosity of HTF at ambient temperatures, the insolubility of HTF, the depth of the water table, and the placement of protective berms around the LTU, it is expected that surface water and groundwater quality beneath the site will not be impacted by LTU operation.

The LTU will be operated under the requirements of CCR Title 23, Division 3, Chapter 15 and Title 27, Section 2000 et seq. and Title 23, Section 2510 et seq.

Sanitary Waste Septic System

Sanitary wastes will be collected for treatment in a septic tank and disposed via a leach field located within the boundaries of the main power block. If separate control rooms with restrooms are located at the remote power blocks, smaller septic systems will be provided to receive sanitary wastes at those locations. The configuration of the power blocks being remote from the office would indicate that at least five leach fields will be required. Based on the current estimate of 2,800 gallons of sanitary wastewater production per day a total leach field area of approximately 5,600 square feet will be required. It is recommended that an additional 5,600 square feet of land be kept undeveloped for purposes of constructing replacement leach fields should that be necessary.

The use and application of septic fields is an established practice as a method of wastewater treatment. The closest septic field to the privately owned parcel of land is in excess of ½ mile. The septic system will have no affect on the surface water in or around the Project site. The septic system will be installed approximately 5-6 feet deep.

The septic system and leach fields for the Project will be constructed in accordance with the requirements of Kern County:

1. Kern County Ordinance Code, Title 14, Chapter 14.12 – Sewer Systems; Section 14.12.360, Private system installation; Section 14.12.370, Private systems,

2. Kern County Title 17 Chapter 17.20 – Uniform Plumbing Code; Section 17.20.170, Appendix K, Section K1 amended –Private Sewage Disposal – General; Section 17.20.180 Appendix K, Section K6(i) amended – Disposal fields,

3. Title 15 Section 15.24.010 (the Uniform Plumbing Code) Appendix K for Private Sewage Disposal – General and Disposal Fields, and

4. Title 8 Section 8.124.030 (Approval and Construction Permit for Sewage Discharge) and Section 8.124.050 (Operation Permit for Sewage Disposal).

Mitigation

Groundwater quality in the vicinity of the project site could be impacted as a result of the operation of the LTU and septic fields. While preliminary studies and calculations have been made to assess the potential for impact, there is a potential to impact groundwater quality in the vicinity of the project site. In addition, regulatory requirements for operation of the LTU as well as stormwater and potentially septic system operations requirements stipulate specific monitoring requirements.

Implementation of Conditions of Certification **SOIL&WATER-6**, **SOIL&WATER-7, SOIL&WATER-12 and SOIL&WATER-13** are anticipated to minimize impacts below a level of significance. These measures are provided in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below.

Surface Water Hydrology

The impacts of the Project on the local surface water hydrology are directly related to proposed onsite grading and the construction and operation of a network of engineered collector/conveyance channels and berms designed for the purpose of protecting the Project from flooding. The Project will change both the extent and physical characteristics of the existing drainage patterns both within and downstream of the Project site. The layout as presented in the Concept Engineering Plans (SM 2010a) has been designed to avoid the 100-year floodplain of El Paso Wash which is the major drainage feature in the immediate vicinity of the project.

The Project Drainage Report (SM 2010a) provides a summary of discharges at the downstream Project boundary which compares existing outflows with post-development outflows. As previously discussed in Section C.9.4.2, the same CN value of 95 was used in the post-development calculations as in the pre-development calculations for the project area. This value may be appropriate for the post-developed condition, but may be significantly too high for the existing condition. The result of this approach is that the calculations show no net increase in the onsite peak discharges between the pre- and post a development condition. This scenario may not be an accurate assessment of the project hydrology as in most cases the process of grading, compacting, and removing all vegetation will increase the CN value over existing conditions. Developed areas downstream of the Project site have a demonstrated history of flooding associated with El Paso Wash. It is therefore critical that any hydrologic analysis in support of changes in the El Paso Wash watershed be well documented and consistent with accepted and mandated local methodologies.

Staff modified the pre-developed conditions HEC-HMS model for the project as provided by the applicant. The revised model utilizes onsite CN values that are consistent with adjacent offsite CN values, as well as with the Kern County Hydrology Manual. The post-developed model was then modified to change the onsite CN values to a value of 94 consistent with the Kern County Hydrology Manual. The values for initial abstraction were also modified to be consistent with the revised CN values. No other parameters in the model were modified. The results of the revised HEC-HMS analysis for the drainage outlet locations as depicted on Soil and Water Figure 13 are provided in Soil and Water Table 10 below. The results indicate the potential for significant increases in post-development discharges at all outlet locations as a result of site development.

The impact to existing drainage patterns will be significant per CEQA criteria as the alteration of the existing drainage patterns may substantially increase the rate or amount of surface runoff in a manner which could result in increased offsite flooding. The implementation of Condition of Certification **SOIL&WATER-8** will ensure that post-development discharges do not exceed existing discharges by more than 5% and will mitigate the potential impacts to below the level of significance.

Soil and Water Table 10
Summary of Existing and Proposed Peak Flow Rates
At Downstream Project Boundary

Channel ID	Existing Flowrate at Outlet of Site (cfs)			Proposed Flowrate at Outlet of Site (cfs)		
	Q_{10}	Q_{25}	Q_{100}	Q_{10}	Q_{25}	Q_{100}
East Outlet	1856	3109	5759	2320	3822	6963
West Outlet	604	950	1645	785	1235	2145
North East Outlet	161	249	430	550	786	1262
Ex. Outlet 1	614	965	1670	780	1227	2132
Ex. Outlet 2	2421	4000	7315	2858	4656	8374
Ex. Outlet 3	164	253	438	550	794	1262

Alteration of Drainage Patterns

Construction and Operation

Onsite Drainage

All existing drainages within the Project boundary will be completely eliminated by the grading of approximately 1,994 acres to provide the flat, uniform and vegetation-free topography required for the construction and operation of the solar mirror array. Due to the relatively steep terrain on the northern portion of the Project site (east of El Paso Wash), the onsite grading will include numerous terraces with an approximately 20-foot grade differential between terraces. This scenario tends to complicate the drainage design both within the solar fields as well as for the peripheral collector and conveyance channels. The existing natural drainage system will be replaced with a system of constructed swales and channels designed to collect and convey onsite flows to designated points of discharge from the project. Onsite stormwater from the project will be discharged directly offsite without the use of detention or retention basins with the exception of at the power block which will include a stormwater basin per the Preliminary Civil Construction Plans. There are numerous points of outfall from the Project site directly into El Paso Wash. The Project site has historically drained into El Paso Wash, although portions of it did so significantly downstream of the proposed points of outfall.

The impact to onsite drainage patterns will be significant per CEQA criteria as the development will substantially alter the existing drainage patterns of the site through the alteration of drainages in a manner which could result in substantial erosion. This erosion would occur primarily where onsite flows will be discharged directly offsite to existing drainages or undisturbed ground. Proper design of erosion protection at these locations per Condition of Certification **SOIL&WATER-11** will mitigate this impact to below the level of significance.

Offsite Drainage

The Project site will be protected from flooding through the construction of a series of engineered drainage channels and berms located where offsite flows potentially impact the facility. These features will intercept and divert offsite flows around the facility. Construction and operation of these features will significantly change the offsite drainage patterns within the vicinity of the solar fields and potentially downstream. Along the east side of the northern solar field, runoff will be concentrated into an engineered channel and released back into North Ridgecrest Wash. Flows approaching the southern solar field from the south will collect against engineered berms and be diverted west and north to a point of discharge at Brown Road west of the facility.

The two most significant concerns related to the alteration of existing offsite drainage patterns are the shifting of flows to an adjacent watershed, and the increased potential for erosion due to the concentration of flows. The shifting of flows to an adjacent watershed can increase flooding and overwhelm existing drainage infrastructure such as culverts and roadside channels. The release concentrated flows from an engineered channel onto the native ground can create severe scour at that location if proper energy dissipation and flow dispersion is not implemented. The concentration of flows against engineered berms can also result in erosion and the development of an incised channel at the toe of the berm if there is sufficient flow and slope. An additional concern with the alteration of offsite flow patterns is that a significant change may “dry-up” discreet areas downstream of the project footprint. In the post-development condition these areas may only receive direct rainfall as they have lost all direct connection to their upstream watershed. This issue is discussed further in Section C.2 – Biological Resources.

The impact to offsite drainage patterns will be significant per CEQA criteria as the development will substantially alter the existing drainage patterns due to the collection and diversion of flows in the eastern collector around the project. This diversion could result in substantial increase in flows over existing conditions at the point of discharge of the eastern collector channel and increased erosion at that location. Implementation of Condition of Certification **SOIL&WATER-10** will mitigate this impact to below the level of significance.

Mitigation

Implementation of Condition of Certification **SOIL&WATER-10** and **SOIL&WATER-11**, (described in detail in Section C.9.13, *Proposed Conditions of Certification/ Mitigation Measures,* below) is anticipated to minimize impacts related to surface drainage associated with construction and operation of the Project to below the level of significance. Condition of Certification **SOIL&WATER-8** will ensure that adequate studies and data are provided to assess that **SOIL&WATER-10** and **SOIL&WATER-11** have been implemented within the context of site specific conditions.

Flood Hazards

Construction

The Project will be protected from flooding from offsite sources through the construction of engineered channels and berms along the project boundaries. For the northern solar field, a collector channel will be constructed along the east side of the solar field and will

be designed to convey 100-year year discharge around the Project. The channel will terminate just north of the solar field and discharge back into North Ridgecrest Wash. A berm will be constructed from the south end of this collector channel to Brown Road to divert all flow in this area north into the collector channel. The north solar field will be protected from flooding in El Paso Wash by generally avoiding the 100-year flood limits as defined in the revised floodplain mapping completed by the applicant based on the new project topography.

The southern solar field will also be constructed outside of the El Paso Wash 100-year floodplain. Berms will be constructed along the south and west property boundaries to divert flow west and north into existing drainage to the west of the project. Conceptual Engineering Plans provided on **Soil and Water Figures 19** through **21** provide information on the location and geometry of the proposed channels and berms as well as show the extent of the El Paso Wash floodplain. Additional details on the project drainage design can be found in the full set of the Conceptual Engineering Plans (SM 2010a).

An issue of concern within the proposed design is how the engineered channel along the eastern boundary of the northern solar field (east of El Paso Wash) will tie into existing grade. The combination of relatively steep terrain, terraced grading on the Project site, and the use of numerous grade control structures in the channel to maintain allowable velocities results in cut slopes as high as 20 to 30 feet along significant channel segments. These slopes will be prone to erosion and headcutting if not properly protected. Stabilization of these slopes through revegetation will likely not be successful. Grading to daylight to existing ground at a maximum 3:1 slope could result in horizontal cut slope distances of 60 feet to over 100 feet based on the site specific topography along the east channel.

Sheet 30 of the Conceptual Engineering Plans (SM 2010a) indicates that lateral flows into the east collector channels will be controlled by the use of a berm on the outside of the channel. Flow would be diverted by the berm to discreet openings which would allow this flow to enter the channel over a soil cement spillway. The plans as presented did not adequately demonstrate how the proposed berm would function and how it would be protected from erosion along its face and at the proposed openings where concentrated flows will enter the channel. Proper design of the berm, openings, and soil cement spillways in the channel would require an estimation of flow quantities, depths and velocities along the structures. The analysis required to provide this data was not provided in the project Drainage Report (SM 2010a). As flow collects along the upstream face of the berm it will likely cause erosion and development of incised channels as the resultant slopes along the toe will be in the range of 4-6%. Additionally, it will be difficult to get flow through the openings without the use of additional diversion berms which extend perpendicular from the main berm. This design would significantly complicate the effort associated with the required channel maintenance program. Condition of Certification **SOIL&WATER-11** prohibits the use of diversion berms and spillways along the eastern collector channel in lieu of full bank protection.

As previously discussed, the eastern collector channel as depicted in the Concept Grading Plans (SM 2010a) contains numerous soil cement drop structures along its length in order to reduce the effective channel slope to acceptable values. The

remainder of the channel would remain unlined with the exception of the soil cement spillways at the outer berm openings and possibly other stress areas such as channel bends. The use of these structures to limit channel slope appears to be one of the major factors contributing to the depth of the channel and the large cut slopes along the eastern project boundary. The use of a fully lined channel would minimize concerns related to channel slope and velocity providing the possibility to eliminate most, if not all, of the proposed grade control structures. This approach would allow the channel to more closely follow existing grade and significantly reduce channel depth and the associated cut slopes on the east bank. A design of this type will require a supercritical flow analysis to identify where hydraulic jumps may occur and to ensure adequate channel depth is provided at those locations.

The concept of a fully lined channel was discussed during data request workshops for the project and obtained consensus with the CEC biologist, CEC hydraulic engineer, and the Fish and Game representative for the project. It was concluded that it is impractical to design the east channel to have any biological benefits, and that the best approach was to minimize the channel footprint and provide a break-away wildlife barrier along the top of the outer channel slope. The barrier would be monitored regularly and replaced or reattached as needed. Condition of Certification **SOIL&WATER-11** requires the eastern collector channel be fully lined to reduce depth and cut slopes, and minimize the extents of impacts related to the channel.

The proposed design contains numerous locations where either diverted offsite flows or post-development onsite flows will be discharged to the existing drainage system. Localized erosion is of particular concern as these locations due to the discharge of concentrated flows. The first primary area of concern is the outlet for the eastern collector channel, denoted as the North-East Outlet in the drainage report. Based on the Concept Grading Plans (SM 2010a) flow will be discharged directly to North Ridgecrest Wash without dispersion or energy dissipation, likely resulting in significant scour downstream of the channel termination. Additionally, the peak discharge data in the Project Drainage Report (SM 2010a) indicate that the 10-year flow at this location will increase from 378 cfs to 777 cfs. The increase in flow is apparently the result of runoff in the Route 385 right-of-way potentially entering the east channel and being conveyed to North Ridgecrest Wash. The formal design will require that the flow in the right-of-way continue per existing conditions and not enter North Ridgecrest Wash upstream of the culvert crossing at Route 385. Implementation of Condition of Certification **SOIL&WATER-10** will ensure that the impacts associated with erosion and potentially greater flows at the outlet of the eastern collector channel will be mitigated below the level of significance.

The second primary issue of concern are the several locations along the western side of the north solar field where onsite flows will be discharged directly into El Paso Wash. Sheet 22 of the Conceptual Engineering Plans (SM 2010a) provides a detail for these outlets which show the construction of soil cement spillways down the side east bank of El Paso Wash with an energy dissipation basin at the bottom of the spillway. No cross-sectional view or information was provided with the details. The proposed spillway slopes are significantly steeper than the existing slopes. It is not clear how the slopes adjacent to the spillway will tie into the structure and if this additional disturbance will be prone to erosion. Implementation of Condition of Certification **SOIL&WATER-10** and

SOIL&WATER-11 will ensure that spillways that discharge onsite flows into El Paso Wash will be designed in a manner to reduce localized erosion to below the level of significance.

The Conceptual Engineering Plans (SM 2010a) provide typical channel sections for the proposed collector and conveyance channels as well as the grade control structures, and generally call for 3:1 side slopes. In the event that soil cement is utilized for bank stabilization or for the construction of grade controls, it is recommended that slopes should be reduced to no steeper than 4:1. Experience has shown that anything steeper than approximately 4:1 is impractical for a “slope paving” type of construction which is the most cost and time efficient method of construction. At steeper slopes, the soil cement is difficult to place and compact within industry accepted specifications, especially in channels which are more than a few feet deep. The option to achieve steeper slopes is to construct the soil cement in lifts which significantly increases material quantities and most likely construction time.

Operation

During operation, the proposed collector and conveyance channel along the east project, as well as along some of the other portions of the Project boundary will be exposed to incoming side flows. These inflows could include concentrated runoff at more defined drainages, shallow sheet flow, and smaller more localized flows. All of these elements have the ability to cause significant erosion of unprotected channel banks as well as to create headcutting which will extend roughly perpendicular from the outer channel bank into the adjacent floodplain. These headcut features have the potential to achieve the same depth as the main collector channel and can extend upstream for several hundred feet over time due to numerous smaller flow events, or can occur very quickly from a single large event depending on the magnitude of flow at a given location. The potential issue is exacerbated by the large cut slopes along primarily the east channel which are as high as 30 feet in some locations. Significant impacts to areas beyond the project boundaries can occur due to these erosional features. Appropriate engineered bank stabilization measures must be implemented to ensure that headcutting is prevented at all locations where flow enters the engineered channels.

Operation of the proposed channels and erosion mitigation measures will require significant inspection and maintenance over the life of the facility to ensure that the channels are operating as intended and that potential and observed erosion issues are addressed promptly to minimize damage to the facility and areas beyond the Project boundary. Relatively small problems and erosional features which develop during smaller more frequent events can become the focal point for problems during larger events. The applicant has presented a Channel Maintenance section in the revised Project Drainage Report which addresses some of the potential issues associated with long term operation of the channels. However, the section does not adequately address the issue of the collection of offsite flows or the use of soil cement along areas subject to inflows from offsite watersheds. The monitoring and mitigation of erosion to offsite areas caused by the presence and operation of the proposed collector and conveyance channels must be explicitly addressed in a Channel Maintenance Program as required by Condition of Certification **SOIL&WATER-13**.

Channel Maintenance Program

The applicant will develop and implement a Channel Maintenance Program that provides a framework for routine channel maintenance projects and ensures compliance with Conditions of Certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program would be a process document prepared by the project owner, which would be reviewed and approved by the both BLM's Authorized Officer and the CPM. Staff is requiring as part of Condition of Certification **SOIL&WATER-12** that the Channel Maintenance Program provide long-term guidance to the applicant to implement routine channel maintenance projects and comply with RSPP's related biological (see Section C.2) and flood protection (**SOIL&WATER-1** and **SOIL&WATER-6**) Conditions of Certification. Condition of Certification **SOIL&WATER-12** requires that the applicant will implement the measures identified in the program. The main goals of the Channel Maintenance Program would be to maintain the diversion channels to meet its original design to provide flood protection, protect offsite areas form erosion, support RSPP mitigation, protect wildlife habitat and movement/migration, and maintain groundwater recharge. Compliance with Condition of Certification **SOIL&WATER-12** would reduce the impacts below the level of significance.

Mitigation

Implementation of Conditions of Certification **SOIL&WATER-9** through **SOIL&WATER-12**, described in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below is anticipated to minimize impacts related to flood hazards and erosion associated with construction and operation of the Project to below the level of significance. They will also provide the basic information to assist the CPM to adequately review and assess the appropriateness of the proposed design within the context of the site specific conditions.

Surface Water Quality

Project storm water may encounter soil or chemicals deleterious to aquatic and terrestrial plants and wildlife. The Project Applicant proposes to implement BMPs for managing potentially harmful storm water and protect water quality. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The Project would alter natural storm water drainages and use BMPs to reduce potentially significant impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. Recognizing these potential impacts, the applicant has prepared a draft industrial SWPPP required by the general waste discharge requirements for industrial activity.

Construction

Potential threats to surface water quality related to construction includes: potential increases in sediment loads to adjacent streams and washes; accidental spills of hydrocarbon fuels and greases associated with construction equipment. The implementation of BMPs as defined in Condition of Certification **SOIL&WATER-1** and

SOIL&WATER-2 (and found in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below) would reduce potential water quality impacts to insignificant.

Operation

Potential threats to surface water quality related to operations includes: potential increases in sediment loads to adjacent washes; accidental spills of hydrocarbon fuels and greases (including HTF fluid) associated with operations equipment, and accidental releases from HTF treatment area. As previously discussed, the Project Applicant proposes to control dust generated by site activities by applying RO concentrate (brine) water to unpaved road surfaces in the Project area.

During a stormwater event, the residual brine salts in the road surface will dissolve into the stormwater that falls on the unpaved road and comes in contact with the salts. Stormwater containing brine salts will then mix with the other stormwater on the solar field (i.e., first mixing). Subsequently, the stormwater from the solar field will drain into the stormwater conveyance system, combining with runoff from upstream sources, and the combined stormwater will discharge from the Project at an outfall (i.e., second mixing). In the case of the RSPP, there are a total of three outfalls for the Project with the stormwater from the solar fields discharging only to one, the center channel, which will combine with stormwater from the El Paso Wash.

The predicted TDS concentration of the brine and the amount of water applied (3.6 inches) per year (based on AFC reported volumes evenly distributed by road area) were used to calculate the unit mass loading of brine salts applied to the unpaved roads (grams per square foot of road), see SM 2009d DA WATER-5 and SM 2010a DR-S&W-135 for the detail calculations. Through the year, about 57 grams per square foot of salts would be applied to the unpaved roads.

The total mass of brine salts applied annually to the unpaved roads for each solar field was calculated from the area of the unpaved roads in each solar field area times the calculated unit mass loading of brine salts. The dimensional data for the unpaved roads was determined from the 30% design conceptual drawings. The 24-hour duration, mean precipitation storm event with a one year frequency was then used to determine the concentration of salts in the stormwater leaving the unpaved roads. The baseline TDS concentration in the stormwater running off the remainder of the solar field excluding the roads was estimated to be 200 mg/L (USGS, Water Resources Investigation Report 2003-4326) (SM 2009d).The predicted concentration of TDS in the stormwater from the solar fields to be 757 mg/L as a result of the mixing of the stormwater from the unpaved road surfaces with the stormwater from the remainder of the solar field and both entering the stormwater conveyance system (i.e., first mixing concentration).

To determine the incremental brine salt concentration contribution to the stormwater at the outfall for the Project, the Drainage Report (SM 2009a, Appendix L) for the site was consulted to understand the conceptual drainage design for the site. The runoff from each solar field or unit drains into a specific channel that in turn drains off the site through a specific outfall at the Project boundary. These channels have been designed to convey both stormwater running on to the Project from up stream watershed areas (as needed) and to convey stormwater running off the solar fields. Therefore, the

stormwater from each solar field is mixed with stormwater from up stream watershed areas before discharging at an outfall (i.e., second mixing). For the RSPP, the contribution of the solar field stormwater run off is 14.2% of the total stormwater flow for the central channel outfall. Table B2 describes the conceptual drainage design for each solar field and associated conveyance channel/outfall and estimates stormwater contribution from each solar field to the total storm flow discharged for the associated channel/outfall discharged from the Project.

The TDS concentration in the outfall is calculated by determining a weighted average of the TDS the concentration in the solar field runoff mixing with that from the up stream source of stormwater. For the RSPP, the TDS concentration in the stormwater at the central channel outfall is estimated to be 279 mg/L (SM 2009a). This concentration is well within the regional groundwater concentrations and below State of California Secondary Drinking Water Standards (State of California, Title 22 CCR, Article 16, Section 64449 [Table 64449 A/B] - Secondary Maximum Contaminant Levels) of 500 mg/L.

The accumulation of brine salts on unpaved road surfaces has been conservatively modeled based on assumptions of rapid dissolution and transport without infiltration during storm events. Assuming that the annual deposition of salts from the brine water is completely dissolved in a one year storm event, the resulting TDS concentration at the RSPP outfall from the solar fields mixing with the run on stormwater is estimated to be 279 mg/L. This TDS concentration within the regional groundwater concentrations and is significantly below the State of California Drinking Water Standard, and is below the underlying groundwater concentrations reported for the Indian Wells Valley Groundwater Basin should water infiltrate downstream of the RSPP.

Mitigation

No significant impacts are anticipated related to surface water quality. Implementation of Condition of Certification **SOIL&WATER-1**, **SOIL&WATER-6**, and **SOIL&WATER-12** (described in detail in Section C.9.13, *Proposed Conditions of Certification/Mitigation Measures,* below), is anticipated to ensure there are no impacts related to surface water quality associated with construction and operation of the Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant.”

The CEC, in its role as CEQA lead agency for the Project evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way

resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

C.9.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1.**

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint (SM, 2009a). The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

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

C.9.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Soil Erosion

Soil erosion at the Northern Unit Alternative project site could be impacted as a result of the construction and operational of the Southern Unit Alternative project. Impacts

related to soil erosion from wind and surface water are anticipated to be less than those associated with the proposed Project due to the smaller foot print and less surface disturbance.

Basin Storage and Groundwater Levels

Groundwater basin balance and groundwater levels in the vicinity of the Northern Unit Alternative project site could be impacted as a result of the construction and operational water use. The potential impacts related to basin storage and groundwater levels are anticipated to be less than those associated with the proposed Project due to the smaller foot print, less surface disturbance and less water requirements. Water usage would be reduced by approximately 40% to approximately ~90 afy during operation. This may reduce the size of the supply pipeline as well as water level draw downs around the IWVWD well field.

Groundwater Quality

Groundwater quality in the vicinity of the Northern Unit Alternative project site could be impacted as a result of the operation of the LTU, and septic fields. These facilities are required regardless of the size of the project. The potential impact would be similar as for the proposed Project.

Surface Water Hydrology

The impacts and mitigation measures for the Northern Unit Alternative would be similar to the preferred alternative. All existing washes within the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting would still be required for all channels and slopes subject to flows.

The volume of offsite flow that would need to be rerouted would be less since flow upstream of Brown Road would not be impeded and diverted to the west and north by engineered berms. The overall changes to the floodplain downstream of the Northern Unit Alternative would be the same as the proposed Project as there would still be drainages that will be completely cutoff from their natural upstream watershed due to placement of the solar field.

Surface Water Quality

Surface water quality in the vicinity of the Northern Unit Alternative Project site could be impacted as a result of surface grading. In addition, potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The potential impacts to surface water would be similar as for the proposed Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant.”

The CEC, in its role as CEQA lead agency for the Project, evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

C.9.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road (SM, 2009a). The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

As stated above, the Southern Unit Alternative is evaluated in this SA/DEIS because it would reduce some impacts of the project. Additionally, the Southern Unit Alternative

would allow the applicant to contribute clean, renewable energy to help meet the State's energy goals, while minimizing impacts to the desert environment. A limited acreage alternative was suggested in scoping comments.

C.9.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Soil Erosion

Soil erosion at the Southern Unit Alternative project site could be impacted as a result of the construction and operational of the Southern Unit Alternative project. Impacts related to soil erosion from wind and surface water are anticipated to be less then those associated with the proposed Project due to the smaller foot print and less surface disturbance.

Basin Balance and Groundwater Levels

Groundwater basin balance and groundwater levels in the vicinity of the Southern Unit Alternative project site could be impacted as a result of the construction and operational water use. The potential impacts related to basin storage and groundwater levels are anticipated to be less than those associated with the proposed Project due to the smaller foot print, less surface disturbance and less water requirements. Water usage would be reduced by approximately 55% to approximately ~68 afy during operation. This may reduce the size of the supply pipeline as well as water level draw downs around the IWVWD well field.

Groundwater Quality

Groundwater quality in the vicinity of the Southern Unit Alternative project site could be impacted as a result of the operation of the LTU, and septic fields. These facilities are required regardless of the size of the project. The potential impact would be similar as for the proposed Project.

Surface Water Hydrology

The impacts and mitigation measures for the Southern Unit Alternative would be similar to the preferred alternative. All existing washes within the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting would still be required for all channels and slopes subject to flows.

The volume of offsite flow which would require diversion would be lower since North Ridgecrest Wash would no longer have to be intercepted and diverted around the north solar field. The overall changes to the floodplain downstream of the Southern Unit Alternative would likely be less than the proposed Project since certain downstream areas would not be cutoff form their natural upstream watersheds due the presence of the north solar filed.

Surface Water Quality

Surface water quality in the vicinity of the Southern Unit Alternative Project site could be impacted as a result of surface grading. In addition, potentially significant water quality

impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. The potential impacts to surface water would be similar as for the proposed Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an “identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant.”

The CEC, in its role as CEQA lead agency for the Project, evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.7 ORIGINAL PROPOSED ALTERNATIVE

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

C.9.7.2 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

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

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking area, bio-remediation unit and maintenance building (SM, 2009a). The approximately 4 mile off-site water line route (approximately 18-acre total disturbance) would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to

the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

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

C.9.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Soil Erosion

Soil erosion at the Original Proposed Project Alternative project site could be impacted as a result of the construction and operation of the Original Proposed Project Alternative project. Impacts related to soil erosion from wind and surface water are anticipated to be about higher than those associated with the proposed Project. Water erosion could be higher since the Original Proposed Project Alternative requires disturbing and re-channelizing El Paso Wash.

Basin Balance and Groundwater Levels

Groundwater basin balance and groundwater levels in the vicinity of the Original Proposed Project Alternative project site could be impacted as a result of the construction and operational water use. The Original Proposed Project Alternative will be using the same amount of water (~150afy during operation) and have the same water related facilities as the proposed Project, the potential impacts related to basin balance and groundwater levels are anticipated to be the same as with the proposed Project.

Groundwater Quality

Groundwater quality in the vicinity of the Original Proposed Project Alternative project site could be impacted as a result of the operation of the LTU, and septic fields. These facilities will be the same size and type required in the proposed Project. The potential impact would be same as for the proposed Project.

Surface Water Hydrology

The impacts and mitigation measures for the Original Proposed Project would be similar to the preferred alternative. All existing washes within the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential channel erosion and headcutting would still be required for all channels and slopes subject to flows.

The volume of offsite flow would likely be the same as for the proposed Project. El Paso Wash is realigned and would be subject to continual maintenance and repair. The overall changes to the floodplain downstream of the Original Proposed Project would likely be less than the proposed Project due the slightly less disturbed area resulting in lower discharges.

Surface Water Quality

Surface water quality in the vicinity of the Original Proposed Project Alternative Project site could be impacted as a result of surface grading. In addition, potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. Since the Original Proposed Project Alternative has the same facilities and would be the same size as the Proposed Project the potential impacts to surface water would be similar as for the proposed Project.

CEQA LEVEL OF SIGNIFICANCE

CEQA Guidelines define a significance threshold as being an "identifiable quantitative, qualitative, or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect will normally be determined to be less than significant."

The CEC, in its role as CEQA lead agency for the Project, evaluates projects on a case by case basis as each power plant impacts soil and water resources in different ways. Facts that would indicate significance include but are not limited to pumping of ground water so that neighboring wells are damaged or polluted, or that hydrologically connected surface water is drained eliminating habitat for species of special concern. Significant impacts may also include soil erosion that pollutes a nearby water way resulting in mortality of fish. Appendix G as discussed in Section C.9.3 provides guidelines to consider when evaluating a project for environmental impacts.

C.9.8 NO PROJECT/NO ACTION ALTERNATIVES

C.9.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project Application and On CDCA Land Use Plan Amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the impacts to soils and water from the construction and operation of the proposed project would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.9.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and Amend the CDCA Land Use Plan to Make the Area Available for Future Solar Development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to classify the site as suitable for solar development. Same as no action no project.

C.9.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project Application and Amend The CDCA Land Use Plan to Make the Area Unavailable for Future Solar Development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to designate the proposed site unsuitable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

C.9.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Soil and Water Table 11 provides a summary comparison of the impacts associated with the proposed Project and each of the proposed Alternatives under consideration.

Soil and Water Table 11
Comparison of Proposed Project and Alternatives

Impact	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Acreage	2,002	1,134	908	1,794	0
Soil Erosion	Potential soil erosion from wind and water. Mitigated to level of insignificance.	Potential soil erosion from wind and water. Less when compared to Proposed Project. Mitigated to level of insignificance.	Potential soil erosion from wind and water. Less when compared to Proposed Project. Mitigated to level of insignificance.	Potential soil erosion from wind and water. Less when compared to Proposed Project. Mitigated to level of insignificance.	No Impacts

Impact	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Groundwater Basin Balance and Water Levels	Potential impact to groundwater balance and groundwater levels. No change in water use during operation, ~150 afy. Mitigated to level of insignificance.	Potential impact to groundwater balance and groundwater levels. ~40% less water need, less impact to groundwater levels. Water use during operation, ~90 afy Mitigated to level of insignificance.	Potential impact to groundwater balance and groundwater levels. ~55% less water need, less impact to groundwater levels. Water use during operation, ~68 afy Mitigated to level of insignificance.	Potential impact to groundwater balance and groundwater levels. No change in water use from Proposed Project, ~150 afy during operation. Mitigated to level of insignificance.	No Impacts
Groundwater Quality	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	Potential impact to groundwater quality from LTU and septic system. Mitigated to level of insignificance.	No Impacts
Surface Water Hydrology	Significant impact to existing onsite drainage. Little impact to offsite drainage. Offsite drainage mitigated to level of insignificance.	Significant impact to existing onsite drainage. Offsite drainage mitigated to level of insignificance.	Significant impact to existing onsite drainage. Little impact to offsite drainage. Offsite drainage mitigated to level of insignificance.	Significant impact to existing onsite drainage. Impact to offsite by channelizing and relocating El Paso Wash. Little impact to offsite drainage. Offsite drainage mitigated to level of insignificance.	No Impacts
Surface Water Quality	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	Potential impacts resulting from grading and operation from spill of hazardous material. Mitigated to level of insignificance.	No Impacts

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site.

C.9.10 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" for CEQA means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time (40 CFR §1508.7).

There is the potential for future development in the Indian Wells Valley area and throughout the southern California desert region. Cumulative impacts can occur if implementation of the proposed project could combine with those of other local or regional projects. The locations of existing and reasonably foreseeable developments in the Indian Wells Valley area are presented in the following sections.

C.9.10.1 GEOGRAPHIC SCOPE OF ANALYSIS

The geographic extent used as part of the cumulative impact assessment includes the IWVGB Groundwater basin. The extent of the basin is described in Section C.9.4.2.

C.9.10.2 EXISTING CUMULATIVE CONDITIONS

Section C.9.4.2, Setting and Existing Conditions describes the current conditions of the IWVGB Groundwater Basin that would take into account existing cumulative conditions as they were known to occur.

C.9.10.3 FUTURE FORESEEABLE PROJECTS

Foreseeable Projects in the Project Area

The potential for cumulative water resources impacts exists where there are two or more individual projects proposed in an area that, when considered together with the proposed Project, could result in an impact to water resources. Projects with overlapping construction schedules and/or operations collectively could result in a demand for water that cannot be met by the Project area water supply resources or could result in water quality impacts to surface or groundwater resources. There are several projects that could contribute along with the RSPP to cumulative impacts to water resources within the IWVGB. A listing of the local cumulative projects and their analysis of water supply impacts is provided in **Soil and Water Table 12,** below:

Soil and Water Table 12
Potential Cumulative Projects in the Indian Wells Valley Groundwater Basin Area

Proposed Project	Water Supply and Analysis of Impacts
Numerous Hotels under Construction along China Lake Boulevard (Construction Complete Mid- to Late 2010)	Projects' water supply requirements will be realized before the RSPP begins construction. Projects do not contribute to cumulative impacts.
China Lake NAWS BRAC Realignment (EIS); Expected Realignment by 2011.	EIS indicates no significant impacts from expected population growth the NAWS. The expected increase in operations is anticipated to create 4,085 new jobs. Assuming 1.5 people of a family of four would find work in these new jobs, a total of about new 2700 households would be added to the Basin. Assuming that a single-family home requires about one acre-foot of water per year, this equates to about 2,700 afy.
City of Ridgecrest Planning Commission Approval of 1970 tract/housing lots in anticipation of BRAC	Assuming that a single-family home requires about one acre-foot of water per year, if all housing were built as proposed, increased water supply requirement would be about 2,000 afy.
City of Ridgecrest - Super Wal-Mart (draft EIR)	According to the draft EIR (2009), "the Project would involve relocation of uses (from the existing Wal-Mart) to the new site, and there could be a slight increase in water demand due to changes in irrigation and fire protection requirements." But, it is not expected to exceed the current supply.

Source: SM 2009a

From these generalized assumptions, the BRAC re-alignment may increase the demand on the IWVGB by between 2,000 and 2,700 afy. The amount of increase in water demand will depend on the actual population growth in response to the number of additional jobs that are realized at the base. By comparison, the RSPP annual use is 150 afy, which represents between about 5-8% of the potential additional water requirements associated with the additional housing construction. This is not a significant increase by comparison to the potential requirements in support of BRAC realignment and thus, the Project's impacts would not be cumulatively considerable.

Mitigation Measures

The RSPP would not have significant cumulative adverse impacts on water resources. To ensure that no significant adverse effects to water quality or supply are caused by the proposed Project pumping for operational supply, the following mitigation measures are proposed for construction and operation.

Water quality will be protected through implementation of the SWPPP and DESCP for construction and operations. If is important to note that in order to keep water use as

low as practicable, the Project will attempt to recycle the process makeup water for a savings of about 25% of the annual total consumptive use.

C.9.10.4 CONTRIBUTION OF THE PROJECT TO CUMULATIVE IMPACTS

Construction and Operation

The construction of the proposed Project is expected to result in short term adverse impacts related to construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the proposed Project. In addition, it is expected that some of the future and foreseeable projects described above may be operational at the same time as the proposed Project. As a result, there may be substantial long term cumulative impacts during operation of these projects related to soils and water resources.

As a result, there may be substantial short term and long-term impacts during construction and operations of those cumulative projects related to: soil erosion, geomorphology, basin balance, groundwater levels, groundwater quality, surface water hydrology and surface water quality and they are discussed below.

Soil Erosion

Construction of the proposed Project would result in both temporary changes at the Project site which could incrementally increase local soil erosion and storm water runoff during construction. The proposed Project would be expected to contribute only a small amount to the possible short term cumulative impacts related to soil erosion because the Project Applicant will be required to implement the mitigation measures defined in this analysis, which are expected to bring short term impacts below the level of significance.

Operation of the proposed Project would result in permanent changes at the Project site. These changes could incrementally increase local soil erosion and storm water runoff. The proposed Project would be expected to contribute only a small amount to these possible long term operational cumulative impacts because potential Project-related soil erosion and increased sedimentation resulting from storm water runoff are expected to be reduced to a level of insignificance through implementation of the mitigation measures specified in Section C.9.13, below.

Groundwater Basin Balance and Groundwater Levels

From these generalized assumptions, the BRAC re-alignment may increase the demand on the IWVGB. The amount of increase in water demand will depend on the actual population growth in response to the number of additional jobs that are realized at the base. By comparison, the RSPP annual use is 150 afy, which represents between about 5-8% of the potential additional water requirements associated with the additional housing construction. This is not a significant increase by comparison to the potential requirements in support of BRAC realignment and thus, the Project’s impacts would not be cumulatively considerably. The Project water demands will be completely offset through an offset program discussed in section C.9.4.3. Thus the Project will have no cumulative impacts related to water demands.

Groundwater Quality

There is a potential that significant cumulative groundwater quality impacts could occur during construction and operation if contaminated or hazardous materials used during construction and operations were to be released and migrate to the groundwater table.

The proposed Project would be expected to contribute only a small amount to the possible short-term cumulative impacts related to groundwater quality, given the distance to the groundwater table (200-400 feet bgs) over the IWVGB and the proposed implementation of a hazardous material management plan as well as monitoring plans associated with operation of LTUs, surface impoundments, septic systems and other various operations. With implementation of the mitigation measures specified in Section C.9.13, below, cumulative impacts to groundwater quality are anticipated to be below the level of significance.

Surface Water Hydrology

The cumulative impacts of the proposed Projects on the local surface water hydrology are directly related to proposed onsite grading and the construction and operation of a network of engineered collector/conveyance channels designed for the purpose of protecting the various projects from flooding. The proposed projects will change both the extent and physical characteristics of the existing floodplain within the project site as well as downstream of each project site, as well as change the sediment transport and depositional characteristics of each of the project sites.

The RSPP (proposed Project) would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water hydrology because the implementation of the mitigation measures specified in Section C.9.13, below, would reduce the cumulative impacts below the level of significance.

Surface Water Quality

It is expected that stormwater generated on the various project sites may encounter soil or chemicals deleterious to aquatic and terrestrial plant and wildlife. It is expected that all of the projects would be required to implement BMPs for managing potentially harmful storm water and protect water quality. Potentially significant water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. It is expected that all of the projects would have Hazardous Material Management Plans to reduce this potential impact to insignificant.

All of the proposed projects would alter natural storm water drainages and the expected use of BMPs would reduce potentially significant impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. The proposed Project would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water quality with implementation of the Conditions of Certification described in Section C.9.13, below.

Operation

In the preceding sections, the following areas were evaluated for potential cumulative impacts: soil erosion, basin balance and groundwater levels, groundwater quality,

surface water hydrology and surface water quality. Implementation of the mitigation measures specified in Section C.9.13, below, would reduce the cumulative impacts below the level of significance.

Decommissioning

The decommissioning of the proposed Project is expected to result in adverse impacts related to soils and water resources similar to construction impacts. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of this Project, because the decommissioning is not expected to occur for approximately 40 years. As a result, the impacts of the decommissioning of the proposed Project would not be expected to contribute to cumulative impacts related to soils and water resources. To ensure there would be no impacts to soil and water resources during and after project decommissioning the applicant should be required to comply with Condition of Certification **SOIL&WATER–5.**

COMPLIANCE WITH LORS

Applicable Federal, State, and local LORS are summarized in **Soil and Water Table 13**. Non-applicable Federal and State LORS are also summarized along with an explanation why they are not applicable.

Soil and Water Table 13
Laws, Ordinances, Regulations, and Standards (LORS)

LORS		Compliance
Federal		
Clean Water Act (33 U.S.C. Section 1251 et seq.)	The Clean Water Act (33 USC § 1257 et seq.) requires states to set standards to protect water quality, which includes regulation of storm water and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967. The Clean Water Act also establishes protection of navigable waters through Section 401. Section 401 certification through the Army Corps of Engineers and Regional Water Quality Control Board (RWQCB) is required if there are potential impacts to surface waters of the State and/or Waters of the United States, such as perennial and ephemeral drainages, streams, washes, ponds, pools, and wetlands. Section 401 requires impacts to these waters to be quantified and mitigated.	The USACE has determined that there are no jurisdictional waters of the U.S. at the project site.
Resource Conservation and Recovery Act	The Resource Conservation Recovery Act (RCRA) of 1976 (40 CFR Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.	The LTU will be required to comply with this LORS, see **SOIL&WATER-6.**
BLM Land Management Regulation, Title 43 CFR Part 2800, et seq.	Part 2800 of Title 43 CFR sets forth application requirements through the BLM for granting a ROW for the project.	Pending Project approval, a site-wide inspection will be performed by a certified professional soil scientist and specific requirements pertaining to Project grading and soil erosion will be developed as part of the joint BLM/CEC review process for the Project. To prevent the discharge of pollutants (i.e., sediment) into waterways. Applicable BMPs will be incorporated into the preliminary construction SWPPP/DESCP, see **SOIL&WATER-1** and **6.**

LORS		Compliance
Title 44 of the Code of Federal Regulations (44 CFR) Part 65	44 CFR contains the basic policies and procedures of the Federal Emergency Management Agency (FEMA) for adoption of rules. Part 65 - Identification and mapping of special hazard areas requires development in areas identified as a FEMA Special Flood Hazard Area to meet the requirements of Title 44 of the Federal Code of Regulations (44CFR)	El Paso Wash passes through the project site and is a FEMA mapped flood way. El Paso Wash, however, will not be realigned or it's flood flows changed. However it will be remapped and a CLOMR will be submitted to FEMA per **SOIL&WATER-9.**
State		
Porter-Cologne Water Quality Control Act of 1967, Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.	In-lieu permit WDRs from the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation) HTF-impacted soil, see **SOIL&WATER-6**
California Water Code (CWC) Section 13550 (Section 2 of Article X, California Constitution)	This section requires the use of recycled water for industrial purposes subject to recycled water being available and upon a number of criteria including: provisions that the quality and quantity of the recycled water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.	Recycled water is not available at or near the project site.
California Water Code Section 13551	Requires the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such water is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare.	Recycled water is not available at or near the project site. Water will be supplied by the IWVWD. The project owners will be offsetting their water use by implementing a program of water conservation measure within the Indian Valley Wells Valley to completely offset their water needs, see **SOIL&WATER-3.**
Recycling Act of 1991 (Water Code 13575 et. seq)	States that retail water suppliers, recycled water producers, and wholesalers should promote the substitution of recycled water for potable and imported water in order to maximize the appropriate cost-effective use of recycled water.	Recycled water is not available at or near the project site.

LORS		Compliance
SWRCB Water Quality Order 99- 08	The SWRCB regulates storm water discharges associated with construction projects affecting areas greater than or equal to 1 acre to protect state waters. The General Construction Permit requires the development and implementation of a SWPPP that specifies BMPs that will reduce or prevent construction pollutants from leaving the site in stormwater runoff and will also minimize erosion associated with the construction phase.	The applicant will develop, comply and monitor compliance of a construction SWPPP, see **SOIL&WATER-6.**
SWRCB Water Quality Order 97-03	The General Industrial Permit requires the implementation of management measures that will protect water quality. In addition, the discharger must develop and implement a SWPPP and a monitoring plan. Through the SWPPP, sources of pollutants are to be identified and the means to manage the sources to reduce stormwater pollution described. The monitoring plan requires sampling of stormwater discharges during the wet season and visual inspections during the dry season.	The applicant will develop, comply and monitor compliance of an operation SWPPP, see **SOIL&WATER-6.**
Public Resources Code Section 25300 et seq.	Consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the CEC adopted a policy stating it will approve the use of "fresh inland" water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound."	The Project will use dry-cooling methods and does not propose to use site groundwater for power plant cooling. Water needs for the Project, including mirror washing, potable needs, etc., will be met by supplied water from the IWVWD.
California Code of Regulations, Title 23 Division 3, Chapter 15	This Chapter requires the Regional Board to issue Waste Discharge Requirements specifying conditions for protection of water quality and is applicable to the LTU.	In-lieu permit WDRs through the CEC for the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation) HTF-impacted soil, see **SOIL&WATER-6.**
California Water Code Section 13260	Requires filing with the appropriate Regional Board a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.	As stated above, in-lieu permit WDRs from the Lahontan RWQCB are required for the LTU that will be used to treat (through bioremediation) HTF-impacted soil, see **SOIL&WATER-6.**

LORS		Compliance
California Safe Drinking **Water and Toxic Enforcement Act**	The California Health & Safety Code Section 25249.5 et seq. prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The RWQCB administers the requirements of the Act.	Groundwater is over 400 feet below the site and is unlikely to have a potential for contamination from activates at the site. In-lieu permit WDRs from the Lahontan RWQCB are required for the LTU, see **SOIL&WATER-6.**
Local		
Kern County Ordinance **Code, Title 4, Chapter 14.08 – Water Supply Systems**	Regulates permitting, sitting, construction and destruction of groundwater wells.	An old well was located on the project site. The project owner will be required to either convert the well to a monitoring well or to abandon the well in accordance with this LORS and **SOIL&WATER-13**.
Kern County Environmental Health Services Department, Chapter II, Section 602, Sewage Disposal by Individual Soil Absorption Systems	Regulates construction of on-site sewage disposal systems.	The project owner will have a septic sewer system on site and is required to conform to this LORS, see **SOIL&WATER-7.**
Kern County Uniform **Plumbing Code, Chapter 17**	Regulates installation and requires inspection for locating disposal/leach fields and seepage pits.	Same as above.
Kern County Division Four, Standards for Drainage	Provides standards for drainage of waters generated by storms, springs, or other sources that should be mitigated so as to provide reasonable levels of protection for life and property, and the maintenance of necessary access to property or passage of the traveling public on the public highways,.	The project owner is required to comply with this LORS, see **SOIL&WATER- 8, 10, 11 and 12.**
Kern County Code of Building Regulations **Chapter 17.48 Floodplain Management**	Regulates development of projects in special flood hazard areas. These regulations are designed to comply with the National Flood Insurance Program regulations.	The project owner is required to comply with this LORS, see **SOIL&WATER-9.**

PROJECT COMPLIANCE WITH STATE WATER POLICY

The Energy Commission has five authoritative sources for statements of policy relating to water use in California applicable to power plants. They are the California Constitution, the Warren-Alquist Act, the Commission's restatement of the state's water policy in the 2003 Integrated Energy Policy Report ("IEPR"), the State Water Resources Control Board ("SWRCB" or "Board") resolutions (in particular Resolutions 75-58 and 88-63), and the Genesis Solar Project (09-AFC-08) Committee's water-issues order as guidance for interpreting all of the above.

California Constitution

California's interest in conserving water is so important to our thirsty state that in 1928, the common law doctrine of reasonable use became part of the state Constitution. Article X, section 2 calls for water to be put to beneficial use, and that "waste or unreasonable use or unreasonable *method of use* be prevented." (Cal. Const., art. X, § 2; emphasis added.) The article also limits water rights to reasonable use, including reasonable methods of use. (*Ibid*.) Even earlier in the 20th Century, a state Supreme Court case firmly established that groundwater is subject to reasonable use. (*Katz v. Walkinshaw* (1903) 141 Cal. 116.) Thus, as modern technology has made dry-cooling of power plants feasible, the Commission may regard wet-cooling as an unreasonable method of use of surface or groundwater, and even as a wasteful use of the state's most precious resource.

Warren-Alquist Act

Section 25008 of the Commission's enabling statutes echoes the Constitutional concern, by promoting "all feasible means" of water conservation and "all feasible uses" of alternative water supply sources. (Pub. Resources Code § 25008.)

Integrated Energy Policy Report

In the 2003 Integrated Energy Policy Report ("IEPR" or "Report"), the Commission reiterated certain principles from SWRCB's Resolution 75-58, discussed below, and clarified how they would be used to discourage use of fresh water for cooling power plants under the Commission's jurisdiction. The Report states that the Commission will approve the use of fresh water for cooling purposes only where alternative water supply sources or alternative cooling technologies are shown to be "'environmentally undesirable'" or "'economically unsound.'" (IEPR (2003), p. 41.) In the Report, the Commission interpreted "environmentally undesirable" as equivalent to a "significant adverse environmental impact" under CEQA, and "economically unsound" as meaning "economically or otherwise infeasible," also under CEQA. (IEPR, p. 41.) CEQA and the Commission's siting regulations define feasible as "capable of being accomplished in a successful manner within a reasonable amount of time," taking into account economic and other factors. (Cal. Code Regs., tit. 14, § 15364; tit. 20, § 1702, subd. (f).) At the time of publication in 2003, dry cooling was already feasible for three projects—two in operation and one just permitted. (IEPR, p. 39.)

The Report also notes California's exploding population, estimated to reach more than 47 million by 2020, a population that will continue to use "increasing quantities of fresh water at rates that cannot be sustained." (IEPR, p. 39.)

State Water Resources Control Board Resolutions

The SWRCB not only considers quantity of water in its resolutions, but also the quality of water. In 1975, the Board determined that water with total dissolved solids ("TDS") of 1,000 mg/l or less should be considered fresh water (Resolution 75-58.). One express purpose of that Resolution was to "keep the consumptive use of fresh water for powerplant cooling to that *minimally essential*" for the welfare of the state (*Ibid*; emphasis added.). In 1988, the Board determined that water with TDS of 3,000 mg/l or less should be protected for and considered as water for municipal or domestic use. (Resolution 88-63.)

Order from the Genesis Solar Power Project Committee

The Genesis Solar Power Project Committee grappled with all these sources of policy to arrive at a simple yet flexible determination for water use by power plants under Commission jurisdiction. The Order states:

> The Committee reads [the policies] as requiring projects seeking to use groundwater for power plant cooling to use the least amount of the worst available water, considering all applicable technical, legal, economic, and environmental factors. (Genesis Solar Energy Power Project Committee, Decision and Scoping Order, Feb. 2, 2010.)

As mentioned above, staff carefully considers all relevant factors when conducting analysis and arriving at recommendations for the Commission. Thus, staff must determine what is the least but nevertheless feasible amount of water available for use, and also the worst, feasible available water that applicant could use for particular purposes on a project. Specifically, in order to conform to decision 88-63, projects should avoid using groundwater when at all feasible.

In several cases the Commission has accepted offset programs that conserve water in the region as means of accepting compliance with the water policies. Staff takes this to mean that such offset programs are an acceptable method to ensure compliance for current projects.

Discussion

The applicant for the Ridgecrest Solar Power Project ("Ridgecrest") proposes a dry-cooled facility that would use 150 acre feet a year (afy) of groundwater delivered by the Indian Wells Valley Water District. Groundwater is the only available source of water. The water would be used for various purposes, including domestic use by workers, dust suppression, and mirror washing. Water is the only feasible means of cleaning the mirrors, which must be clean to maintain efficiency of output by parabolic trough solar plants. Process makeup water would be recycled, for an estimated savings of about 38 afy. Overall use of the water is efficient for this technology, requiring 60 afy per 100 MW of capacity, or 0.30 acre feet per gigawatt-hour generated.

Staff concludes that the Ridgecrest Solar Power Project complies with the state's water policies to feasibly use the least amount of the lowest-quality water available. For staff's complete analysis of related water issues for the Ridgecrest project, please see section C.9.4 of this Staff Assessment.

The administering agencies for the State LORS are the Energy Commission, the SWRCB, and the Lahontan RWQCB. The Project would comply with the applicable State LORS related to water use and quality during construction and operation.

C.9.12 NOTEWORTHY PUBLIC BENEFITS

No noteworthy public benefits of the proposed project were identified associated with soil and water resources.

C.9.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

This section presents the mitigation monitoring, compliance and reporting measures for Soil and Water Resources recommended by Energy Commission staff. For a summary of all proposed Project impacts and their respective mitigation measures, please see the Impact Summary Tables provided at the end of the Executive Summary.

DRAINAGE EROSION AND SEDIMENTATION CONTROL PLAN

SOIL&WATER-1 Prior to site mobilization, the Project owner shall obtain both the BLM's Authorized Officer (AO) and CPM approval of the Drainage Erosion and Sedimentation Control Plan (DESCP) for managing stormwater during Project construction and operations as normally administered by the County of Kern. The DESCP must ensure proper protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, include provisions for sediment and stormwater retention from both the power block, solar fields and transmission right-of-way to meet Kern County requirements, address exposed soil treatments in the solar fields for both road and non-road surfaces, and identify all monitoring and maintenance activities. The plan must also cover all linear project features such as offsite transmission mains. The DESCP shall contain, at minimum, the elements presented below that outline site management activities and erosion and sediment-control BMPs to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

A. Vicinity Map – A map(s), at a minimum scale 1 inch=100 feet, shall be provided indicating the location of all Project elements (construction sites, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

B. Site Delineation – All areas subject to soil disturbance for the proposed Project (Project phases, laydown area, all linear facilities, landscaping areas, and any other Project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

C. Watercourses and Critical Areas – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the proposed

Project construction, laydown, and landscape areas and all transmission and pipeline construction corridors.

D. **Drainage Map** – The DESCP shall provide a topographic site map(s), at a minimum scale of 1 inch=100 feet, showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

E. **Drainage of Project Site Narrative** – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features.

F. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.

G. **Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all Project elements (Project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

H. **Soil Wind and Water Erosion Control -** The plan shall address exposed soil treatments to be used during construction and operation of the proposed Project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed Project site that would not cause adverse effects to vegetation. BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use. All dust palliatives, soil binders, and weighting agents shall be approved by both the AO and CPM prior to use.

I. **Best Management Practices Plan –** The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, Project element excavation and construction, and final grading/stabilization).

J. **Best Management Practices Narrative –** The DESCP shall show the location (as identified in (i) above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all Project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each Project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information would be available.

K. **Project Schedule –** The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, Project element construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each Project element for each phase of construction.

L. **Erosion Control Drawings –** The erosion-control drawings and narrative shall be designed, stamped and sealed by a professional engineer or erosion control specialist.

M. **Agency Comments –** The DESCP shall include copies of recommendations, conditions, and provisions from the County of Kern, California Department of Fish and Game (CDFG), and Lahontan RWQCB.

N. **Monitoring Plan:** Monitoring activities shall include routine measurement of the volume of accumulated sediment in the onsite drainage ditches, and storm water diversions. The monitoring plan shall be part of the Channel Monitoring and Maintenance Plan, **SOIL&WATER-12.**

Verification: No later than 90 days prior to start of site mobilization, the Project owner shall submit a copy of the final DESCP to the County of Kern, the Lahontan RWQCB, and both the AO and CPM for review and comment. No later than 60 days prior to start of site mobilization, the Project owner shall submit the DESCP with the County's and Lahontan RWQCB's comments to the both the AO and CPM for review and approval. Both the AO and CPM shall consider comments by the county and Lahontan RWQCB before approval of the DESCP.

The DESCP shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. The DESCP shall be a separate plan from the SWPPP developed in conjunction with any NPDES permit for Construction Activity. The Project owner shall provide in the monthly compliance report with a narrative on the effectiveness of the drainage, erosion, and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the Project owner shall

update and maintain the DESCP for the life of the Project and shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

WATER SUPPLY - CONSTRUCTION AND OPERATION

SOIL&WATER-2 The Project's owner proposes to obtain a water supply from the IWVWD for both construction and operation activities. They also will be providing a water conservation offset program for all their water usage (**SOIL&WATER-3**). As part of that program, they may opt to obtaining construction water from the LADWP Los Angeles Aqueduct. The Project owner shall provide both the AO and CPM two copies of an executed Water Purchase Agreement(s) (Agreement) between the project Owner and water supplier(s). The applicant shall do one of the following:

1. Obtain a long term Agreement with IWVWD through the life of the project covering both the construction and operations water supply; or

2. Obtain a short term Agreement with LADWP for construction water for the construction period of 28 months and a long term Agreement with IWVWD for operations water supply for 30 years.

The agreement shall specify all terms, conditions and costs for the delivery and use of the water supply at the project site.

Verification: No later than thirty (30) days prior to start of construction, the Project's owner shall submit two (2) copies of the executed agreement(s) for the water supply(s) for construction and operation.

PREPARE AND IMPLEMENT A WATER CONSERVATION OFFSET PROGRAM

SOIL&WATER-3 Sixty (60) days prior to start of construction, the project Owner shall provide a Water Conservation Offset Plan (WCOP) for review and comment by the both the AO and CPM. The Final WCOP shall be approved by the both the AO and CPM prior to the start of any site mobilization activities, and remain in effect for the life of the project. The Final WCOP shall include the following:

A. The plan shall follow the recommendations in the Proposed Plan for Offsetting Construction and Operational Water Supply in **SOIL AND WATER APPENDIX B**.

B. The plan shall contain a monitoring program. The monitoring plan shall monitor the effectiveness of the program on a monthly basis, summarized annually and included with the annual compliance report.

C. A tabulation of conservation measures including the amount of water to be conserved through each measure along with how they will be implemented and methodology and schedule for implementation.

D. The WCOP shall contain a contingency to assure a 100% offset of the Project's construction and operation water use during the life of the project.

E. A written and approved agreement between the Project owners and the WCOP primary participants agreeing to the plan including its implementation schedule and the plan monitoring.

F. Demonstration in the water conservation accounting that RSPP shall not be credited with other independent water conservation activities occurring within IWVWD's service area and IWVGB for which the WCOP has no effect.

G. Methodology for annual monitoring, reporting, and independent confirmation of the results of the WCOP demonstrating actual water conservation equivalent to RSPP's proposed annual water use of up to 1,470 af for the 28-month construction period and 150 afy during RSPP operation. The water conservation offset shall be demonstrated as an annual average over a running 3 years for the life of the project.

H. Demonstration that the WCOP meets the requirements of the both the AO and CPM

Verification: No later than 60 days prior to the start of construction, the Project owner shall submit the WCOP to both the AO and CPM for review, comment, and approval.

A. No later than 30 days prior to the start of construction the Project owner shall have an executed WCOP agreement with the IWVWD and any private participants outside of IWVWD. The WCOP agreement(s) are to be provided to the AO and CPM for review.

B. The WOCP shall be in full implementation before the use by the project of any water for construction or operation. The Project owner shall provide evidence of project implementation to the AO and CPM before the start of construction.

C. The Project owner shall submit its annual accounting/monitoring of the WCOP identifying the conservation measures implemented, demonstrating the actual conservation of groundwater from the IWVGB equivalent to RSPP's annual water use and include the report in the annual compliance report.

CONSTRUCTION AND OPERATION WATER USE

SOIL&WATER-4 The Project owner proposes to use groundwater (supplied by IWVWD) for water supply during construction and during operation. The proposed Project's use of groundwater in the IWVGB during construction shall not exceed 1,470 af during the 28 months of construction and 150 afy during operation.

Prior to the use of water for construction, the Project owner shall install and maintain metering devices as part of the water supply and distribution system

to document Project water use and to monitor and record in gallons per day the total volume(s) of water supplied to the Project from this water source. The metering devices shall be operational for the life of the Project.

Verification: At least thirty (30) days prior to the start of construction of the proposed Project, the Project owner shall submit to both the AO and CPM a copy of evidence that metering devices have been installed and are operational.

Beginning six (6) months after the start of construction, the Project owner shall prepare a semi-annual summary of amount of water used for construction purposes. The summary shall include the monthly range and monthly average of daily water usage in gallons per day.

The Project owner shall prepare an annual summary, which will include daily usage, monthly range and monthly average of daily water usage in gallons per day, and total water used on a monthly and annual basis in acre-feet. For years subsequent to the initial year of operation, the annual summary will also include the yearly range and yearly average water use by source. For calculating the total water use, the term "year" will correspond to the date established for the annual compliance report submittal.

DECOMMISSIONING PLAN

SOIL&WATER–5 The project owner shall identify likely decommissioning scenarios and develop specific decommissioning plans for each scenario that will identify actions to be taken to avoid or mitigate long-term impacts related to water and wind erosion after decommissioning. Actions may include such measures as a decommissioning SWPPP, revegetation and restoration of disturbed areas, post-decommissioning maintenance, collection and disposal of project materials and chemicals, and access restrictions.

Verification: The project owner shall submit decommissioning plans to the AO and CPM for review and approval 60 days after project certification. The project owner shall amend these documents as necessary, with approval from the AO and CPM, should the decommissioning scenario change in the future.

WASTE DISCHARGE REQUIREMENTS

SOIL&WATER-6 Conditions to require implementation of waste discharge requirements for the General Construction SWPPP, General Industrial Stormwater Permit during operation, and LTU is currently in development and will be included in the SAE/FEIS.

Verification: The Project owner shall do all of the following: Requirements are in development and will be included in the SAE/FEIS.

SEPTIC SYSTEM AND LEACH FIELD REQUIREMENTS

SOIL&WATER-7 The project owner shall comply with the requirements of the Kern County Ordinance Code, Title 14, Chapter 14.12 and the Kern County Title 17 Chapter 17.20 – Uniform Plumbing Code regarding sanitary waste disposal facilities such as septic systems and leach fields. The septic system and leach fields shall be designed, operated, and maintained in a manner that ensures no deleterious impact to groundwater or surface water. Compliance

shall include an engineering report on the septic system and leach field design, operation, maintenance, and loading impact to groundwater.

Verification: The project owner shall submit all necessary information and the appropriate fee to the County of Kern and the Lahontan RWQCB to ensure that the project has complied with county and state sanitary waste disposal facilities requirements. Written assessments prepared by the Kern County and the Lahontan RWQCB regarding the project's compliance with these requirements must be submitted to the AO and CPM for review and approval 30-days prior to the start of power plant operation.

REVISED PROJECT DRAINAGE REPORT AND PLANS

SOIL&WATER-8 The Project owner shall provide a revised Drainage Report which includes the following additional information:

A. Revised CN values for existing and proposed conditions that are consistent with available soil mapping and the Kern County Hydrology Manual.

B. A hydrologic analysis that supports a drainage design resulting in no more than a 5% increase in the post-development discharges at any of the designated outlet locations defined in the current Drainage Report (SM 2010a). Peak discharges must be based on curve number values consistent with those presented in the Kern County Hydrology Manual for the observed site conditions.

C. Detailed scour calculations to justify toe-down depths for all spillways, berms, drop structures, slope protection, and any other features where scour is an issue.

D. Revised hydraulic analysis for the fully lined east channel option accounting for supercritical flow and hydraulic jump conditions.

E. Revised onsite hydrology map showing peak discharge values at all locations where the onsite drainage system discharges directly offsite such as the outlets into El Paso Wash.

F. Report figure showing the revised El Paso Wash floodplain superimposed on the proposed site grading plan.

G. Specific analysis and discussion addressing the discharge of flows at the terminal end of the eastern collector channel and the methods for erosion control.

H. Specific analysis and discussion of the methods to be employed to prevent existing flows along the southwest right-of-way of Route 385 from entering the eastern collector channel and entering North Ridgecrest Wash upstream of the culvert crossing at Route 385.

I. Analysis and discussion of flows along the proposed diversion berms on the southern solar field demonstrating that flows are non-erosive or providing for the appropriate erosion protection. This task may require mapping of the floodplain along portions of the berm.

J. Digital copies of all hydrologic and hydraulic analysis.

The Project owner shall also provide the 30% Grading and Drainage Plans which include the design based on information provided in the revised Drainage Report outlined above.

Verification: The Project owner shall submit a Revised Project Drainage Report with the 30% Grading and Drainage Plans to both the AO and CPM for their review and comments 30 days after project certification. The Project owner shall address comments provided by both the AO and CPM until approval of the report is issued. All comments and concepts presented in the approved Revised Project Drainage Report with the 30% Grading and Drainage Plans will be included in the final Grading and Drainage Plans. The Revised Project Drainage Report and 30% Grading and Drainage Plans shall be approved by both the AO and CPM.

CONDITIONAL LETTER OF MAP REVISION

SOIL&WATER–9 In accordance with Kern County's Floodplain Management Ordinance and 44 CFR 65.12, the project owner shall prepare all necessary engineering plans and documents to support a Conditional Letter of Map Revision (CLOMR) application submittal to FEMA. The CLOMR shall cover both El Paso Wash and North Ridgecrest Wash within the limits of the project and far enough beyond to tie into the effective FIS per FEMA requirements. The project shall not commence construction in the SFHA until Kern County receives from FEMA an approved CLOMR. Following construction, the Project Owner shall prepare all necessary documents required for a final Letter of Map Revision (LOMR). The project owner shall use FEMA's Guidelines and Specifications for Mapping Partners for guidance. The project owner shall:

1. Prepare hydrologic analyses to estimate the 10-, 2-, 1-, and 0.2-% annual chance flood events for the El Paso watershed. The analyses shall be conducted using numerical models approved by FEMA;

2. Prepare preliminary (30%) design drawings for the channel, include typical channel cross section dimensions, typical details for all structural elements needed to protect the channel from erosion, and a grading plan for proposed conditions that ties into existing topography;

3. Conduct hydraulic analyses for existing and proposed conditions. Plot the water surface and energy grade line profile for the constructed channel. Tie the proposed conditions water surface elevation profile into the water surface profile from the existing hydraulic model upstream and downstream of the site;

4. Prepare flood hazard mapping for the existing and proposed conditions. Floodplain mapping shall tie-into the upstream and downstream special flood hazard mapping shown on the effective DFIRM;

5. Provide notification to all adjacent property owners, impacted by the proposed change to the SFHA;

6. Complete the necessary FEMA MT-2 application forms package and pay all applicable CLOMR review fees. The submittal shall be certified by a California-licensed professional engineer; and

7. Address all FEMA review comments as needed to receive an approved CLOMR.

Prior to mobilization, the Project Owner shall receive confirmation from Kern County that FEMA has issued a CLOMR for the RSPP. The Project Owner shall address all "conditions" in the CLOMR during project construction. No later than six months after the end of construction, the project owner, through a request from Kern County, must notify FEMA of the changes in accordance with 44 CFR 65.3.

The Project Owner shall submit the following technical or scientific data as part of a Letter of Map Revision (LOMR) request:

1. Conduct an As-Built survey of the completed construction;

2. Update the Proposed Conditions Model to reflect the As-Built Revised Conditions and delineate the resulting flood hazards;

3. Complete the necessary FEMA MT-2 application forms package and pay all applicable LOMR review fees. The submittal shall be certified by a California-licensed professional engineer;

4. Address all FEMA review comments as needed to receive approval of the LOMR; and

5. Notify the both the AO and CPM of the approved LOMR.

Verification: The project owner shall do all of the following:

1. Submit a copy of the draft application for a CLOMR, to include all backup calculations and the preliminary design drawings, to the both the AO and CPM 60 days prior to sending the request to FEMA.

2. No later than thirty (30) days after receiving notification from FEMA that all required CLOMR or LOMR documents have been received by FEMA, the Project Owner shall notify the both the AO and CPM that the project is currently being reviewed by FEMA. During the review process, the project owner shall submit all correspondence between FEMA and project owner's engineer representative responsible for addressing FEMA's comments.

3. Prior to construction activity within the effective SFHA the Project Owner shall provide a copy of the CLOMR to the both the AO and CPM for verification.

4. Following construction of the channel improvements, the Project Owner shall complete an As-built survey of the improvements, update the hydraulic model, and prepare a final submittal, to include forms and fees, for a FEMA LOMR request. The Project Owner shall submit a copy of the completed LOMR submittal to the both the AO and CPM and Kern County for review.

5. No later than thirty (30) days after receiving notification from FEMA that the LOMR has been issued to Kern County the project owner shall submit a copy of the LOMR to the both the AO and CPM for verification.

DRAINAGE CHANNEL AND BERM DESIGN

SOIL&WATER-10 All collector and conveyance channels shall be constructed consistent with Kern County Flood Control guidelines where applicable. Deviation from those guidelines should be documented in the Project drainage report along with justification. Grade control structures shall be utilized where needed in unlined channels to meet channel velocity and Froude number requirements. Channels shall be sized along discreet sections based on the results of the detailed hydrologic analysis as presented in the revised Project Drainage Report.

The eastern collector channel must be designed in a manner which minimizes channel depth and the length of the cut slopes on the eastern bank. This can be accomplished by fully lining the channel with concrete or gunnite. The channel lining on the eastern bank shall extend up the bank to the tie-in point with existing grade, and shall be constructed with a minimum 18” toe-down along the top edge. Break-away wildlife barrier fence is to be placed on the outside of the channel. The presence of this barrier will allow channel side slopes as steep as 1:1 given access ramps are provided for maintenance.

The site drainage design must ensure that the pre- and post-development discharges at the terminal end of the eastern collector channel are within 5% where flow is discharged back into North Ridgecrest Wash. Flows which previously were conveyed along the Route 395 right-of-way shall be conveyed directly to the downstream culvert crossing and not allowed to enter North Ridgecrest Wash. Flow dispersion and scour protection shall be provided at the downstream terminal end of the eastern collector channel to ensure a transition back to existing depth and velocity at that location.

All berms must be designed to prevent erosion along the toe and the incisement of a channel due to the concentration of flow along those structures. The design of the berms must be consistent with the hydraulic analysis presented in the Revised Drainage Report. As described in **SOIL&WATER-8.**

The proposed collector channel design must be fully documented in the revised Engineering Plans and must include the following information:

A. Accurate cut/fill lines demonstrating in plan view how the channel would tie into existing grade and the solar facility.

B. Channel cross-sections at 100ft intervals showing the engineered channel geometry, existing grade, proposed grade at the facility and how the channel would tie in on both banks.

C. Detailed channel profiles showing existing and finished grades at channel flow line and left and right banks. The 100-year water surface elevation shall be provided on all profiles.

D. Typical sections and design details for all discreet channel sections, berms, drop structures, channel confluences, flow inlets and outlets, flow dispersion structures and other relevant drainage features.

E. Grading detail for the proposed spillway structures which will convey flow into El Paso Wash.

F. Consistent nomenclature and stationing on all plans, sections, profiles and details.

Verification: The Project owner shall prepare preliminary, 30% channel design drawings and submit two (2) copies for both the AO and CPM review and comment. The preliminary design drawings shall be submitted at the same time as the **Revised Project Drainage Report** in **SOIL&WATER-8**. The Project owner shall update and modify the design as necessary to obtain both the AO and CPM approval.

CHANNEL EROSION PROTECTION

SOIL&WATER–11 Prior to construction, the Project owner must provide revised Engineering Plans which incorporate the items and information as listed below for the onsite collector and conveyance channels and berms.

A. Soil cement or concrete bank protection must be provided such that collector and conveyance channels are protected from bank erosion and lateral headcutting. The extents of the bank protection must be shown on the revised Engineering Plans. Typical sections for these channels must show the layout of the bank protection including thickness, width and toe-down location and depth consistent with the scour calculation provided in the revised Drainage Report.

B. Soil cement bank protection shall be provided on both channel banks wherever 10-year channel flow velocity exceeds 5 ft/s. It shall be provided on the outer channel bank wherever offsite topography indicates surface flow would enter the collector channels.

C. Other methods of channel stabilization, such as dumped riprap or gabions, will not be permitted. Bio-stabilization measures are not permitted.

D. Earthen berms used on the outside of collector channels to guide flow to discreet points of discharge into a channel shall not be utilized in lieu of soil cement or concrete bank protection on the outside bank of collector channels. Offsite flows shall discharge directly into collector channels.

E. If applicable, the plans shall include reference to regionally accepted specifications for soil cement production and construction. A copy of the specification must be submitted with the revised plans.

F. If applicable, a soils report indicating the suitability of the Project soils for use in the production of soil cement to the Project specifications shall be submitted with the revised Engineering Plans.

G. With the exception of the east channel on the north solar field which is to be fully lined, the bottom of engineered collector channels may be left earthen or fully lined at the discretion of the engineer. Fully lined channels will have higher allowable velocities and Froude numbers assuming hydraulic jumps are modeled and considered in the channel design.

H. Permanent erosion protection shall be provided at all locations where onsite flows discharge offsite either into existing channels or ground. This protection shall be designed to meet the specific conditions and 100-year peak discharge at each point of discharge.

Verification: The required information and criteria shall be incorporated into the Grading and Drainage Plans and with all subsequent submittals as required in **SOIL&WATER-8**. The Project owner shall update and modify the design as necessary to obtain both the AO and CPM approval.

CHANNEL MAINTENANCE PROGRAM

SOIL&WATER-12 The Project owner shall develop and implement a Channel Maintenance Program that provides long-term guidance to implement routine channel maintenance projects and comply with Conditions of Certification in a feasible and environmentally-sensitive manner. The Channel Maintenance Program will be a process and policy document prepared by the Project owner, reviewed by both the AO and CPM and the public entity. The Channel Maintenance Program shall be developed in consultation with the Maintenance District and the public entity and shall include the following:

A. Purpose and Objectives – establishes the main goals of the Program, of indefinite length, to maintain the diversion channel to meet its original design to provide flood protection, support RSPP mitigation, protect wildlife habitat and movement/ migration, and maintain groundwater recharge.

B. Application and Use - The channel maintenance work area is defined as the RSPP engineered channel, typically extending to the top of bank, include access roads, and any adjacent property that RSPP owns or holds

an easement for access and maintenance. The Program would include all channel maintenance as needed to protect the RSPP facilities and downstream property owners.

C. Channel Maintenance Activities

1. **Sediment Removal** - sediment is removed when it: (1) reduces the diversion channel effective flood capacity, to less than the design discharge, (2) prevents appurtenant hydraulic structures from functioning as intended, and (3) becomes a permanent, non-erodible barrier to instream flows.

2. **Vegetation Management** - manage vegetation in and adjacent to the diversion channel to maintain the biological functions and values proposed in the mitigation. Vegetation management shall include control of invasive or nonnative vegetation as prescribed in Condition of Certification **BIO-14**.

3. **Bank Protection and Grade Control Repairs** – Bank protection and grade control structure repairs involve any action by the Project owner to repair eroding banks, incising toes, scoured channel beds, as well as preventative erosion protection. The Project owner would implement instream repairs when the problem: (1) causes or could cause significant damage to RSPP; adjacent property, or the structural elements of the diversion channel; (2) is a public safety concern; (3) negatively affects groundwater recharge; or (4) negatively affects the mitigation vegetation, habitat, or species of concern.

4. **Routine Channel Maintenance** - trash removal and associated debris to maintain channel design capacity; repair and installation of fences, gates and signs; grading and other repairs to restore the original contour of access roads and levees (if applicable); and removal of flow obstructions at RSPP storm drain outfalls.

5. **Channel Maintenance Program –** Exclusions including: emergency repair and CIP.

D. Related Programmatic Documentation – both the AO and CPM will review and approve the Channel Maintenance Program programmatic documentation. Maintenance activities shall comply with the stream alteration agreement provisions and requirements for channel maintenance activities consistent with California's endangered species protection regulations and other applicable regulations.

E. Channel Maintenance Process Overview

1. **Program Development and Documentation** – This documentation provides the permitting requirements for channel maintenance work in accordance with the Conditions of Certification for individual routine maintenance of the engineered channel without having to perform separate CEQA/NEPA review or obtain permits.

2. **Maintenance Guidelines** - based on two concepts: (1) the maintenance standard and (2) the acceptable maintenance condition, and applies to sediment removal, vegetation management, trash and debris collection, blockage removal, fence repairs, and access road maintenance.

3. **Implementation** – Sets Maintenance Guidelines for vegetation and sediment management. RSPP's vegetation management activities are established in Condition of Certification **BIO-14**. Maintenance Guidelines for sediment removal provide information on the allowable depth of sediment for the engineered channel that would continue to provide design discharge protection.

4. **Reporting** – both the AO and CPM requires the following reports to be submitted each year as part of the Annual Compliance Report:

   a. Channel Maintenance Work Plan - Describes the planned "major" maintenance activities and extent of work to be accomplished; and

   b. Channel Maintenance Program Annual Report – Specifies which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

   c. A report describing "Lessons Learned" to evaluate the effectiveness of both resource protection and maintenance methods used throughout the year.

F. Resource Protection Policies - establishes policies to ensure that resources would be protected to the fullest extent feasible during routine channel maintenance activities. Policies would be developed to guide decision-making for channel maintenance activities. BMPs shall be developed to implement these policies.

Verification: The Project owner shall submit a Channel Maintenance Program to the AO and CPM for review and approval 30 days after project certification. The Project Owner shall provide written notification that they plan to adopt and implement the measures identified in the approved Channel Maintenance Program. The Project owner shall:

- Supervise the implementation of a Channel Maintenance Program in accordance with Conditions of Certification;
- Ensure the RSPP Construction and Operation Managers receive training on the Channel Maintenance Program;
- As part of the RSPP Annual Compliance Report to the both the AO and CPM , submit a Channel Maintenance Program Annual Report specifying which maintenance activities were completed during the year including type of work, location, and measure of the activity (e.g. cubic yards of sediment removed).

EXISTING WELL MAINTENANCE PROGRAM

SOIL&WATER-13 The Project owner shall construct a monitoring well in the existing well onsite or destroy the well. The Project owner shall ensure that the well is completed or destroyed in accordance with all applicable state and local water well construction permits and requirements, including the County of Kern County well construction/destruction requirements. Prior to initiation of well construction/destruction activities, the Project owner shall submit a well construction/destruction packet to the County of Kern, in accordance with the County of Kern Environmental Health requirements for construction/destruction of the existing well, containing all documentation, plans, and fees normally required for the county's well permit, with copies to both BLM's Authorized Officer and the CPM. The project shall not construct/destroy the well until the County of Kern provides a written concurrence that the proposed well construction/destruction would comply with all applicable county requirements and both BLM's Authorized Officer and the CPM provides approval to construct/destroy the well.

Post-Well Installation. The Project owner shall provide documentation to both BLM's Authorized Officer and the CPM that the well has been properly completed or destroyed. In accordance with California's Water Code section 13754, the driller of the well shall submit to the DWR a Well Completion/Destruction Report for the well. The Project owner shall ensure the Well Completion/Destruction reports are submitted. The Project owner shall ensure compliance with all county water well standards and requirements for the life of the wells and shall provide BLM's Authorized Officer and the CPM with two (2) copies each of all monitoring or other reports required for compliance with the County of Kern water well standards and operation requirements, as well as any changes made to the operation of the well.

Verification: The project owner shall do all of the following:

1. No later than sixty (60) days prior to the start of Project construction activities, the project owner shall submit to both BLM's Authorized Officer and the CPM a copy of the water well construction/destruction packet submitted to the County of Kern.

2. No later than thirty (30) days prior to the start of Project construction activities, the project owner shall submit a copy of written concurrence received from the County of Kern that the proposed well construction/destruction activities comply with all county well requirements and meet the requirements established by the county's water well permit program.

3. No later than sixty (60) days after installation/destruction of the existing well at the project site, the Project owner shall ensure that the well driller submits a Well Completion/Destruction Report to the DWR with a copy provided to both BLM's Authorized Officer and the CPM. The project owner shall submit to the CPM together with the Well Completion/Destruction Report a copy of well drilling logs, water quality analyses, and any inspection reports.

4. During well construction/destruction and for the operational life of the well, the project owner shall submit two (2) copies each to BLM's Authorized Officer and the CPM of any proposed well construction or operation permit changes within ten (10) days of submittal to or receipt from the County of Kern.

5. No later than fifteen (15) days after completion of the onsite monitoring well, the project owner shall submit documentation to BLM's Authorized Officer, the CPM, and the Lahontan RWQCB that well drilling activities were conducted in compliance with Title 23, California Code of Regulations, Chapter 15, Discharges of Hazardous Wastes to Land, (23 CCR, sections 2510 et seq.) requirements and that any onsite drilling sumps used for project drilling activities were removed in compliance with 23 CCR section 2511(c).

C.9.14 CONCLUSIONS

With the information provided to date, California Energy Commission staff referred to as staff) have determined that construction, operation, and decommissioning of the proposed Ridgecrest Solar Power Project (RSPP) could potentially impact soil and water resources. Where these potential impacts have been identified, Commission staff, under CEQA and Commission regulations, has proposed mitigation measures to reduce identified impacts to levels that are less than significant. The project's contribution to overdraft is cumulatively considerable but the proposed mitigation will reduce these impacts to less than significant. The mitigation measures, as well as specifications for laws, ordinances, regulations and standards (LORS) conformance, are included herein as Conditions of Certification. The Project would conform to all applicable LORS. Commission staff's conclusions based on analysis of the information submitted to-date are as follows:

1. The proposed Project would be located on an alluvial fan where flash flooding and mass erosion could impact the Project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users. A Draft Drainage, Erosion, and Sedimentation Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. Based on these factors, the proposed Project could result in impacts that would be significant with respect to CEQA significance criteria specified herein and NEPA significance criteria specified in 40 CFR 1508.27. Therefore, Conditions of Certification have been developed that define the requirements for reports, plans, monitoring, and inspection, as well as standards and procedures for implementing Best Management Practices during construction and operations.

2. The proposed Project would be located in an area with no designated entity responsible for maintaining integrity of the rerouted channels. Commission staff believes the Applicant should be required to establish a Channel Maintenance Program as indicated in Condition of Certification **SOIL&WATER-12**.

3. The project applicant proposes to use groundwater supplied by the Indian Wells Valley Water District (IWVWD). Water from IWVWD wells will be piped to an existing tank and transmitted via pipeline that will be built by the RSPP to the Project site. The IWVWD and the Project owner signed a Water Supply Agreement on October 29, 2009. IWVWD also issued a Will Serve Letter for water service. Water will be supplied to the project site from the Ridgecrest Heights B Zone water storage tank. A 16 inch diameter pipeline from the water storage tank shall be constructed in China Lake Boulevard southerly to Brown Road then westerly to the Project site. The Project owner is responsible for the design, permitting and construction of all necessary facilities. IWVWD is in the process of annexing the Project site.

This analysis indicates that the IWVGB is already significantly overdrafted and the Projects pumping will exacerbate the overdraft condition. The Applicant has proposed a mitigation to offset the proposed construction and operation water demands. Condition of Certification **SOIL&WATER-2** and **3**, is expected to reduce the impact of the Project's water demand on the IWVGB to below the level of significance.

C.9.15 REFERENCES

California Department of Water Resources (CDWR), 1986, Bulletin 113-4: Crop Water Use in California, April.

California Department of Water Resources (CDWR), 1998. California Water Plan Update Bulletin 160-98, November 1998.

California Department of Water Resources (CDWR), 2004, Indian Wells Valley Groundwater Basin, California's Groundwater Bulletin 118, 1975 (updated in February 2004).

California Department of Water Resources (CDWR), 2009. Groundwater Level Data and Water Quality Data. Accessed at http://well.water.ca.gov.

Federal Emergency Management Agency (FEMA), 2008, Flood Insurance Rate Map, Kern County, California.

Groundwater Management Group, 2008, AB303 Final Report – Installation and Implementation of a Comprehensive Groundwater Monitoring Program for the Indian Wells Valley, California, March. Accessed at http://www.iwvgroundwater.org/.

Indian Wells Valley Water District (IWVWD), 2008, Annual Water Quality Report - Water Testing Performed in 2008, PWS ID# 1510017.

Kunkel, Fred, and Chase, G.H., 1969, Geology and Ground Water in Indian Wells Valley, California, U.S. Geological Survey, Open-File Report 69-329, January 23, 1969.

RWQCB, 2005. Water Quality Control Plan for the Lahontan Region, North and South Basin: California Regional Quality Control Board, Lahontan Region, Victorville, California.

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

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

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

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

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

ACRONYMS

af	acre-feet
AF	Acre-feet
AFC	Application for Certification
afy	acre-feet per year
AFY	Acre-Feet per Year
amsl	Above mean sea level
bgs	Below ground surface
BLM	United States Bureau of Land Management
BMPs	Best management practices
BP	Before Present
CEC	California Energy Commission
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CWA	Clean Water Act
CVGWB	Chuckwalla Valley Groundwater Basin
DESCP	Drainage Erosion and Sediment Control Plan
DR	Data Request
CDWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
ft	Feet
ft/s	feet per second
ft^2	square feet
ft^2/d	square feet per day
gpd	gallon per day

gpm	Gallons per minute
HTF	Heat Transfer Fluid
in	Inches
IWVGB	Indian Wells Valley Groundwater Basin
IWVWD	Indian Wells Valley Water District
LORS	Laws Ordinances, Regulations and Standards
Lahontan RWQCB	Lahontan Regional Water Control Board
LTU	Liquid Treatment Unit
mg/L	milligrams per liter
NPDES	National Pollutant Discharge Elimination System
NRCS	National Resource Conservation Service
NWIS	National Water Information System
OW	Observation Well
RSPP	Ridgecrest Solar Power Project
RO	Reverse Osmosis
ROW	Right of Way
RPS	Renewable Portfolio Standard
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	California State Water Resources Control Board
t/ac/yr	tons per acre per year
TDS	Total Dissolved Solids
TW	Test Well
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey

SOIL AND WATER
APPENDIX A

IWVWD WILL SERVE LETTER AND AGREEMENT

INDIAN WELLS VALLEY WATER DISTRICT

BOARD OF DIRECTORS

Leroy Corlett, President
Peter Brown, Vice President
Peggy Breeden
Donald J. Cortichiato
Harold W. Manning

Thomas F. Mulvihill
General Manager
Krieger & Stewart, Incorporated
Engineers
McMurtrey, Hartsock & Worth
Attorneys-at-Law

RECEIVED 10/5/09 rs

October 2, 2009

Solar Millennium, LLC
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709

ATTN: Josef Eichhammer, CEO

RE: Will Serve Letter for the Ridgecrest Solar Power Project

To Whom It May Concern:

The Indian Wells Valley Water District ("District") can provide potable water service, to the Ridgecrest Solar Power Project as described in and subject to that certain "Water Supply Agreement Between Indian Wells Valley Water District and Solar Millennium, LLC, dated October 2, 2009 ("Agreement"), subject to all District Ordinances, Rules and Policies, upon commencement of construction by Solar Millennium of the Project described in the Agreement and the deposit of applicable charges and fees for obtaining water service.

Pursuant to Section 2(h) of the Agreement, this offer of service shall be valid for a period of twelve (12) months following Solar Millennium's receipt of all necessary permits, consents, and approvals for the Project, including but not limited to, a right of way or lease with BLM, permit from CalTrans for the pipeline to cross Highway 395, and Certification and Verification of the Project by the California Energy Commission.

Sincerely,

Tom Mulvihill

Tom Mulvihill
General Manager

500 West Ridgecrest Boulevard - Mailing Address: P.O. Box 1329, Ridgecrest, California 93556-1329
(760) 375-5086 FAX (760) 375-3969
www.iwvwd.com E-mail: iwvwd@iwvwd.com

WATER SUPPLY AGREEMENT BETWEEN INDIAN WELLS VALLEY WATER DISTRICT AND SOLAR MILLENNIUM, LLC

THIS AGREEMENT is entered into as of the 2 day of October, 2009, by and between INDIAN WELLS VALLEY WATER DISTRICT, a California water district organized and existing under the provisions of Division 13 of the Water Code of the State of California ("District") and SOLAR MILLENNIUM, LLC, a California limited liability company ("Solar Millennium").

AGREEMENT:

1. General Provisions.

a. The District is authorized to operate, maintain, and repair the necessary works for the production, storage, transmission, and distribution of water ("District System").

b. Solar Millennium intends to develop a solar thermal power plant utilizing dry cooling technology with a capacity of 242 megawatts ("Project") on approximately 3,920 acres as shown on Exhibit "A" hereto ("Site"), subject to a right-of-way or lease with the United States Bureau of Land Management ("BLM");

c. The Project requires approximately 1,500-acre feet of water during construction of the Project, which is estimated to last approximately twenty-eight (28) months from the start of construction, which is estimated to begin in the fourth quarter of 2010 ("Project Construction Water"). The Project requires water, in an amount not to exceed 165 acre-feet per annum, for operations over a period of thirty (30) years as shown on Exhibit "B" ("Project Operations Water"). The maximum instantaneous water flow required for operations is estimated to be 310 GPM;

d. Solar Millennium desires to receive water from the District for the construction and operation phases of the Project, and District is willing to provide water subject to the terms and conditions set forth in this Agreement. Upon execution of this Agreement, the District will execute the Will Serve Letter attached as Exhibit "C" hereto. The District will cooperate with Solar Millennium in its efforts to obtain permits and approvals for the Project. Solar Millennium will cooperate with District in its annexation efforts related to the Project;

e. In order for District to serve the Project, Solar Millennium must construct a water main and other District-required facilities from the District's Ridgecrest Heights B Zone water storage tank to the Project Site ("Facilities"). All Facilities constructed by Solar Millennium from the Ridgecrest Heights B Zone water storage tank to and including the water meter ("Off-Site Facilities") shall be dedicated to and become the property of the District upon District's written acceptance of the Off-Site Facilities. All facilities within the boundaries of the Project shall be the property of Solar Millennium ("On-Site Facilities"); and

f. Solar Millennium shall be responsible for obtaining all necessary permits, consents, and approvals for the Project and adoption and approval of any and all required environmental documents for the Project.

2. Construction of Facilities.

In the event that Solar Millennium, in its sole and absolute discretion, proceeds to construct the Facilities, Solar Millennium shall comply with the following requirements:

a. Solar Millennium shall prepare, at its expense, detailed plans and specifications for the Facilities to be installed and shall submit the same to District for review and written approval.

b. Solar Millennium agrees to install approved Facilities in compliance with said plans and specifications prepared by Solar Millennium and approved in writing by District. In no event shall Solar Millennium install additional or different Facilities without first obtaining the written approval of District.

c. Solar Millennium agrees to construct and install all Off-Site Facilities to be dedicated to District to the alignment and grade set forth on the approved plans and specifications and in the manner designated and approved in writing by District's engineer. Said construction and installation work shall be done at a time and in a manner that will not interfere with the District's delivery of water to its customers.

d. Solar Millennium shall pay the entire cost of laying, constructing and installing the Facilities, including the costs of all labor and materials incurred or used in connection with the trenching, installing, backfilling, testing and disinfecting of the Facilities.

e. Solar Millennium shall pay District for all costs associated with engineering review and approval of the construction plans and specifications ("Plan Checking") and all costs associated with all inspections of Off-Site Facilities constructed by Solar Millennium ("Inspection"). Said Plan Checking and Inspection fees shall be paid at the times and in the amounts specified in the District's Water Sales and Service Policy Manual.

f. Solar Millennium shall pay all applicable District charges and fees specified in the District's Water Sales and Service Policy Manual, including but not limited to Construction Meter Charges, Rates and Provisions; Capital Facility Fee; and Service Installation Charges.

g. In the event Solar Millennium either elects to terminate this Agreement pursuant to Section 23(a) infra or does not pay the entire costs or fails to complete the construction of said Off-Site Facilities as provided in this Agreement, District may in its sole and absolute discretion, and upon thirty (30) days written notice to Solar Millennium, agree to accept ownership of the Off-Site Facilities "as is" and any Off-Site Easements[1] in existence at that time, in which case Solar Millennium shall transfer, assign, and dedicate, subject to District's written acceptance, any and all Off-Site Facilities and Off-Site Easements free and clear of all liens, claims and encumbrances. In the event District decides in its sole and absolute discretion to accept

[1] Off-Site Easement is defined in Section 3(b) infra.

ownership of the Off-Site Facilities and Off-Site Easements pursuant to this Section 2(g), this Agreement shall automatically terminate upon Solar Millennium's transfer, assignment, and dedication, and District's written acceptance of any and all Off-Site Facilities and Off-Site Easements to the District, and Solar Millennium shall have no further responsibility to complete construction of the Off-Site Facilities and the Warranty of Off-Site Facilities in Section 4 of this Agreement shall not apply.

h. Construction of the Facilities shall begin within twelve (12) months of Solar Millennium's receipt of all necessary permits, consents, and approvals for the Project, including but not limited to, a right of way or lease with BLM, permit from CalTrans for the pipeline to cross Highway 395, and Certification and Verification of the Project by the California Energy Commission.

i. The District shall at all times have access to inspect the construction of the Off-Site Facilities.

3. <u>Dedication.</u>

a. Solar Millennium agrees that, upon completion of construction and installation of said Off-Site Facilities and District's written acceptance thereof, which acceptance shall not be unreasonably withheld or delayed, Solar Millennium shall dedicate the Off-Site Facilities at no cost to the District free and clear of all liens, claims and encumbrances. District shall at all times be in sole and absolute control of the manner, method, and time of conveying and delivering water through District's Off-Site Facilities.

b. Prior to District's acceptance and Solar Millennium's dedication of the Off-Site Facilities, Solar Millennium agrees that it must acquire and dedicate, on behalf of the District, any and all easements required for the construction, operation, maintenance and repair of the Off-Site Facilities ("Off-Site Easements"). The configuration and dimensions of the Off-Site Easements and the form and substance of the Off-Site Easements will be determined solely by District and subject to District's written approval of the plans and specifications for the Facilities.

c. Solar Millennium shall cause to be issued, a standard CLTA policy of title insurance insuring District as owner of the Off-Site Easements, subject to those items shown as exceptions to a preliminary title report issued and delivered to District, unless District, within thirty (30) days after receipt of said preliminary title reports, indicates those items which it is not willing to accept, in which case Solar Millennium shall cause such items to be removed prior to the dedication of the Off-Site Easements to District.

4. **Warranty of Off-Site Facilities.**

a. Solar Millennium agrees to warrant to District said Off-Site Facilities that are constructed by Solar Millennium in good condition and repair continuously for a period of two (2) years from and after the completion of construction by Solar Millennium and District's written acceptance of said Off-Site Facilities and to pay all costs of such repairs and of any replacement of any part thereof required to keep said Off-Site Facilities in good operating condition during said two (2) year period.

b. Solar Millennium agrees that, in the event it fails, neglects or refuses to repair or replace promptly, upon demand by District, any part of said Off-Site Facilities during Solar Millennium's two (2) year warranty period pursuant to Section 4(a), District shall have the right, but shall not be required, to make any such repairs or replacements and Solar Millennium does hereby agree to repay District the cost of any such repairs or replacements made by District, with interest at 10% per annum from the date such cost is incurred to the date of repayment.

5. **Reimbursement.**

a. Solar Millennium shall submit to District separate detailed bid results/sheets ("Bid Sheets") for construction of the Off-Site Facilities; one Bid Sheet based on the District-specified minimum diameter water main and up to two (2) additional Bid Sheets based on larger diameter water mains as selected by the District. District shall advise Solar Millennium within forty-five (45) days of receipt of said Bid Sheets of District's decision to have the Off-Site Facilities constructed using a larger diameter water main. At District's request, Solar Millennium shall construct the Off-Site Facilities using the larger diameter water main selected by District. District agrees to reimburse Solar Millennium for the difference in total construction costs between construction of the Off-Site Facilities using the District-specified minimum diameter water main and construction of the Off-Site Facilities using the larger diameter water main selected by District, as determined by the Bid Sheets submitted by Solar Millennium to District pursuant to this Section 5(a).

b. District agrees to reimburse Solar Millennium for the difference in total construction costs between construction of the Off-Site Facilities using the District-specified minimum diameter water main and construction of the Off-Site Facilities using the larger diameter water selected by District. The difference in total construction costs shall be determined based on the Bid Sheets submitted by Solar Millennium to District, pursuant to Section 5(a), and paid to Solar Millennium within forty-five (45) days of District's written acceptance of the Off-Site Facilities.

c. District and Solar Millennium shall each appoint a Representative to work together in good faith to facilitate the terms of this Section 5.

6. **Insurance.**

a. Solar Millennium's and/or its contractor(s) shall maintain during the design and construction of the Facilities, without cost or expense to the District, the following insurance with the District, its directors, officers, employees, consultants and agents all named as additional insureds:

i. Commercial general liability insurance covering third-party liability risks including, without limitation, bodily injury, personal injury, property damages, contractual liability covering the indemnity provisions contained in this Agreement, premises/operations, products/completed operations, and underground hazard liability including explosion and collapse hazard, underground excavation and removal of lateral support. Coverage shall have limits of liability not less than one million dollars ($1,000,000) per occurrence, two million dollars ($2,000,000) annual aggregate.

ii. Comprehensive automotive liability insurance, with bodily injury and property damage limits of not less than one million dollars ($1,000,000) per claim.

iii. Professional liability insurance covering claims arising out of the design or construction of the Facilities under this Agreement and caused by the wrongful acts, errors, and omissions, or negligent acts for which Solar Millennium or contractor is liable, in an amount not less than two million dollars ($2,000,000) per claim and annual aggregate.

iv. Worker's compensation and employer's liability insurance as required by law for not less than the statutory limits.

7. **Delivery of Water.**

a. Project Operations Water. Upon Solar Millennium's request and District's written acceptance of the completed Off-Site Facilities, the District shall deliver Project Operations Water to the Project Site, in an amount not to exceed 165 acre feet per annum and in an amount not to exceed an instantaneous water flow requirement of 500 gallons per minute, for use in the operation of the Project, in accordance with the District's rules and regulations.

b. Project Construction Water. Upon Solar Millennium's request, the District shall make Project Construction Water available to Solar Millennium at a mutually agreeable location in the vicinity of the Ridgecrest Heights B Zone until the Off-Site Facilities have been completed and upon District's written acceptance, at which time Project Construction Water shall be provided via the Off-Site Facilities, in an amount not to exceed a total of 1500 acre feet and in an amount not to exceed an instantaneous water flow requirement of 500 gallons per minute, for use in construction of the Project, in accordance with the District's rules and regulations.

c. Fire protection. Solar Millennium understands and acknowledges that District is not responsible for providing the Project's fire protection requirements, however, District understands and agrees that Solar Millennium may use water supplied by the District for fire protection purposes.

d. Payment for water services. Solar Millennium shall pay the District for water delivered pursuant to this Agreement in accordance with the District rates effective at the time of delivery. District agrees that it will not implement a rate system that charges Solar Millennium a higher rate than is charged to other water users with a same size meter for commercial and/or industrial use, or like category.

e. Water Service. In the event of a water emergency declared by the Board of Directors of the District, restrictions implemented on Solar Millennium will be the same as those restrictions implemented on other commercial and/or industrial users, or like category.

8. Term.

a. The term of this Agreement shall commence upon execution by the parties and shall terminate thirty (30) years after the date of the first delivery of Project Operations Water to the Project Site, unless otherwise earlier terminated.

9. Representations and Warranties.

a. Representations and Warranties of Solar Millennium. Solar Millennium hereby makes the following representations and warranties, which representations and warranties are true in all respects as of the date hereof:

i. Solar Millennium has the requisite right, power, legal capacity and authority to enter into and fully perform each and all of its obligations under this Agreement.

ii. The individuals executing this Agreement on behalf of Solar Millennium have the requisite right, power, legal capacity and authority to execute and enter into this Agreement on behalf of Solar Millennium, to legally bind Solar Millennium to the terms and provisions of this Agreement and to execute all other documents and take all other actions as may reasonably be necessary to perform each and all of Solar Millennium's obligations under this Agreement.

b. Representations and Warranties of the District. The District hereby makes the following representations and warranties, which representations and warranties are true in all material respects as of the date hereof:

i. The District has the requisite right, power, legal capacity and authority to enter into and fully perform each and all of its obligations under this Agreement.

ii. The individuals executing this Agreement on behalf of the District have the requisite right, power, legal capacity and authority to execute and enter into this Agreement on behalf of the District, to legally bind the District to the terms and provisions of this Agreement, and to execute all other documents and take all other actions as may reasonably be necessary to perform each and all of the District's obligations under this Agreement.

10. Indemnity.

a. Solar Millennium agrees to fully defend, protect, indemnify, and hold harmless District, its directors, officers, employees, consultants, and agents, from and against each and every claim, demand, or cause of action, and any liability, costs, expenses (including, but not

limited to reasonable attorney's fees and expenses incurred in defense of District), damage or loss in connection therewith, which may be made or asserted by Solar Millennium, Solar Millennium's employees, agents, subcontractors, or any third parties on account of personal injury or death or property damage to the extent caused by, arising out of, or in connection with Solar Millennium's negligent performance of this Agreement, except such as may result solely from the negligence of District.

b. District agrees to fully defend, protect, indemnify, and hold harmless Solar Millennium, its directors, officers, employees, consultants, and agents, from and against each and every claim, demand, or cause of action, and any liability, costs, expenses (including, but not limited to reasonable attorney's fees and expenses incurred in defense of Solar Millennium), damage or loss in connection therewith, which may be made or asserted by District, District's employees, agents, subcontractors, or any third parties on account of personal injury or death or property damage to the extent caused by, arising out of, or in connection with District's negligent performance of this Agreement, except such as may result solely from the negligence of Solar Millennium.

11. Compliance with District Rules and Regulations.

a. Solar Millennium shall comply with all of the District's policies, rules, regulations and ordinances, and as they may be amended from time to time.

12. Readiness.

a. Both parties shall maintain adequate facilities, personnel and resources to meet their respective obligations under this Agreement.

13. Remedies in Event of Either Party's Failure to Perform.

a. In the event of either party's failure to perform any of its obligations under this Agreement, the other party's right to seek all remedies at law or in equity are reserved.

14. Dispute Resolution.

a. In the event of any dispute arising out of or relating to this Agreement, the parties agree to participate in good faith in the mediation and negotiations related thereto for a period of thirty (30) days. Said thirty (30) day period to commence upon written notice by either party that it wishes to participate in mediation and negotiations pursuant to this Section 14.

15. NOTICES.

a. Any notices necessary under the terms of this Agreement shall be delivered by first class mail, return receipt requested, effective upon receipt as follows:

To District: Indian Wells Valley Water District
500 W. Ridgecrest Boulevard
Post Office Box 1329
Ridgecrest, CA 93556
Attn: Thomas F. Mulvihill, General Manager

To Solar Millennium: Solar Millennium LLC
1625 Shattuck Ave., Suite 270
Berkeley, CA 94709
Attn: Legal Counsel

Either party may change the address by giving written notice in accordance with this paragraph.

16. Attorneys' Fees.

a. If any action at law or in equity is necessary to enforce or interpret the terms of this Agreement, the prevailing party shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party may be entitled. The phrase "prevailing party" shall include a party who receives substantially the relief desired, whether by settlement, dismissal, summary judgment, judgment, or otherwise.

17. Successors and Assigns.

a. This Agreement shall bind and inure to the benefit of the successors and assigns of the Parties.

18. Sale or Transfer of Ownership of the Project.

a. Solar Millennium shall be entitled to (i) assign this Agreement, in whole or in part, to an affiliate and/or in connection with the sale or transfer of ownership of the Project.

19. Entire Agreement.

a. This Agreement sets forth the entire agreement between the parties with respect to the matters herein.

20. Choice of law.

a. This Agreement shall be governed by and construed in accordance with the laws of the State of California and any lawsuit related to this Agreement shall be initiated and maintained in Kern County, California.

21. Interpretation.

a. If any clause, sentence or other portion of this Agreement shall become illegal, null or void for any reason, or shall be held by any court of competent jurisdiction to be so, the remaining portions shall remain in full force and effect.

22. No Agency Relationship.

a. The parties shall not become or be deemed a partner or joint venturer with one another by reason of this Agreement.

23. Termination.

a. Solar Millennium may terminate this Agreement in its sole and absolute discretion upon thirty (30) days written notice to the District.

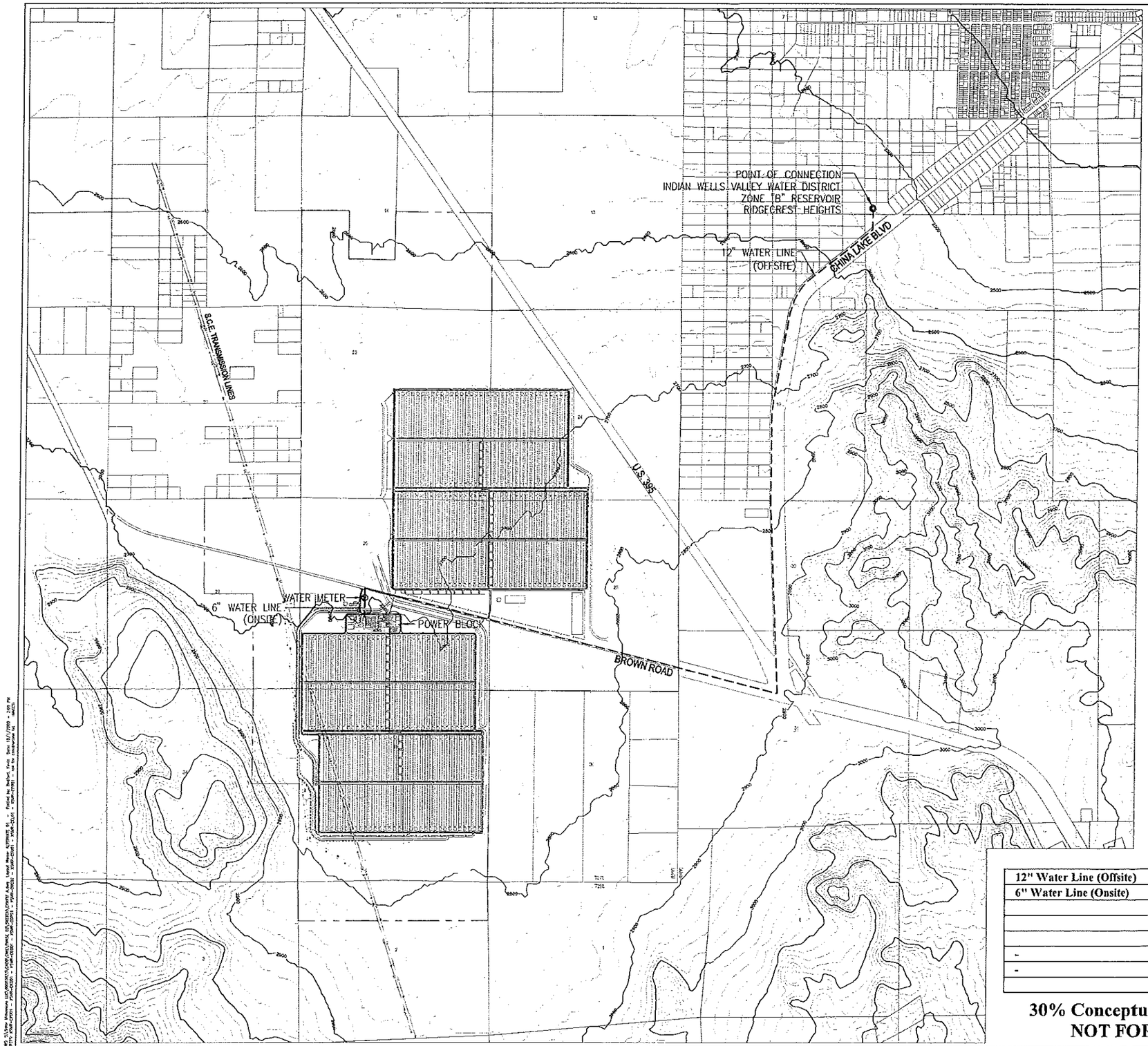
IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year first above written.

INDIAN WELLS VALLEY WATER DISTRICT

By: Thomas F Mulhill
Its: General Manager

SOLAR MILLENNIUM, LLC

By: V. Fichtner
Its: CEO



12" Water Line (Offsite)	26,385 LF
6" Water Line (Onsite)	812 LF
-	-
-	-

30% Conceptual Engineering Plans
NOT FOR CONSTRUCTION

AECOM

AECOM
5001 E. Commercenter Dr.
Bakersfield, Ca 93309
Phone 661.325.7253
www.aecom.com

Designed:	W. BLACK
Checked:	W. BLACK
Drawn:	K. S. BEDFORD
Record Drawing Initials:	

Revisions:

#	DATE	DESCRIPTION

Prepared for:

Solar Millennium LLC

1000 500 0 1000 2000
SCALE IN FEET

Ridgecrest Solar Power Project

Kern County, California

WATER MAIN PLAN

EXHIBIT "A"

Date: 10/01/09
Sheet: 1 OF 1

EXHIBIT B

Ridgecrest Solar Power Plant: Estimated Monthly Water Consumption

TOTAL MONTHLY WATER CONSUMPTION & COSTS (Boiler Water + Mirror Wash Water + Aux Cooling Water + Sanitary and Service Water)

Units	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total (yearly)
gal/month	1,000,000	2,800,000	3,600,000	5,100,000	5,700,000	5,700,000	5,600,000	5,300,000	4,800,000	3,400,000	2,700,000	2,300,000	49,000,000
af/month	6	9	11	16	17	17	17	16	15	10	8	7	150
gallons per day	64,516	100,000	116,129	170,000	183,871	190,000	180,645	170,968	160,000	109,677	90,000	74,194	
gallons per hour	2,688	4,167	4,839	7,083	7,661	7,917	7,527	7,124	6,667	4,570	3,750	3,091	

INDIAN WELLS VALLEY WATER DISTRICT

BOARD OF DIRECTORS

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Attorneys-at-Law

[DATE]

Solar Millennium, LLC
1625 Shattuck Avenue, Suite 270
Berkeley, CA 94709

ATTN: Josef Eichhammer, CEO

RE: Will Serve Letter for the Ridgecrest Solar Power Project

To Whom It May Concern:

The Indian Wells Valley Water District ("District") can provide potable water service, to the Ridgecrest Solar Power Project as described in and subject to that certain "Water Supply Agreement Between Indian Wells Valley Water District and Solar Millennium, LLC, dated _____, 2009 ("Agreement"), subject to all District Ordinances, Rules and Policies, upon commencement of construction by Solar Millennium of the Project described in the Agreement and the deposit of applicable charges and fees for obtaining water service.

Pursuant to Section 2(h) of the Agreement, this offer of service shall be valid for a period of twelve (12) months following Solar Millennium's receipt of all necessary permits, consents, and approvals for the Project, including but not limited to, a right of way or lease with BLM, permit from CalTrans for the pipeline to cross Highway 395, and Certification and Verification of the Project by the California Energy Commission.

Sincerely,

Tom Mulvihill
General Manager

500 West Ridgecrest Boulevard - Mailing Address: P.O. Box 1329, Ridgecrest, California 93556-1329
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SOIL AND WATER
APPENDIX B

PLAN FOR OFFSETTING PROPOSED CONSTUCTION AND OPERATIONAL WATER SUPPLY

AECOM
Environment

Prepared for:
Ridgecrest Solar I, LLC

Data Request 170-172

Plan for Offsetting Proposed Construction and Operational Water Supply

Ridgecrest Solar Power Project
Kern County, California

February 2010

60139696-WMP

AECOM
Environment

Prepared for:
Ridgecrest Solar I, LLC

Data Request 170-172

Plan of Offsetting Proposed Construction and Operational Water Supply

Ridgecrest Solar Power Project
Kern County, California

Prepared By Brian Ho

Reviewed By Michael Flack, PG, CEG

February 2010

60139696-WMP

Contents

1.0 Introduction 1-1

1.1 Project Description 1-1

1.2 Water Use Requirements 1-1

1.3 Groundwater Use within the Indian Wells Valley Groundwater Basin 1-2

1.4 Current Water Conservation Programs in Indian Wells Valley 1-3

1.4.1 Indian Wells Cooperative Groundwater Management Group Objectives 1-3

1.4.2 Indian Wells Valley Water District 1-4

1.4.3 Naval Air Weapons Station - China Lake 1-4

2.0 Proposed Water Offsets 2-1

2.1 Low-Flow Irrigation 2-1

2.2 Artificial Turf Replacement 2-2

2.3 Tamarisk Removal 2-2

2.4 Fallowing of Agricultural Land 2-3

2.5 Xeriscaping 2-3

2.6 Water from the LADWP Aqueduct 2-5

3.0 Feasibility of Water Mitigation Options 3-1

3.1 Low-Flow Irrigation 3-1

3.1.1 City of Ridgecrest Parks and Recreation Department Landscaping 3-1

3.1.2 City of Ridgecrest Government Facilities Landscaping 3-2

3.1.3 Kern County Government Facilities Landscaping 3-2

3.1.4 Feasibility of Low-Flow Irrigation as a Water Mitigation Option 3-2

3.2 Artificial Turf 3-3

3.2.1 Quantity of Landscape Available 3-4

3.2.2 Feasibility of Artificial Turf as a Water Mitigation Option 3-4

3.3 Fallowing of Agricultural Land 3-4

3.3.1 Quantity of Agricultural Land Available 3-4

3.3.2 Feasibility of Fallowing as a Water Mitigation Option 3-5

3.4 Xeriscaping of Residential Properties 3-5

3.4.1 Quantity of Landscaping Available for Xeriscaping 3-5

3.4.2 Feasibility of Xeriscaping as a Water Mitigation Option 3-6

3.5 Water from the LADWP Aqueduct 3-7

3.6 Tamarisk Removal 3-7

3.6.1 Tamarisk Population 3-7

3.6.2 Feasibility of Tamarisk Removal as a Water Mitigation Option 3-7

3.7 Summary of Feasible Options for Offsetting Project Water Supply 3-7

4.0 Proposed Mitigation Offset Plan 4-1

4.1 Water Supply Through the LADWP 4-1

4.2 Xeriscaping of Residential Landscapes 4-2

4.3 Agricultural Fallowing 4-3

5.0 References 5-1

List of Appendices

Appendix A AWAC Xeriscape Program Details

List of Tables

Table 2-1 Summary of Xeriscaping Programs “Cash For Grass” Southwestern and Southern United States (Addink, 2005) 2-4

Table 2-2 Climate and Precipitation in Inyokern, California and Las Vegas, Nevada 2-5

Table 3-1 Summary of Water Usage City of Ridgecrest Recreation and Parks Department 3-1

Table 3-2 Estimate of Turf Acreage within the City Of Ridgecrest 3-6

Table 3-3 Summary of Feasibility Study of Potential Offset Options to Mitigate Project Water Supply 3-8

Table 4-1 Summary of Water Savings Potential - Primary Water Offset Options 4-1

List of Figures

Figure 1 Site Location Map

Figure 2 Known Tamarisk Locations in the Vicinity of RSPP

Figure 3 Ridgecrest Area Agricultural Resources

Figure 4 LA Aqueduct Location Map

Figure 5 Landscaped Areas in Ridgecrest

Figure 6 Parcel Numbers of Alfalfa Fields Near RSPP

List of Abbreviations

°F	degrees Fahrenheit
af	acre-feet
afy	acre-feet per year
AVEK	Antelope Valley East Kern Water Agency
AWAC	Alliance for Water Awareness and Conservation
Basin	Indian Wells Valley Groundwater Basin
BMPs	Best Management Practices
CEC	California Energy Commission
CIMIS	California Irrigation Management Information Systems
DOE	Department of Energy
DWR	Department of Water Resources
ET	evapotranspiration
$gpft^2$/year	gallons per square foot per year
gpm	gallons per minute
Group	Indian Wells Valley Cooperative Groundwater Management Group
IWV Water District	Indian Wells Valley Water District
KCDA	Kern County Department of Agriculture
Kgal	Kilogallon
LADWP	Los Angeles Department of Water and Power
MDW	Metropolitan Water District
NAWS	Naval Air Weapons Station
Project	Ridgecrest Solar Power Project
PVID	Palo Verde Irrigation District
RSPP	Ridgecrest Solar Power Project
SNWA	Southern Nevada Water Authority
sq. ft.	square feet
STC	Synthetic Turf Council
USGS	US Geological Survey
WRCC	Western Region Climate Center

1.0 Introduction

This report was prepared as a supplemental response to Data Request 170-172 that was provided to the California Energy Commission (CEC) on January 25, 2010 to address water offset/mitigation plans.

Ridgecrest Solar I, LLC is proposing the Ridgecrest Solar Power Project (RSPP or Project), a solar thermal power project (in the Indian Wells Valley Groundwater Basin (Basin). The Project proposes to use dry (or air) cooling in the steam-cycle, which significantly minimizes water use by comparison to a wet-cooled facility of a similar design. The Project has been designed to minimize its water use in consideration of the Basin, which has been in overdraft for many years.

Though water use is minimized, some water for construction and other operational processes including mirror washing is required. Any additional water use, such as that required by the Project, is considered to be a significant impact on the water resources by the CEC. As such, the Project has always proposed to mitigate or offset the water supply that will be provided from existing groundwater supply wells through the Indian Wells Valley Water District (IWV Water District). This plan is the next step in identifying measures to offset water use.

The plan identifies possible offset options (Section 2) within the Basin, and evaluates their feasibility of implementation, as well as provides the required offset in a reasonable time frame (Section 3). From the feasibility study, a plan is presented wherein multiple options are proposed that will address the timely implementation of the full offset volume for construction and operational water supply (Section 4). The source of water for the Indian Wells Valley is exclusively groundwater, which is currently being used at a rate above what is being recharged to the Basin. With the exception of one possible option for construction water supply that may represent a new source of water to the Basin, all the options considered result in a net reduction of current groundwater use by residential, public or agricultural users.

1.1 Project Description

Ridgecrest Solar I, LLC is proposing to construct, own and operate a concentrating solar electric generating facility proposed on an approximately 3,995-acre site in Kern County, California (**Figure 1**). The Project will have a nominal electrical output of 250 megawatts and commercial operation is planned to commence by the third quarter of 2013, subject to timing of regulatory approvals, equipment procurement and construction schedule. The Project will use well-established parabolic trough solar thermal technology which uses solar energy in a heat transfer process to generate steam and drive a steam turbine generator that produces electricity. The estimated life for the Project is 30 years.

1.2 Water Use Requirements

The Project proposes to use dry cooling in the steam cycle. Water for process water makeup and other industrial uses such as mirror washing will be supplied by the IWV Water District through their water supply wells no. 18, 33 and 34 that are located north of the Project site. Groundwater will be pumped from these wells and conveyed through existing pipelines to the Ridgecrest Heights Booster Station. From there, a new five-mile long, 12- to 16-inch diameter pipeline will be constructed along China Lake Boulevard, south to the Project site. Construction of the pipeline is expected to take approximately five months to complete. During the period it takes to construct the water pipeline, water will be delivered daily to the Project site by tanker trucks supplied from a turnout at the Ridgecrest Heights Booster Station.

The Project will use about 450 acre-feet (af) of groundwater per year (afy) during the 2.33-year long (28 month) construction period. This equates to a total volume of 1,500 af over the construction period.[1]

The Project will use about 150 afy of groundwater for operations, which equates to an average pumping rate of about 90 gallons per minute (gpm). Over the Project's 30-year life, water use will total about 4,500 af.

A Memorandum of Understanding has been approved (dated October 2, 2010) by the IWV Water District Board for water supply to the Project in the volume of 1,500 af for construction and up to 165 afy[2] for operational supply for 30 years. Amortizing the construction water volume over the life of the Project (30 years) yields a yearly water supply for offset of 215 afy.

1.3 Groundwater Use within the Indian Wells Valley Groundwater Basin

The current conceptual model for the hydrogeologic system in the Basin is that it is closed with no groundwater outflow and the bulk of inflow comes primarily from the mountain front recharge. Recharge to the Basin is derived from the infiltration of precipitation and runoff from the Sierra Nevada, sub-flow from the Rose Valley Basin through the Little Lake Gap and return form excess water applied for domestic or agricultural irrigation, or from wastewater treatment system percolation ponds. The estimates of total basin recharge have varied from 9,000 to 11,000 afy (AECOM 2009).

Water usage information for the Basin was provided for review in development of this plan by the IWV Water District (AECOM 2010a). While this information should be considered an order-of-magnitude estimate, as not all the usage could be verified, groundwater production from 1975 to 2008 show that the total average groundwater use for the period was 26,134 afy. The major water users within the Basin and their average water use over the period are as follows:

- Brown Road Farming (alfalfa) – 7,257 afy;
- IWV Water District – 6,806 afy;
- Naval Air Weapons Station (NAWS) – 3,720 afy;
- Private Wells – 3,434 afy; and
- Searles Valley Minerals – 2,645 afy.

Of the major water users, Brown Road Farming represents about 30 percent of the total average water use since 1975. Recent trends over the past 10 years show a decline in the annual water use for private water users and NAWS, and a relative stability of consumption for Searles Valley Minerals. In general, there has been an increase in water use for Brown Road Farming, as the annual usage has been over 9,000 afy in the last 10 years. The Groundwater Water Management Plan (Tetra Tech 2003) projects relative stability in water use for the other users within the Basin and a two percent increase in water use through the IWV Water District through 2020.

Groundwater is the exclusive source for water for the Valley. At this time, there are no other outside sources of water that are brought into the Valley. The City of Los Angeles Department of Water and Power (LADWP) Aqueduct is located on the west side of the Basin in the foothills of the Sierra Nevada. The Antelope Valley East Kern Water Agency that brings water from the California Delta to the south terminates in California City, about 40 to 45 miles south of the City of Ridgecrest. Water supply from the California

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[1] A yearly volume of 450 af equates to an average pumping rate of about 390 gallons per minute (gpm) of water for construction activities (assuming a continuous uninterrupted supply and continuous usage).

[2] IWV Water District wanted to include a margin even though the project will only use 150 afy.

Delta is uncertain and has been curtailed to users in the Antelope Valley and California City in response to reductions in supply from the Delta.

1.4 Current Water Conservation Programs in Indian Wells Valley

The following is a summary of current programs that have been implemented by a variety of water users within the Basin in response to overdraft conditions. They are discussed briefly to provide context for the current status of water savings programs in the Valley and as a basis for identification of possible supplemental programs or alternatives that could be used by the Project to offset its water supply.

1.4.1 Indian Wells Cooperative Groundwater Management Group Objectives

The Indian Wells Valley Cooperative Groundwater Management Group (Group) is a public data-sharing group consisting of most of the major water producers, other government agencies and concerned citizens in the Indian Wells Valley (http://iwvgroundwater.org/). The Group was formed in 1995 to encourage water conservation and preservation of the water resources within the Indian Wells Valley. To meet this goal, the members work to coordinate efforts, share data and avoid the redundancy of effort that has occurred in the past. The current signatories of the Group are:

- U.S. Bureau of Land Management
- City of Ridgecrest
- County of Kern-Board of Supervisors 1st District
- Eastern Kern County Resources Conservation District
- Searles Valley Minerals
- Indian Wells Valley Airport District
- IWV Water District
- Inyokern Community Services District
- Kern County Water Agency
- NAWS China Lake
- Quist Farms

With the exception of Brown Road Farming, the major water users within the Basin are included in the Group.

Currently, the Group has developed and published a Water Conservation Public Advisory (revised June 19, 2008) which provides a variety of recommendations for water conservation, including the use of gray water for all domestic, commercial, industrial and agricultural water users in the Valley. According to this advisory, the average water consumption per connection per year in Ridgecrest has decreased since the 1980s from 0.84 afy to 0.77 afy (the Group 2008):

In November 2009, the Group published its 2010 and 2011 planning objectives. The objectives and methods for meeting them are as follows:

- Objective No. 1: Limit additional large-scale pumping in areas that appear to be adversely impacted.
- Objective No. 2: Distribute new groundwater extraction within the Valley in a manner that will minimize adverse effects to existing groundwater conditions and maximize the long-term supply within the Valley.
- Objective No. 3: Aggressively pursue the development and implementation of water conservation policy and education programs.
- Objective No. 4: Encourage the use of treated water, reclaimed water, recycled, gray and lower quality water where appropriate and economically feasible.

- Objective No. 5: Explore the potential for other types of water management programs that are beneficial to the Valley.
- Objective No. 6: Continue cooperative efforts to develop information and data, which contributes to further defining and better understanding the groundwater resource in the Indian Wells Valley.
- Objective No. 7: Develop an inter-agency management framework to implement and enforce the objectives of this plan.

Of the 2010/2011 objectives, Objective No. 3 (water conservation and education) is directly applicable to the Project as it promotes water savings and a reduction in water usage within the Basin.

1.4.2 Indian Wells Valley Water District

Water conservation measures for new housing developments have been enacted through local Ordinance Numbers 90 and 91. The Ordinances require water efficient landscaping as a condition of receiving water service from the IWV Water District. Ordinance No. 90 pertains to new single-family housing developments while Ordinance No. 91 applies to new multi-family housing as well as landscape irrigation at new commercial business developments. Both Ordinances contain the following provisions:

1. No turf is allowed in the front yard;
2. Only plants from an approved plant list are allowed in the front yard;
3. Only low-volume irrigation systems are allowed; and
4. The landscaped area shall be designed to eliminate any runoff.

The IWV Water District has voluntary summer outdoor watering guidelines whereby from May 1 through October 31, residents are urged to limit outdoor watering to three days per week, with watering performed between the hours of 8:00 P.M. and 8:00 A.M.

The IWV Water District has not yet enacted a “cash for grass” program in which residents who remove lawns and replace them with low-water use plants and low-flow irrigation systems are reimbursed by the District on a unit cost per square foot basis, although elements of such a program are under review and the District has indicated they are interested in implementing such a program (IWVWD 2010b). The “cash for grass” are directly applicable to the Project offset requirements as they provide a mechanism for water savings and net reduction in water use within the Basin.

The IWV Water District has a free program called XERIC© (Xeriscape Education, Resources and Idea Corps) that helps homeowners transition to more water efficient landscape. The IWV Water District sends volunteer expert gardeners to a home for a free one-hour consultation. The homeowner/renter gets a sketch, plant recommendations, a plant guide, a watering guide, irrigation tips, hand-outs of do-it-yourself projects and other helpful information. They also receive a list of local plant and hardware providers known to be familiar with Xeriscape principles and a list of online nurseries. The IWV Water District also sponsors a public education program in the form of dry climate seminars and workshops that are given throughout the year.

1.4.3 Naval Air Weapons Station - China Lake

To comply with Executive Order 13323, Strengthening Federal Environmental, Energy and Transportation Management, signed January 24, 2007, the U.S. Navy developed a Water Management Plan (Plan) for NAWS China Lake. NAWS China Lake is located approximately 12 miles north of the Project. The Plan (U.S. Navy 2008) provides a guide for water use from the time it is pumped at a well through its ultimate disposal. Based on the use of the water, the Plan presents best management practices (BMPs) for water conservation and management.

The Plan specifically references ten BMPs, recommended by the Department of Energy (DOE), for water conservation. Currently, the DOE recommends facilities implement at least four of the following BMPs:

- Public Information and Education Programs;
- Distribution System Audits, Leak Detection and Repair;
- Water Efficient Landscaping;
- Toilets and Urinal;
- Faucets and Showerheads;
- Boiler/Steam Systems;
- Single-Pass Cooling Systems;
- Cooling Tower Systems;
- High Water-Use Processes; or
- Water Reuse and Recycling.

NAWS China Lake has completed phase one of a two-phase irrigation project that focused on irrigation system replacement at six buildings and installation of computerized irrigation controllers. The Navy estimates the water savings from these two upgrades is 118,500 kilogallons (Kgal) annually (364 afy).

Another BMP being implemented by NAWS China Lake is replacement of old style high-flow shower heads (approximately 2.5 gpm) with new low-flow (1.5 gpm) models. Additionally, they have replaced old style toilets in three buildings with new dual flush toilet flushometers. These two ongoing projects are estimated to save approximately 2,527 Kgal of water annually (7.7 afy).

The Plan also calls for NAWS China Lake to replace current urinals with new waterless models (or install models rated at less than one gallon per flush); to install water meters for all significant water uses on base (currently approximately 20 percent of the significant buildings are metered) to help in identifying system leaks; to implement a water conservation awareness program; and to implement other relevant BMPs. The estimated water savings from implementation of these activities/programs could be 33,000 Kgal annually (101 afy).

At present, most of the water savings programs proposed under the plan are being or have been implemented by NAWS. As such, other alternatives to meet the offset requirement are being considered.

2.0 Potential Water Offsets

To provide an offset of 215 afy, several potential programs were considered in light of the current water conservation measures being implemented or contemplated for the Basin by members of the Group. As the initial step of the plan, a group of possible offset measures were identified that could be implemented to meet the water savings requirement, either solely or in combination with other options. No option was considered that would not lead to a reduction in groundwater use within the Basin. For example, a change in water use from potable to recycled water or gray water use was not considered an alternative as there would be no net reduction in water use within the Basin. Additionally, use of wastewater in place of groundwater that is currently being discharged to land and serves as recharge to the Basin was also not considered since this would be a simple exchange of water and not result in a net reduction of water use in the Basin. The feasibility of their implementation and capability to meet the water offset requirement in a timely fashion is described in Section 3.0.

The options that are under consideration to address the offset of the proposed construction and operational water supply include the following:

1. Low-Flow Irrigation – Conversion to low-flow irrigation in the landscaped areas at the City of Ridgecrest recreational and government facilities and at County of Kern facilities within the Basin.
2. Artificial Turf Replacement – Replacement of natural turf with artificial turf at City parks and recreational fields (youth football, baseball, and soccer fields).
3. Tamarisk Removal – Implementation of a Tamarisk Removal Program for areas of infestation within the Basin.
4. Fallowing – Fallowing (or removal) of agricultural land within the Basin.
5. Xeriscaping ("cash for grass") – Replacement of turf lawns for xeriscaping at homes within the Basin.
6. Water from LADWP Aqueduct – Secure a connection to the aqueduct to offset the construction water use.

2.1 Low-Flow Irrigation

Low-flow irrigation systems use small-diameter tubes placed on top of or below the soil's surface. Frequent, slow applications of water are applied to the soil through small holes or emitters. The emitters are supplied by a network of main, submain, and lateral lines. Water is dispensed directly to the root zone, avoiding runoff or deep percolation and minimizing evaporation. Different types of low-flow irrigation systems include the following (eSSORTMENT 2010):

- Drip and Micro-Sprinklers – these are a cross between spray nozzles and drip irrigation. This type of sprinkler system has a low flow rate, a low application rate, a small radius that ranges from 4 to 12 feet and operates with low pressures. These types of sprinklers are well suited for ornamental plantings as well as a single tree or shrubs.
- Drip Irrigation (micro irrigation) – applies water to the soil at point locations using low controlled flow rates and drip emitters that discharge at a rate of 0.5 to 2 gallon per hour. Drip irrigation can be used on individual plants or groupings of plants. There are two types of drip irrigation: drip tubing and bubble irrigation.

Properly installed drip-irrigation systems use approximately 20 percent less water than conventional sprinkler systems.

For the Project, potential offsets could come from the landscaped areas managed by the City of Ridgecrest government buildings and parks and recreation department and those managed by the Kern County.

2.2 Artificial Turf Replacement

Artificial turf or synthetic turf has been in use for decades as the playing surface for professional sports teams and is increasingly popular as the playing surface of choice by athletic departments at colleges and universities. Manufacturers of artificial turf tout the benefits of the synthetic surface as a means to reduce the expense of irrigation and maintenance costs that are associated with natural turf fields.

Artificial turf installation typically includes ground preparation measures that entail removing a portion of the existing landscape. A blend of crushed rock is then spread and compacted to create a stable base. The turf is then laid and secured. All seams are then glued and stapled to avoid splitting. Lastly, the turf is in-filled with a rubber and sand composite. Section 3.0 describes some of the issues associated with artificial turf maintenance including the application of water for cooling the surface of the turf to maintain a safe temperature in hot climates.

For the Project, proposed water offsets would come in the form of replacing existing natural turf with artificial turf at City of Ridgecrest parks and recreational fields and/or installing artificial turf (instead of natural turf) at new parks/recreational fields that are planned to be constructed by the City over the next three to five years. Installation of artificial turf would reduce the demand for irrigation water thus generating savings in water use year after year.

2.3 Tamarisk Removal

Tamarisk (salt cedar) is native to southwestern Asia and was introduced to the United States in the early 1800s for wind breaks. In the western United States, tamarisk is a highly invasive weed that has taken hold in semi-arid and arid watersheds in recent decades (de Gouvenain 1996).

Tamarisk can consume up to 250 gallons of ground water per day per mature tree (State of Washington 2009). In addition, it competes for resources utilized by native species and, in many cases, disrupts ecological cycles. Previous studies suggest that tamarisk spread has significant effects on river channel morphology including the ability to decrease channel width, increase overbank flooding, stabilize sand bars at river bends, and enlarge and stabilize islands (Lovich 1996).

Using the assumption that a single tree can use 250 gallons per day, a single tree has the potential to consume about 0.28 afy. To meet the full volume of 215 afy, a total of about 800 trees would be required for removal.

A program to remove significant stands of Tamarisk within the Basin could reduce impacts to the groundwater supply. The amount of groundwater saved would then help to mitigate the impact caused as a result of water use by the Project. Further, a removal program would also provide substantial biological benefit by removing an invasive species. This species out-competes native vegetation and alters the natural desert ecosystem functions and values by converting the habitats into monocultures void of the diversity that supports native flora and fauna populations. There are known locations of Tamarisk around the perimeter of the Basin (**Figure 2**).

2.4 Fallowing of Agricultural Land

Under this option, the Project would lease or purchase agricultural farmland (or lease the water rights) within the Basin and fallow the land for the lifetime of the Project. This water can then be used for other purposes, in this case as an offset for Project water supply. The fallowing is generally rotated between tracts of land, with no tract of land being fallowed for more than five years (PVID 2010). The minimum size of each tract of land is normally considered to be five acres.

According to the Kern County Department of Agriculture (KCDA 2009), more than 970 acres of alfalfa are grown by private growers within the Basin, and much of this acreage is farmed along Brown Road north of the Project site (**Figure 3**). Alfalfa cultivation requires 5.1 af of water per acre (DWR 1986). Therefore, to mitigate the full volume of water supply of 215 afy, a total of 42 acres per year would need to be fallowed.

2.5 Xeriscaping

In the Mojave Desert of the southwestern United States, 60 to 90 percent of potable water drawn by single-family residences in municipalities is used for outdoor irrigation (Sovocool et.al. 2001). A water conservation measure that is gaining in popularity among municipalities and water districts of desert communities is xeriscape (low-water use or water-smart) landscaping in place of traditional natural turf.

The Alliance for Water Awareness and Conservation (AWAC) is a coalition of 25 regional organizations (municipalities, water districts, local colleges and universities, etc.) created in 2003 in response to the growing water demand that exceeds available supply throughout the 4,900-square mile area of the Mojave Desert in Southern California. It is the mission of AWAC to promote the efficient use of water and increase communities' awareness of conservation as an important tool to help ensure an adequate water supply (AWAC 2009). The IWV Water District is not a member of AWAC although they have indicated their interest in joining AWAC in 2010 or 2011 (IWV Water District 2010b). Both AWAC and IWV Water District promote xeriscape landscaping as a viable water conservation measure.

Xeriscape basic design guidelines include the following elements (AWAC 2009):

- Sound Landscape Planning and Design – planting trees near the house will provide shade and will serve to cool the house. Group plants with similar water needs together. Homeowners should keep in mind the mature size of the plants they choose for their landscape.
- Limitation of Turf to Appropriate Areas – grass should only be planted where it provides functional or recreational benefits.
- Use of Water-Efficient and Native Plants – these types of plants thrive with less water in hot, dry climates. A water-smart garden may include many elements, such as trees, grasses, shrubs, ground covers, and flowers. Young trees and shrubs will require water more often; but after they are established, they can be watered thoroughly on an infrequent basis. This will encourage them to grow deep roots and be tolerant of hot, dry conditions.
- Efficient Irrigation – install an appropriate irrigation system that includes an automatic sprinkler system, which targets plantings and avoids runoff. Installing a drip or bubbler systems to water shrubs, trees, and flower beds puts water directly in the root zone and saves hundreds of gallons of water. Irrigating early in the day and late in the evening also conserves water.
- Soil Amendments – to help shrubs and flowers thrive in a water-efficient landscape, adding 4 inches of organic material to the soil will increase the soil's ability to absorb and store water for plant use. The plants will be healthier, and watering can be kept to a minimum.

- Use of Mulches – a layer of mulch covering the soil surface around plants will reduce evaporation, help prevent soil compaction, conserve water and protect plant roots from both heat and cold temperatures. Good mulch materials include rocks, bark, gravel, wood chips, or compost.
- Appropriate Landscape Maintenance – weed control, proper mowing, proper fertilization, pest control and an efficient irrigation system will all help conserve water.

Increasingly, water districts and local municipalities have offered cash rebates to homeowners as an incentive to convert their natural turf grass yards to xeriscape, a program more commonly referred to as "cash for grass." Cash for grass programs are in place in several states including California, New Mexico, Nevada, and Texas as noted by Addink (2005) and are summarized as follows:

Table 2-1 Summary of Xeriscaping Programs "Cash For Grass" Southwestern and Southern United States (Addink 2005)

Location	Gallons Saved per Square Foot	Square Feet needed to Save One Acre-foot of Water
North Marin County, California	33	9,874
Albuquerque, New Mexico	19	17,150
Southern Nevada	56	5,256
El Paso, Texas	18	18,103

Notes:

Addink, S., 2005, "Cash for Grass" – A Cost Effective Method to Conserve Landscape Water?, University of California Riverside – Turfgrass Research Facility. **http://ucturf.ucr.edu/**

Acre-foot = 326,829 gallons

From the study of various "cash for grass" programs, some key conclusions drawn by Addink (2005) were:

- The water savings was partly due to the replacement of turf with xeriscape plants, but the savings also was due to the installation of a more efficient irrigation system.
- Overwatering of the xeriscaping was observed in some of the studies. In the case of the New Mexico study, Addink (2005) found that 17 percent of the participants used more water after putting in the drought-tolerant plants.

The "cash for grass" program enacted for Southern Nevada by the Southern Nevada Water Authority (SNWA) is an appropriate model for comparison to similar program for the City of Ridgecrest. The SNWA is a consortium of five water districts and municipalities in Clark County, Nevada and includes the greater Las Vegas area including Las Vegas Valley, and communities south and east of Las Vegas. SNWA manages the 300,000 af that Nevada has allocated from the Colorado River and approximately 200,000 af from return flow credits and groundwater aquifers; SNWA member agencies serve approximately 96 percent of Clark County's population (Sovocool, et.al. 2001). Monthly and annual climate and rainfall totals are similar between the Indian Wells Valley Area and Las Vegas according to data from the Western Regional Climate Center (WRCC 2010). As shown in Table 2-2, the average annual rainfall is similar (4.18 inches in Inyokern, 4.15 inches in Las Vegas); the average annual maximum temperatures are similar (80.5 degrees Fahrenheit [°F] for Inyokern, 80.1°F for Las Vegas), although the average annual minimum temperature is lower in Inyokern (47.2°F) than Las Vegas (54.1°F).

Table 2-2 Climate and Precipitation in Inyokern, California and Las Vegas, Nevada

Area	Climate	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual[1]
Inyo-kern	Ave. Max. Temp (ºF)	59.6	64.9	70.4	77.8	87.0	96.7	102.7	101.2	94.2	83.3	69.0	59.7	80.5
	Ave. Min. Temp (ºF)	30.7	34.6	38.7	44.4	52.9	60.5	66.2	64.6	58.1	48.2	37.3	30.3	47.2
	Ave. Total Precip (in)	0.73	0.95	0.56	0.17	0.07	0.02	0.16	0.22	0.21	0.10	0.39	0.59	4.18
Las Vegas	Ave. Max. Temp (ºF)	57.1	62.5	69.5	78.2	88.5	98.6	104.6	102.2	94.6	81.4	66.5	57.3	80.1
	Ave. Min. Temp (ºF)	34.4	38.9	44.3	51.7	61.1	69.9	76.5	74.8	66.4	54.3	41.9	34.7	54.1
	Ave. Total Precip (in)	0.49	0.57	0.45	0.20	0.15	0.07	0.43	0.44	0.32	0.26	0.37	0.40	4.15

Notes:
Source - Western Regional Climate Center, 2010, http://www.wrcc.dri.edu/
(Climate Stations 044278 – Inyokern, CA and 264436 – Las Vegas Airport, NV)
Data for Station 044278 is from 1940 – 2009 and Station 264436 is from 1937 – 2009.
[1] Refers to the annualized average of monthly temperature and precipitation values.

Key:
Ave – Average
Max – Maximum
Temp - Temperature
ºF - degrees Fahrenheit
Precip – Precipitation
in – inches

The average annual evapotranspiration (ET) rate in Indian Wells Valley area is 66.5 inches per year (CIMIS 2009) while the ET rate for Las Vegas is about 74 inches per year (Addink 2005). Given the relative similarity of climatic conditions, it would be anticipated that the savings rate for implementation of a xeriscaping program in Ridgecrest would be similar to the 56 gallons per square foot savings rate reported for the SNWA study.

According to Lucinda Crosby, Conservation Coordinator for the IWV Water District, (natural) turf in Ridgecrest requires 73 gallons of water per square foot per year (gpft^2/yr) to thrive (IWVWD 2010b). She indicated that xeriscape plants only need 17 gpft^2/yr to thrive, resulting in a water savings of 56 gpft^2/yr.

2.6 Water from the LADWP Aqueduct

According to the LADWP - Southern District, unless direction is given otherwise by the Aqueduct Manager, construction water for projects is available though it will only be granted to government-owned agencies or private utilities engaged in public works projects (e.g., highway construction, windmill construction for public power supply, etc.). As the Project once constructed would be a private utility engaged in a public works program, this option is being explored to offset water supply for its construction water use (1,500 af). A successful application process would lead to a connection to the aqueduct and metering of the water supply for construction water offset. Conveyance of the water from the aqueduct has not been determined at this time, and would be an important component of this option. The LADWP aqueduct is located approximately 10 miles west of the Project site and is located in the foothills of the Sierra Nevada (**Figure 4**).

3.0 Feasibility of Water Mitigation Options

In this section, each option identified in Section 2.0 is evaluated as to its feasibility for timely implementation of offsetting the Project water supply. In evaluating each option, the following criteria were applied:

- Could the option provide the full offset volume of water?
- Could the option be implemented at the start of construction?
- Could the option upon implementation offset the full volume of Project water use or would there be a phase-in period such that only after a period of time the full offset volume would be realized?

The goal of the feasibility study is to identify one or more options to offset water use on a 215 afy basis for the term of the Project.

3.1 Low-Flow Irrigation

Replacement of existing landscape irrigation systems with low-flow irrigation systems at City parks and recreational facilities within the City of Ridgecrest and at County of Kern facilities would appear to be a plausible option to reduce the amount of water use in the Basin. This option is predicated on the amount of available land that has not been converted to date and could be converted to low-flow irrigation. In the assessment of the feasibility of this option, the Parks and Recreation Department, City of Ridgecrest Schools, and Kern County were contacted to determine the availability of landscaping for conversion to low-flow irrigation.

3.1.1 City of Ridgecrest Parks and Recreation Department Landscaping

The City of Ridgecrest Parks and Recreation Department operates and maintains several recreational facilities and parks, all of which contain natural turf areas that require landscape irrigation. A potential water mitigation offset measure would be for the Project to install low-flow irrigation systems in the landscaped areas of the City's parks and recreational playing fields. There are at least six parks or recreational facilities with youth sports fields totaling more than 100 acres in the City of Ridgecrest according to the City's Park and Recreation Department (City of Ridgecrest 2010). The main water usage by the department is summarized as follows.

Table 3-1 Summary of Water Usage City of Ridgecrest Recreation and Parks Department

Facility	Facility Description	Facility Size	Annual Water Usage
Freedom Park	Open Turf	19.8 acres	Not Listed by the City of Ridgecrest
Jackson Sports Complex	Softball fields, soccer fields, and tennis courts	56 acres	36 afy
Kerr McGee Youth Sports Complex	Five baseball fields and one football field	11.7 acres	11 afy
Pearson Park	Playground with basketball courts and lawn with trees	4.5 acres	4 afy

Table 3-1 Summary of Water Usage City of Ridgecrest Recreation and Parks Department

Facility	Facility Description	Facility Size	Annual Water Usage
Upjohn Park	Combined playground, basketball courts, and lawn	6 acres	4.5-afy
Hellmers Park	Lawn and trees	5 acres	5 afy
Roadway Medians in Ridgecrest	Landscaped roadway medians	Not provided by City	3 afy
Pinney Community Swimming Pool	Recreational swimming pool	Not provided by City	Not provided by City

Although there are about 64 afy of water offset through the parks and other landscaping, according to the Parks and Recreation Department, most of the sprinklers already installed at these facilities are low-flow or water efficient systems (City of Ridgecrest 2010). Mr. Ponek, the Director of the Ridgecrest Parks and Recreation Department, indicated that the toilets and showerheads at the recreational facilities have not been upgraded with low-flow devices, but the toilets and showers are not heavily used and upgrading to low-flow would not likely create significant water savings. It is Mr. Ponek's opinion that unless parks and medians are closed or turf and landscaping is removed, a significant savings in water usage does not seem possible.

The community of Ridgecrest is in need of additional recreational facilities with one more regulation football field, four more baseball fields, two more softball fields, and two additional soccer fields (approximately 35 acres total) possibly being added by 2015 (Ponek 2010). While these might be candidates as future mitigation options, the City would likely require low-flow systems in the development, and as such, even if the Project would fund the installation there would not be a net savings in water to the Basin.

3.1.2 City of Ridgecrest Government Facilities Landscaping

Another potential water mitigation offset measure would be for the Project to replace the existing irrigation system with low-flow irrigation systems in landscaped areas of government facilities of the City of Ridgecrest. This would include landscaped areas at facilities such as City Hall and public school district (Sierra Sands Unified School District). The amount of landscaped area is approximately 23.2 acres (USGS 2009).

3.1.3 Kern County Government Facilities Landscaping

Kern County government facilities within the City of Ridgecrest include the Kern County Administrative Northeast Center, which includes the Superior Courthouse Building, County Administrative Building, the Ridgecrest Public Library, and Kern County Fire Station 74. The landscaped area for this complex of buildings is approximately 1.25 acres (USGS 2009). Kern County Fire Station 77 has a small natural turf lawn which is included in the acreage for the Kern County Administrative Northeast Center complex. These county facilities are landscaped with natural grass lawns and could be replaced with low-flow irrigation systems. The amount of water saved by converting to low-flow irrigation would create an offset amount available to the Project.

3.1.4 Feasibility of Low-Flow Irrigation as a Water Mitigation Option

Though some water savings is possible through the conversion at City or County government facilities, the amount of savings through implementation of a low-flow irrigation program is minimal, being less than 30 acres. As such, implementation of a low-flow conversion would not yield sufficient volume to

offset the entire water volume of 215 afy. At this time, there does not appear to be potential offset through the Parks and Recreation Department, as landscaping for those facilities has already been converted to low-flow irrigation.

The option should only be considered as part of a combination of options to address the full volume of yearly offset for the Project. Any consideration of this option in the future would depend upon implementation of one or more of the following more viable options that would appear to yield significantly higher volumes of water. It is important to note, that some of the landscaping mentioned above would be eligible for the xeriscaping program as described in Section 4.0. As the installation of low-flow irrigation systems is a subset of and an integral part of a xeriscaping program, some of the landscaping mentioned above would be eligible, and should be considered for the "cash for grass" program as described in Section 4.0.

3.2 Artificial Turf

Advertisements by manufactures of artificial turf list the "low cost" of maintenance and the "low water-requirements" among advantages of artificial turf over natural grass turf. However, maintaining synthetic turf systems is not as inexpensive or labor-free as the manufacturers would have prospective buyers believe, according to athletic turf managers at a Synthetic Turf Maintenance Seminar (Fouty 2005).

Synthetic turf fields require periodic watering to clean the playing surface as part of the normal maintenance as recommended by the Synthetic Turf Council (STC 2007). However, outdoor artificial turf fields tend to get very hot from exposure to sunlight to the extent that water is needed to cool the playing surface in order to avoid injury to players. According to a heat study of artificial turf surfaces versus natural turf surfaces by Brigham Young University (Williams and Pulley 2002), surface temperatures of artificial turf are substantially higher than temperatures of natural turf, such that constant wetting was necessary to lower temperatures in order for play to continue on artificial turf fields (e.g., football & soccer).

Williams and Pulley (2002) measured the surface temperatures of the artificial turf playing field that the University uses for sporting events as well as the temperature for other surfaces. Some of their key observations of artificial turf are summarized as follows

- The hottest surface temperature recorded on an artificial turf surface was 200°F on a day when the highest ambient air temperature measured for the day was 98°F.
- Irrigation of the artificial turf surface significantly cooled the surface from 174°F to 85°F; however, after 5 minutes, the surface temperature rebounded to 120°F and by 20 minutes later, the surface temperature had rebuilt to 164°F.
- The amount of sunlight has greater impact on the surface temperature of artificial turf than the air temperature. In October, when the air temperature was 80°F, the artificial turf surface temperature reached 112° F.

The Williams and Pulley study concluded that the heating characteristics of artificial turf make cooling the surface during sports events a priority. The study led the Safety Office at Brigham Young University to establish a surface temperature limit of 120°F as maximum temperature that surface could reach before measures were taken to cool the playing surface (when the surface temperature reaches 122°F, it takes less than 10 minutes to cause injury to skin). Williams and Pulley (2002) noted that heat control added significant cost to the maintenance budget for artificial turf fields.

Synthetic turf fields generally incorporate an efficient drainage system beneath the playing surface to divert runoff during heavy rain events and when the surface is cleaned. Without the drainage system, moisture build-up in the infill of the synthetic turf would foster mold and mildew growth, which would

shorten the life span of the synthetic surface and potentially cause adverse health effects among users of the playing fields. Unfortunately, the same drainage system would shorten the water retention time of the artificial turf field as water is added to cool the playing surface. Thus, the artificial turf drainage system would require more water to keep the playing surface within tolerable temperatures (below 120°F).

The volume of water that was used to cool an artificial turf field during the course of a year was not quantified in their study, and would be expected to be variable based on climatic conditions.

3.2.1 Quantity of Landscape Available

This option entails the replacement of selected portions of the natural turf at the City's recreational facilities. The amount of landscape that would be available to replace is the same area or acreage of City parks and facilities shown on Table 3-1.

3.2.2 Feasibility of Artificial Turf as a Water Mitigation Option

Replacing natural turf with artificial turf at the City of Ridgecrest's recreational facilities may result in some savings in the annual amount of water that is used by comparison to natural turf, but because of the potential need to use water to cool the surface of synthetic turf (especially in a desert environment such as Ridgecrest), it is difficult to quantify the amount of water savings.

As with the low-flow irrigation option, the combined acreage of natural turf at the City's recreational facilities is insufficient to provide the full offset volume (215 afy), and as such, the option would need to be part of several other alternatives to meet the offset objective. Further, with the Project start of construction scheduled to begin in late 2010, it is unlikely that conversion to artificial turf fields could be accomplished before Project construction activities begin.

Given the uncertainty in the actual water savings due to the maintenance requirements during the hotter summer months, the potential for injury and the limited acreage for replacement of turf, artificial turf is not considered a viable alternative at this time to offset the Project water supply. This option may be considered in the future depending upon the successful outcome of implementation of more favorable options.

3.3 Fallowing of Agricultural Land

In an agricultural fallowing program, a landowner is paid an annual fee to not grow crops on a specific acreage of land that otherwise would have been irrigated; this produces a volume of "Saved Water". This water can then be used for other purposes. The fallowing is generally rotated between tracts of land, with no tract of land being fallowed for more than five years. The minimum size of each tract of land is generally considered to be five acres. The fee paid to the landowner, is based on the value of the crop that would have been cultivated. Following the model used by the Palo Verde Irrigation District (PVID) for fallowing of agricultural land in the Blythe area, the steps to implement a fallowing program include identifying a willing landowner, establishing a water factor per acre of land fallowed (e.g., 5.1 af per acre as for alfalfa), and developing a lease agreement that would establish the term of the fallowing and crop rotation, payment terms entry, inspection privileges and means to verify that the water is not being used for other purposes.

3.3.1 Quantity of Agricultural Land Available

Several crops are grown in the communities of Inyokern and Phelan, which are near Ridgecrest. Over 970 acres of alfalfa, more than 288 acres of pistachios, and slightly more than 2 acres of tomatoes are grown in this area as shown in **Figure 3**. As noted in Section 1.3, Brown Road Farming north of the

Inyo-Kern Airport is the largest water user in the Basin, representing about 30 percent of the total volume of all the major water users since 1975.

3.3.2 Feasibility of Fallowing as a Water Mitigation Option

With the amount of land in which alfalfa is grown in the communities near Ridgecrest, there is sufficient land such that fallowing part of the land would mitigate the full potential impact to groundwater supply as a result of water use by the Project. Fallowing agricultural land is a mechanism that has been used successfully by the PVID in Riverside County to generate groundwater savings that can offset the water use required for other purposes in the Palo Verde Valley Groundwater Basin.

With the implementation of the option, the full volume of the offset could be realized, and through successful negotiation, the option could be brought online in time for the start of the construction program. As a result, fallowing agricultural land is a feasible option to mitigate the impact to groundwater resources in the Basin and will be carried forward as a plan option.

3.4 Xeriscaping of Residential Properties

Xeriscaping or “cash for grass” is a viable mitigation option that can meet the Project water supply offset requirements. The IWV Water District has indicated their interest in establishing a cash for grass water-smart landscaping program for the residents within their district, which includes the City of Ridgecrest (IWV Water District 2010b). The IWV Water District is reviewing elements of xeriscaping and has indicated their cash for grass program would incorporate elements from AWAC as well as elements of the cash for grass program initiated by SNWA.

Addink (2005) noted that “Good landscape water management is more important than plant material change.” His assessment indicated that a majority of the water savings in the Albuquerque, Las Vegas, and North Marin studies may be attributed to more efficient irrigation practices. Factors such as plant spacing, vegetation coverage, plant size, and growth rate can be more important determinants of water use than plant selection.

3.4.1 Quantity of Landscaping Available for Xeriscaping

To develop an estimate of landscaping within the Basin that could be included in a cash for grass program, AECOM used digital aerial photographs from the US Geological Survey (USGS) High Resolution State Ortho-imagery for Kern County, California and geographic information system software to create polygons representing natural turf lawns or playing fields over a representative area within the City limits of Ridgecrest. For each lawn or natural turf displayed in the aerial photographs, a polygon was created that represents the area of landscaping. Polygons were aggregated by land-use type within the City of Ridgecrest, under residential, commercial and industrial properties. The sum of the turf area was divided by the total area of the property to produce the percent coverage within each land use type. This percentage was then multiplied by the total area of each land use type to develop an estimate of the total acreage of landscaped area with natural turf for each land use type in the City of Ridgecrest. **Figure 5** shows the distribution of land use types within the City that were used to estimate the available acres of turf that could be converted to xeriscape.

In **Table 3-2**, the “Sample Acres” category is the area of a land use that was used to calculate the percentage. “Sample Lawn” category is the acreage of lawns within the sample area (Note that the rural sample area is larger than the rural acreage, this is because the sample was located out of the City of Ridgecrest city limits). Actual acreage is the number of acres in the City of Ridgecrest for that land use category (from the City of Ridgecrest General Plan). Lawn acreage is the actual acreage multiplied by the percent lawn.

Table 3-2 Estimate of Turf Acreage within the City Of Ridgecrest

Land Use Category	Sample Acres	Sample Lawn	Percent Lawn	Actual Acreage (acres)	Lawn Acreage (acres)
Residential					
Rural	817.41	2.05	0.25%	664	1.66
Estate	68.73	4.66	6.78%	700	47.48
Low Density	77.14	7.79	10.10%	2659	268.58
Medium Density	51.93	2.27	4.37%	675	29.49
Nonresidential					
Commercial	53.37	3.49	6.55%	2101	137.54
Industrial	76.88	0.15	0.20%	210	0.42

From this assessment, the following information was found:

- Total turf acreage – 485.17 acres;
- Total turf residential – 347.21 acres; and
- Total turf commercial/industrial – 137.96 acres.

The amount of natural turf landscaping in the City of Ridgecrest that is potentially available for conversion to xeriscaping is estimated to be approximately 485 acres. This represents the combined total for residential and nonresidential (i.e., commercial and industrial) land use in the City.

Using 215 afy as the basis for the annual volume of water to be offset and 56 gallons per square foot as the amount of water that can be saved by conversion from turf to xeriscape, an estimated 29 acres of turf would need to be converted. Assuming 2,000 square feet per residence (IWV Water District 2010c), this equates to total of about 625 homes in the City. This number of participating households is equivalent to about 10.1 percent of the 6,191 owner-occupied households in Ridgecrest (Ridgecrest Demographics 2010). This does not include multi-family dwellings or households that are leased or rented in Ridgecrest.

From this assessment, there appears to be available acreage to convert turf to xeriscape within the City to meet the yearly offset volume of 215 afy.

3.4.2 Feasibility of Xeriscaping as a Water Mitigation Option

Implementation of a xeriscaping program has the potential to meet the required offset volume for Project water use. It is not probable that the entire volume would be offset by the start of construction or several years following the start of construction based on the experience of other programs. For example, in the case of the SNWA program, residents have up to six months to convert to xeriscape landscaping (with accompanying installation of low-flow irrigation system) from the time in which the resident submits the application to enroll in the Cash for Grass Rebate Program. Although there would be financial incentive induced by the Project to convert from turf to xeriscape, it would be anticipated that homeowners in the Ridgecrest area would also participate in the program at a similar rate.

As an outdoor water conservation program, the conversion to xeriscape program has one of the lowest assumed customer acceptance percentages (five percent) according to Addink (2005). In a survey of 1,800 residential homeowners in Phoenix, for example, Addink notes that “70 percent of the homeowners preferred a landscape dominated by the color green that had at least some lawn area.” In Utah, “citizens have a passion for green lawns with gardening as the number one hobby in the state” (Addink 2005).

While there would be a lag in the final implementation of the offset using a cash for grass program, the option would ultimately lead to the required savings and this savings would extend beyond the lifetime of the Project. For this reason, the cash for grass program is being retained and included in the plan for offsetting the Project water supply.

3.5 Water from the LADWP Aqueduct

If water can be provided for the construction supply to the Project, it would represent an outside source of water brought into the Basin. The application process includes initial approvals from the Aqueduct Manager and subsequent development of an agreement and access conditions to the aqueduct through the Bishop Real Estate Office and Mojave Superintendant. Because the option has the potential to provide the full water volume for construction, and potentially in a timely fashion, it is being pursued as a feasible offset option. Analysis of the connection and conveyance required to bring the water to the Project or serve as an offset within the Basin is not known at this time and will be considered upon successful application for a connection.

3.6 Tamarisk Removal

As noted in Section 2.0, the purpose of a Tamarisk Removal Program would be to provide for an additional mechanism to offset water supply by the Project. This component not only provides benefits to the groundwater system, but also provides a substantial biological benefit by removing an invasive species that out-competes native vegetation and alters the natural desert ecosystem functions and values by converting the habitats into monocultures void of the diversity that supports native flora and fauna populations.

3.6.1 Tamarisk Population

The known locations in eastern Kern County and Inyo County with significant Tamarisk locations are shown on **Figure 2**. As noted in Section 2.3, a total of 800 trees would be required to be removed in order to meet the project water supply offset under an assumption that each tree consumes 250 gallons of water per day. In consultation with the Bureau of Land Management (Glenn Harris 2010), there are insufficient numbers of tamarisk trees in the Indian Wells Valley Groundwater Basin to make a significant difference in the offset volume for the Project.

3.6.2 Feasibility of Tamarisk Removal as a Water Mitigation Option

As a result of an absence of significant population, the full amount of water offset for the Project cannot be realized. As such, exploration of a Tamarisk Removal Program is not a feasible option and is not carried forward at this time. This option may be considered in the future in conjunction with other programs should the total water savings goals not be achieved.

3.7 Summary of Feasible Options for Offsetting Project Water Supply

Table 3-3 below provides a summary of the feasibility study of potential options for offsetting the Project water supply. The options being carried forward into the Plan are those that have the potential to completely offset the water supply in a reasonable time frame following initiation of construction activities. Options such as low-flow irrigation and tamarisk removal are suitable for only a portion of the

required offset and as such may be considered in the future if required as one or more of the more robust options prove infeasible.

Table 3-3 Summary of Feasibility Study of Potential Offset Options to Mitigate Project Water Supply

Offset Option	Capable of Fully Meeting Project Water Supply (215 afy)	Option Implementable at the Start of Construction	Option to be Considered Further and Incorporated in Mitigation Plan
Low-Flow Irrigation	NO	YES	Option retained for future consideration. Possibly implemented through "cash for grass", as it is a subset of that program.
Artificial Turf	NO	NO	Option not being retained for consideration.
Tamarisk Removal	NO	YES	Option retained for future consideration as needed to supplement primary options.
LADWP Aqueduct	YES	UNCERTAIN[1]	Option included in Plan as a primary option.
Fallowing of Agricultural Land	YES	YES	Option included in Plan as a primary option.
"Cash for Grass" - Xeriscaping	YES	YES	Option included in Plan as a primary option.

Notes
1 – At this time, it is not clear on the period required to secure a connection.

4.0 Proposed Mitigation Offset Plan

From the feasibility study of potential options, the following were selected to be the initial focus of the water supply offset plan:

- Water Supply through the LADWP;
- Xeriscaping ("cash for grass") of residential and commercial landscaped areas; and
- Fallowing of agricultural land within the Basin.

Options such as low-flow irrigation and tamarisk removal will be considered as necessary depending on the outcome of the implementation of the construction water supply through the LADWP aqueduct, xeriscaping program though the IWV Water District or agricultural fallowing. These options may be implemented to make up the difference should one or more of the primary options not be realized.

The above portfolio of mitigation measures either solely or in combination is expected to provide enough water to meet the required offset of 215 afy. Table 4-1 summarizes the contribution expected from each measure.

Table 4-1Summary of Water Savings Potential - Primary Water Offset Options

Offset Option	Potential Water Savings
Water Supply through the LADWP Aqueduct	1,500 af for construction water only.
Xeriscaping of Residential and Commercial Properties	215 afy, assuming 56 gallons per square foot savings by replacing turf with xeriscape. At this savings rate about 29 acres of turf would need to be converted; 29 acres represents about 6 percent of the estimated acreage (485 acres) in the City.
Fallowing of Agricultural Land	215 afy, assuming fallowing of alfalfa and a water use rate of 5.1 afy/acre. At this usage rate, about 42 acres are required on an annual basis; 42 acres is about 4 percent of the more than 970 acres of alfalfa grown within the Basin. Much of this acreage is farmed along Brown Road.

At this time, all the options discussed in the following subsections are being pursued equally as viable alternatives to further understand their implementability in meeting the Project construction start date and water offset requirement. Should one or more options prove to be feasible, a multi-option approach may be undertaken and the plan will be updated to reflect apportionment of the water supply between one or more options.

4.1 Water Supply from the LADWP

Access to the aqueduct would provide water from outside the Basin to offset water supply for construction of the Project. The application and approval process requires initial approval of the Project

as a “public works” project through an initial contact with the Aqueduct Manager in Bishop, California. Following approval by the Aqueduct Manager, the application process is managed by Bishop Real Estate Office and the Mojave Superintendant, who will establish the terms and requirements of the agreement, location of the connection, size of connection and required service.

Ridgecrest Solar I, LLC has initiated contact with the Aqueduct Manager though a formal letter of request has not been provided. Further details leading to an understanding of the viability of this option and a schedule for implementation are not yet provided but will be when they are understood.

4.2 Xeriscaping of Residential Landscapes

The IWV Water District is currently in the process of developing a Cash for Grass Rebate Program for the City of Ridgecrest. The program consists of converting residential and commercial areas landscaped with grass/turf and replacing them with xericscape. The IWV Water District plans to model their program after the cash for grass program by the AWAC (IWV Water District 2010c). The AWAC cash of grass program details are summarized in Appendix A.

To meet the required offset volume, the Project would underwrite a portion of the xeriscaping program as planned by the IWV Water District to the 625 homes needed to offset the water supply. In providing this support, the Project would offer financial incentives to the property owners within the City to convert their landscape. The administration and monitoring of the implementation would be performed by the IWV Water District. Initial discussions between RSPP and the IWV Water District have begun to determine how the Project can participate in the implementation of the cash for grass program. The schedule for implementation of the program is planned following receipt of the license from the CEC and to be coincident with the initiation of the Project construction.

To assess the effects of water-use savings and to verify the quantity of water that is offset as a result of conversion to a xeric landscape, pre- and post-xeric conversion water consumption monitoring would be performed. For each participating property, monthly consumption data provided by IWV Water District would be summed to get annual and average monthly consumption values for each year from the five years before conversion (or as many records as are available) and for each year thereafter following post-conversion.

In return for the cash rebate incentive for converting to xeric landscape, the residents would need to agree to ongoing monitoring of their xeric landscape water consumption. This would be accomplished in two ways:

1. Main water meter data would be taken from normal monthly meter reading.
2. Residents would agree to install a sub-meter that monitored irrigation consumption on the xeric landscape only. Sub-meters would be read monthly, as with main water meters.

Annual consumption on a per area basis would be calculated for participating properties. This is accomplished by summing the monthly consumption values for each sub-meter and dividing by the measured area of the xeric landscape. In this way, accurate measures of consumption for each xeric landscape could be measured on a property-by-property basis.

Based on the monitoring program, a continuous assessment of the water savings would be provided that can be used to evaluate the total savings against the require offset on an annual basis. These data can be used to identify if a sufficient number of homes or commercial properties have been included in the program to meet the required offset volume. As the amount of irrigation is directly related to precipitation and ET rates, it is proposed that the total volume of water saved be estimated on an annual basis and that additional properties (or square feet of landscaping) that would be needed to meet the required offset be estimated on running average from all the annual estimates calculated to date.

Further, it is proposed that upon the water savings meeting the required volume, monitoring be conducted for a period of five years to ensure that the annualized water savings continues to exceed the required offset.

To manage properties that would choose to remove their xeriscape, it is proposed that through the agreement that would be required with the IWV Water District to implement, a condition be provided that if the xeriscape was removed the costs for installation, monitoring and administration up an to the date of removal be levied to the property owner.

4.3 Agricultural Fallowing

The fallowing program would focus on alfalfa crops that are grown by Brown Road Farming on over 970 acres of farmland north of Inyokern, approximately 12 to 16 miles north of the Project site. The proposed plan would be similar to the agricultural land fallowing program that is currently in use by the PVID in the County of Riverside and the City of Blythe in the Palo Verde Mesa Groundwater Basin.

A land fallowing program would include some or all of the following elements:

1. Meet with the Brown Road Farming landowner(s) and determine if they would be willing to participate in the fallowing program;
2. Establish a “water factor per acre” to determine the acreage of land that will need to be fallowed to obtain the required volume of water. (PVID/Metropolitan Water District [MWD]) has established a single “water factor per acre” for their fallowing program in the Palo Verde Valley/Palo Verde Mesa area.) For the Basin, a determination should be made on using a single “water factor per acre” or using one that is crop specific for the Ridgecrest area. (For the South Lahontan Basin area, which includes the Indian Wells Valley Groundwater Basin, the average alfalfa crop water use is about 5.1 afy per acre [DWR 1986]).
3. Develop contracts/lease agreement with the property owner that, include but are not limited to the following provisions:
    a) Establish what land is suitable for inclusion in this program. Suitable land would be that which has historically been used for agriculture (alfalfa) and previously irrigated and would be irrigated if not included in this program.
    b) Establish the total acreage to be fallowed and the crop rotation.
    c) Establish the minimum size of each parcel that could be fallowed (i.e., minimum of a 5-acre parcels to make up total acreage to be fallowed).
    d) Establish the time frame for each parcel of land to be fallowed, before rotation to reuse.
    e) Establish conditions granting rights of entry for inspection purposes, to confirm the land has been fallowed.
    f) Establish non-assignment of unused water (i.e., landowner acknowledges that it does not have the right to, and shall not transfer or assign (by lease, license, grant or any other form of agreement) any rights the Saved Water that is developed through the Fallowing pursuant to this contract/lease agreement).
    g) Establish a method of verifying the water saved is not being used for other purposes or by other entities.
    h) Establish a payment schedule for the length of the Program.

The proposed land fallowing program would include the IWV Water District in the agreement (similar to the role that the MWD plays in the PVID fallowing program) in that water use would be monitored on a

monthly and annual basis by the IWV Water District to ensure that the annual water use by the grower does not exceed the negotiated water offset amount.

To ensure that land fallowed for water use offsets remains fallowed, a monitoring program will be implemented. The IWV Water District does not provide water for irrigation to all growers; therefore, there are no meters or other means for monitoring water use other than visual inspection of the properties to ensure that they are not being irrigated. The monitoring program should consist of site visits on a regular or periodic basis to visually verify that properties participating in the fallowing program are complying with their contract requirements. Visual verification can be through site visits and/or review of aerial photography.

To date there have been no discussions between RSPP and the Brown Road Farming landowner on how the Project can implement a fallowing program. The schedule for implementation of the program is planned following receipt of the license from the CEC and to be coincident with the initiation of the Project construction.

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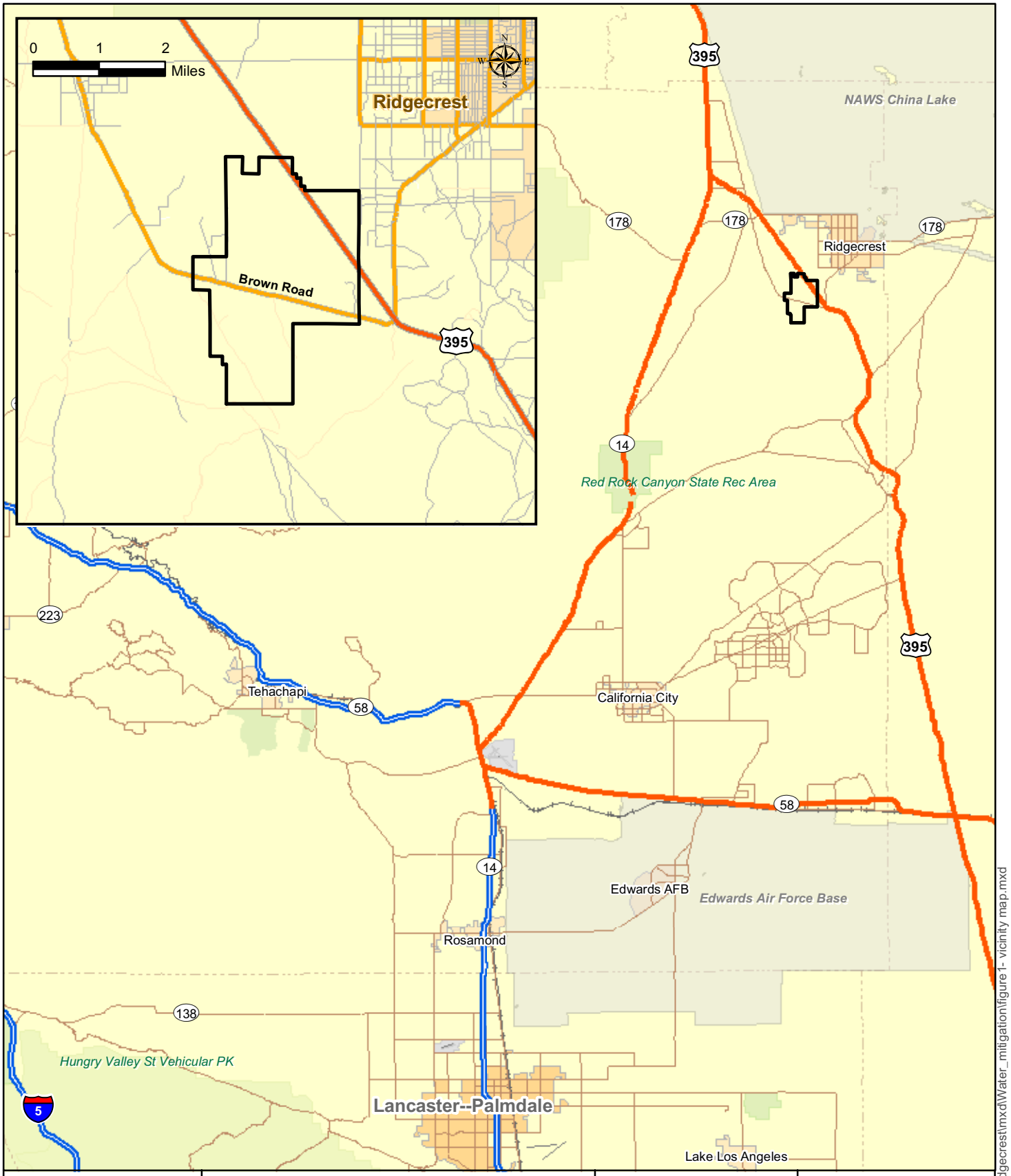

0 5 10
Miles

Ridgecrest Solar Power Project

Figure 1
Regional Location and Vicinity Map

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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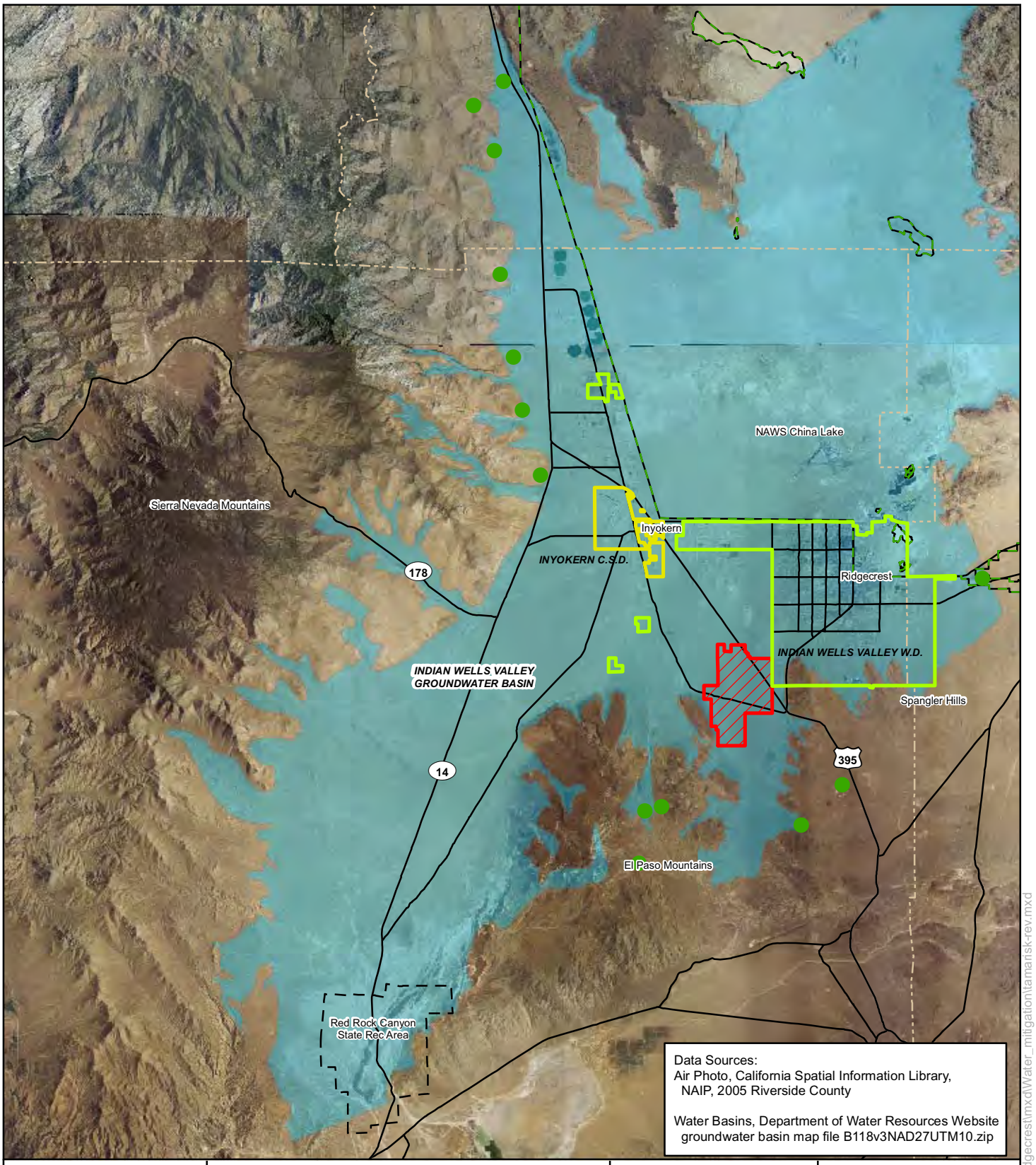

Map Location

Legend

- Project Right-of-Way
- Inyokern C.S.D.
- Indian Wells Valley Groundwater Basin
- Indian Wells Valley Water District
- NAWS China Lake Boundary
- Approximate Location of Known Tamarisk (Source: BLM 2010)

0 4 8 Miles

N W E S

Ridgecrest Solar Power Plant

Figure 2
Known Tamarisk Locations in the Vicinity of RSPP

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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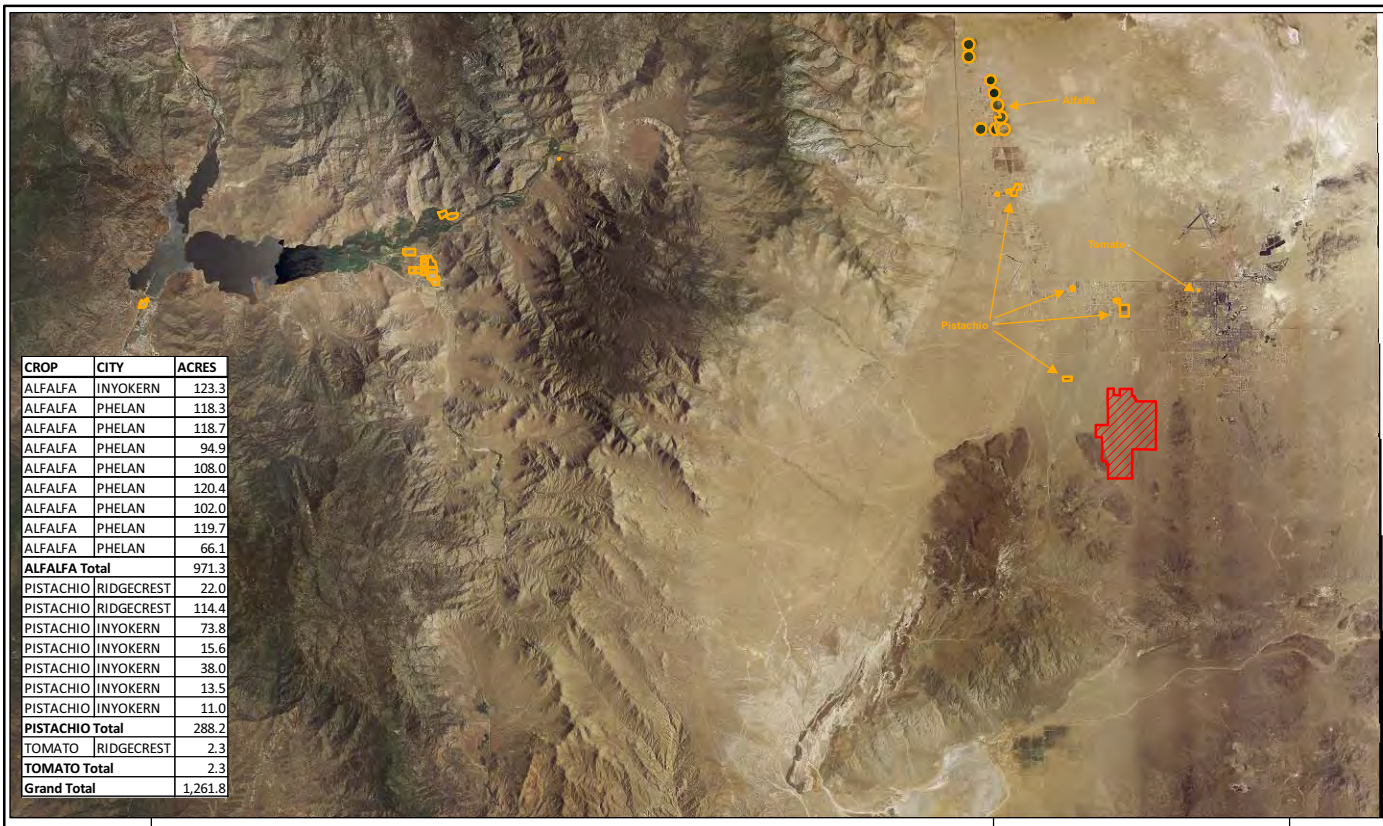

CROP	CITY	ACRES
ALFALFA	INYOKERN	123.3
ALFALFA	PHELAN	118.3
ALFALFA	PHELAN	118.7
ALFALFA	PHELAN	94.9
ALFALFA	PHELAN	108.0
ALFALFA	PHELAN	120.4
ALFALFA	PHELAN	102.0
ALFALFA	PHELAN	119.7
ALFALFA	PHELAN	66.1
ALFALFA Total		971.3
PISTACHIO	RIDGECREST	22.0
PISTACHIO	RIDGECREST	114.4
PISTACHIO	INYOKERN	73.8
PISTACHIO	INYOKERN	15.6
PISTACHIO	INYOKERN	38.0
PISTACHIO	INYOKERN	13.5
PISTACHIO	INYOKERN	11.0
PISTACHIO Total		288.2
TOMATO	RIDGECREST	2.3
TOMATO Total		2.3
Grand Total		1,261.8

Map Location

N
W E
S

4 0 4 Miles

1:253,440

Legend

Project Right-of-Way

Kern County Crop Land 2009

Data Sources:
Air Photo: California Spatial Information Library (CaSIL) NAIP, 2005
//casil.ucdavis.edu/casil/imagerybasemapslandcover/imagery/naip-2005
/county_mosacis/kern
Permitted Crop Boundaries from Kern County Department of Agriculture,
online at
http://www.co.kern.ca.us/gis/downloads.asp
and Measurement Standards
Basemap, (Roads, streams, cities), ESRI

Ridgecrest Solar Power Project

Figure 3
Ridgecrest Area Agricultural Resouces

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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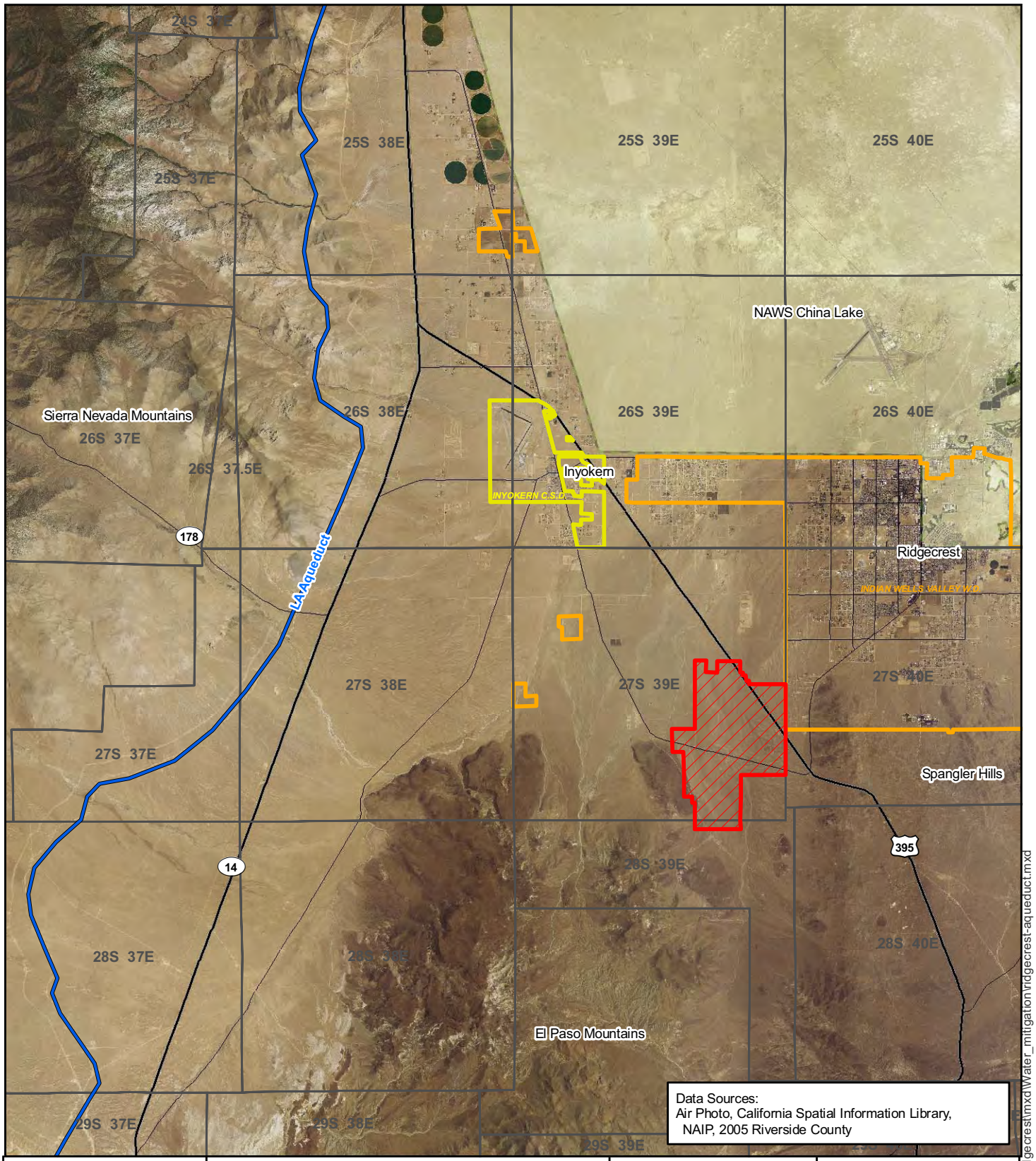

Data Sources:
Air Photo, California Spatial Information Library, NAIP, 2005 Riverside County

Map Location

Legend

- Project Right-of-Way
- Township and Range
- NAWS China Lake Boundary
- LA Aqueduct
- Indian Wells Valley W.D.
- Inyokern C.S.D.

0 3 6 Miles

N W E S

Ridgecrest Solar Power Project

Figure 4
Los Angeles Aqueduct Location Map

Solar Millennium

AECOM

Project: 60139696
Date: February 2010

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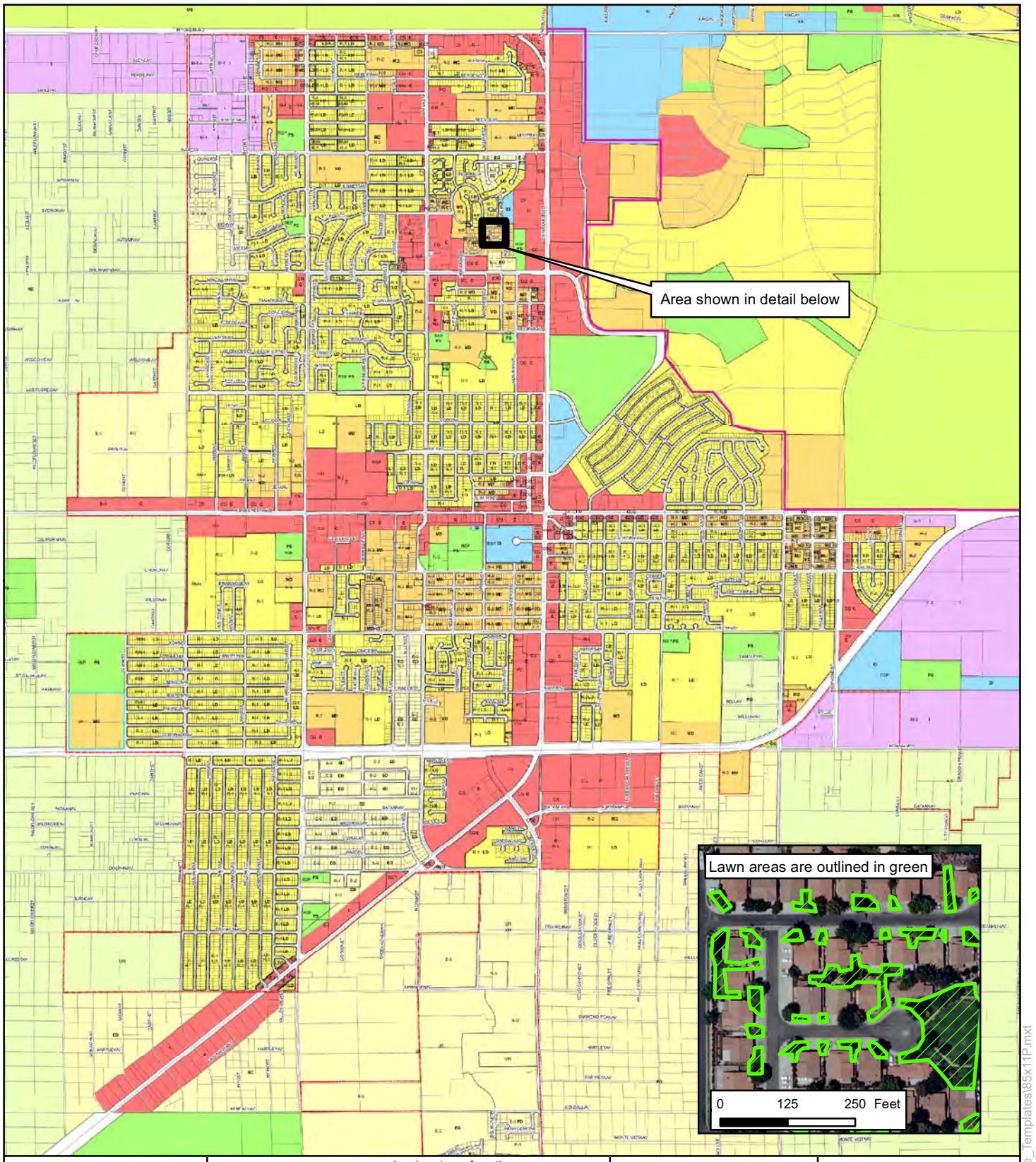

Map Location

Legend

General Plan

- RD=Rural Residential Density
- ED=Estate Residential Density
- LD=Low Residential Density
- MD=Medium Residential Density
- C=Commercial and Office
- I=Industrial
- CI=Civic and Institutional
- PS=Parks and Schools
- OS=Natural Open Space

Landuse types from the 2008 General Plan Map with Zoning as of January 1, 2008, found online at http://ridgecrest-ca.gov/uploadedFiles/Departments/Public_Services/Planning_Department/General%20Plan%20and%20Zoning%20with%20lots%201-2008%2030x42.pdf

1 inch = 3,000 feet

0 3,000 6,000 Feet

Ridgecrest Solar Power Project

Figure 5
Landuse for the City of Ridgecrest

AECOM

Project: 60139696-5230
Date: February 2010

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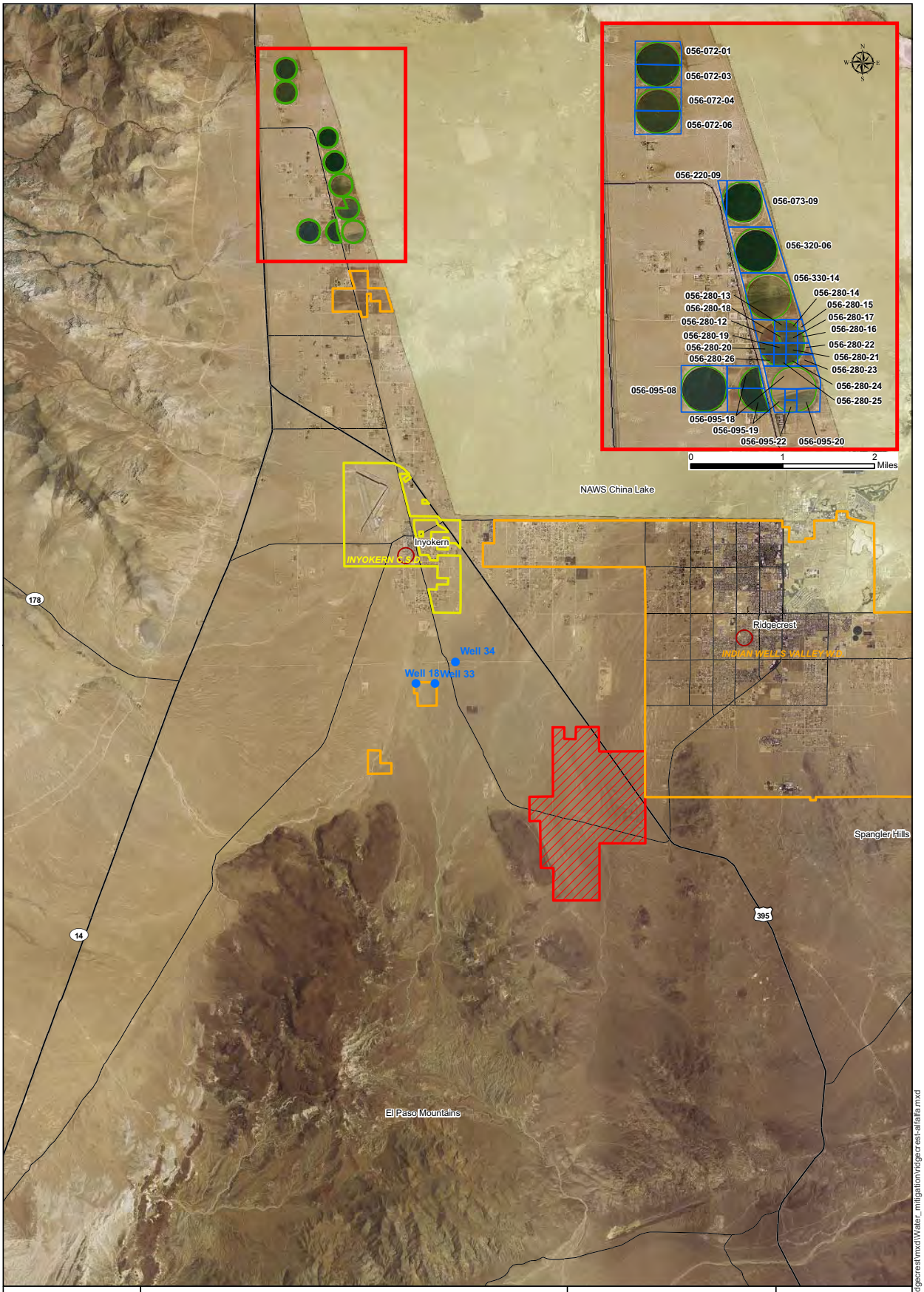

Map Location

Legend

- Project Right-of-Way
- Parcel Boundaries
- 056-280-25 Parcel Number
- Alfalfa Field
- Indian Wells Valley W.D.
- Inyokern C.S.D.
- Geographic/Cultural Area of Interest
- NAWS China Lake Boundary
- Indian Wells Valley Water District Wells

0 2 4 Miles

Ridgecrest Solar Power Project

Figure 6
Parcel Numbers of Alfalfa Fields Near RSPP

Solar Millennium

AECOM

Project: # 60139696
Date: February 2010

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Appendix A

AWAC Xeriscape Program Details

The District plans to model their program after the “cash for grass” program by the Alliance for Water Awareness and Conservation (AWAC) (Personal Communication, Tom Mulvihill, January 13, 2010). The AWAC cash of grass program details are summarized below.

Eligibility Requirements

- Program application must be submitted and pre-approved by the District before any lawn is removed and before beginning the landscape conversion project.
- The District may require the participant’s presence during the site pre-inspection prior to receiving approval for the project.
- Areas to be converted must be living and maintained lawn.
- Residential landscape conversion limits - zero square feet (sq. ft.) up to 6,000 sq. ft. maximum.
- Commercial/Industrial/Institutional (CII) landscape conversion limits - zero sq. ft. up to 20,000 sq. ft. maximum.
- Applicant must participate in a post-inspection to receive final approval and sign-off of the landscape and irrigation system conversion.

Landscaping Requirements

- A minimum of 25 percent living plant coverage must be achieved within the converted area at plant maturity. This requirement will be determined during your pre-inspection.
- Plant lists are available through your local water district and the AWAC (www.hdawac.org).
- Remaining lawn areas are not considered as plant cover.
- Plants and lawn outside the converted area may be considered in the rebate calculation even if they are adjacent or overhanging into the area. This determination will be made during the pre-inspection.
- Impermeable surfaces that do not allow water to penetrate into the ground are not allowed. This includes concrete, plastic film used as landscape fabric, and all other non-permeable materials.
- Converted areas must be covered by a minimum 2-inch layer of permeable mulch.
- Mulches may include bark, rock, and un-grouted stepping stones.

Irrigation System Requirements

- Spray irrigation is not permitted in the landscape conversion area.
- If a spray irrigation system is currently being used, it must be converted to a low-volume drip system equipped with a pressure regulator, filter and emitters providing irrigation to new plantings.
- Each drip emitter must be rated at less than 20 gallons per hour (gph).
- If part of a lawn is converted, the sprinkler system must be properly modified to provide adequate coverage to the remaining lawn without spraying the converted area.

Rebate Amount and Details

- Rebate Amount - The AWAC cash for grass rebate amount is $0.50 per square foot for approved landscape conversions. Cash for grass rebate values are up to $3,000 for qualifying residential properties, and up to $10,000 for qualifying commercial, industrial and institutional properties. Rebate checks are issued within 60 days after the post-inspection to the billed customer named on the account.
- Rebate Terms - The terms of the agreement expire six calendar months from the date the District approves the application. The final inspection is not counted against the six-month time limit once the District has been notified that the project is complete. Only one rebate payment may be received under the agreement. The District reserves the right to reject or limit the number of applications being processed. Applications will be accepted on a first-come, first-serve basis and only while funding is available or until the program is discontinued.

Application Process

- Applications must be submitted to the District prior to commencement of any landscape conversions, otherwise the project will be ineligible for participation in the program.
- Applications are accepted on a first-come, first serve basis while funding is available.

Inspections

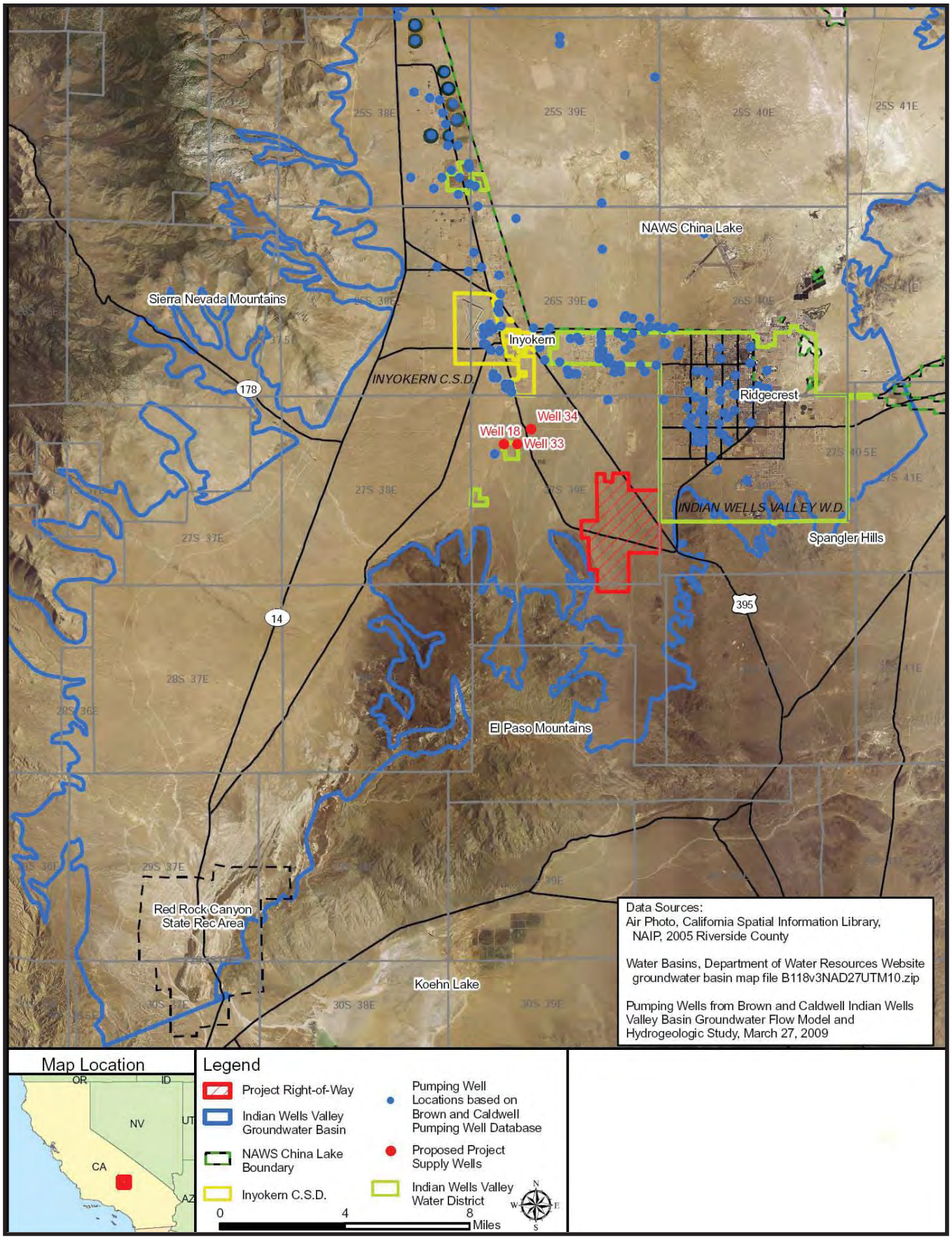
- Pre-Conversion Inspection - A pre-conversion inspection on the existing landscape will be conducted by the District. The application must be pre-approved before removing any lawn and beginning a conversion.
- Post-Conversion Inspection - Once the landscape project is finished, the owner is responsible for notifying the District to schedule a post-inspection. The post inspection will include taking photos of the converted landscape, obtaining converted landscape area measurements, irrigation system inspection, plant eligibility review for program compliance and rebate eligibility verification.

Conversion Sustainability Requirements

- The landscape conversion area must remain in compliance with all program conditions for a period of two years. If the landscaping is altered during this two year period, the participant may be required to refund some or the entire rebate if this requirement is violated. Landscape and plant maintenance, plant quality and appearance before, during, and after the conversion are the sole responsibility of the participant. This requirement is void upon property transfer of ownership

SOIL AND WATER - FIGURE 1

Ridgecrest Solar Power Project - Pumping Wells in the Indian Wells Valley Groundwater Basin

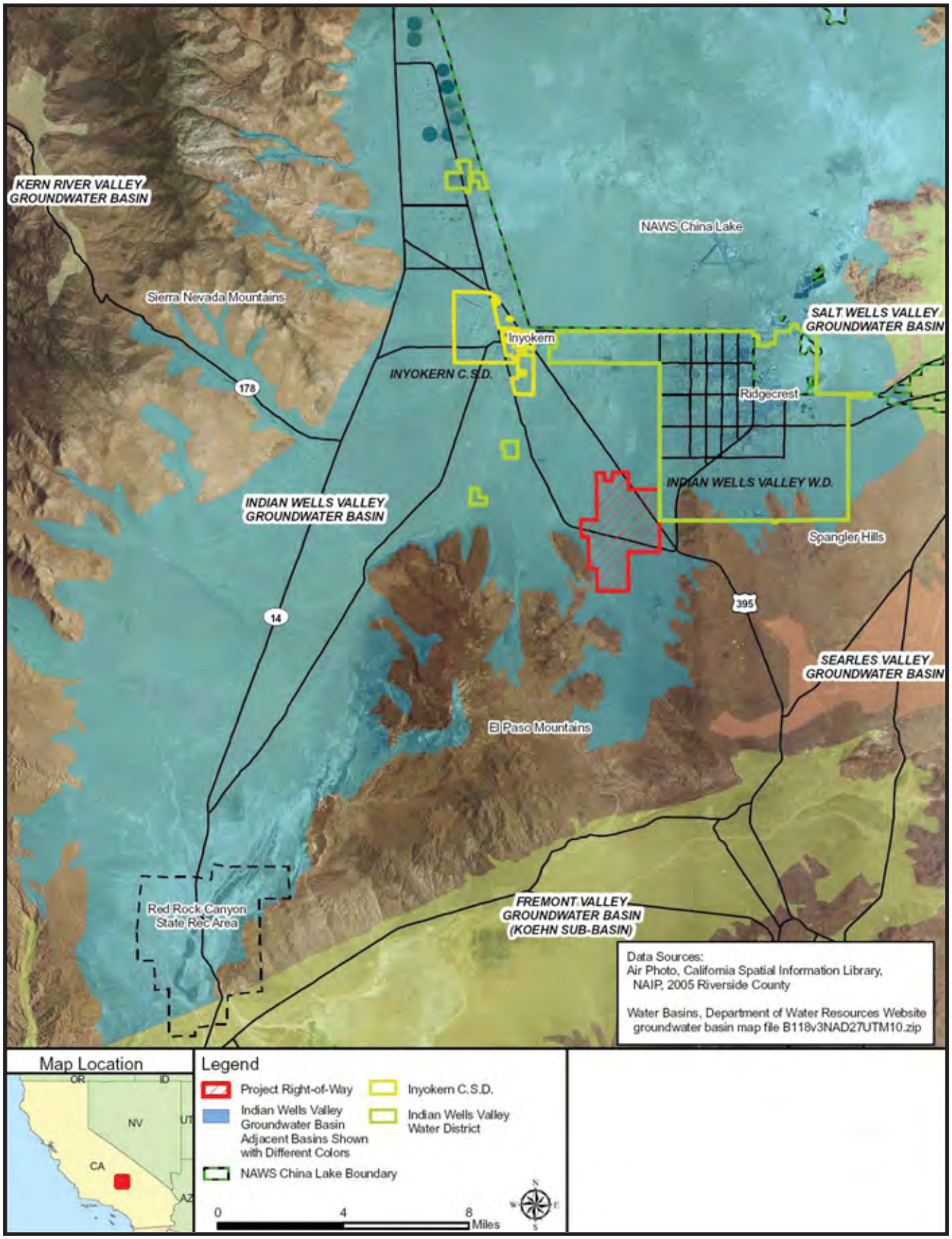


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 2

Ridgecrest Solar Power Project - Regional Groundwater Basin

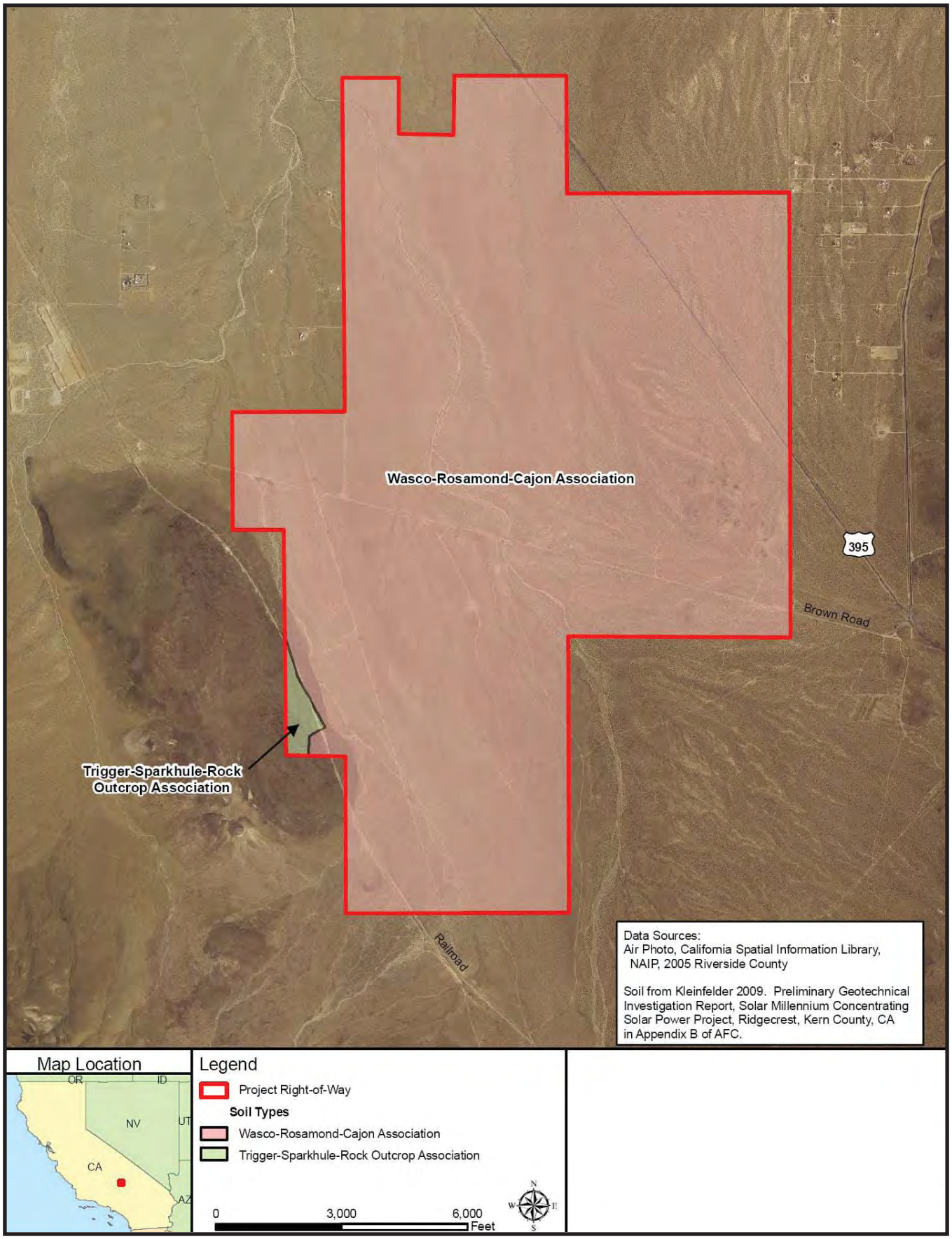


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 3

Ridgecrest Solar Power Project - Site Soils Map

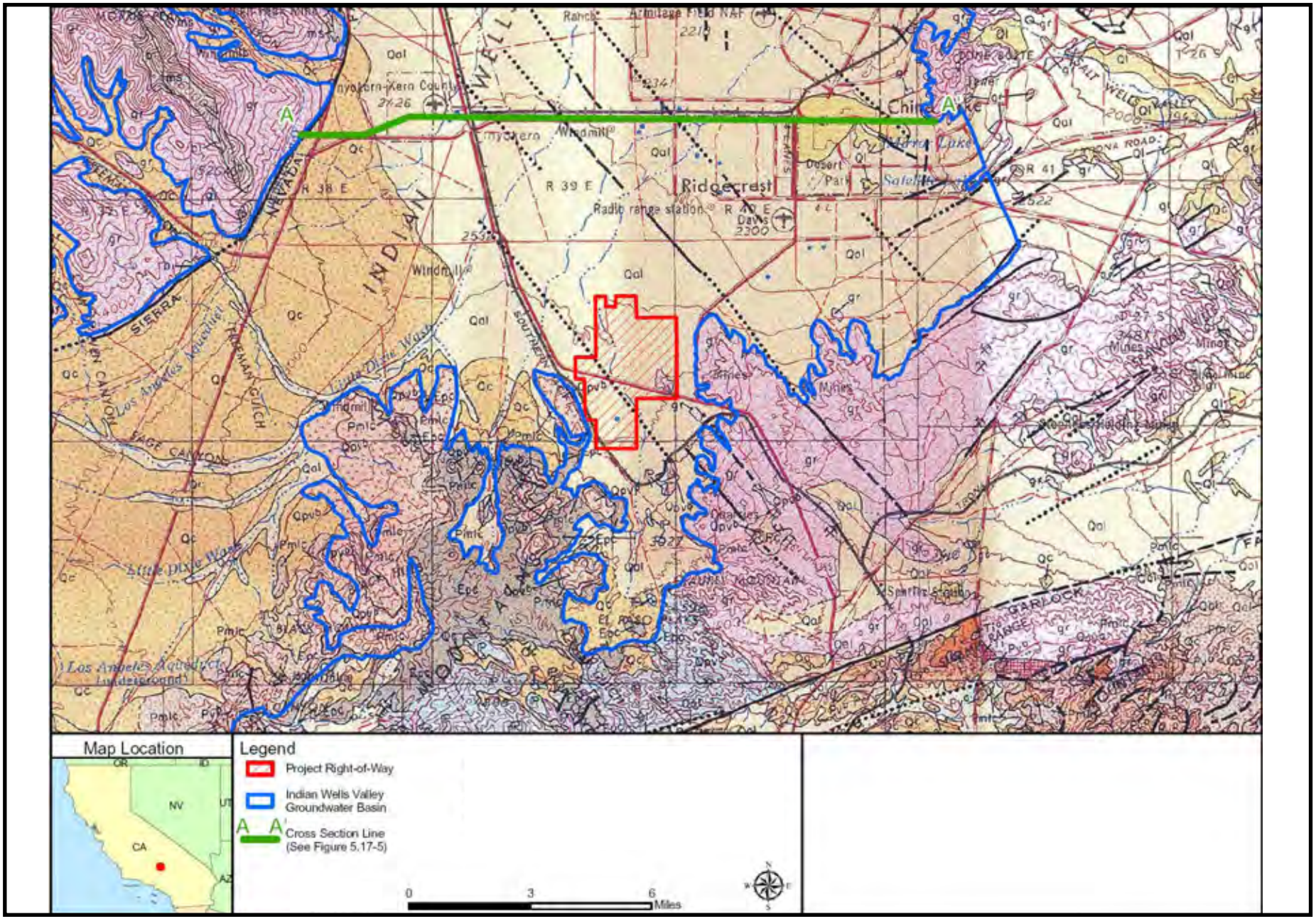


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 4

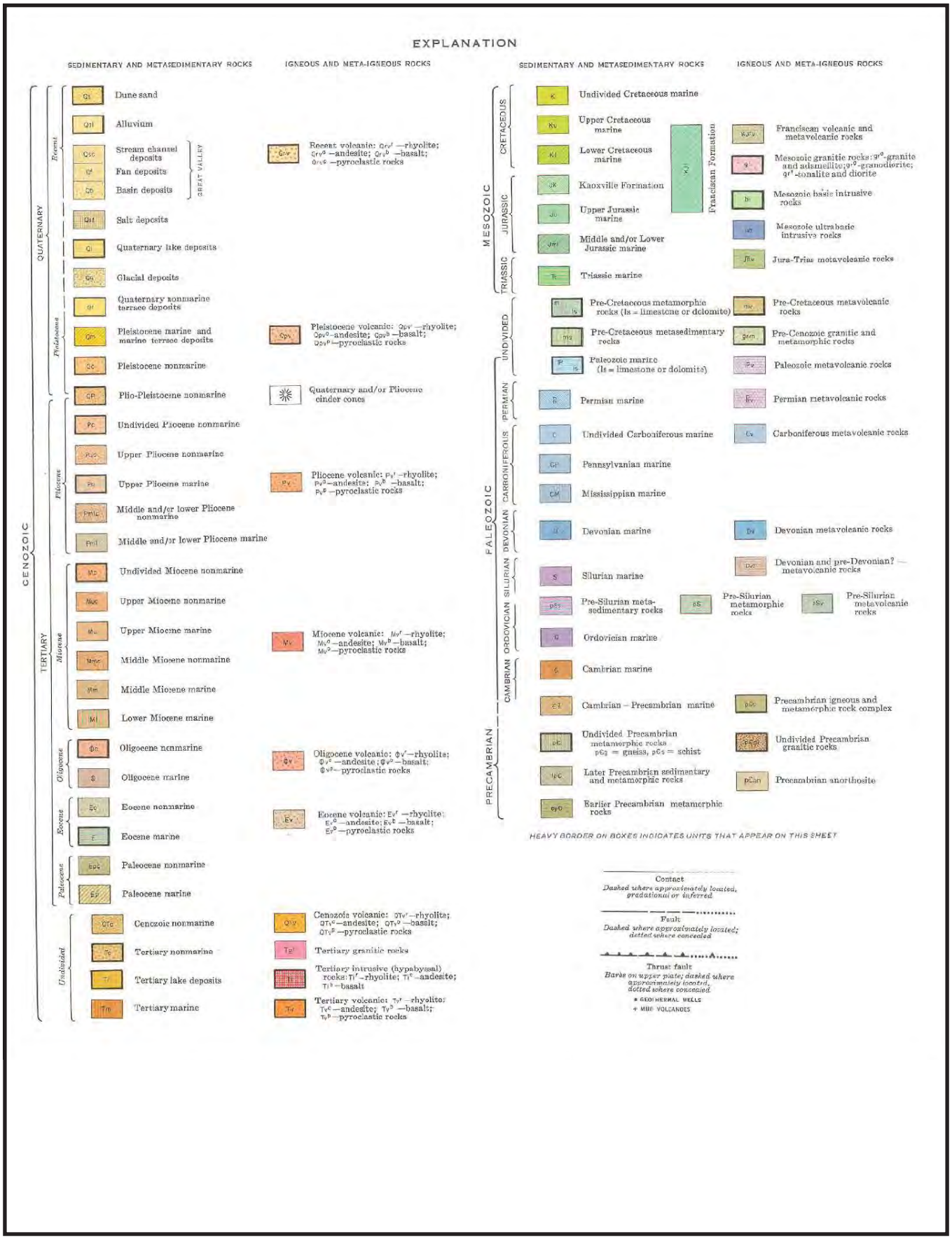
Ridgecrest Solar Power Project - Regional Geology Map



SOURCE: SM 2009a

SOIL AND WATER - FIGURE 5

Ridgecrest Solar Power Project - Regional Geology Map Legend

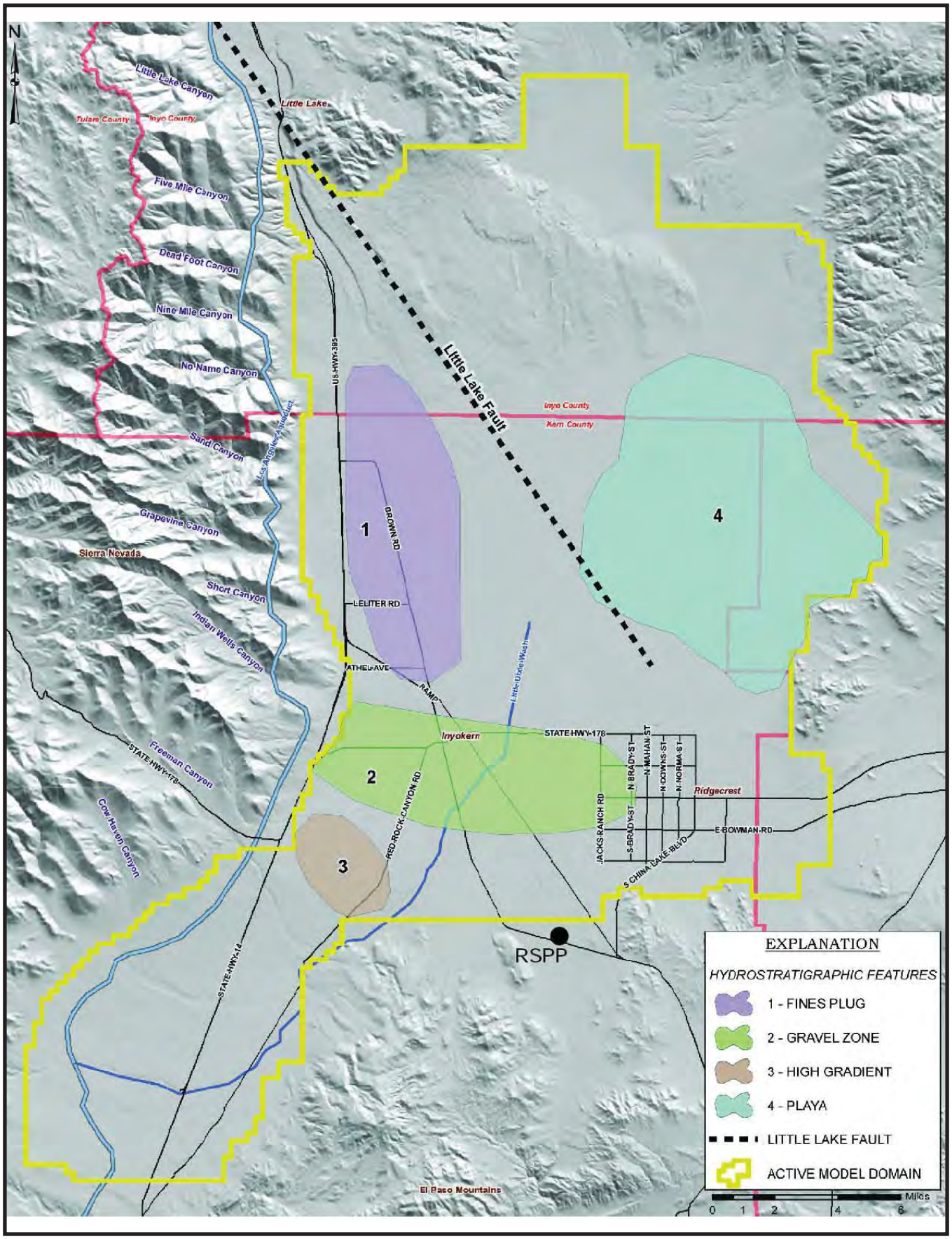


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 6

Ridgecrest Solar Power Project - Hydrostratigraphic Features in the Indian Wells Valley Groundwater Basin

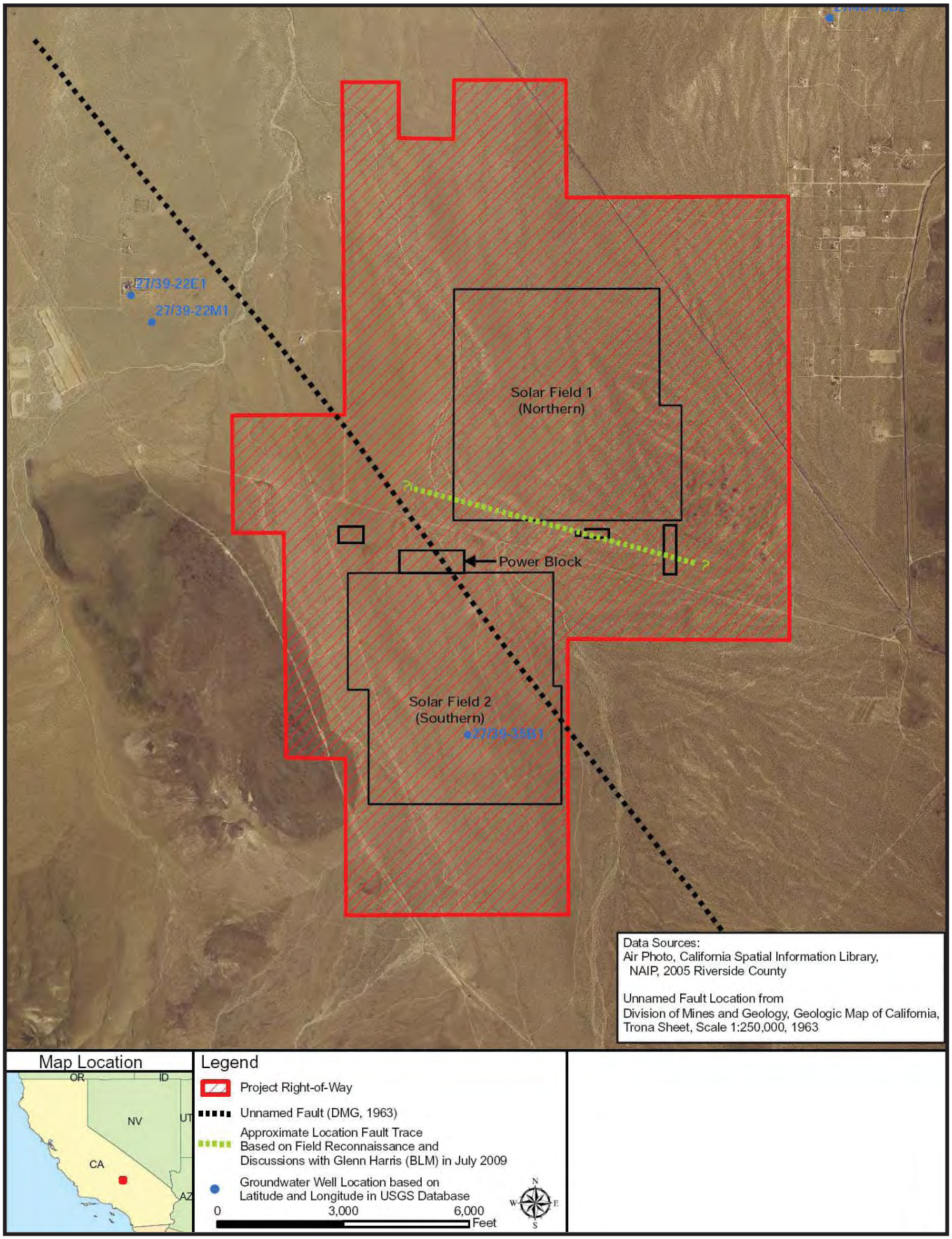


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 7

Ridgecrest Solar Power Project - Inactive Fault Mapped Onsite

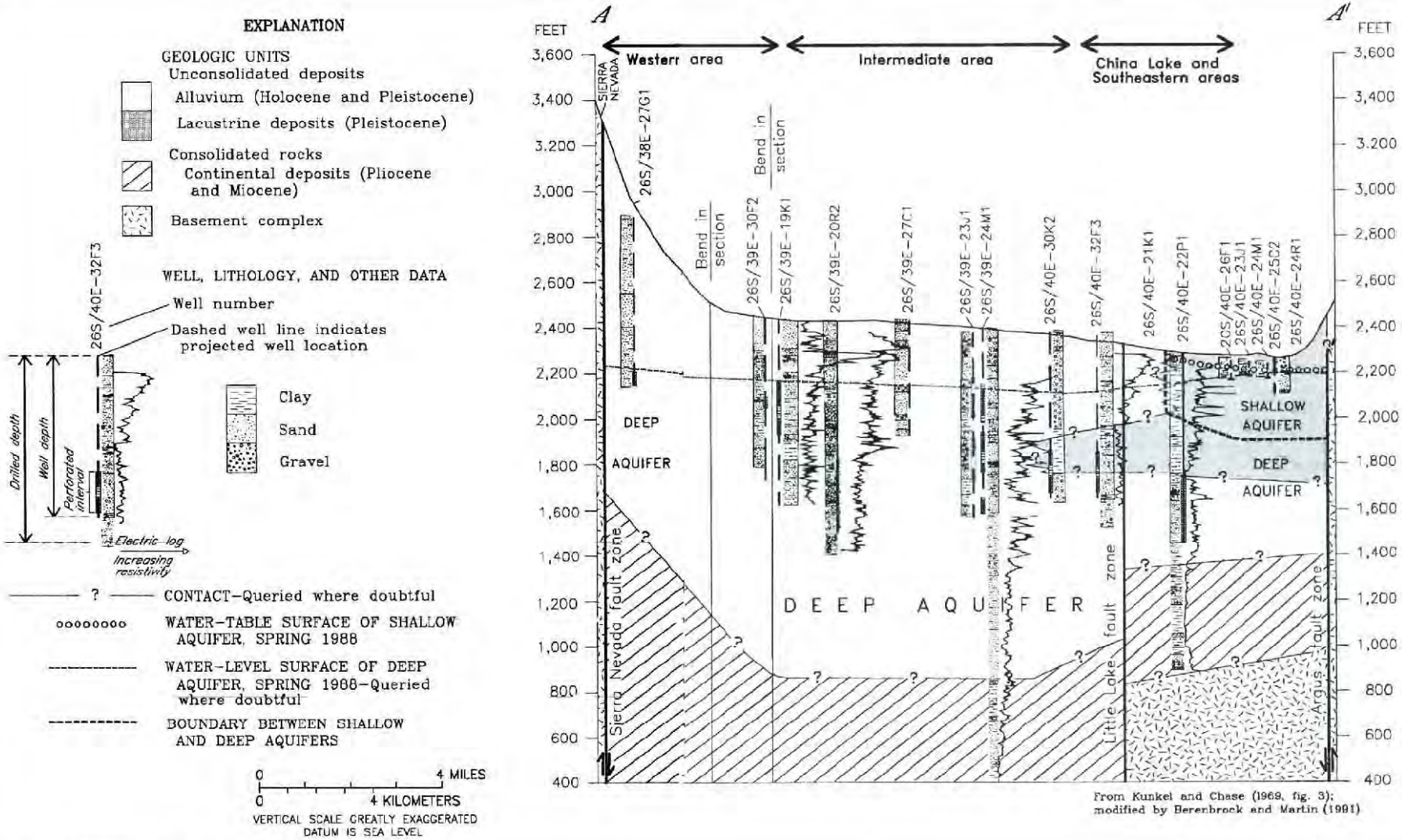


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 8

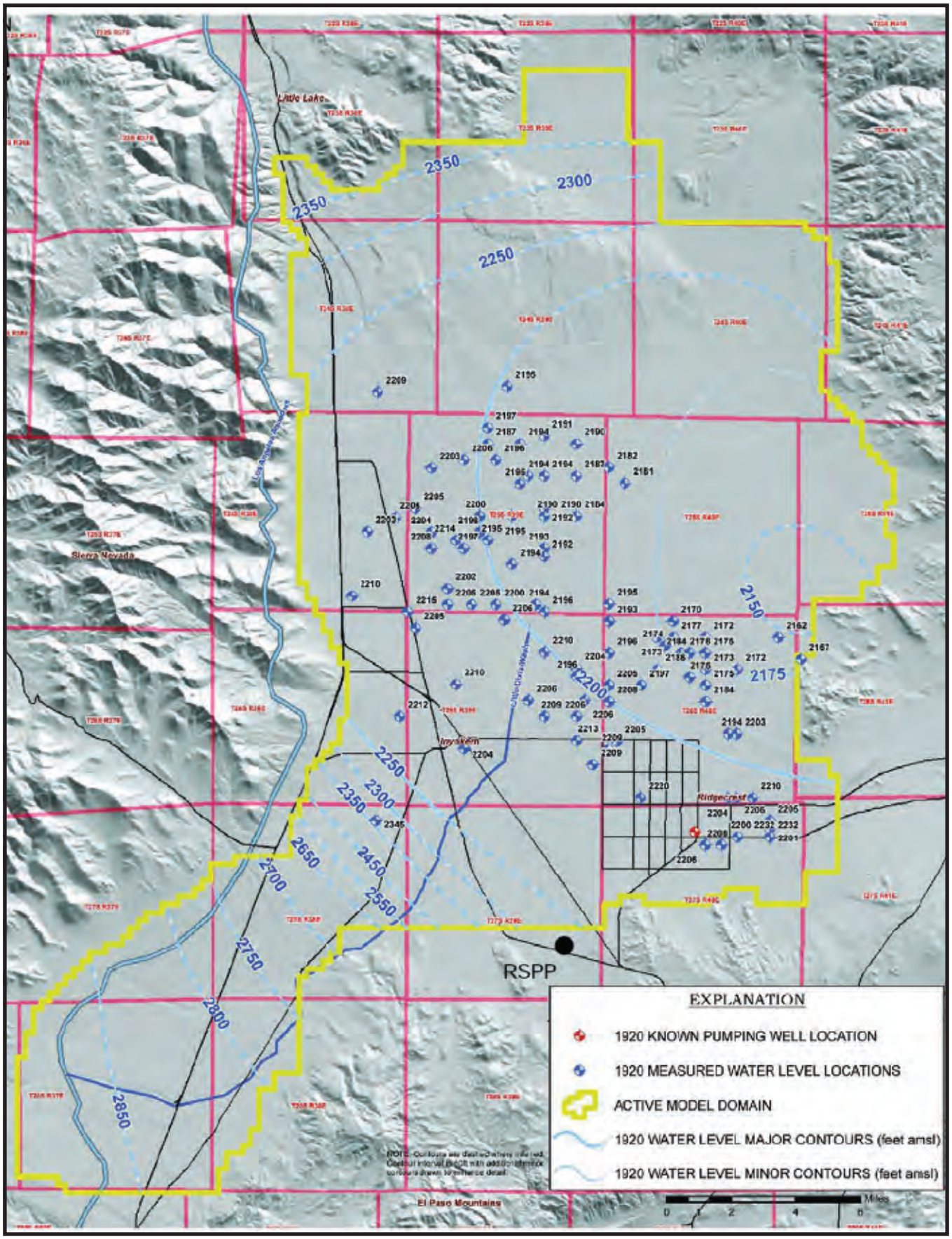
Ridgecrest Solar Power Project - Cross-Section A-A'



SOURCE: SM 2009a

SOIL AND WATER - FIGURE 9

Ridgecrest Solar Power Project - Groundwater Levels - 1920

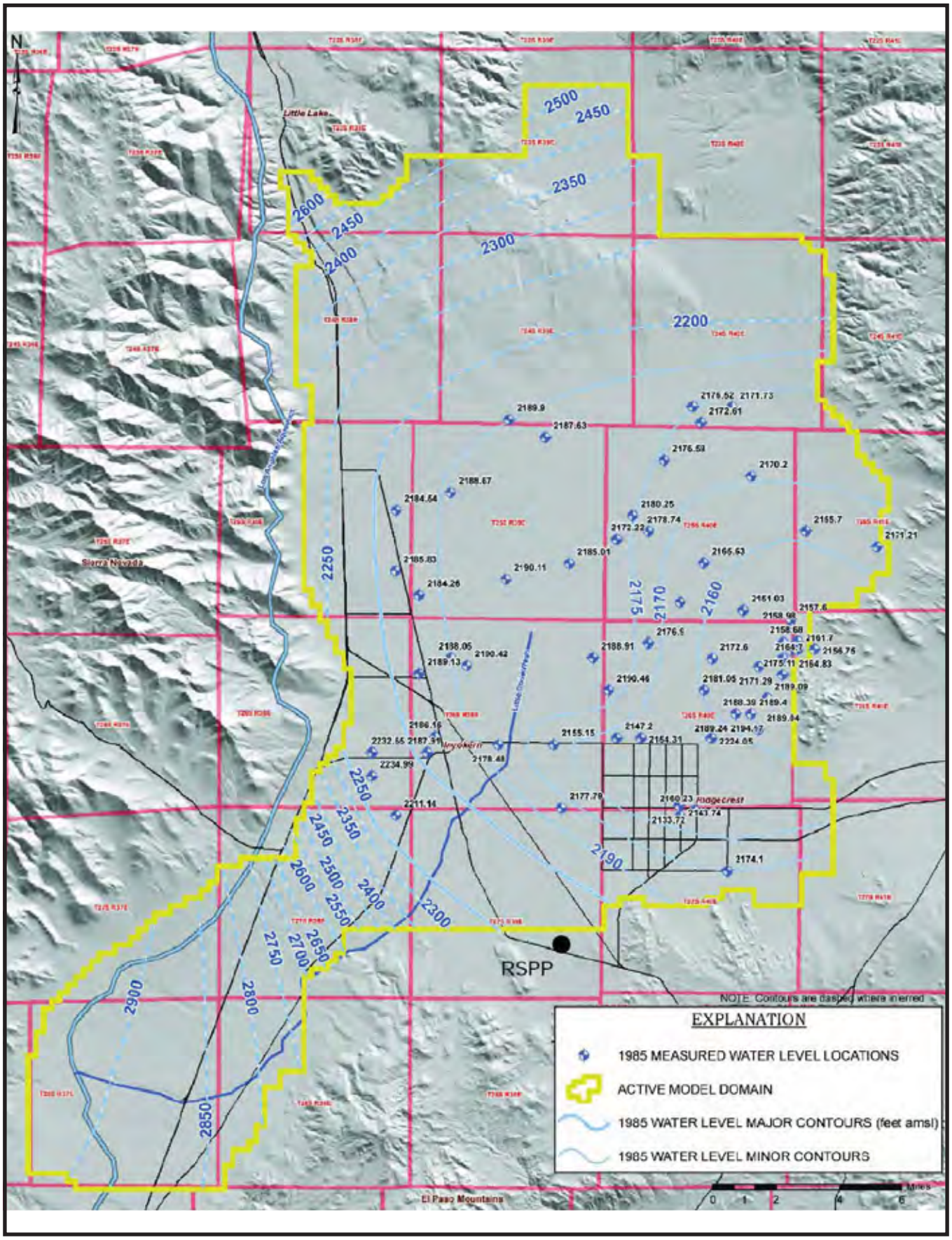


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 10

Ridgecrest Solar Power Project - Groundwater Levels - 1985

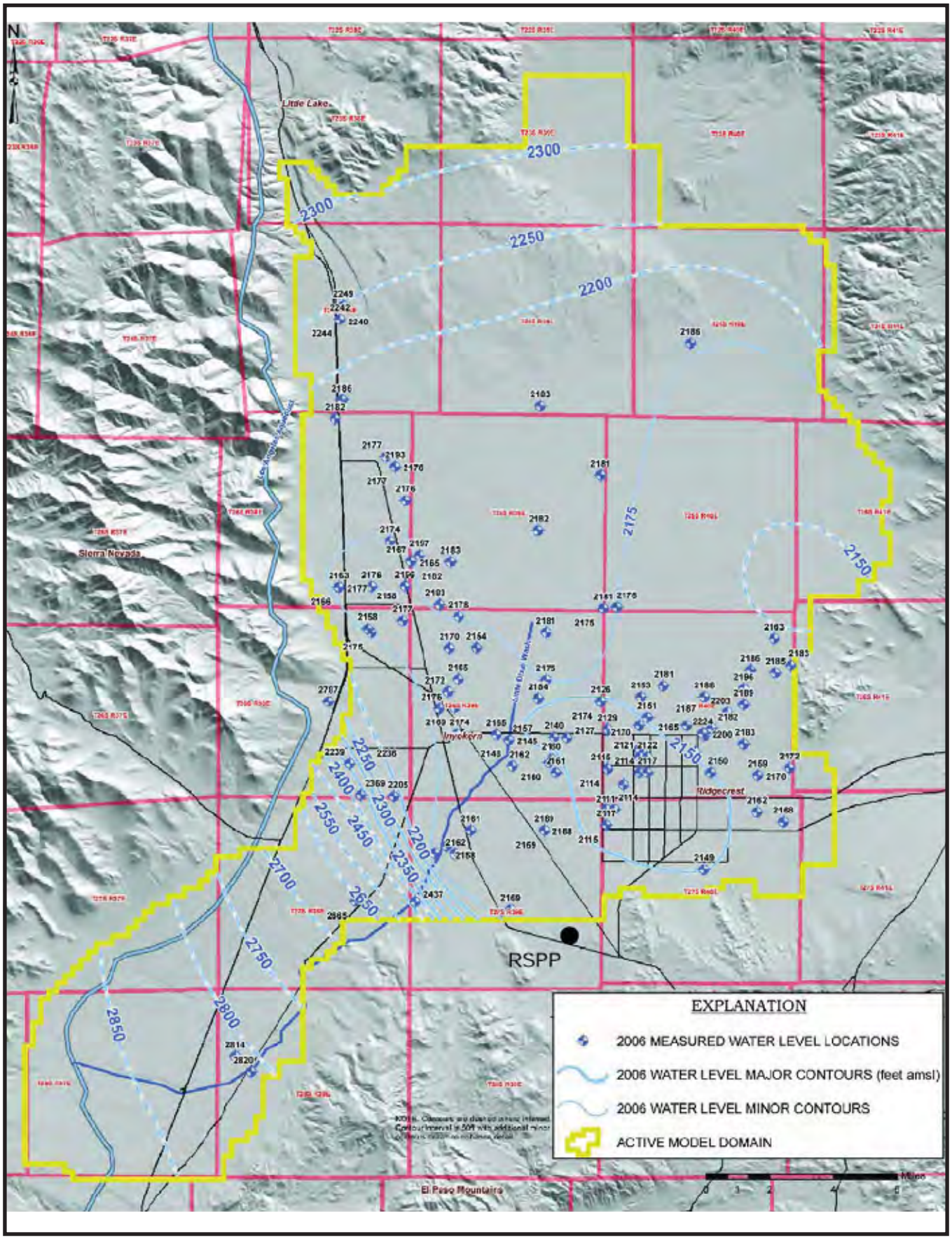


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 11

Ridgecrest Solar Power Project - Groundwater Levels - 200

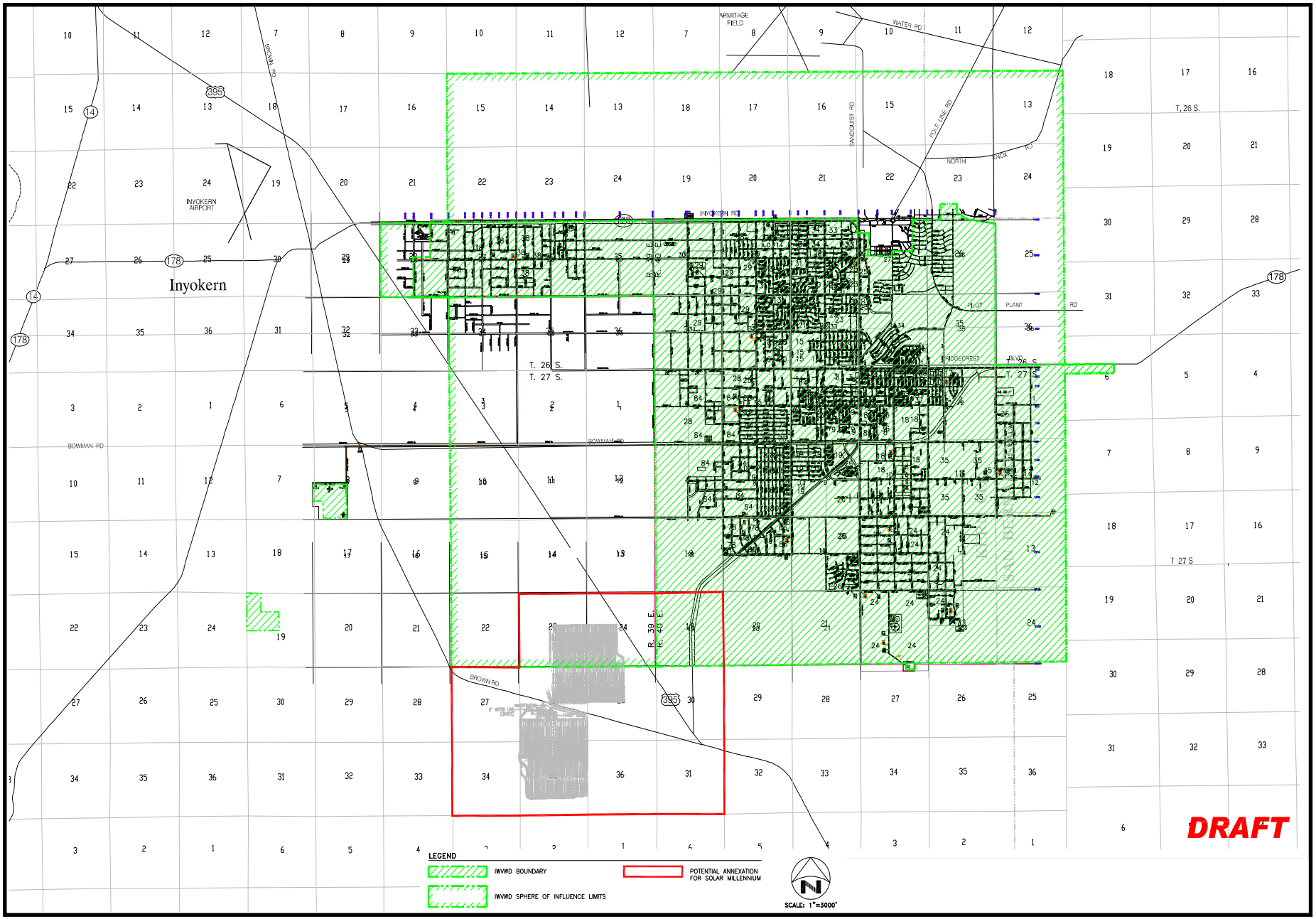


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a

SOIL AND WATER - FIGURE 12

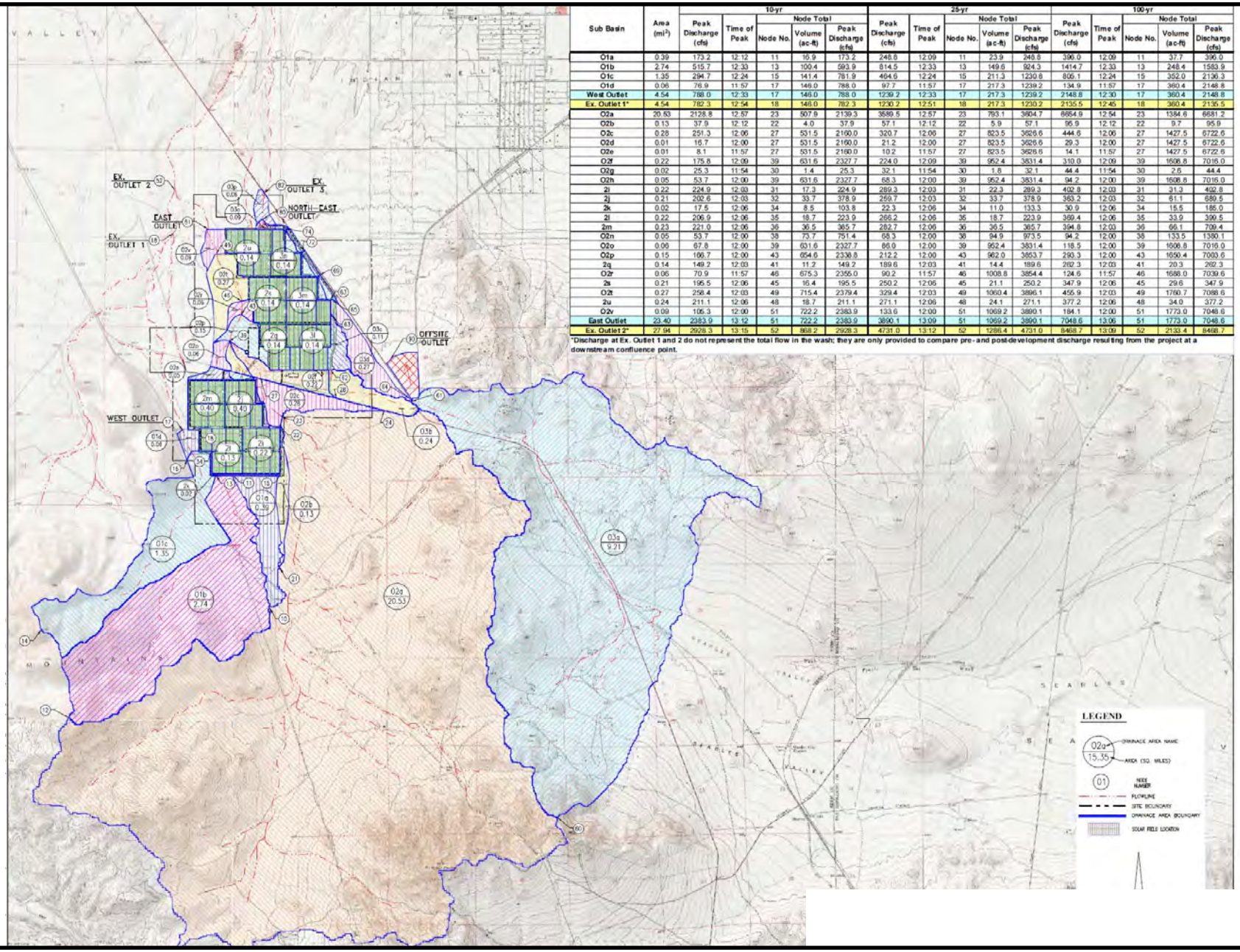
Ridgecrest Solar Power Project - IWVWD Proposed Annexation of Project Site



SOURCE: SM 2010a

SOIL AND WATER - FIGURE 13

Ridgecrest Solar Power Project - Developed Watershed



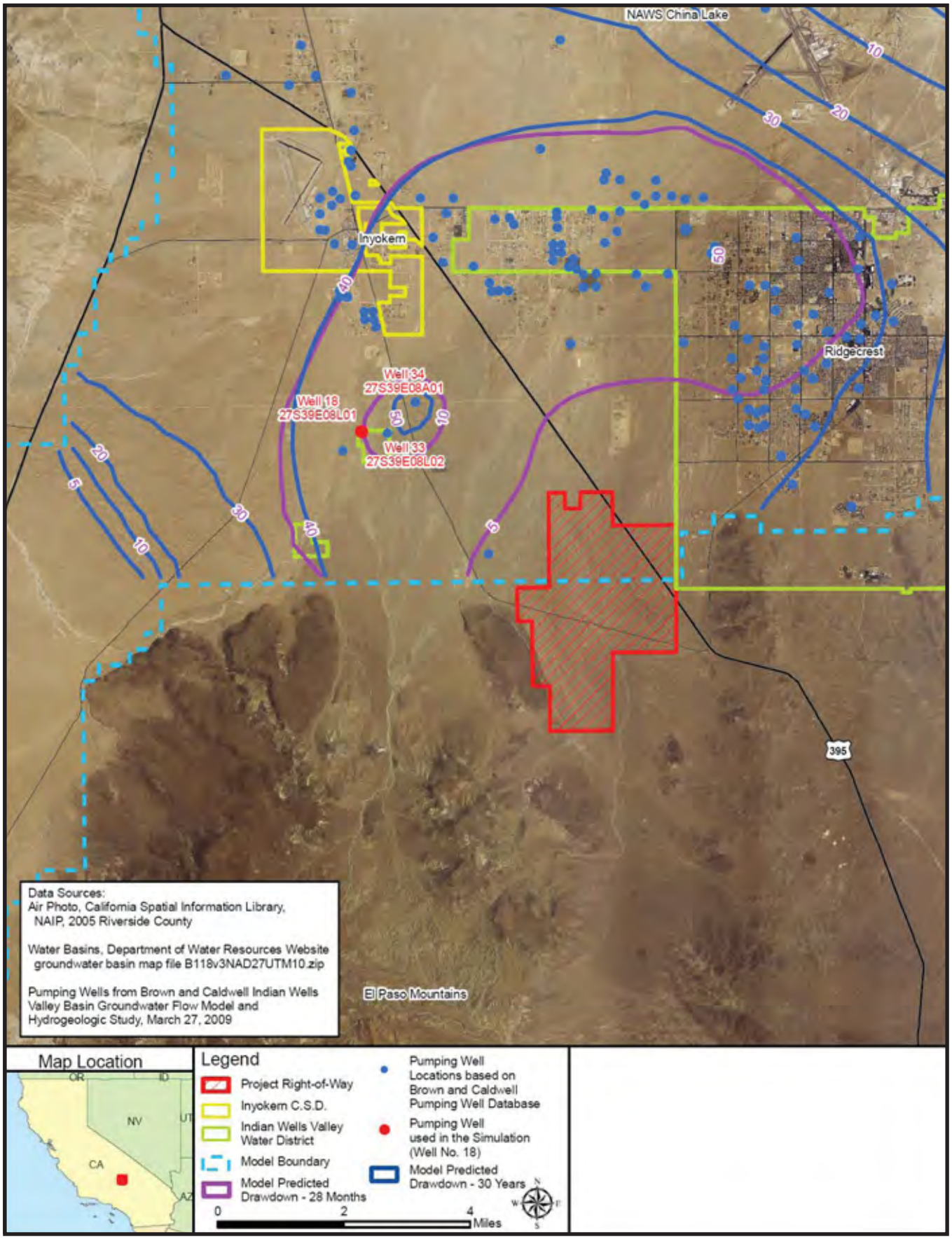
Sub Basin	Area (mi²)	10-yr					25-yr					100-yr				
		Peak Discharge (cfs)	Time of Peak	Node Total			Peak Discharge (cfs)	Time of Peak	Node Total			Peak Discharge (cfs)	Time of Peak	Node Total		
				Node No.	Volume (ac-ft)	Peak Discharge (cfs)			Node No.	Volume (ac-ft)	Peak Discharge (cfs)			Node No.	Volume (ac-ft)	Peak Discharge (cfs)
O1a	0.39	173.2	12:12	11	16.9	173.2	248.8	12:09	11	23.9	248.8	396.0	12:09	11	37.7	396.0
O1b	2.74	515.7	12:33	13	100.4	593.9	814.5	12:33	13	149.6	924.3	1414.7	12:33	13	248.4	1583.9
O1c	1.35	294.7	12:24	15	141.4	781.9	464.6	12:24	15	211.3	1230.8	806.1	12:24	15	352.0	2136.3
O1d	0.06	76.9	11:57	17	146.0	788.0	97.7	11:57	17	217.3	1239.2	134.9	11:57	17	360.4	2148.8
West Outlet	4.54	788.0	12:33	17	146.0	788.0	1239.2	12:33	17	217.3	1239.2	2148.8	12:30	17	360.4	2148.8
Ex. Outlet 1*	4.54	782.3	12:54	18	146.0	782.3	1230.2	12:51	18	217.3	1230.2	2135.5	12:45	18	360.4	2135.5
O2a	20.53	2128.8	12:57	23	507.9	2139.3	3589.5	12:57	23	793.1	3604.7	6664.9	12:54	23	1384.6	6681.2
O2b	0.13	37.9	12:12	22	4.0	37.9	57.1	12:12	22	5.9	57.1	95.9	12:12	22	9.7	95.9
O2c	0.28	251.3	12:06	27	531.5	2160.0	320.7	12:06	27	823.5	3626.6	444.6	12:06	27	1427.5	6722.6
O2d	0.01	16.7	12:00	27	531.5	2160.0	21.2	12:00	27	823.5	3626.6	29.3	12:00	27	1427.5	6722.6
O2e	0.01	8.1	11:57	27	531.5	2160.0	10.2	11:57	27	823.5	3626.6	14.1	11:57	27	1427.5	6722.6
O2f	0.22	175.8	12:09	39	631.6	2327.7	224.0	12:09	39	952.4	3831.4	310.0	12:09	39	1606.8	7016.0
O2g	0.02	25.3	11:54	30	1.4	25.3	32.1	11:54	30	1.8	32.1	44.4	11:54	30	2.6	44.4
O2h	0.05	53.7	12:00	39	631.6	2327.7	68.3	12:00	39	952.4	3831.4	94.2	12:00	39	1606.8	7016.0
2i	0.22	224.9	12:03	31	17.3	224.9	289.3	12:03	31	22.3	289.3	402.8	12:03	31	31.3	402.8
2j	0.21	202.6	12:03	32	33.7	378.9	259.7	12:03	32	33.7	378.9	363.2	12:03	32	61.1	680.5
2k	0.02	17.5	12:06	34	8.5	103.8	22.3	12:06	34	11.0	133.3	30.9	12:06	34	15.5	185.0
2l	0.22	206.9	12:06	35	18.7	223.9	266.2	12:06	35	18.7	223.9	369.4	12:06	35	33.9	399.5
2m	0.23	221.0	12:06	36	36.5	365.7	282.7	12:06	36	36.5	365.7	394.8	12:03	36	66.1	709.4
O2n	0.05	53.7	12:00	38	73.7	751.4	68.3	12:00	38	94.9	973.5	94.2	12:00	38	133.5	1380.1
O2o	0.06	67.8	12:00	39	631.6	2327.7	86.0	12:00	39	952.4	3831.4	118.5	12:00	39	1606.8	7016.0
O2p	0.15	166.7	12:00	43	654.6	2338.8	212.2	12:00	43	962.0	3853.7	293.3	12:00	43	1650.4	7093.6
2q	0.14	149.2	12:03	41	11.2	149.2	189.6	12:03	41	14.4	189.6	262.3	12:03	41	20.3	262.3
O2r	0.06	70.9	11:57	46	675.3	2355.0	90.2	11:57	46	1008.8	3854.4	124.6	11:57	46	1688.0	7039.6
2s	0.21	195.5	12:06	45	16.4	195.5	250.2	12:05	45	21.1	250.2	347.9	12:06	45	29.6	347.9
O2t	0.27	258.4	12:03	49	715.4	2379.4	329.4	12:03	49	1060.4	3896.1	455.9	12:03	49	1760.7	7088.6
2u	0.24	211.1	12:06	48	18.7	211.1	271.1	12:06	48	24.1	271.1	377.2	12:06	48	34.0	377.2
O2v	0.09	105.3	12:00	51	722.2	2383.9	133.6	12:00	51	1069.2	3890.1	184.1	12:00	51	1773.0	7048.6
East Outlet	23.40	2383.9	13:12	51	722.2	2383.9	3890.1	13:09	51	1069.2	3890.1	7048.6	13:06	51	1773.0	7048.6
Ex. Outlet 2*	27.94	2928.3	13:15	52	868.2	2928.3	4731.0	13:12	52	1286.4	4731.0	8468.7	13:09	52	2133.4	8468.7

*Discharge at Ex. Outlet 1 and 2 do not represent the total flow in the wash; they are only provided to compare pre- and post-development discharge resulting from the project at a downstream confluence point.

SOURCE: SM 2010

SOIL AND WATER - FIGURE 14

Ridgecrest Solar Power Project - Baseline Model Production Drawdown

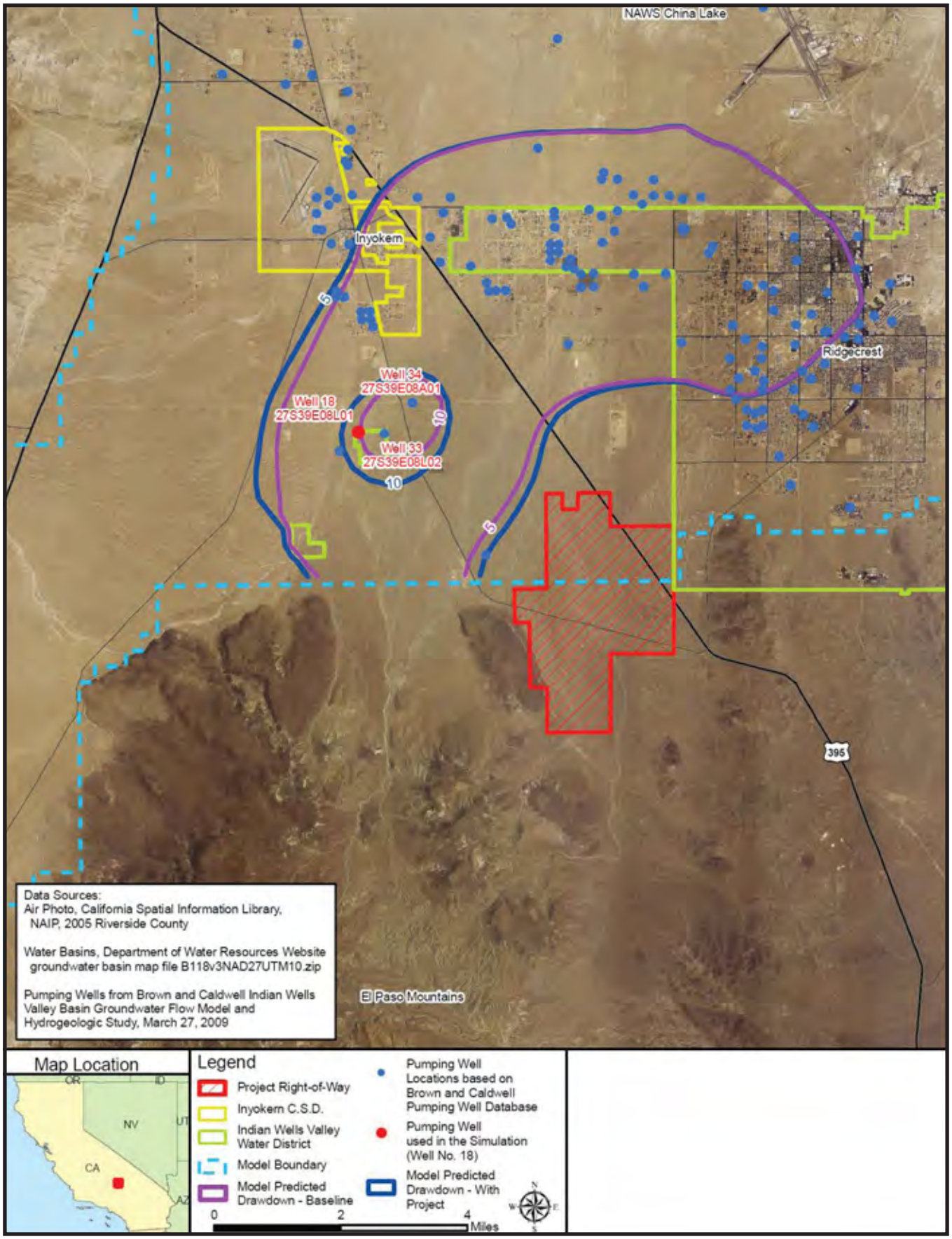


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a, Apendix J

SOIL AND WATER - FIGURE 15

Ridgecrest Solar Power Project - Baseline Plus Project Construction Pumping (End of 28 Months)

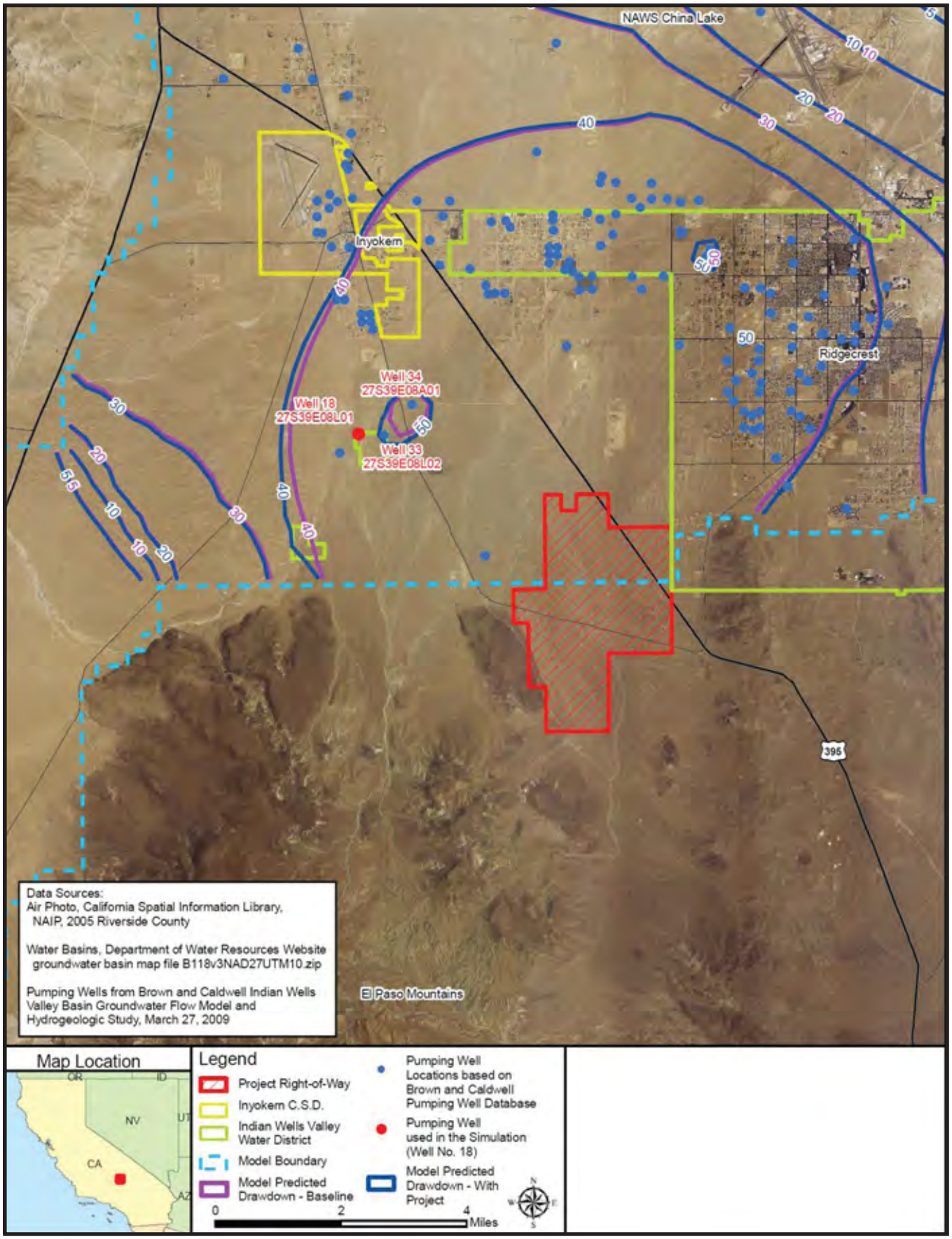


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a, Apendix J

SOIL AND WATER - FIGURE 16

Ridgecrest Solar Power Project - Baseline Plus Operational Pumping (After 30 Years)

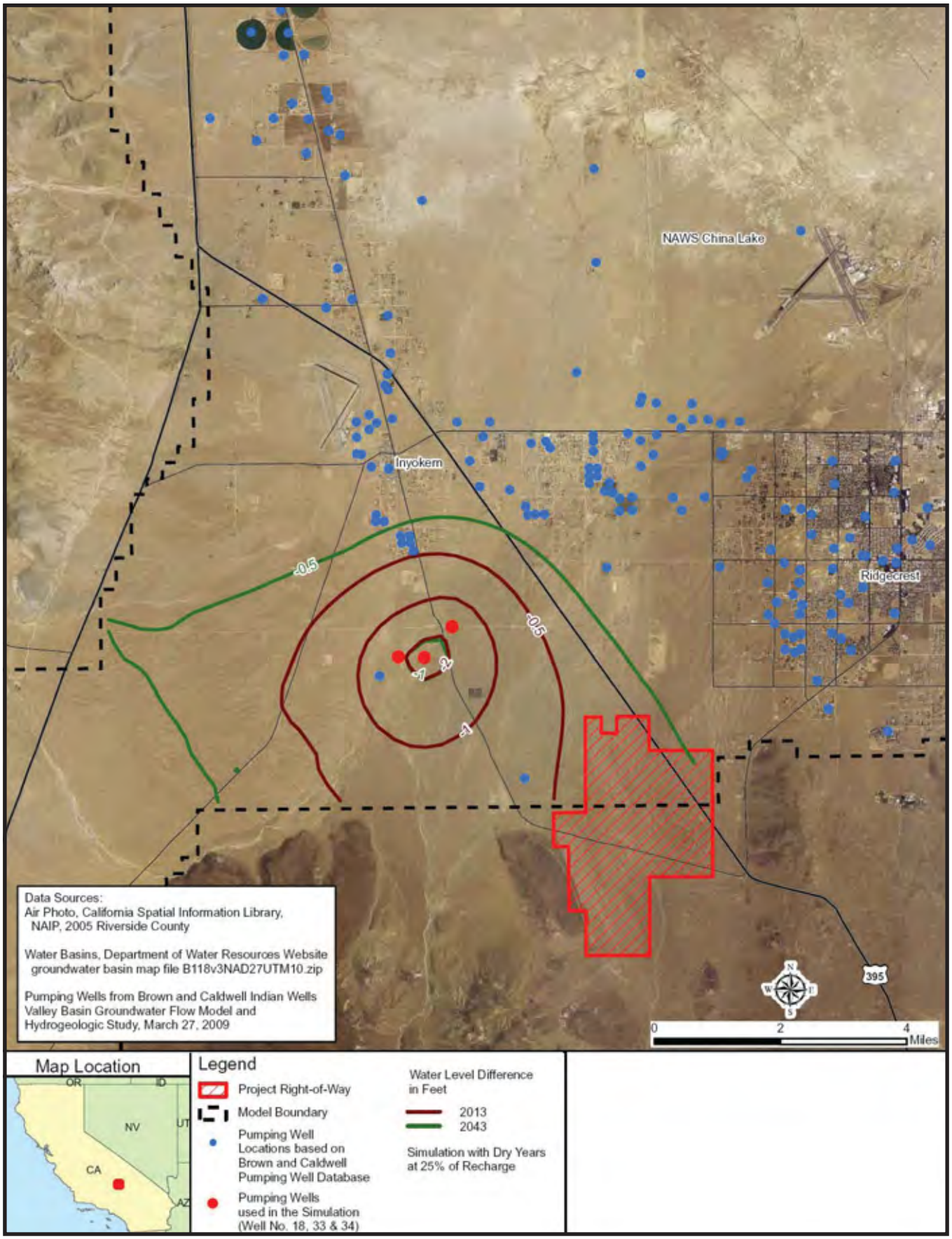


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2009a, Apendix J

SOIL AND WATER - FIGURE 17

Ridgecrest Solar Power Project - Predicted Water Level Difference 2013 and 2043 Scenario (3a) and Project (4a)

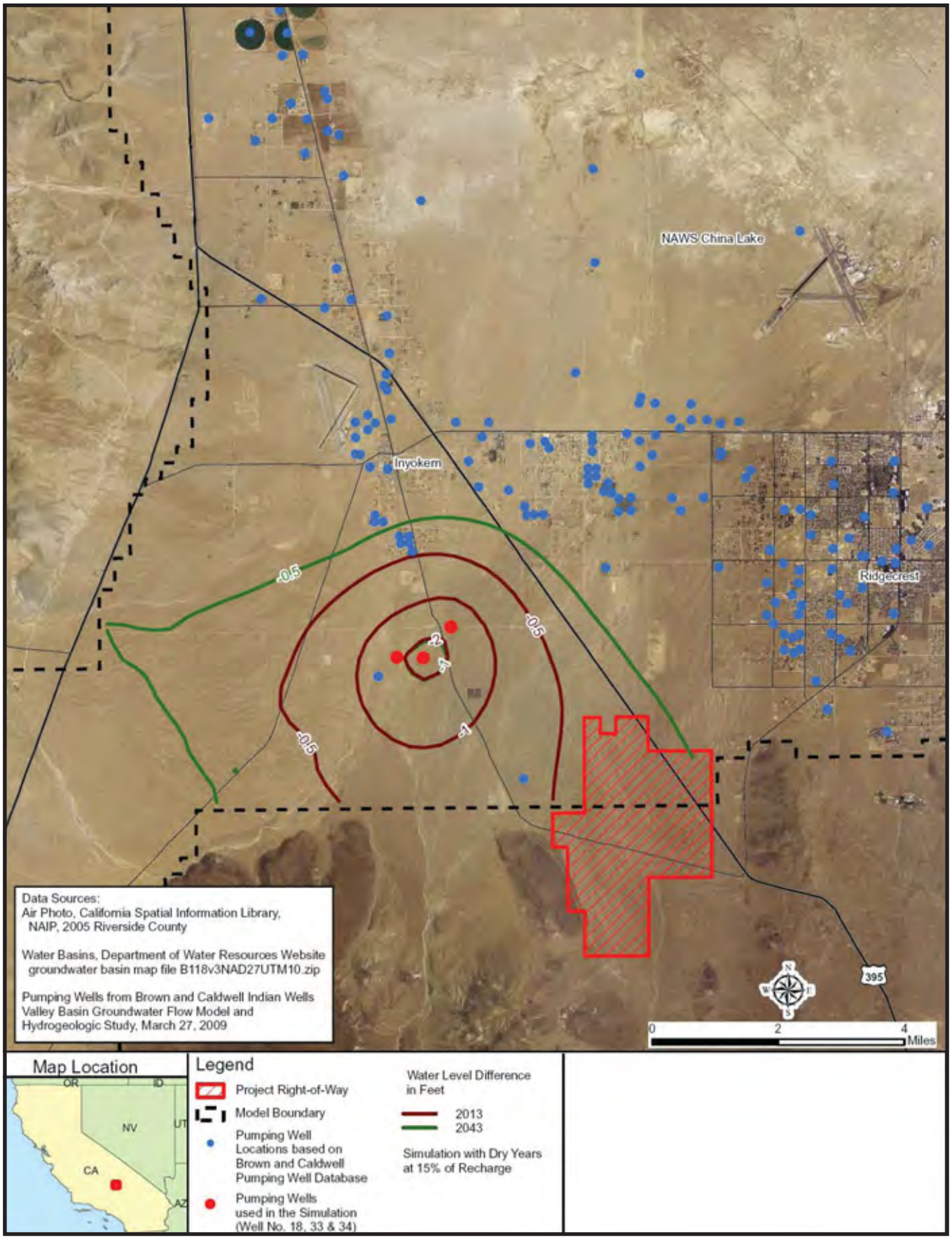


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010a, DR 133

SOIL AND WATER - FIGURE 18

Ridgecrest Solar Power Project - Predicted Water Level Difference 2013 and 2043 Scenario (3b) and Project (4b)

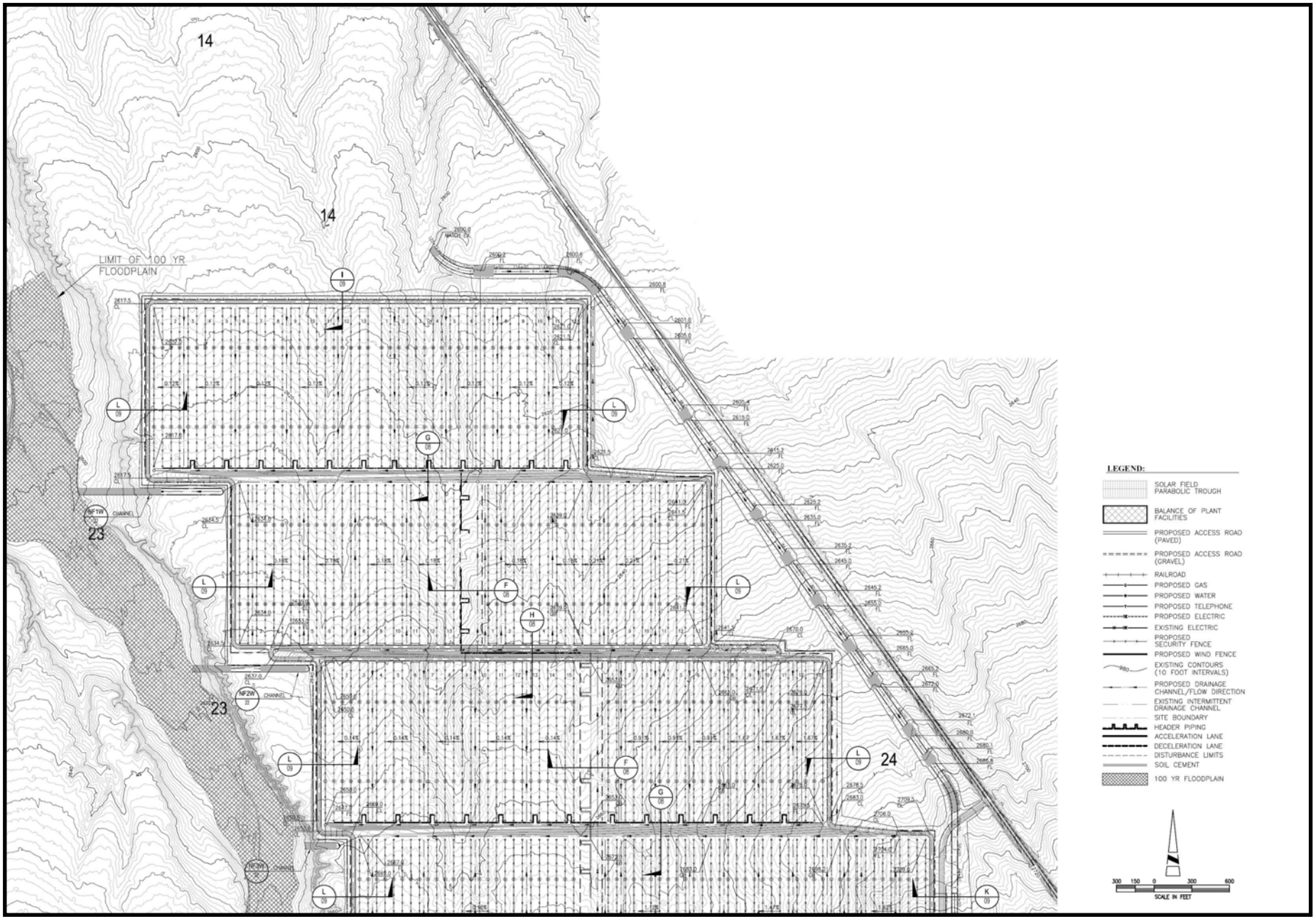


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: SM 2010a, DR 133

SOIL AND WATER - FIGURE 19

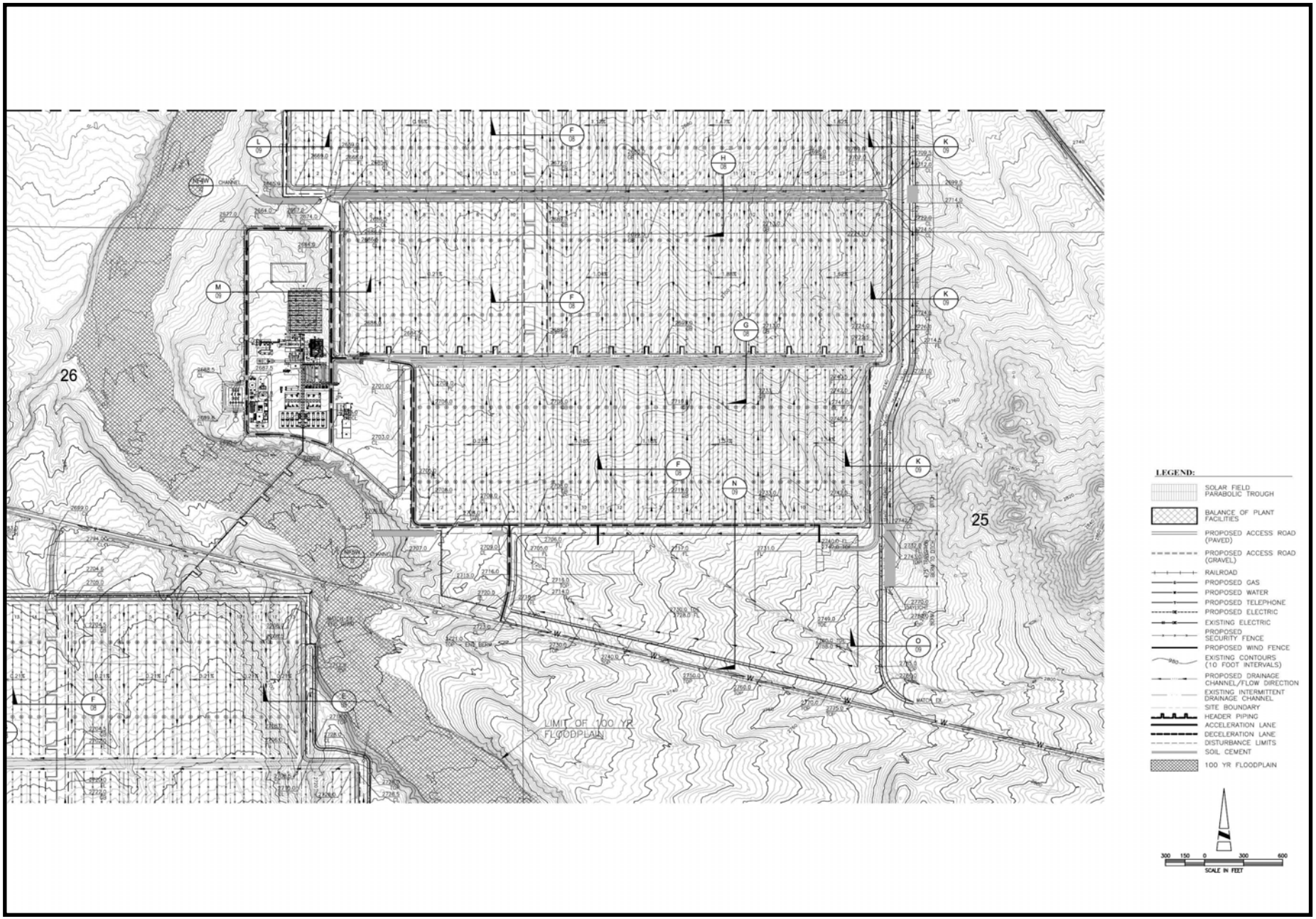
Ridgecrest Solar Power Project - El Paso Floodplain 1



SOURCE: SM 2010

SOIL AND WATER - FIGURE 20

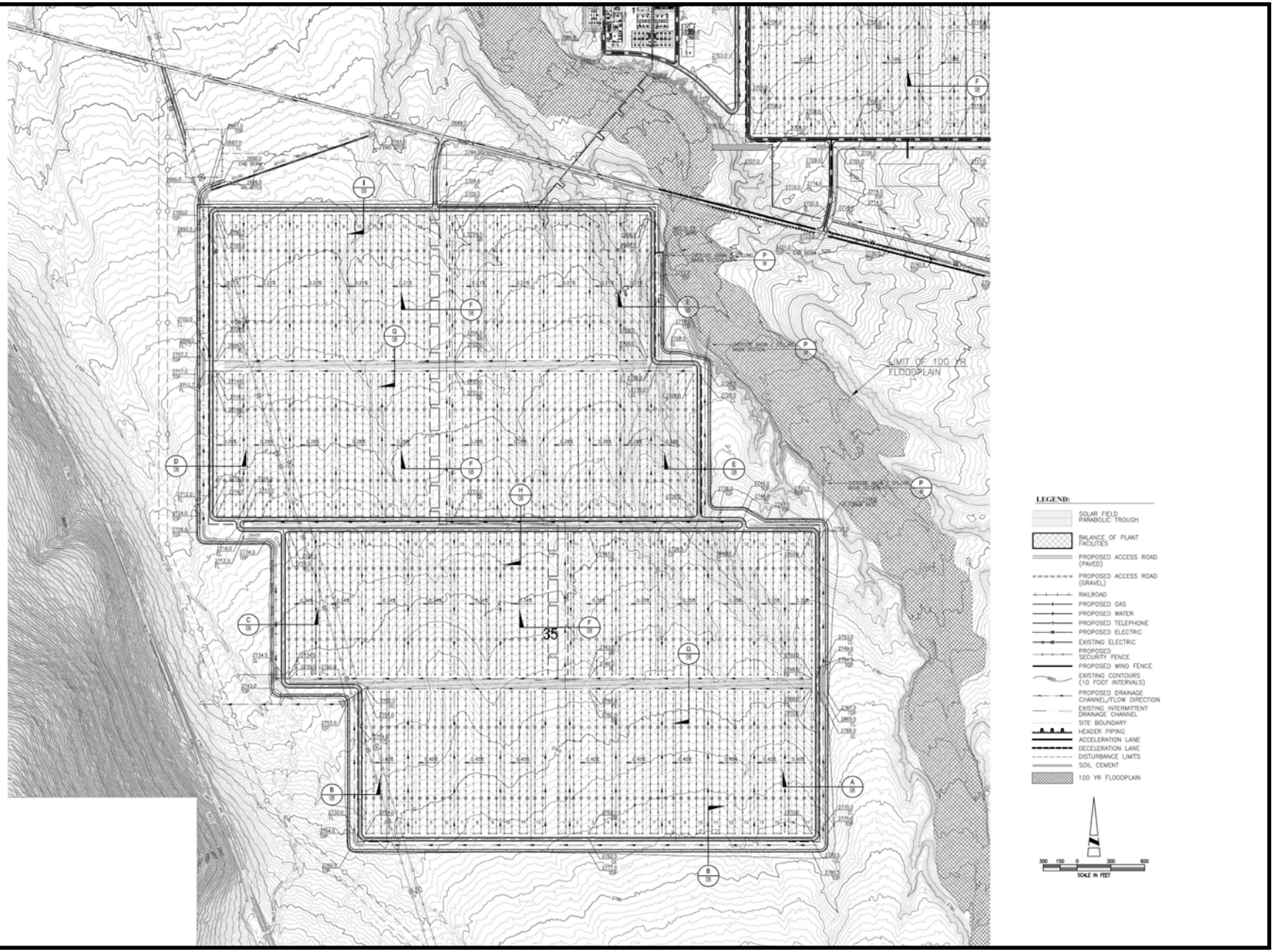
Ridgecrest Solar Power Project - El Paso Floodplain 2



SOURCE: SM 2010

SOIL AND WATER - FIGURE 21

Ridgecrest Solar Power Project - El Paso Floodplain 3



SOURCE: SM 2010

C.10 TRAFFIC AND TRANSPORTATION

Testimony of Robert Fiore

C.10.1 SUMMARY OF CONCLUSIONS

The Ridgecrest Solar Power Project (RSPP) would conflict with an applicable laws, ordinances, regulations, and standards (LORS) pertaining to State and Kern County's level of service (LOS) standards. LOS D is the minimum acceptable LOS standard for State highways and Kern County roads. The Brown Road, US 395 and China Lake Boulevard intersection currently operates at LOS B but project related construction trips would degrade the LOS for the intersection to LOS E. California Energy Commission staff's (staff) recommended conditions of certification would ensure that the proposed RSPP does not conflict with and would be in compliance with applicable LORS. Other transportation system aspects of the RSPP would be in compliance with applicable LORS related to traffic and transportation, including the Circulation Element of the County of Kern County General Plan and Municipal Code and the Circulation-Transportation Element of the Ridgecrest General Plan Circulation Element.

RSPP would introduce an impact (significant under CEQA) related to traffic safety. The Brown Road, US 395 and China Lake Boulevard intersection experiences a collision rate almost three times the State average for similar intersections. Project related construction trips are likely to significantly increase the collision rate at the intersection. Fifteen percent more vehicle trips (approximately 583) would encounter the intersection as a means to access the proposed RSPP site.

RSPP would introduce an impact (significant under CEQA) with respect to glare. The solar mirror troughs would reflect light or create glare posing a hazard to motorists. RSPP induced impacts related to glare hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

RSPP would introduce impacts (significant under CEQA) related to vertical velocity plumes and glare affecting pilots. Military operations occur at low altitudes over the proposed project site. R2506 is a restricted military air space for the purposes of providing the military an area for performing low altitude maneuvers. In addition, civilian aircraft may fly over the proposed project site, with permission from the military. Further, the area within 20 miles of the Inyokern airport presents ideal conditions for sailplanes and pilot instruction due to the many atmospheric and geographic conditions of the eastern side of the Sierra Nevada Mountains.

Vertical velocity plumes are unseen currents of air exhausted upward from the Air Cooled Condenser (ACC) stacks that would pose a hazard to aircraft with direct over flight of these facilities. As presented above, there is a potential that military and civilian flight paths and patterns would occur over the proposed RSPP site. RSPP induced impacts related to the vertical velocity plume hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

Similar to the affect glare or reflection may pose on motorists, the solar mirror troughs would reflect light or create glare that pose a hazard to civilian and to military flight operations. RSPP induced impacts related to hazards affecting pilots would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

C.10.2 INTRODUCTION

The transportation system within the proposed RSPP's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways. Analysis of these aspects of the traffic and transportation system is statutorily required by the Energy Commission's Siting Regulations[1].

In cooperation with Bureau of Land Management (BLM), the traffic and transportation analysis identifies existing and reasonably foreseeable transportation systems and conditions as the basis for determining potential impacts induced by the proposed project. This analysis is organized by: a) assessing existing and planned transportation systems and conditions, b) assessing the impacts induced by the proposed project on existing and planned transportation systems and conditions, c) assessing the cumulative impacts of the proposed project and reasonably foreseeable future projects on the transportation systems and conditions and, d) determining compliance with applicable traffic and transportation laws, ordinances, regulations and ordinances (LORS).

C.10.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA) require agencies to integrate environmental values into the decision making processes by considering the environmental impacts of projects. The purpose of NEPA is to disclose a proposed action's environmental effect and to avoid or minimize such adverse effects to the extent practicable[2]. Similar to NEPA, the purpose of CEQA is to identify a project's environmental effect and to minimize such environmental effect. The Application for Certification 09-AFC-9 and other resources were consulted to assist in determining the proposed action or project's traffic and transportation environmental effects. Neither NEPA nor CEQA provide specific methodologies or thresholds for determining a project's environmental affects or impacts to the existing or reasonably foreseeable traffic and transportation conditions. It is the responsibility of the lead agency to develop such methodologies, thresholds or policy statements.

CEQA Guidelines and Environmental Checklist[3], provide issues the lead agency can consider in determining project induced environmental effects and the significance of

[1] California Code of Regulations, Title 20, Chapter 5, § 1704, Appendix B (g)(5)

[2] Code of Federal Regulations, Title 40, § 6.100

[3] California Code of Regulations, Title 14, § 15063

the effects. It is important to understand the significance of environmental effect to determine if such effect can be mitigated and the mitigation measure if the effect can be mitigated. The methodologies and thresholds staff used to determine the significance of project induced impacts includes an integration of principles and practices, performance standards and thresholds established by interested agencies. The following are the Environmental Checklist questions staff considered and the methodology, threshold, performance standard or principle and practice staff used to determine the significance of the environmental effect induced by the proposed RSPP:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

Level of service (LOS) is the primary measure for determining environmental effect associated with the circulation system within the proposed projects affected environment. State and County LORS establish LOS standards for roadways and intersections within the proposed project's affected environment. Since the proposed project would impact state and local roadways, the following performance standards were used to determine the proposed project's environmental effect:

- LOS D or better conditions on a State of California highways (Federal highways are operated and maintained by Caltrans[4])
- LOS D or better conditions on an Kern County roadways

Policies adopted by the Kern Council of Governments and Kern County pertaining to mass transit, congestion management, transportation demand management and pedestrian and bicycle paths, and Caltrans construction traffic control plan manual also provide the basis for mitigating circulation system impacts.

- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

There are four primary safety concerns that pose impacts to flight paths and patterns associated with power plants. The four safety concerns are obstruction, plumes, radio and telecommunications and glare.

Power plant buildings and structures can present an obstruction to flight paths and patterns. Planning policies used to assess the potential environmental effect related to obstruction include the Code of Federal Regulations, Special Federal Aviation Regulations and Federal Aviation Administration informational circulars, Military

[4] California Department of Transportation

Restricted Area R-2506, Military Restricted Area R-2508 Joint Land Use Study and the Kern County Airport Land Use Compatibility Plan.

Power plant operations could generate visible water vapor and vertical velocity plumes. What constitutes a potential visible water vapor or vertical velocity safety concern is not clearly defined and methodologies or thresholds are currently being debated. Staff has concluded that the most remote possibility of hazard is considered significant and must be mitigated.

The proposed project would present glare that may affect pilot's vision. What constitutes a potential glare related safety concern is not clearly defined and methodologies or thresholds are currently being debated. Staff has concluded that the most remote possibility of hazard is considered significant and must be mitigated.

- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Traffic generated by the proposed RSPP would exacerbate an existing traffic safety condition. The threshold is based on average collision statistics for State of California highways and existing conditions. Collision statistics vary between years but, according to Caltrans, the intersection of Brown Road, US 395 and China Lake Boulevard has a collision incident rate that is 2.8 times higher than the state average.

- Result in inadequate emergency access?

Kern County Municipal Code Title 19.80 establishes policies for emergency access and Kern County design manuals and design procedures ensure adequate and safe emergency access.

- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

Kern Council of Governments, Kern County, and the City of Ridgecrest have developed the Regional Transportation Plan and General Plan Circulation Elements containing policies regarding public transit, bicycle, or pedestrian facilities. These planning documents do not contain methodologies or thresholds for measuring impacts but do contain statements that promote, encourage and support public transit, bicycle, or pedestrian facilities. These statements provide the basis for mitigation of other impacts.

C.10.4 PROPOSED PROJECT

C.10.4.1 SETTING AND EXISTING CONDITIONS

Ridgecrest Solar 1, LLC (RSI), the applicant, is proposing to develop, own and operate a utility-scale solar thermal electric generating facility. Application for Certification, 09-AFC-9 (SM 2009a), states that the proposed project would be located on approximately 1,940 acres of a ROW grant on lands managed by the Bureau of Land Management (BLM) in Kern County, California. Ridgecrest, California is located approximately five miles northeast of the proposed project. The China Lake Naval Air Weapons Station

and the many recreational activities offered in El Paso Management Area (BLM) are the main attractions for the area within the vicinity of the proposed project.

Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. (SM 2009a, p. 5.13-13) Other components of the proposed project with the potential to affect traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines (SM 2009a, Sections 2.1, 2.5 and 2.6).

The California Desert Conservation Area (CDCA) Plan is the land (including transportation) planning document for BLM managed lands for the California desert where the RSPP would be developed. It was adopted in 1980 (BLM 1980a). CDCA includes policies and procedures for motorized vehicle access as an integral part of desert land planning. Originally adopted in 1980, the CDCA was re-published in 1999 and included several amendments. In March 2006, the BLM issued a Record of Decision amending the CDCA plan with the West Mojave Plan (BLM 2005a). Section 2.2.6 of the West Mojave Plan discusses the Public Land Motorized Vehicle Access Network. It establishes sub-regions and motorized access zones (MAZ). The project site would be located in the El Paso sub-region. The purpose of the plan is to identify and balance recreation, habitat conservation and access.

BLM designated motorized vehicle access routes currently traverse the proposed project site (BLM 1980a, pp 75-83). BLM MAZ's are multiple-use routes not necessarily for the purpose connecting origins and destinations. These routes are primarily used for recreation activities. MAZ routes are discussed further in the **LAND USE** section of this staff assessment.

Vacant land and sparse rural residential development characterize the proposed project site and surrounding uses. The nearest residence is located approximately 3,200 feet northwest of the proposed project site. Brown Road is used to access these sparsely developed home-sites. Brown Road also provides access to the community of Inyokern.

C.10.4.1.1 Regional and Local Highways and Roads

The proposed RSPP site is located near the apex of Brown Road and US 395. There are three regional highways within the proposed project's affected environment that connect the proposed project site with the employment base. These routes are US 395, SR-14 and SR-178. China Lake Boulevard and Brown Road are primary roadways also serving the proposed project site. China Lake Boulevard connects Ridgecrest with Brown Road and Brown Road connects SR-178 and US 395 to the proposed project site.

Traffic and Transportation Figure-1 illustrates regional and local roadways within the project's affected environment. Construction workforce origination centers include Ridgecrest (5 miles), Barstow (80 miles), Bakersfield (100 miles), Antelope Valley (90 miles), Victor Valley (85 miles) and other cities within the Los Angeles metropolitan area (100 miles). The proposed project site is accessible from these centers via the routes cited above.

Traffic analysis begins with identifying routes and intersections to be affected by the proposed project. It is likely that construction traffic would travel a distance of up to two hours (100 miles) from the proposed project site. Energy Commission staff requested the applicant to expand their data to include routes and intersections accordingly. The applicant assigned a distribution of construction traffic trips to routes of anticipated points of origin (SM 2010a, DR-Traffic-193). The following are routes and intersections identified that project construction and operations traffic would use to access the proposed project site:

The anticipated routes for construction traffic include:

- From Ridgecrest, traffic would travel south on US 395 or China Lake Boulevard (45%)
- From Inyokern, traffic would travel east on SR-178 and south on Brown Road or US 395. (30% includes trips originating from the Antelope Valley or 5%, respectively)
- From Inyo and Mono counties, traffic would travel south on US 395. (5%)
- From Victorville and Barstow, traffic would travel north on US 395. (20%)
- From the Antelope Valley, traffic would travel north on SR-14 and east on SR-178 and south on Brown Road or US 395. (43% includes overlap)

US 395

US 395 is operated and maintained by Caltrans. It is the primary connector route for the communities on the eastern side of the Sierra Nevada Mountains. It extends north and south between the Oregon border and the Victor Valley. US 395 is a two-lane highway with two 12-foot travel lanes from SR-14 to Victorville. The posted speed limit is 55-miles per hour (mph) within the proposed project's immediate vicinity. US 395 peak hour volumes are shown in **Traffic and Transportation Table 1**.

Access from US 395 to the proposed site, would occur via US 395 to Brown Road. Traffic traveling north bound from US 395 from south of the proposed project site would turn left on Brown Road. South bound traffic traveling US 395 from north of the proposed project site would turn right on Brown Road. **Traffic and Transportation Figure-2** is a photograph illustrating the intersection's grade separation. The alignment of the intersection is illustrated on **Traffic and Transportation Figure-3**.

US 395 intersects Brown Road and China Lake Boulevard near the proposed RSPP site. There are safety and geometric issues associated with the US 395, Brown Road and China Lake Boulevard intersection. Safety issues associated with this intersection include:

- South bound traffic on US 395 north of the intersection approaches the intersection on a downward slope, increasing speed).
- North bound traffic on US 395 encounters a sharp curve just south of the intersection as it approaches the intersection.
- Brown Road and China Lake Boulevard approaches to US 395 are not at a perpendicular angle.

- The intersection is grade separated. It was constructed above natural grade to avoid the potential for flooding.

China Lake Boulevard

China Lake Boulevard is a two-lane collector road. It connects Ridgecrest to US 395 near the proposed project site. This route is maintained by Kern County and the City of Ridgecrest, in their respective jurisdictions. The posted speed limit is 55 mph for the Kern County portion and 35 mph for the Ridgecrest portion. China Lake Boulevard average daily traffic (ADT) is shown in **Traffic and Transportation Table 1**. Vehicles traveling south on China Lake Boulevard are stopped at US 395 if proceeding forward or turning left. For vehicles turning left, the vehicle turns into the travel lane. Vehicles traveling north bound on US 395 from China Lake Boulevard are also stopped before proceeding right. This right turn also turns into the travel lane. Neither turning movement has a transitional lane. The alignment of the intersection is illustrated on Traffic and Transportation Figure-2.

SR-14, SR-178 and Brown Road

SR-14, SR-178 and Brown Road are presented together as this is the route traffic would travel if originating from the Antelope Valley and places in between. This route takes into account traffic originating from Mono and Inyo counties and Inyokern. Construction traffic would use Brown Road from SR-14 and SR-178. SR-14 and SR-178 peak hour volumes and Brown Road ADT are shown in **Traffic and Transportation Table 1.**

SR-14 is a regional serving route that connects Los Angeles to the Antelope Valley and the Antelope Valley with the eastern side of the Sierra Nevada mountains. It connects with US 395 just north of Inyokern and approximately twelve miles north of the proposed project site. It is a two lane highway with transitional lanes at SR-178 from Redrock-Inyokern Road to approximately one mile north of SR-178. SR-14 is a 4-lane divided highway from one mile north of SR-178 to US 395.

Northbound SR-14 has a travel lane and right turn lane to SR-178 east bound. South bound traffic has a travel through lane and a separate left turn lane to eastbound SR-178. The SR-14 and US 395 interchange provides a southbound traffic ramp to US 395 and a northbound US 395 ramp to northbound SR-14. There is no direct access to southbound SR-14 from US 395 at this location. The posted speed limit on SR-14 is 55-65 mph.

SR-178 is also a regional serving highway connecting Bakersfield to Ridgecrest and on to Trona. The route is combined with SR-14 for approximately nine miles between Inyokern and the point where it traverses west toward Bakersfield off SR-14. From Bakersfield to SR-14, SR-178 is primarily a two-lane highway. Between SR-14 and eastbound SR-178 intersection, SR-178 is a three lane highway with two lanes westbound (up a hill). At Avenue Del Sol it becomes a two lane highway through to US 395. In Inyokern, SR-178 has a dual-turn center lane and it is four lanes from US 395 to Ridgecrest.

Traffic turning left from SR-178 to southbound SR-14 is stop controlled. West bound traffic on SR-178 to northbound SR-14 is also stop controlled because there is a single northbound travel lane on SR-14.

Brown Road is a two-lane collector road. It connects US 395, near the proposed project site, and SR-178, in Inyokern. This route is maintained by Kern County. Kern County Municipal Code Title 10, Section 10.04.525, establishes the speed limit for Brown Road. Between two thousand three hundred (2,300) feet south of Inyokern Road (State Route 178) and two thousand one hundred (2,100) feet north of Inyokern Road, the speed limit is forty-five (45) miles per hour (mph). Brown Road is 25-35 mph through Inyokern.

The alignment for the intersection of SR-178 and Brown Road is illustrated on **Traffic and Transportation Figure-4.** The critical turning movements for this intersection are eastbound SR-178 to southbound Brown Road and northbound Brown Road to westbound SR-178. SR-178 approaches (eastbound and westbound) to Brown Road are not stop controlled. The Brown Road approaches to SR-178 are stop controlled. SR-178 eastbound traffic going south bound on Brown Road does not need to stop.

Traffic and Transportation Table 1 summarizes the most recently available data characteristics of the roadway segments studied within the vicinity of the RSPP. The data contained in the table includes segments from the likely origination points.

Based on existing traffic patterns and the highly skilled trades required for project construction, staff has some concerns with the distribution of anticipated construction vehicle trips. Data indicates that there would be more trips originating from the Victor Valley. As shown in the Table, the annual average daily traffic (AADT) on US 395, in the proximity of China Lake Boulevard, is 4,000 vehicle trips on US 395 south of Brown Road and 2,950 vehicle trips on US 395 north of Brown Road. The difference in the through trips between the two segments is the result of traffic patterns entering and exiting US 395 and traveling on China Lake Boulevard The data suggests that approximately 25% of traffic travels between Ridgecrest and points beyond the SR-58 and US 395 interchange using US 395 and China Lake Boulevard Consistent with this pattern, it is likely that more than 20% of construction traffic would use US 395 from the Victor Valley and Barstow.

Traffic and Transportation Table 1
Existing Roadway Segment Characteristics

Roadway Segment	Roadway Class/ Lanes	Capacity	2008 Caltrans AADT[1]	Peak Hour ADT Volume [1]	V/C
US 395 in Independence, CA (95 miles)	Arterial/ 2	UNK	6,150	1,100	UNK
US 395 @SR-190	Arterial/ 4 Divided	UNK	5,700	940	UNK
US 395 North of SR-14	Arterial/ 4 Divided	UNK	5,700	940	UNK
US 395 South of SR-14	Arterial/ 2	2,000[3]	3,000	440	22%
US 395 South of SR-178	Arterial/ 2	2,000[3]	2,850	420	21%
US 395 North of Brown Rd.	Arterial/ 2	2,000[3]	2,950	410	20%
US 395 South of Brown Rd.	Arterial/ 2	2,000[3]	4,000	550	28%
US 395 @ Randsburg Rd.	Arterial/ 2	2,000[3]	4,000	550	28%
US 395 North of SR-58	Arterial/ 2	2,000[3]	4,800	580	29%
US 395 South of SR-58	Arterial/ 2	2,000[3]	7,800	940	47%
US 395 @ I-15 (86 miles)	Arterial/ 4 Divided	UNK	28,000	2,900	UNK
SR-14 South of US 395	Arterial/ 3	UNK	2,900	590	UNK
SR-14 South of SR-178 E	Arterial/ 2	2,000	3,400	570	29%
SR-14 South of SR-178 W	Arterial/ 2	2,000	5,400	700	35%
SR-14 @ Randsburg Rd.	Arterial/ 2	2,000	6,600	740	37%
SR-14 @ SR-58	Arterial/ 4 Divided	UNK	17,800	1,750	UNK
SR-14 @ Avenue L (90 miles)	Arterial/ 4 Divided	UNK	92,000	7,900	UNK
SR-178 W @ SR-14	Arterial/ 2	2,000	1,500	140	11%
SR-178 E @ SR-14	Arterial/ 2-3 Undivided	UNK	7,100	750	UNK
SR-178 East of US 395	Arterial/ 2-3 Undivided	UNK	7,500	850	UNK
SR-178 @ Ridgecrest	Arterial/ 4 Divided	UNK	7,500	820	UNK
Brown Road	Collector/ 2	UNK	1,200 (ADT)	UNK	UNK
China Lake Blvd.	Collector/ 2	2,000[3]	2,350 (ADT)	212[3]	11%

AADT = Average Annual Daily Taffic
ADT = Average Daily Taffic
V/C = Volume to capacity stated in percentage
UNK = Unknown
Peak hour volumes are usually counted when a route is expected to experience the most demand.
The typical peak hour is between 7:00am and 9:00am and between 4:00pm and 6:00 pm.
Source: 1. http://www.dot.ca.gov/hq/traffops/saferesr/trafdata/2008all.htm and
Source: 2. http://www.co.kern.ca.us/roads/pdf/Traffic_Counts.pdf
Source: 3. SM 2009a , Table 5.1-5

Traffic and Transportation Table 2 summarizes the applicant's traffic engineer HCM worksheets intersections within the vicinity of the RSPP.

Traffic and Transportation Table 2
Existing Intersection Characteristics

Intersection	AM Peak Hour		PM Peak Hour	
	Delay	LOS	Delay	LOS
US 395, Brown Road and China Lake Blvd.				
US 395 SB to Brown Road WB (1)	(1)	(1)	(1)	(1)
US 395 SB to China Lake Blvd. EB	7.4	A	7.3	A
US 395 NB to China Lake Blvd. EB (1)	(1)	(1)	(1)	(1)
US 395 NB to Brown Road WB	7.3	A	7.3	A
Brown Road EB to US 395 NB	10.2	B	9.7	A
Brown Road EB to US 395 SB	8.5	A	8.5	A
Brown Road EB to China Lake Blvd.*	10.2	B	9.7	A
China Lake Blvd. WB to US 395 NB	8.7	A	10	A
China Lake Blvd. WB to US 395 SB	10	A	8.6	A
China Lake Blvd. WB to Brown Road WB	10	A	10	A
US 395 and SR-178				
US 395 NB to SR178 EB	12.8	B	13.5	B
US 395 NB to SR178 WB	7.7	A	8	A
SR-178 EB to US 395 SB	13.1	B	14.4	B
SR-178 WB to US 395 SB	8	A	7.7	A
SR-14 and SR-178 E				
SR-14 NB to SR-178 EB*	10.5	A	9.5	A
SR-178 WB to SR-14 SB	9.5	A	10.5	A
SR-14 SB to SR178 EB	7.4	A	7.4	A
SR-178 and Brown Road				
SR-178 EB to Brown Road SB*	12.2	B	9.2	A
Brown Road NB to SR-178 WB	9.2	A	12.2	B
Brown Road SB thru SR-178	13.2	B	15.7	C

Source: SM 2009a, p. 5.13-9 and DR-TRAFFIC-196

*Assumed the reverse of route

(1) Delay and LOS not applicable. Movement is an uncontrolled right turn (no stop control) and therefore no delay LOS A

The applicant did not assess China Lake Boulevard in Ridgecrest though 45% of construction traffic is anticipated to originate from there. Since a another significant amount of construction traffic may originate from the Antelope Valley, the Victor Valley, Barstow and Inyo and Mono Counties, project related construction would likely encounter the following additional intersections as well:

- US 395 and SR-14
- US 395 and Randsburg Road
- US 395 and SR-58
- Several intersections along US 395 in the Victor Valley
- SR-14 and SR-178 W

- SR-14 and Randsburg Road
- SR-14 and SR-58
- SR-14 and SR-58 Business
- Several intersections along SR-14 in the Antelope Valley
- Multiple localized intersections along SR-178 in Weldon, Lake Isabella and Bakersfield

C.10.4.1.2 Railways

The location of the railways within the proposed project's affected environment is shown on **Traffic and Transportation Figure-1**.Trona Railway Company operates a railroad that connects Trona to Mojave. In Mojave, Trona Railway railroad junctions with the Burlington Northern – Santa Fe (BNSF) Railways and Union Pacific Railroad (UPRR) railroads. Trona Railway Company's railroad follows Randsburg Road between SR-14 and US 395 and extends easterly toward Trona and southwesterly toward Mojave. The applicant proposes to use railways for the transport of materials and equipment but did not present any specifics as to how it would occur.

Trona Railway Company railroad crosses US 395 south of Garlock Road. It is gate and signal controlled at-grade crossing. UPRR railroad crosses SR-14/ CA Business SR-58 in Mojave. It is a gate and signal controlled at-grade crossing.

C.10.4.1.3 Airports

The locations of the airports within the proposed project's affected environment are shown on **Traffic and Transportation Figure-1**. Three of the seven airports are military installations. The Mojave Desert provides diverse terrain and many open spaces suitable for military operations. Air Force Flight Test Center at Edwards Air Force Base, National Training Center at Fort Irwin and Naval Air Weapons Station at China Lake use and manage the 20,000 square miles of restricted military airspace, R-2508 Special Use Complex, above Kern and surrounding counties and above the proposed project site.

The project site is located approximately eight miles south-southwest of the China Lake Naval Air Weapons Station or Armitage Field (FAA identifier is NID, AirNav.com 2009a). RSPP would be located within the R-2506 internal restricted area, a sub area of the R-2508 Special Use Complex.

The project site is located approximately seven miles south of the Inyokern Airport (FAA identifier is IYK, AirNav.com 2009a). Energy Commission staff discussed airport operations and flight paths with the Inyokern Airport General Manager. The Inyokern Airport General Manager stated that pilots avoid flying through the R-2506 air space restricted area because of the Handbook (USAF 2010a) procedures required for entry. He further stated that some commercial flight paths transect the R-2506 airspace but occur at very high altitudes. (S. Seymour, IYK 2009a)

Indian Wells Airport District/Inyokern Airport serves the China Lake Naval Air Weapons Station, the community of Inyokern, and the City of Ridgecrest with scheduled airline service to Los Angeles International Airport. It also serves local general aviation needs for personal, business and recreational flying.

The Inyokern Airport is located northwest of the community of Inyokern. Existing facilities consist of three runways, longest of which is the 7,344-foot runway 15-33. This runway and runways 2-20 (6,275-feet length) and 10-28 (4,153-feet length) are equipped with medium intensity runway lights and precision approach path indicators on runways 20 and 33.

The area surrounding Inyokern Airport, including the project site, is an internationally known soaring site for sailplanes. The reliable thermal and mountain lift provided by the surrounding ranges, including the El Paso Mountains, make this a perfect soaring location for the beginner and expert alike. Many national and world sailplane altitude, distance, and speed records have been set in the airspace around and above the Inyokern airport. (IYK, 2010a) Non-motorized aircraft generally fly by visual flight rules[5] (see and avoid) and have less ability to react to or recover from unexpected flight conditions.

Airports and distances from the proposed project are summarized in the **Traffic and Transportation Table 3**.

Traffic and Transportation Table 3
Airports

Airport	Military/ Public	Distance from RSPP
China Lake Naval Air Weapons Station	Military	10 miles north
Inyokern Airport,	Public	10 miles northwest
Trona Airport	Public	59 miles northeast
California City Municipal Airport	Public	32 miles southwest
Mojave Air and Space Port	Public	53 miles southwest
Edwards Air Force Base	Military	50 miles south
Fort Irwin National Training Center	Military	55 miles southeast

Source: AirNav.com

[5] Visual flight rules (VFR)**.** Flight rules adopted by the FAA that govern aircraft flight using visual references. VFR operations specify the amount of ceiling and the visibility the pilot must have in order to operate according to these rules.

C.10.4.1.4 Transmission Lines and Pipelines

There are three transmission lines and pipelines proposed as part of the project that potentially affect traffic and transportation. **Traffic and Transportation Figure-5** shows the proposed transmission lines and pipelines and the locations of roadway crossings. Electricity transmission would occur via overhead power lines. Water for the proposed project and the heat transfer fluid would occur via underground pipelines. (SM 2009a, Section 2.5)

Transmission lines would connect the proposed project's power block to a proposed substation adjacent to the existing Southern California Edison transmission lines, which is west of Brown Road. The transmission lines would cross over Brown Road (SM 2010c, Attachment 1).

Heat generated by the parabolic mirrors would be transported via a underground heat transfer fluid (HTF) pipeline. The heat transfer fluid pipeline would connect the parabolic mirrors south of Brown Road with the steam turbine generator in the power block north of Brown Road (SM 2010c, Attachment 1).

The water mainline would connect the Ridgecrest Heights water storage tank to the proposed project. Water uses for the proposed project include mirror washing, dust control, potable water and other similar uses. The water storage tank is located near China Lake Boulevard on Kendall Avenue. This pipeline would extend approximately 4.5 miles from the storage tank along China Lake Boulevard and cross US 395 to the proposed project site (SM 2010c, Attachment 1).

There are no navigable waterways or water transport systems within the proposed RSPP's vicinity.

C.10.4.1.5 Public Transportation and School Bus Service

The Kern Regional Transit operates an intercity public transit service that connects Ridgecrest with Mojave and California City (KRT 2009a). It originates from Ridgecrest City Hall to SR-178, stops in Inyokern and then goes south to California City and Mojave, then returns the same route. The Eastern Sierra Transit Authority provides bus service that extends from Lancaster to Reno. On a very limited basis, it connects Ridgecrest with Lone Pine and other cities north. Ridgecrest does not offer fixed route services within the community but the City contracts for dial-a-ride services (COR 2009a).

Sierra Sands Unified School District provides school bus service for the communities of Ridgecrest, Inyokern and other communities near the proposed project site. A school bus route exists along China Lake Boulevard Other school bus routes exist along local streets but not along the other roads and highways the construction workforce is likely to use. (SSUSD 2009a)

Traffic and Transportation Figure-5 shows the public transit and school bus routes.

C.10.4.1.6 Bicycle and Pedestrian Facilities

Kern County Council of Governments designates China Lake Boulevard from the Ridgecrest city limits to the proposed project site as a planned bike route. Funding for this route has not been established (KCOG 2009a). Likewise, the City of Ridgecrest designates China Lake Boulevard within the city as a planned bicycle route (COR 2009b, p.6-3). **Traffic and Transportation Figure-5** shows the planned bicycle route. In addition, Brown Road is regularly used by recreation bicyclists and is a published bike route by the High Sierra Cyclists biking club (HSC 2010a).

Sidewalks and pedestrian pathways are limited to the urban areas of the proposed project's vicinity. US 395, China Lake Boulevard and Brown Road do not include sidewalks within the respective road rights-of-way. There are pedestrian and bike trails traversing BLM managed lands. These routes are primarily used for recreation activities. Trails and off-highway vehicles (OHV) routes are discussed further in the **LAND USE** section of this staff assessment.

C.10.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section evaluates the potential for the proposed project, during construction and operation, to impact the anticipated future traffic and transportation conditions. It is anticipated that the RSPP would be constructed between 2011 and 2013 and operations to commence in 2014.

The project is evaluated for its impacts on existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways. For example, if an ACC stack is at a height that intrudes into the paths of aircraft, staff uses known resources to evaluate the project's stack height impact to airport operations. In addition, the proposed projects impacts are measured in terms of significance. The project may impact the traffic and transportation system but it may not be significant. RSPP traffic or facilities are measured against or added to current and projected conditions to determine the potential for environmental impact. Mitigation is recommended for potential significant impacts induced by the proposed project.

C.10.4.2.1 Direct/Indirect Impacts and Mitigation

The direct and indirect impacts of the RSPP are addressed for modes of travel and significance criteria previously addressed. Impacts were evaluated for two separate time periods. Project construction is anticipated to occur between late 2010 to mid-year 2013, with the peak construction occurring in month 11 (late 2011) and RSPP operation startup in 2014. Year 2011 base conditions include present day traffic volumes plus anticipated future growth unrelated to the RSPP. Other planned projects in the vicinity of the proposed RSPP site were determined to contribute to both year 2011 and year 2014 traffic levels; therefore, trips from the planned projects were added into the future traffic volumes, which include planned projects unrelated to RSPP. Future conditions are discussed further in the **CUMULATIVE IMPACTS** discussion contained herein.

The Kern Council of Governments prepared the Regional Transportation Plan (RTP) for Kern County (KCOG 2009b). It is the transportation planning guide for the next 24 years beginning May 2007. It provides transportation and air quality goals, policies and actions for now and into the future, and includes programs and projects for congestion management, transit, airports, bicycles and pedestrians, roadways, and freight. It also provides a discussion of all mechanisms used to finance transportation and air quality program implementation. The RTP does not contain policies directed toward specific land development projects. Its purpose is to identify existing conditions and project future scenarios that are intended to improve multi-modal interaction and function. The RTP Congestion Management Program Element presents the interrelationship between roadway congestion and alternative transportation. Congestion Management is an important component of the RTP that encourages alternative transportation. Alternative transportation is discussed under **BICYCLE, PEDESTRIAN, PUBLIC AND ALTERNATIVE TRANSPORTATION AND SCHOOL BUS ROUTE** discussion contained herein.

The Kern County General Plan, Circulation Element, establishes goals, objectives and policies for roadways and roadway function, safety hazards, scenic routes, trucks routes and hazardous materials transport, airport compatibility and railroad crossings (KERN 2007a). Similarly, the Ridgecrest General Plan establishes goals, objectives and policies for the city's transportation system.

C.10.4.2.1.1 Regional and Local Highways and Roads

Figure 7 of the Kern County Circulation Element identifies major roads, including China Lake Boulevard and Brown Road. Circulation Element Policy 2.3.4, Policy 2, states that the County should monitor development and in relation to traffic estimates developed for this plan. It further states that if development causes affected roadways to fall below Level of Service (LOS) D, mitigation could involve exactions to build off-site transportation facilities.

The Ridgecrest General Plan Circulation Element Policy C-2.4 states that the City shall strive to maintain Level of Service C or better for both daily and peak hour conditions.

The Traffic Study (SM 2010a, DR-Traffic-205) presents existing traffic data and conditions within the project's affected environment. It also presents traffic data, conditions and potential impacts, which may be caused by the project, to regional and local highways and roads. Energy Commission staff consulted with the California Department of Transportation (Caltrans) District 9 Permits and Traffic Operations office to review and comment on the AFC data pertaining to State highways and Kern County for AFC data pertaining to local roads.

As presented above, primary regional and local roadway segments and intersections, routes and traffic patterns for the proposed RSPP were identified. For these roadways, intersections, routes and patterns, LOS is the policy that establishes the baseline for measuring effectiveness roadways and intersections. Other modes and elements of the transportation system are considered to off-set impacts to roadway, intersections, routes and patterns. Project generated traffic is also evaluated so as not to conflict with congestion management program policies for the purposes of reducing traffic and demand. Another important component of evaluating project generated traffic is to

ensure that hazards are not created or substantially increased due to an existing or proposed design feature (e.g., sharp curves or dangerous intersections) or incompatible uses.

Level of Service

The Highway Capacity Manual (TRB 2000a) is widely accepted for principles and practices pertaining to traffic data and assessment. According to the HCM, LOS is quality measure describing roadway and intersection operational conditions, such as speed and travel time, maneuverability, traffic interruption and comfort and convenience, within a traffic stream and are assigned a letter grade A through F. LOS A is assigned to operational conditions with free flowing traffic that encounters minimal design issues and minimal distraction. LOS F is assigned to operational conditions with significant traffic congestion and delay due to capacity constraints, traffic controls, design issues or distractions. Measures of Effectiveness (MOEs) are performance measures commonly expressed in terms of travel speed, vehicle-to-capacity ratios, delays or both. These qualitative measurements establish the fundamental basis for determining the significance of traffic impacts and corresponding LOS grade.

Existing roadway and intersection traffic conditions are based on data obtained from Caltrans and through field surveys (SM2009a, Tables 5.13-5 and 5.13-6). Existing conditions establish the basis for determining potential project (construction an operation) induced traffic impacts to roadways and intersections. The applicant used HCM methodology to establish existing LOS on roadways and at intersections and then applied RSPP project induced traffic to establish LOS on roadways and at intersections as anticipated during construction and once the project becomes operational (SM2009a, Tables 5.13-7, 5.13-8, 5.13-9 and 5.13-10).

State and County LORS establish the LOS (roadways and intersections) standards for the proposed RSPP, as follows:

- LOS D or better conditions on a State of California highways (Federal highways are operated and maintained by Caltrans)
- LOS D or better conditions on an Kern County roadways

Traffic and Transportation Table 4 presents HCM standards for intersection LOS. It is based on the average vehicle delay per second at a particular intersection. LOS A indicates little or no delay or little or no stacking. LOS F indicates excessive vehicle delay per second.

Traffic and Transportation Table 4
Level of Service Criteria for Intersections

Level of Service	Un-signalized Intersection Delay Per Vehicle (in Seconds)	Signalized Intersection Delay Per Vehicle (in Seconds)
A	Less than 10	Less than 10
B	10 to 15	10 to 20
C	15 to 25	20 to 35
D	25 to 35	35 to 55
E	35 to 50	55 to 80
F	50 or more	80 or more

Source: HCM

A significant impact would occur if the project generates vehicle trips that reduce roadway and intersection operations below the accepted LOS standards on a Federal, State or County roadways and intersections

Construction Traffic Impacts and Mitigation

Potential traffic impacts associated with construction of the RSPP were evaluated for both construction workforce traffic and construction truck traffic. To determine the amount of construction workforce vehicle trips to the RSPP site during peak construction, the applicant assumed that workers would commute alone during the morning and afternoon peak hours (7 to 9 AM and 4 to 6 PM). It is anticipated that the average number of construction workers would be approximately 405. During the peak month, the number of workers increases to 633 (SM 2009a, p. 5.13-13).

The applicant states that according to the Electric Power Research Institute, construction workforce would commute as much as two hours from the workplace (SM 2009a, p. 5.11-18). Regional demographics and availability of skilled laborers establish the basis for distributing construction workforce vehicle trips. The applicant's distribution of vehicle trips indicates that approximately 50% of the construction employees will reside in the project's immediate vicinity (10 miles) and approximately 50% of the construction employees will commute from Victor Valley, Antelope Valley, Barstow, Bakersfield, Inyo and Mono counties and possibly from Los Angeles and San Bernardino areas. Due to the diversity of people behaviors and the broad employment base, it is difficult to project more accurately a distribution of workforce construction trips. The applicant's population and employment tables (SM 2009a, Section 5.11.3.2) show that Kern County, Los Angeles County and San Bernardino County have sufficient workforce. A large segment of workforce would likely originate from Victor Valley, Antelope Valley and Barstow. Ridgecrest would also be a considerable workforce source. Bakersfield, Inyo and Mono counties and possibly Los Angeles and San Bernardino areas provide additional workforce.

During construction, it is anticipated that construction workers and technical workers will reside in temporary housing or apartments during the week. There is sufficient temporary housing in Ridgecrest and Inyokern.

Under a worst-case scenario, all construction workers would travel alone. If this occurred, there would be a 910 one-way passenger car trips on the average day and 1,266 passenger car trips during peak month. This would be 405 and 633 vehicle trips entering and exiting the site, respectively but not including truck trips.

Construction of the RSPP would require the use and installation of heavy equipment and associated systems and structures. The heavy equipment would be used throughout the construction period, including trenching and earthmoving equipment, forklifts, cranes, cement mixers and drilling equipment. This heavy equipment would likely be delivered by contractors to RSPP and has been added to the RSPP trip generation. (SM 2009a, p. 5.13-15)

The applicant anticipates that RSPP construction would require an average 100 truck trips. During foundation construction, approximately month 8, there would be 140 truck trips per day. It is standard practice for a truck to equal three passenger cars. The passenger car equivalent (PCE) for 100 trucks is 300 vehicle trips and for 140 trucks the PCE is 420 vehicle trips. (SM 2009a, p. 5.13-13)

Total peak construction traffic (passenger car and trucks) would be 1,686 vehicle trips (1,266 workers plus 420 PCE for trucks and deliveries). Similarly, an average day could result in 1,210 vehicle trips. If all workers and trucks entered and exited the proposed project site in the AM and PM peak hour during the peak construction month, there would be 843 vehicle trips in the AM and PM peak hour. Similarly, the average day peak hour vehicle trips would be 605.

Traffic and Transportation Table 5 shows the change in traffic volumes, including 2008 Peak Hour, estimated 2011 No Project Peak hour and estimated 2011 Project Construction Peak Month Peak Hour. As shown in the Table, it is not likely any roadway segment would exceed its design capacity.

The third column of **Table 5** assumed a 6% per year increase in traffic for all road segments except where provided by the applicant. The third column includes construction workforce trips and truck trips. As shown in the table, except where capacity is not known, 2011 conditions road plus construction workforce trips and truck trips road segment volumes, even with the exceptional rate of increase, would be far below capacity. It is not likely any of the road segments where capacity was not provided would exceed design capacity, based on the data and number of lanes for those routes.

The traffic data contradicts the RTP. As reflected in RTP Figures 4-3 and 4-5, SR-178, between US 395 and SR-14, is operating at LOS D in 1998 and in 2030 respectively. RTP Figure 4-8, shows near term projects, which includes improving US 395 to four lanes between SR-178 and China Lake Boulevard with construction to occur between 2011 and 2030.

Traffic and Transportation Table 5
Comparison of Construction Year (2011) Traffic on Roadway Segments

US 395 in Independence, CA (95 miles)	1,100	1,310	1,319	UNK
US 395 @SR-190	940	1,120	1,136	UNK
US 395 North of SR-14	940	1,120	1,162	UNK
US 395 South of SR-14	440	524	566	28%
US 395 South of SR-178	420	500	711	36%
US 395 North of Brown Rd.	410	508[3]	540[3]	27%
US 395 South of Brown Rd.	550	818[3]	945[3]	28%
US 395 @ Randsburg Rd.	550	655	866	43%
US 395 North of SR-58	580	691	902	45%
US 395 South of SR-58	940	1,120	1,246	62%
US 395 @ I-15 (86 miles)	2,900	3,454	3,580	UNK
SR-14 South of US 395	590	703	745	UNK
SR-14 South of SR-178 E	570	620[3]	746	37%
SR-14 South of SR-178 W	700	834	960	48%
SR-14 @ Randsburg Rd.	740	765[3]	891	45%
SR-14 @ SR-58	1,750	2,084	2,152	UNK
SR-14 @ Avenue L (90 miles)	7,900	9,409	9,476	UNK
SR-178 W @ SR-14	140	167	293	UNK
SR-178 E @ SR-14	750	893	1,020	51%
SR-178 West of US 395	750	774[3]	940[3]	UNK
SR-178 @ Ridgecrest	820	846[3]	910[3]	46%
Brown Road	14	15[3]	458[3]	23%
China Lake Blvd.	212[3]	219[3]	503[3]	25%

1. Applicant projects up to 6% increase per year based on historical records

2. Distribution workforce percentage plus 2011 No project conditions

3. AFC Table 5.13-7 and DR-Traffic-194

V/C = Volume to capacity stated in percentage

UNK = Unknown

Traffic and Transportation Table 6 shows intersection LOS projected for 2011 under the No Project scenario and the projected LOS for intersections under the 2011 conditions plus construction traffic scenario. Intersection LOS is substantially influenced by traffic volumes. Other important factors that contribute to intersection delay include, traffic control, turning radius, number of trucks, number of lanes including turn lanes, grade, and visual distraction or roadway conditions.

As reflected in the AFC, the traffic counts and projections were used to determine the LOS for intersections which takes into account the factors stated above and other factors. Based on these highly specialized calculations, the applicant anticipates that four intersections would experience delay equal to LOS D or less. These intersections include eastbound SR-178 eastbound to southbound Brown Road, the reverse route (Brown Rd. to SR-178), Brown Road south bound through SR-178 and China Lake

Boulevard through US 395 to Brown Road. To mitigate the potential intersection impacts, the applicant proposes to stagger the work schedule of construction workers.

Data was not provided for intersections in the city limits of Ridgecrest. If 45% of construction traffic would use China Lake Boulevard, it is likely that Ridgecrest intersections would be impacted. Also, construction traffic would impact SR-178 intersections through Inyokern, other than the SR-178 and Brown Road intersections.

Certain Ridgecrest intersections would encounter up to 379 one-way construction related vehicle trips. It is a policy of the Ridgecrest General Plan 1991-2010, Circulation-Transportation Element (Policy 2.1.11) to relieve traffic congestion at major intersections and along arterial roads. Policy 2.1.24 states, work with major employers to establish car and van pooling. Further, the City of Ridgecrest's Draft General Plan 2010, Policy C-2.4 states that the City shall strive to maintain LOS C or better for peak hour conditions. Policy C-2.6 states critical intersections within the City require monitoring.

Safety and hazards to roadways, intersections, routes and patterns, associated with the proposed RSPP also must be considered. Caltrans cited collision rates 2.8 times the State average occurring at the US 395 and Brown Road (DOT 2010a) intersection. This intersection is above the statewide average for injury and total accidents for a similar facility. It is below the statewide average for fatal accidents. There have been nine accidents at this intersection in the five year period between January 1, 2004 and December 31, 2008. Of the nine collisions/ accidents four involved injury to13 people. The other five accidents involved property damage only. All nine of these accidents were turn related from Brown Road or China Lake Blvd onto US 395. Two accidents occurred while it was dark and seven occurred during daylight hours.

Chapter 2 of the RTP policy states, "provide heavy truck access planning guidance including a review of the current Surface Transportation Assistance Act route system, review of geometric issues and signaling for all routes identified as major local access routes, and the develop standards for truck access." This policy requires coordination with COG regarding heavy truck access.

Traffic and Transportation Table 6
2011 No Project and 2011 Conditions Plus Workforce Traffic Comparison

Intersection	AM Peak Hour 2011 No Project		PM Peak Hour 2011 No Project		AM Peak Hour 2011 With Construction Traffic		PM Peak Hour 2011 With Construction Traffic	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 395, Brown Road and China Lake Blvd.								
US 395 SB to Brown Road WB (1)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
US 395 SB to China Lake Blvd. EB	7.4	A	7.4	A	7.4	A	7.4	NP
US 395 NB to China Lake Blvd. EB (1)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
US 395 NB to Brown Road WB	7.3	A	7.3	A	7.6	A	9.3	NP
Brown Road EB to US 395 NB	9.9	A	9.9	A	12.5	B	13.4	NP
Brown Road EB to US 395 SB	8.6	A	8.6	A	8.6	A	9.1	NP
Brown Road EB to China Lake Blvd.*	9.9	A	9.9	A	12.5	B	12.2	B
China Lake Blvd. WB to US 395 NB	8.7	A	10.3	B	40.6	E (2)	19.2	NP
China Lake Blvd. WB to US 395 SB	10.2	B	8.7	A	8.7	A	8.7	NP
China Lake Blvd. WB to Brown Road WB	10.2	B	10.3	B	40.4	E (2)	18.9	C
US 395 and SR-178								
US 395 NB to SR178 EB	12.9	B	13.8	B	13.1	B	14	B
US 395 NB to SR178 WB	7.7	A	8.1	A	7.8	A	8.1	A
SR-178 EB to US 395 SB	13.3	B	14.3	B	13.6	B	15.1	B
SR-178 WB to US 395 SB	8	A	7.7	A	8.1	A	7.7	A
SR-14 and SR-178 E								
SR-14 NB to SR-178 EB*	10.5	A	9.5	A	11.5	B	9.5	A
SR-178 WB to SR-14 SB	9.5	A	10.6	B	9.5	A	11.5	B
SR-14 SB to SR178 EB	7.4	A	7.4	A	7.4	A	7.4	A
SR-178 and Brown Road								
SR-178 EB to Brown Road SB*	12.2	B	9.2	A	25.2	D	9.7	A
Brown Road NB to SR-178 WB	9.2	A	12.3	B	9.7	A	25.2	D
Brown Road SB thru SR-178	13.5	B	16.2	C	27.6	D	19.7	C

Source: RSPP 2009, p. 5.13-9 and DR-TRAFFIC-196

*Assumed the reverse of route

(1) Delay and LOS not applicable. Movement is an uncontrolled right turn (no stop control) and therefore no delay LOS A

(2) With mitigation of adding exclusive thru lane on China Lake Approach WB China Lake to 395 NB delay improves to 23.7 (LOS C) and WB China Lake to Brown delay improves to 10.0 (LOS A/B)

N/A = Not available

The applicant projects that 20% of project related construction traffic would use US 395 from the south of the proposed project and 5% would use US 395 from north of the proposed project. In addition, the applicant projects that 45% of construction traffic trips would travel on China Lake Boulevard between Ridgecrest and the proposed project site. Based on the applicant's projected construction related trips, there would be approximately 379 Ridgecrest area originating construction trips and approximately 211 Victor Valley originating construction related trips. That means 590 RSPP construction related vehicle trips would use the Brown Road, US 395 and China Lake Boulevard intersection. This represents an additional 15% traffic trips through the intersection, substantially increasing the possibility for collision at the intersection.

Access via Brown Road was proposed by the applicant. Caltrans and Kern County suggested two alternative access routes to the proposed RSPP site to avoid the Brown Road, US 395 and China Lake Boulevard intersection. One alternative would be to provide a temporary access directly from US 395 approximately one mile north of the existing Brown Road, US 395 and China Lake Boulevard intersection. The other would be to route traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection.

An evaluation of the applicant's proposed access and the two suggested alternatives are as follows:

Traffic and Transportation Figure 1 illustrates the location for the proposed Ridgecrest Solar Power Plant project. RSPP would be located northwest of Brown Road and US 395. Traffic generated by the project would reduce the Brown Road, US 395 and China Lake Boulevard intersection of to LOS E. Brown Road and SR-178 intersection would be also operate at LOS D. The applicant proposes to split work shifts to reduce impacts to the intersections. Though a rotational or staggered work shift would bring the project in compliance with the local LOS LORS policy but the Brown Road, US 395 and China Lake Boulevard intersection safety issues would be exacerbated. Energy Commission staff evaluated the constraints of the proposed and alternative access routes.

Basis:

- Peak construction related trips is 843
- 25% of the trips (211) would originate from the Victor Valley (US 395 south of Brown Road)
- The applicant projects that 40% of the trips (337) would originate from Ridgecrest and use China Lake Blvd.
- 30% of the trips (252) would use SR-178 and Brown Road

Applicant's Proposed Brown Road Access

The applicant's proposed Brown Road access is problematic because of the alignment at the Brown Road, US 395 and China Lake Boulevard intersection. Project generated traffic originating from the Victorville and San Bernardino areas south of the project site would travel north on US 395 to the Brown Road, US 395 and China Lake Boulevard intersection and turn left on Brown Road.

The US 395 north and south bound legs of the intersection are not controlled and traffic flows freely through the intersection, unless a vehicle is making a left turn on to Brown Road (Brown) or China Lake Blvd (CLB). A vehicle heading north on US 395 must wait for oncoming traffic before proceeding left on to Brown Road, causing delay to US 395 northbound vehicles. The turning movement on to Brown from US 395 is more acute than standard, causing an extreme turn radius and increase in hazard. A separate right turn lane on the US 395 northbound approach to CLB provides through traffic on US 395 to flow freely and an exit for traffic heading northbound on CLB. Transitional lanes are non-existent or extremely limited for traffic entering US 395 from Brown Road or China Lake Boulevard. The majority of the collisions are a result traffic entering US 395 from Brown or CLB and traffic going through to Brown and CLB.

The most ideal scenario would be to fully improve the Brown Road, US 395 and China Lake Boulevard intersection to minimize the potential for hazard. Existing conditions contribute to high collision rates without the proposed project and intersection realignment and improvements would be warranted anyway and not attributable to the applicant. In addition, Caltrans acknowledged that it is not likely this intersection would be realigned and improved within the next ten years. There is little nexus to require the applicant to realign and improve the intersection and traffic impact fees would not resolve the collision rate hazard.

Caltrans states further that it is highly unlikely that signalization would be a solution. Signalization often creates more but perhaps less severe collision.

Constraints:

- Since the intersection is above natural grade, improvements to the intersection and measures could require additional environmental review, multiple agency involvement and extensive financial consideration. Factors such as these could affect the viability of Brown Road as the proposed projects primary access.
- Southbound US 395 declines in grade and speeds increase as vehicles approach Brown Road from the north. Likewise, northbound US 395 traffic encounters a curve that limits sight distance just before the Brown Road intersection.
- Bicyclists that use Brown Road are in opposition to construction traffic using Brown Road.

Potential mitigation:

- Install a left turn lane from north bound US 395 to Brown Road, a deceleration lanes from south bound US 395 to Brown Road, a separate left turn lane from China Lake

Boulevard to US 395 south bound, acceleration and deceleration lanes on US 395 from China Lake Boulevard and Brown Road and acceleration and deceleration lanes on Brown Road to US 395.

- Develop a Traffic Control Plan (TCP) to include:
  - Staggering work shifts.
  - Monitoring construction related traffic to ensure it is not contributing to additional roadway safety problems and collisions. The monitoring would include monthly reporting of construction related traffic patterns and collision incidents.
  - Employee training and driver education.
  - Incentives for ride sharing, off-site parking and the provision of vans for van pools consistent with the RTP, Transportation Control Measures Action Element, pages 4-57 through 4-60.
  - Post law enforcement, flag men, informational and warning signage and reduce speeds during high traffic times.

It is difficult to quantify reducing the possibility of increasing the collision rates associated with these measures. However, these measures are consistent with standard protocol for reducing collisions in construction zones as contained in California's Manual on Uniform Traffic Control Devices (Caltrans, January, 2010) and Caltrans Construction Manual, Chapter 2, Safety and Traffic.

Direct US 395 Access

Access would be constructed specifically for the project and be located in a tangent section one to 1.5 miles north of the existing Brown Road, US 395 and China Lake Boulevard intersection. Caltrans suggested this scenario because direct access would be at-grade and would not require substantial re-grading or design and construction. (DOT 2010a)

The alignment of the new access would include acceleration, deceleration and turn lanes. A left turn lane for north bound construction related traffic and a right turn deceleration lane for south bound construction related traffic would be provided from US 395 to the new project access. From the new project access, there would be a separate left turn lane and right turn lane to US 395. The left turn from the alternative would transition via an acceleration lane on to US 395 and then merge into the northbound travel lane. The right turn from the alternative would transition via an acceleration lane on to US 395 and then merge into the southbound travel lane. Right and left turns from the alternative access would be stop controlled.

Similar to the Brown Road access, vehicles heading north on US 395 must wait for oncoming traffic before proceeding left on to the alternative access. However, there would be no delay to US 395 northbound vehicles because of the separate left turn lane and the turning movement would be designed in a more standard perpendicular manner. Also, south bound traffic would not be delayed or slowed because of the deceleration lane.

Constraints:

- State highway rights-of-way request - BLM is the land owner of the RSPP site, therefore they would authorize BLM as an agent to the applicant to request access to State highway right-of-way. A primary factor in the evaluation of a State highway right-of-way access request in rural areas is that it be at least one mile from the next nearest intersection. It is not known whether the request for access to State highway rights-of-way can be temporary.
- Caltrans has not officially recommended this alternative as preferable. This scenario involves obtaining State highway right-of-way access. Obtaining the right to access a State highway requires Caltrans and California Transportation Commission approval and the preparation of a Transportation Impact Study.
- The alternate access would not resolve the collision issue at the Brown Road, US 395 and China Lake Boulevard intersection. It is anticipated that up to 75% of construction traffic would travel through the intersection. However, it would avoid the awkward turning movements from US 395 to Brown Road.

Potential mitigation if State right-of-way access can be obtained:

- Route China Lake Boulevard construction related traffic to SR-178 and then to US 395, the amount of traffic traveling through the intersection is reduced substantially. The increase in traffic through the intersection that would be generated by the project would be 5% versus 15% without the routing scenario. Notwithstanding, the 5% or 211 traffic trips pose the likelihood for collision rates to increase.
- Install improvements and prepare a TCP as discussed above.

Route traffic to avoid the Brown Road, US395 and China Lake Boulevard intersection

Another scenario would be to route construction traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection. US 395 north bound construction related traffic would travel west on SR-58 (Kramer Junction) then proceed north bound on SR-14. Construction traffic would then travel east bound on SR-178, then south bound on Brown Road to the proposed RSPP site. Also, construction traffic from Ridgecrest would travel west bound on SR-178 and south bound on Brown Road.

The most likely intersection that would experience significant delay as a result of routing traffic around Brown Road, US 395 and China Lake Boulevard intersection would be the SR-178 and Brown Road intersection. Without the routing of construction related traffic, the intersection would operate at LOS D for the proposed project. The additional construction trips could degrade the intersection to LOS E.

Constraints:

- It is not likely this routing of vehicles would capture all of the construction related traffic because approximately 45% of construction related traffic would use China Lake Boulevard and up to 25% would use US 395 to Brown Road. Besides, construction related traffic originating from the Victor valley is not likely to travel an

additional 49 miles to work at the proposed project. In addition, Energy Commission staff has not evaluated the environmental effects associated with routing traffic the additional 45 miles.

- Traffic collision data has not been provided for the proposed routing of traffic to SR-58, SR-14, SR-178 and Brown Road for the purposes of evaluating associated impacts. In addition, the data provided by the applicant in the AFC and subsequent data request responses does not account for other potentially impacted intersections as a result of the routing of construction related traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection.

Based on the three scenarios, the best option would be the Brown Road access. Constraints associated with the suggested alternatives involve further study and are not likely to reduce the potential increase to the existing hazardous conditions of the Brown Road, US 395 and China Lake Boulevard intersection. Staff is also concerned with providing multiple accesses from US 395 and the timing of obtaining access to a State highway. Though the direct access from US 395 would be equally sufficient in limiting the potential for an increase in collision rates at Brown Road, US 395, China Lake Boulevard intersection, similar mitigation would be required. Further, staff is concerned with the routing of traffic to avoid the Brown Road, US 395 and China Lake Boulevard intersection because of the potential environmental and unknown impacts to traffic volumes and safety.

Summary

Construction related traffic for the proposed RSPP is not anticipated to impact roadway segments. However, SR-14 becomes extremely congested on weekends and holidays, usually during Friday evenings and Sunday nights. Though data and statistics are not readily available, the influx of recreational travelers would likely contribute to degrade LOS on SR-14 during Friday PM peak hour conditions.

Construction related traffic would degrade four intersections to LOS D but only one intersection would be reduced to LOS E. The proposed RSPP would conflict with applicable RTP and Kern County General Plan Circulation Element LOS LORS. As stated above, other modes and elements of the transportation system are considered as means to off-set significant impacts to roadway, intersections, routes and patterns and to reduce traffic and demand.

Ridgecrest intersections would be impacted by construction related vehicle trips. The proposed RSPP would conflict with applicable Ridgecrest General Plan Circulation Element LOS LORS.

Brown Road, US 395 and China Lake Boulevard intersection has safety issues and the proposed RSPP would likely contribute to the increase in collision rates at the intersection.

Truck traffic would be a generated by the proposed RSPP. RTP requires coordination with COG regarding heavy truck access.

With the effective implementation of intersection improvements together with the preparation of a TCP would minimize the potential for collision rates to be significantly increased at the Brown Road, US 395 and China Lake Boulevard intersection. Staff recommends Condition of Certification **TRANS-1,** which would require the project owner to install recommended Brown Road, US 395 and China Lake Boulevard intersection improvements and to prepare a Traffic Control Plan that effectively employs traffic reduction and calming measures and a plan for heavy truck access.
In addition, **TRANS-1** would require the project owner: to stagger work shifts to avoid weekend recreational traffic using US 395 and SR-178 on Friday evenings, contribute fair share traffic impact fees toward the future planned interchange at Brown Road, US 395 and China Lake Boulevard.

Operation Traffic Impacts and Mitigation

The AFC projects that during operation of the RSPP there would be an 84 person workforce. Since the RSPP would be a 24-hour facility, not all workers would arrive and depart during AM and PM peak hours, therefore, the proposed RSPP would generate 60 peak hour vehicle trips. The AFC also projects that the RSPP would generate three one-way truck trips per day. This would equate to nine PCE trips arriving and nine PCE trips departing the RSPP per day. These trips may not necessarily arrive or depart during peak hours. The applicant did not project the number of deliveries and visitor trips per day. (SM 2009a, pp. 5.13-15 and 5.13-16)

Traffic and Transportation Table 7 provides a comparison of roadway segment volumes between 2008 and 2014 and 2014 volume conditions with project operations generated traffic. As shown in the Table, operational phase trips would not impact roadway design capacities.

Project operations vehicle trips and intersection LOS impacts would be far less than during the project's construction phase. However, similar to RSPP construction related traffic, the three alternatives apply. Left turns from north bound US 395 to Brown Road would be hazardous due to roadway geometrics. In addition, other turning movements at this intersection and roadway design contribute to the hazardous conditions.

Traffic and Transportation Table 7
Comparison of Operations Year (2014) Traffic on Roadway Segments

Roadway Segment	2008 Peak Hour Volume	Est. 2014 No Project Peak Hour[1]	Est 2014 Project Construction Peak Month & Peak Hour[2]	2011 Project Construction Est. V/C
US 395 in Independence, CA (95 miles)	1,100	1,472	1,541	UNK
US 395 @SR-190	940	1,258	1,259	UNK
US 395 North of SR-14	940	1,258	1,261	UNK
US 395 South of SR-14	440	589	592	30%
US 395 South of SR-178	420	562	579	29%
US 395 North of Brown Rd.	410	571	588	29%
US 395 South of Brown Rd.	550	919	936	47%
US 395 @ Randsburg Rd.	550	736	753	38%
US 395 North of SR-58	580	776	793	40%
US 395 South of SR-58	940	1,258	1,268	63%
US 395 @ I-15 (86 miles)	2,900	3,881	3,891	UNK
SR-14 South of US 395	590	790	793	UNK
SR-14 South of SR-178 E	570	697	707	35%
SR-14 South of SR-178 W	700	937	947	47%
SR-14 @ Randsburg Rd.	740	860	870	43%
SR-14 @ SR-58	1,750	2,342	2,347	UNK
SR-14 @ Avenue L (90 miles)	7,900	10,572	10,578	UNK
SR-178 W @ SR-14	140	187	193	UNK
SR-178 E @ SR-14	750	1,004	1,014	51%
SR-178 West of US 395	750	870	880	UNK
SR-178 @ Ridgecrest	820	951	961	UNK
Brown Road	14	17	27	1%
China Lake Blvd.	212[3]	246	256	13%

1. Applicant projects up to 6% increase per year based on historical records

2. Distribution workforce percentage plus 2011 No project conditions

V/C = Volume to capacity stated in percentage

UNK = Unknown

Traffic and Transportation Table 8 provides a comparison of intersection delay and LOS between 2008 and 2014 and 2014 conditions with project operations generated traffic. As shown in the Table, operational delay and LOS would not significantly impact intersections.

Traffic and Transportation Table 8
2014 No Project and 2014 Conditions Plus Operations Traffic Comparison

Intersection	AM Peak Hour 2014 No Project		PM Peak Hour 2014 No Project		AM Peak Hour 2014 With Operations Traffic		PM Peak Hour 2014 With Operations Traffic	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
US 395, Brown Road and China Lake Blvd.								
US 395 SB to Brown Road WB (1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
US 395 SB to China Lake Blvd. EB	7.4	A	7.4	A	7.4	A	7.4	A
US 395 NB to China Lake Blvd. EB (1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
US 395 NB to Brown Road WB	7.3	A	7.3	A	7.3	A	7.3	A
Brown Road EB to US 395 NB (L)	10.1	B	10	A	10.2	B	10.2	B
Brown Road EB to US 395 SB ®	8.6	A	8.6	A	8.6	A	8.6	A
Brown Road EB to China Lake Blvd. (T)	10.1	B	10	A	10.2	B	10	B
China Lake Blvd. WB to US 395 NB ®	8.8	A	8.7	A	11.1	B	11	B
China Lake Blvd. WB to US 395 SB (L)	10.5	B	10.4	B	8.8	A	8.7	A
China Lake Blvd. WB to Brown Road WB (T)	10.4	B	10.4	B	11.1	B	11	B
US 395 and SR-178 Ramp Junctures								
SR 178 WB LEFT to US 395 SB On (L)	8	A	7.7	A	8	A	7.8	A
SB US 395 Off-Ramp to SR178	13.6	B	15.1	B	13.7	B	15.2	B
SR-178 EB LEFT to US 395 NB On	7.7	A	8.1	A	7.7	A	8.1	A
US 395 NB Off-Ramp LEFT to SR-178 WB	13.1	B	14	B	13.2	B	14.1	B
SR-14 and SR-178 E								
SR-14 SB to SR-178 EB (L)	7.4	A	7.4	A	7.4	A	7.4	A
SR-178 WB to SR-14 SB (L)	9.6	A	10.7	B	9.6	A	10.7	B
SR-178 SB to SR14 NB ®	N/A	A	8.9	A	N/A	A	8.9	A
SR-178 and Brown Road								
NB Brown Road	9.3	A	12.5	B	9.3	A	12.6	B
SB Brown Road	13.8	B	16.5	C	13.9	B	16.6	C

Source: RSPP 2009, p. 5.13-9 and DR-TRAFFIC-196

(1) Delay and LOS not applicable. Movement is an uncontrolled right turn (no stop control) and therefore no delay LOS A

(2) With mitigation of adding exclusive thru lane on China Lake Approach WB China Lake to 395 NB delay improves to 23.7 (LOS C) and WB China Lake to Brown delay improves to 10.0 (LOS A/B)

Operations workforce is not likely to travel up to two hours from the proposed RSPP site. Ridgecrest skilled labor force is accentuated by China Lake Naval Air Warfare Station. It is likely that a significant operations workforce would relocate to Ridgecrest because of the services offered associated with the naval base. It is not anticipated that primary regional and local roadway segments and intersections, routes and traffic patterns LOS would be diminished.

As discussed herein, China Lake Boulevard experiences 25% of the traffic volumes from US 395 during the peak hour. There is a good possibility that RSPP operations would mimic this pattern. Project operations generated traffic plus projected truck trips equal 69 PCE trips. Approximately 25% of the 69 one-way vehicle trips or approximately 17 trips would travel through the Brown Road, US 395 and China Lake Boulevard intersection. This represents a negligible increase in traffic through the intersection and a negligible potential for collision rates to increase.

Glare Effect to Roadways Impacts and Mitigation

The **VISUAL RESOURCES** section of this document addresses the general topic of glare impacts. As it relates to transportation, glare has the potential to be a distraction to motorists and corresponding degradation in traffic safety. The greatest chance for solar reflection to occur is when the solar troughs reflect the sun at sunrise and sunset (MIL 2009a). US 395 is a regional serving route with national significance for interstate commerce. The slightest chance that glare may affect motorists may result in a substantial safety risk and impede interstate commerce.

Staff recommends Condition of Certification **VIS-4**, which requires the project owner to provide opaque or nearly opaque screening (berms, fencing, landscaping, or similar means) along the project boundaries facing Brown Road and US 395 at a height to effectively intercede any light reflection from the mirror troughs. It would be necessary to perform a line-of-sight study for Brown Road and US 395 to determine the appropriate height for the screening. Design of the screening would be included on the final construction drawings and notated showing lines-of-sight. Staff recommends Condition of Certification **TRANS-2**, which would require the project owner to perform a line-of-sight study for Brown Road and US 395 to determine the appropriate height of the screening. Such a study would provide data to allow Commission staff to customize the mitigation recommended in **VIS-4.**

Access and Internal Roadway Impacts and Mitigation

Two access driveways are proposed for the RSPP (SM 2009a, Section 2.5.6.5, p. 21). One access would serve the northern portion of the project site and one would serve the southern portion. The driveway serving the northern portion of the site is a 550-foot access drive from Brown Road to the power block. It would be located approximately 1.75 miles west of the Brown Road and US 395 intersection and is proposed to be 24 feet wide, consistent with common emergency access standards. The driveway for the southern portion would provide access to the solar field for maintenance and similar duties. It would be 650 feet in length, 24 feet wide and be located 0.6 miles west of the access road to the northern portion.

RSPP egress and ingress would be accompanied by acceleration and deceleration lanes within the Brown Road right-of-way. Ingress, right-in from west bound traffic traveling on Brown Road entering the site, to the proposed northern project site would be served by a deceleration lane 1,500 feet in length. Egress, right-out to west bound traffic departing the site, would be served by an acceleration lane 1,000 feet in length. Similarly, ingress, right-in from east bound traffic traveling on Brown Road, to the proposed southern project site would be served by a deceleration lane 1,500 feet in length. Egress, right-out to Brown Road eastbound, would be served by an acceleration lane 1,000 feet in length. The applicant is not proposing left turns for the site access driveways.

Kern County Municipal Code, Section 12.16 (KERN 2009a), requires encroachment permits for access and construction in public rights-of-way. Encroachment permits would be required for the proposed acceleration and deceleration lanes on Brown Road. Kern County states that any improvements or alterations to Brown Road shall be determined by the Roads Department, including length and design of acceleration and deceleration lanes (SM 2009a, DR-Traffic-197). Encroachment permits are ministerial permits that ensure the design of the lanes and ingress and egress meet county standards. These ministerial permits are better suited for local implementation.

During construction of the power plant, construction related traffic would account for 843 PCE trips. Left turn lanes are not proposed by the applicant as part of the ingress and egress. Left turning movements would encounter opposing oncoming traffic on Brown Road. Some construction traffic is anticipated to travel south bound on Brown Road to the proposed northern project site. This would require a left turn into this portion of the project site. Additionally, some construction traffic would travel north bound on Brown Road and turn left to the southern portion of the proposed project site. Left turns present a hazard when left turning lanes are not provided, especially considering the amount of opposing traffic and trucks during construction. There would be 590 construction trips using Brown Road between US 395 and the proposed project site and 253 construction trips using Brown Road between the proposed project site and SR-178. Though small amounts of non-project related traffic would pass through the proposed ingress and egress areas, traffic travels at 45 mph and it would be important to move construction related traffic and trucks out of the travel lanes. Further, as construction approaches the left turns it may stack, causing shorter stopping distances. It would be important to move construction traffic to left turn lanes as well.

To accommodate left turns and acceleration and deceleration lanes as discussed above and meet the standards of Kern County encroachment permits, staff recommends Condition of Certification **TRANS-3**. **TRANS-3** would require the project owner to temporarily widen Brown Road to accommodate 500 foot left turn lanes from Brown Road to the northern and southern portions of the proposed project site. **TRANS-3** would also require the project owner to submit plans, meeting the Kern County encroachment permit standards, for the left turn lanes and acceleration and deceleration lanes to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

Solar field access driveways would be unpaved. The applicant does not discuss how these driveways would be improved to accommodate the weight of construction equipment and maintenance vehicles. The power block would be 18 acres with six acres of paved area for circulation.

Internal roadway standards are reviewed with final construction drawings. **TRANS-3** requires the project owner to design and provide cross sections demonstrating that the internal driveways would accommodate construction, operations and maintenance vehicles, per Kern County standards, and submit the plans to the CBO and CPM for review and approval.

Project Closure and Decommissioning Impacts and Mitigation

Traffic and transportation facilities constructed with the project include, construction laydown and parking area, paved surface of the power block, internal circulation driveways, temporary left turn lanes, acceleration and deceleration lanes on Brown Road and intersection improvements to the Brown Road, US 395 and China Lake Boulevard intersection. The Decommissioning Plan may allow alternatives to full site restoration (SM 2009a, sec. 3.2, p. 3-2).

At project closure, the construction laydown and parking area and power block paved area can serve as a BLM parking facility and recreation vehicle staging area and rest stop, if BLM is willing to accept these areas at the time of closure. If BLM is not willing to accept these areas for such purposes due to cost, etc., the project owner will be required to fence this area to protect BLM from liability.

The recommended external improvements to Brown Road would be temporary. Mitigation for the temporary improvements are discussed under the heading Potential for Roadway Damage Impacts and Mitigation. The recommended external improvements to the Brown Road, US 395 and China Lake Boulevard intersection would serve as an interim design until the State can provide the realignment and improvements according to preliminary designs when funding may be available.

At plant closure, if the project owner sells the site to a BLM approved replacement user the purchaser would be required to meet any conditions BLM imposes. If the project owner cannot sell to a BLM approved replacement user, staff recommends Condition of Certification **TRANS-4**, requiring the project owner, at plant closure, to offer the internal traffic and transportation components, as stated above, to BLM. If BLM accepts these areas, then the project owner will be required to improve these areas for recreational parking and recreational vehicle staging and ensure the driveways are converted to acceptable off-road vehicle trails or pedestrian paths. If BLM does not accept these areas, the project owner shall fence off such areas so as to protect BLM from liability.

Scenic Route Corridors Impacts and Mitigation

Kern County Circulation Element Policy 2.3.9 states, “the California Scenic Highways Master Plan designates three State highways in Kern County "Eligible State Scenic Highway."Route 1 consists of State Route 14 and State Highway 395. It begins north of Mojave and continues to the Inyo County line. Route 1 traverses high desert land, hilly areas, and is next to the Sierra Nevada Mountains. Plants indigenous to the area along

the route have good scenic qualities when wildflowers are in bloom. Points of interest include 20-Mule Team Terminus (State Registered Landmark 652) in Mojave, Desert Springs (State Registered Landmark 14), and Robbers Roost. Other interesting points are Red Rock Canyon State Park, Salt beds (near Koehn Lake), and Freeman Junction (State Registered Landmark 766)."

Kern County does not have project specific policies regarding scenic corridors and Caltrans has not made any recommendations pertaining to scenic corridors. Please refer to the **VISUAL RESOURCES** section of the Staff Assessment for discussion pertaining to potential scenic resource impacts.

Potential for Oversize and Heavy Load Vehicle Hazard Impacts and Mitigation

Project construction and operation would involve the transport of equipment and materials that exceed roadway load or size limits that would require special permits to be obtained through state and local regulatory agencies. It is a goal of Kern County to reduce overweight vehicles (Circulation Element, Section 2.5.1) on county roadways. According to the AFC, the maximum weight for heavy load vehicles in Kern County is 80,000 pounds (SM 2009a, Section 5.13.3.2, p. 5.13-15).

The transport of equipment and materials may require the use of truck and trailer with multiple axles on public roadways. The multi-axles trucks transporting oversize and heavy loads would create potential hazard because of such factors as being able to see around or overtake this type of vehicle, the ability for these vehicles to speed, slow or stop and the amount of turning radius needed for the vehicles to maneuver.

The California Vehicle Code (See LORS Compliance **Traffic and Transportation Table 8**) includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials. In addition, the Kern County Circulation Element provides goals, objectives and policies for the purposes of reducing to oversize and heavy load vehicles on public roadways.

It is a requirement of the California Vehicle Code and California Streets and Highway Code, that if State highways are used by oversized truck and trailer with multiple axles, the mover is required to obtain a permit from Caltrans, and use trailing warning vehicles or police control. These are ministerial permits that are more appropriately obtained when the specific circumstances are presented.

For the proposed project to be in compliance with LORS pertaining to overweight and oversized vehicles, staff recommends Condition of Certification TRANS-5. TRANS-5 requires that all project-related overweight and oversize vehicles used on public roadways during construction and operations comply with Caltrans and Kern County regulations pertaining to overweight and oversize vehicles. The project owner must also obtain necessary state and Kern County permits for all project-related overweight and oversize vehicles and use trailing warning and police control, if necessary.

Hazardous Material Transport Impacts and Mitigation

Circulation Element, Figure 11, identifies adopted hazardous materials shipping routes, which include US 395 and SR-14. The RTP (Freight Movement Action Element, page 4-

52) states, “Kings County, northwest of Kern County, is the site of a Class 1 hazardous waste facility. The facility, located at Kettleman Hills, draws trucks carrying hazardous materials from all western states. The presence of these trucks on regionally significant routes increases the probability of dangerous spills (RTP, page 4-52).

RSPP would require the delivery of hazardous materials and off-site shipment of wastes (SM 2009a, Section 5.13.3.3, Page 5.13-15). The California Vehicle Code and California Streets and Highway Code require permits for hazardous materials shipment and handling including quantities, routes and operator training and qualifications. Again, these are ministerial permits for the purpose of preventing hazard when the hazard can be better understood. Because the project would require the delivery of hazardous materials, staff recommends Condition of Certification TRANS-6. TRANS-6 requires the project owner to obtain the necessary permits from the appropriate federal, state and local agencies for the delivery of hazardous materials on public roadways and to only use SR-14 and US 395 (and Brown Road from the project site to US 395), according to the County’s Circulation Element adopted hazardous materials shipping routes. Permits obtained pursuant to the Code of Federal Regulations and the California Vehicle Code and Streets and Highways Code would include a description of quantities and routes and ensure operator training and qualifications.

For a discussion of the potential impacts related to hazardous materials please see the **HAZARDOUS MATERIALS MANAGEMENT** section in this Staff Assessment (SA).

Potential for Roadway Damage Impacts and Mitigation

California Streets and Highway Code: Division 1 and 2, Chapter 3 and Chapter 5.5, includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.

Chapter 2 of the RTP (KCOG 2009a) contains policies that promote opportunities for truck-to-rail and truck-to-intermodal mode shifts and encourages the use of rail and air to reduce impacts to state and inter-county routes. The policies also encourage coordination between the public and private sectors to explore innovative strategies for the efficient movement of goods. The policies specifically state, “oppose higher axle load limits for the trucking industry on general purpose roadways”.

The applicant proposes to use railways to the extent possible (SM 2010a, Section 5.13.2.5, Page 5.13-10). **TRANS-1** requires the project owner to coordinate with Kern COG to include railway transport of equipment, materials and supplies as part of the traffic control plan, to minimize the potential of roadways being damaged.

Heavy equipment transport and repetitive public right-of-way use is likely to occur on Brown Road. Project related transport of heavy equipment and repetitive use from construction activities on public rights-of-way would likely damage public rights-of-way. Kern County states that the applicant shall be required to restore and reconstruct Brown Road to pre-construction conditions, including complete structural sections resulting from heavy equipment and vehicles.

Kern County Roads Department (KCPD 2010a) requires roadways damage by vehicles and equipment be restored to existing conditions. Caltrans also requested that State

highways be repaired to pre-construction condition (DOT 2010a). Staff's recommended Condition of Certification TRANS-7, would require the project owner to repair any road damaged by the transport of heavy equipment and repetitive use of roadways associated with construction activities to its pre-construction condition. **TRANS-7** also requires the project owner to document before/after conditions of the roadways. This would ensure that any damage to local roadways would not be a safety hazard to motorists.

C.10.4.2.1.2 Parking, Internal Circulation and Emergency Access Impacts and Mitigation

Kern County General Plan Circulation Element Policy, 2.3.7, requires setback deviation studies. It pertains to any County collector road that may need additional right-of-way as new developments are proposed. The RSPP is not likely to spur growth along Brown Road or US 395 as infrastructure and environmental constraints significantly reduce the possibility. It is Energy Commission staff's position that a setback deviation is not warranted.

Kern County's Zoning Ordinance, Chapter 19.82, provides requirements for off-street parking and parking design standards. The most closely related use to a power plant (Chapter 19.82.020 (L)) is industrial uses, manufacturing or assembly (Chapter 19.82.020 (F) (2)). The off-street parking requirement for this type of use is: One (1) space per five hundred (500) square feet of floor area plus one (1) per two hundred and fifty (250) square feet of office area. The minimum parking space dimension is 9 x 20 feet (Chapter 19.82.030). The applicant's traffic engineer anticipates that construction laydown and parking would require 5.5 acres. A standard parking space is 9 x 20 feet or 180 square feet. During the peak months of construction and if the construction workforce commutes alone in a passenger sized vehicle or pickup truck the acreage required for parking would be 2.5 acres. Under the same conditions, trucks would require an additional 1.75 acres plus area for turning and backing. This would result in just over one acre for equipment, materials and supply storage and maneuverability. The applicant submitted 30 % preliminary site drawings (SM 2010c, Attachment 1) indicating that the construction laydown area exceeds the 5.5 acres needed for parking and laydown area, as cited in the AFC.

Chapter 19.82.050 establishes parking standards for persons with disabilities and must be in compliance with Title 24 of the California Administrative Code and all applicable federal requirements and be surfaced and designed to facilitate wheelchair use.

Chapter 19.82.060 requires three loading spaces for up to 100,000 square feet of floor area plus one loading space for each additional 80,000 square feet.

Chapter 19.82.090 establishes parking area design standards. Chapter 19.82.090 (B) states that parking aisles shall comply with the following minimum standards arrangement minimum/ aisle width:

- 30 degree, single row 11 feet
- 45 degree, single or multiple row 14 feet
- 60 degree, single or multiple row 18 feet

- 90 degree, single or multiple row 25 feet

Chapter 19.82.090 (C) states that all parking spaces shall be clearly marked with white painted stripes and concrete wheel blocks or a six- (6-) inch raised A.C. curb shall be installed at each parking space that abuts a structure or property line. Chapter 19.82.090 (E) states that driveways for industrial developments shall be a minimum of eighteen (18) feet in width with fifteen (15) feet of unobstructed vertical clearance.

In compliance with Kern County LORS, the proposed RSPP would be subject to Kern County Zoning Ordinance Chapter 19.80. The purpose of this chapter is to establish parking and internal circulation development standards for industrial uses. 19.80.030 (D) states that all access drives, parking areas, and vehicle maneuvering areas shall be surfaced with a minimum of two (2) inches of asphaltic concrete paving constructed over a minimum of three (3) inches of compacted base material or material of higher quality. The paved access drive shall be continuously maintained in good condition. 19.80.030 (D) states that fire protection facilities and access ways and safety setbacks shall be as required and approved by the Kern County Fire Department. 19.80.030 (K) states that all industrial uses with five (5) or more employees provide adequate space for the collection and loading of recyclable materials.

The proposed RSPP site is of adequate size to accommodate parking, loading, and the design and access requirements. Accordingly, the final construction plan sets must demonstrate compliance with the parking LORS. Staff recommends Condition of Certification TRANS-8, which requires the project owner to provide adequate parking to accommodate the proposed number of construction employees, parking for persons with disabilities, per Title 24, loading lanes, and design parking and access according to the parking development standards.

The applicant submitted 30% preliminary site drawings (SM 2010c, Attachment 1) and states that internal turning radius for all the internal roadways will be a minimum of 35 feet to comply with Kern County requirements. Internal circulation turning radius and sight distances cannot be determined at this time. The proposed RSPP site is of adequate size to accommodate minor adjustments to internal circulation, if necessary, so traffic movements can function safely within the site. The final construction plan sets must clearly demonstrate that traffic can move safely within the site and adequate areas are set aside for backing and maneuvering of large trucks. TRANS-8 requires that the project owner provide adequate internal circulation within the project site, including sight distances, turning radii and line of sight for internal circulation and show these design criteria on the final construction drawings. The final construction drawings shall be provided to the Kern County for review and comment and to the CBO and CPM for review and approval.

Inadequate emergency access would be a significant impact under CEQA. In the event of an emergency at the RSPP site, emergency vehicles would likely use Brown Road to access the project site. Kern County Fire Department determines the requirements for emergency access.

The applicant states that the proposed emergency access driveway would be paved with a width of 24 feet, if required by Kern County, a secondary point of access from

Brown Road to the area of the power block would be provided and that all driveways for access to the occupied areas have grades less than 5%. In addition, the applicant states that all roads to occupied areas will be a minimum of 20 feet in width, paved, and provided with a structural section capable of H-20 loading, which will meet or exceed the Kern County requirements for their emergency fire vehicles. The applicant further states that scaled plans showing emergency access including design radii, grades lane widths, etc., will be developed during the design process as the project moves forward. And, all emergency access work will be designed and completed in conformance with the Kern County Fire Marshall's standards and requirements. (SM 2010a, DR-Traffic-203)

The proposed RSPP site is of adequate size to accommodate minor adjustments to emergency access, if necessary. Accordingly, the final construction plan sets must demonstrate compliance with emergency access LORS and strive to address Kern County's Fire Marshall standards and requirements. Staff recommends Condition of Certification TRANS-9, which requires the project owner to ensure adequate emergency access within the project site by showing emergency access including design radii, grades lane widths, etc. on the final construction plan sets. The final construction drawings shall be provided to the Kern County for review and comment and to the CBO and CPM for review and approval.

For additional discussion of emergency services serving the facility, refer to the WORKER SAFETY and FIRE PROTECTION section in this Staff Assessment.

C.10.4.2.1.3 Bicycle, Pedestrian, Public and Alternative Transportation, School Bus Route Impacts and Mitigation

A significant impact would be present if an impact conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. The proposed RSPP would result in a change to a regularly traveled bicycle route. Numerous bicyclists use Brown Road as a recreational bicycle route. Refer to the **LAND USE** section of this Staff Assessment for discussion and analysis pertaining to motorized and non-motorized vehicle access. Conditions of Certification **LAND-5** and **LAND-6** provide mitigation for bicyclists using Brown Road. **Traffic and Transportation Figure-5** depicts bicycle, public transportation and school bus routes.

Kern County uses the RTP for bicycle and pedestrian facility planning. The RTP Bicycle and Pedestrian Action Element (KCOG 2009a, pp. 4-54 to 4-56) promote bicycle and pedestrian facility development and use. Its purpose is to asses and plan for the development and financing of such facilities but does not contain project specific project policies. Kern County utilizes fees, grants and bonds to finance facilities not specifically required of projects to implement bike and pedestrian facilities.

Kern COG adopted the *Kern County Bicycle Facilities Plan* (KCOG 2009a), which provides a compendium of bicycle transportation facilities, constructed and planned for Kern County. As stated in the setting section, China Lake Boulevard from the Ridgecrest city limits to the US 395 is a planned bike route. Funding for the China Lake Boulevard bicycle route has not been established.

The distance from downtown Ridgecrest to the proposed project site is within bicycle commuting distance. Bicycling can be an alternative transportation mode to reduce construction trips.

Kern County alternative transportation goals, objectives and policies are contained in the RTP. RTP Transportation Control Measure Action Element (KCOG 2009a, pp. 4-33 to 4-40) and Congestion Management Action Element (KCOG 2009a, pp. 4-68 to 4-85) promotes the implementation of alternative transportation and transportation control. Transportation control is commonly referred to as Transportation Demand Management programs (TDM). Kern County does not require specific projects to participation in a TDM.

As noted above China Lake Boulevard is a school bus route. Approximately 379 construction related PCE trips would use China Lake Boulevard in the morning and evening peak hours. The number of trips poses an impact to the school bus route. Staff has been advised by Sierra Sands Unified School District School (SSUSD 2009b) that buses operate along China Lake Boulevard from 7:00 to 9:15 am and again between 2:15 to 4:00pm. Additionally, kindergartens operate to noon so school buses use China Lake Boulevard from 11:30 am to 12:30 pm.

As discussed herein, the Brown Road, US 395 and China Lake Boulevard intersection experiences a collision rate almost three times the State average. Construction and traffic is likely to increase the collision rate significantly. **TRANS-1** requires improvements to the intersection the preparation of a traffic control plan. As a means to further reduce project related construction traffic through the intersection, the Traffic Control Plan would require the project owner to implement a TDM program. The Traffic Control Plan would also restrict heavy equipment and building materials deliveries from using China Lake Blvd. between 7:00am and 9:15am and from 2:30pm to 400pm. In addition, construction workers shall be trained on precautionary measures for avoiding collisions with school busses and instructed to take extra precautions to avoid collisions with school busses, especially during midday hours.

Sidewalks and pedestrian pathways are limited to the urban areas of the proposed project’s vicinity. There are no sidewalks along US 395, China Lake Boulevard and Brown Road rights-of-way. The nearest residence with pedestrian dedicated access to the proposed project site is several miles away. It is unlikely that pedestrians would walk more than two miles to access the project site so sidewalks would not be required.

Kern County public transportation goals, objectives and policies are contained in the RTP. The RTP Public Transportation Action Element (KCOG 2009a, pp. 4-33 to 4-40) plans for public transportation needs. A goal of this element is to improve services to rural parts of the County. Kern Regional Transit would be a service provider that provides services to rural parts of the County. However, Kern County does not have LORS implementing the rural network needs. Since the proposed project’s construction is temporary in nature, requiring public transportation fees or services is not warranted.

C.10.4.2.1.4 Linear Facilities Impacts and Mitigation

As stated in the setting, RSPP would include a HTF pipeline, transmission lines and water pipeline. These facilities would cross public right-of-way.

Kern County Municipal Code, Title 12, Section 12.16.110 states that any trench and excavation or piling any material in the traveled part of any public highway require the placement and maintenance of warning lights at each end of such pile or excavation, at distances of not more than one hundred (100) feet apart along such pile or excavation, from sunset of each day to sunrise of the next day, until such excavation is entirely refilled, or such pile of material is removed. Section 12.16.120, states that the laying of gas or water pipes or conduits requires a permit to tunnel under improved portion of highways. The surface shall be blocked up to ensure the safe use of the highway pending the work and the work shall be conducted as expeditiously as possible, and upon completion the tunnel shall be filled and closed so that the surface of the street will be supported to pre-existing conditions. Section 12.20.010 states that electric power corporations, granted the right to construct electric power wires along, upon and across any public road or highway may erect poles for supporting the wires and other necessary fixtures of such lines, so as to not incommode the public in the ordinary use of such roads or highways. Section 12.20.020, states that such wires along such roads and highways shall be suspended not less than twenty-five (25) feet in height on posts or poles, and such wires across roads or highways shall be suspended at least eighteen (18) feet above the road or highway, or higher if required by public utilities commission regulations.

The HTF is proposed to cross Brown Road approximately halfway between the access driveways for the northern and southern portions of the proposed project. An encroachment permit and franchise agreement (PUC 2010a) would be required to trench through or bore under Brown Road. Similarly, the proposed transmission line would crossover Brown Road. The transmission lines must be constructed according to Section 12.20.020 and an encroachment permit and franchise agreement would be required.

The proposed water pipeline would be installed by Indian Wells Valley Water District (IWVWD). Right-of-way for the Installation of the water pipeline is 30 feet wide but the trench will be three feet wide. The waterline will be constructed 15 to 20 feet from existing pavement on the west side of China Lake Boulevard and along the north side of Brown Road to the proposed project site. It will run 4.5 miles from IWVWD's Ridgecrest Heights storage tank to the proposed project site. (SM 2010a, DR-Traffic-212) According to Kern County Assessor parcel maps, there is adequate public right-of-way to accommodate the waterline along the proposed corridor.

IWVWD would be required to obtain the encroachment permit and franchise agreement. Since the existing Brown Road shoulder is not very wide, construction of the water pipeline may require the water pipeline placement under Brown Road. To do this work, parts of Brown Road would be temporarily impacted. The water pipeline would also require an encroachment permit from Caltrans to permit work within a State highway (DOT 2010a). There are nine private and public driveways the waterline would affect

during its installation. Consistent with Kern County encroachment permit requirements, conditions for the installation of the waterline include temporary driveway diversions and phasing the installation.

Staff recommends Condition of Certification **TRANS-10** for project related HTF pipelines, transmission lines and water pipeline activities affecting public roads. **TRANS-10** would require the project owner to comply with the LORS listed above and install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities, prior to transmission line cable stringing. In addition, **TRANS-10** would also require the project owner to submit plans, meeting the Kern County encroachment permit standards for project related HTF pipelines, transmission lines and water pipeline activities to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

The project owner would be required to provide 15 foot temporary driveway diversions within 10 feet immediately adjacent to the existing driveway location and phase the installation when necessary (SM 2010a, DR-Traffic-213). Staff recommends Condition of Certification **TRANS-11,** which would require the project owner to provide driveway diversions during construction of the water pipeline.

C.10.4.2.1.5 Air Traffic, Water and Rail Impacts and Mitigation

Air Traffic

Impacts would occur if the project causes a change in air traffic patterns, including either, an increase in traffic levels or a change in location that results in substantial safety risks. There are four potential primary causes for project to affect a change in air traffic patterns or increase safety risks. The four causes include height of structures near airports, vertical velocity and visible water vapor plumes generated from industrial exhaust, radio or telecommunication interference and glare.

Operations conducted in the R-2506 internal restricted area include low altitude high speed maneuvers and radar intercept areas. The vertical dimension for the restricted area extends from surface to 6,000 feet mean sea level (MSL) or approximately 2,000 feet above ground level at the project site. Entry into the restricted areas requires prior approval from the designated using agency. The designated using agency is determined by the R-2508 Joint Policy and Planning Board, which is comprised of the three military facilities commanding officers (USAF 2010a) within the Isabella Military Operating Area (MOA). The MOA is used for military flight activities, including acrobatic or abrupt flight maneuvers, intercepts, air combat maneuvering, aerial refueling, and training areas for student pilots. It has a minimum altitude of 200 feet above ground level (AGL), but the project site's proximity to the Ridgecrest and Inyokern communities and El Paso Wilderness generally precludes extremely low altitude flights in the project area.

Obstruction

United States Department of Transportation, Federal Aviation Administration Title 14, Chapter 1, Part 77 establishes procedures for evaluating project construction within

10,000 feet from runways of 3,200 feet in length or greater. If the proposed project would introduce any construction or alteration that is greater in height than an imaginary surface extending outward and upward at the following applicable slope 100 to 1 for the horizontal distance of 20,000 feet from project to the nearest 3,200 foot (FAA 2009a), the developer is required to notify the FAA.

Furthermore, FAA Advisory Circular 70/7460-1, Obstruction Lighting/Marking Requirements, requires that any temporary or permanent structure, including all appurtenances, that exceeds an overall height of 200-feet above ground level (AGL) or exceeds any obstruction standard contained in FAA Form 7460, should normally be marked and/or lighted (FAA 2009b).

The proposed RSPP is not located within 20,000 feet of the nearest airport runway. None of the project's physical structures would exceed 120 feet in height and are, therefore, well below the 200-foot maximums for structures within the affected operational airspace of either airport.

Plumes

Vertical velocity plumes are currents of air emitted upward from the ACC stacks. At 4.3 meters per second and up to 1,500 feet above ACC stacks, vertical velocity plumes can be emitted at a velocity as to affect anything that travels over or through its current. The ACC stacks for the Blythe Solar Project are similar to the ACC stacks for RSPP and would emit vertical velocity plumes at a similar rate (BSPP 2010a).

Aircraft operating in the traffic pattern or within sight of a tower, or aircraft known to be departing or arriving from flight in local practice areas (within a 20-mile radius of the airport), or aircraft executing practice instrument approaches at the airport. (FAA 2009a). As stated herein, the area within the vicinity of the proposed RSPP provides ideal conditions for sail planes. Vertical velocity thermal plumes are generally invisible and may present a hazard to gliders, as well as an attractive nuisance to sailplane enthusiasts, intent on improving their soaring records. Staff recommends Condition of Certification **TRANS-12** would require the applicant to notify the FAA regarding vertical velocity thermal plumes that may be generated by the project and may pose a hazard to flights occurring at low altitudes above the proposed power block. Although the potential hazard would still remain, pilots would receive adequate warning to avoid or compensate.

Visible water vapor plumes are similar to fog in the fact that the air mass contains high moisture levels that may reduce visibility. These plumes occur as a result of ACC stacks exhaust combined with the presence of low temperature and high humidity weather. **TRANS-12** would require the applicant to notify the FAA regarding visible water vapor plumes that may be generated by the project and may pose a hazard to flights occurring at low altitudes above the proposed power block. Although the potential hazard would still remain, pilots would receive adequate warning to avoid or compensate.

Radio and Telecommunications

The applicant acknowledges the affect of the electronic spectrum of the proposed project has not yet been fully developed. At the present time, staff cannot evaluate the

potential effects of the proposed project's electronic spectrum on military air operations. It is not likely to affect flights paths and patterns of public airports because of the distance between the public airports and the proposed project.

However, radio transmissions that may be required for the proposed RSPP could produce interference that would disrupt military testing and training operations conducted in the project vicinity and on the military ranges (SM 2009a, Appendix K). However, full implementation of condition of certification **LAND-7** would eliminate potential mission impacts. (See **TRAFFIC & TRANSPORTATION** section for further discussion.)

Glare

Sunlight can reflect off the mirror troughs at extremely limited interval, normally at sunrise and sunset. The proposed RSPP mirror troughs may generate glare that would distract pilots.

Staff has contacted Anthony Parisi, PE, Head, Sustainability Office, NAVAIR Ranges requesting a review of the RSPP proposal, specifically for stack heights, vertical velocity plumes and visible water vapor plumes and glare. Mr. Parisi states that the U. S. Department of Defense Renewable Energy Workshop has reviewed the proposed RSPP would not impact military missions, with respect to low flying aircraft over stack heights and glare (DOD 2009a). The response did not include discussion of vertical velocity plumes and visible water vapor plumes.

Staff also consulted with CDR Dan Harmon, Operations Officer / N3, NAWS China Lake requesting a review of the RSPP proposal, specifically for stack heights, vertical velocity plumes and visible water vapor plumes and glare. The response did not address stack heights, vertical velocity plumes and visible water vapor plumes (Harmon, email 2/18/2010). CDR Harmon expressed concerns regarding "the potential for reflectivity from the mirrors may affect aircraft departing China Lake NAWS, which are usually on a southwesterly course heading to cross Inyokern Rd at Jack's Ranch Rd. and then proceed climbing to the south.

Commission staff states, in the mornings the directional array will be pointed east and the reflective energy will be right in the eyes of the pilots during what is termed as a "critical phase of flight". Upwards of 80% of mishaps occur during critical phases of flight (takeoffs and landings), due to high task loading, proximity to ground and changes in aircraft configuration. Additional distractions only increase the probability of mishap. The proposed RSPP plant uses reflective troughs. In the morning the troughs turn from stow position to tracking position and in the evening move in the reverse. It is in that transition before the sun is properly focused that the mirrors send out a linear solar reflection which can produce thermal damage to humans within 60 feet of the plant boundary. This line of light is not cumulative; that is, it represents only one sun at any given point on the mirror and would likely last six seconds. Once the sun and the mirror are aligned 95% of the direct sunlight falls on the heat collecting element and an observer then sees the bright blue sky or clouds reflected from the mirror and not total solar energy. The mirrors can produce "bright spots" at their top and bottom but is not likely to affect departures. (MIL 2009a)

There is no question that the mirrors have the possibility to be bright, intrusive objects in the field of view. However, they will not produce retinal damage but may be distracting. There is general agreement in the field of specialists dealing with these mirror fields that they have the appearance of lakes. The visible spectrum from total solar energy 60 feet from the plant boundary and would be at moderate levels. (MIL 2009a)

Staff recommends Condition of Certification **VIS-4**, which requires the project owner to provide opaque or nearly opaque screening (berms, fencing, landscaping, or similar means) along the project boundaries facing Brown Road and US 395 at a height to effective intercede any light reflection from the mirror.

Navigable waterways

The proposed RSPP is not located adjacent to a navigable waterway; therefore, the RSPP is not expected to affect water-related transportation.

Railways

Rail line LA 028634 is a former Southern Pacific Railroad 100 foot right-of-way that exists to the west of the proposed project site. The Phase I Environmental Site Assessment did not locate railroad ties, tracks or roadway crossings, but did locate infrastructure associated with the railroad corridor, like bridges and storm water conveyances. The rail road corridor currently serves as a hiking trail. Project facilities are located at least 230 feet from the rail road corridor. The boundary of the proposed project would be fenced and it is unlikely persons working at the plant site would encounter the rail road corridor (SM 2010a, DR-Traffic-208).

As stated herein, the project related construction and operations traffic would likely cross railways. These crossing are gated and signalized. Project construction and operations traffic is not likely to affect railway operations.

C.11.4.3 CEQA LEVEL OF SIGNIFICANCE

With implementation of conditions of certification as defined above, the proposed RSPP would not conflict and be in compliance with applicable LORS. Further, RSPP project traffic and transportation impacts would be reduced to less than significant.

C.10.5 NORTHERN UNIT ALTERNATIVE

The northern unit alternative would be the proposed project minus all facilities south of Brown Road (see Alternatives Figure 1). Regional access to the site would occur via United States Route 395 (US 395), State Road-14 (SR-14), SR-178 and China Lake Boulevard Local access is provided via Brown Road. **Traffic and Transportation Figure-1** illustrates regional and local roadways within the project's affected environment.

Traffic generated from construction operations would impact local and regional serving roadways. Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. Other components of the proposed project with the potential to affect

traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines.

C.10.5.1 SETTING AND EXISTING CONDITIONS

The transportation system within the northern unit alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

The anticipated routes and distribution for construction traffic is the same as the proposed project. Traffic volumes and delay at intersections would be similar to the proposed project because facility construction would involve the same number of construction workers during the peak month. Other existing traffic and transportation aspects of the proposed northern unit alternative are not different from the proposed project, except that the HTF line would not cross Brown Road.

C.10.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit alternative would present similar traffic and transportation impacts as the proposed project. Traffic and transportation aspects considered with this alternative are listed below. If the proposed project's LORS, significant impacts or mitigation are modified or changed then it is discussed below:

Construction and operation roadway and intersection impacts would not significantly change. Traffic generated by the proposed alternative would not impact roadway segments but would impact the Brown Road, US 395 and China Lake Boulevard intersection. Construction traffic would degrade the intersection to LOS E (LORS), similar to the proposed project. In addition, the construction and operations traffic generated by the alternative would pose a potential significant increase in collision rates. Condition of Certification **TRAN-1** would minimize the potential increase to collision rates and with the implementation of **TRAN-1** the proposed alternative would be in compliance with LORS.

The mirror troughs may generate glare and pose a hazard on motorists. Condition of Certification **TRAN-2** would require a line-of-sight study along the alternative's boundary facing Brown Road and US 395 to determine the height needed to prevent glare effecting motorists.

The alternative project's access and internal driveways must comply with LORS for encroachment permits and construction design standards. Condition of Certification **TRAN-3** requires compliance with these LORS and the project owner to construct temporary left turn lanes and acceleration and deceleration lanes on Brown Road. This condition of certification would be modified to eliminate the requirement for a left turn from Brown Road and acceleration lanes to and from Brown Road to the proposed project's southern portion since it is not a part of the alternative.

If the alternative project was decommission or closed, project facilities would be located on BLM managed lands. Condition of Certification **TRANS-4** requires security fencing or conversion of the project facilities.

The alternative project would involve the use of oversize and overweight vehicles, the transport of hazardous materials and present the potential to damage public roadways. Conditions of Certification, **TRAN-5, TRANS-6 and TRANS-7,** require compliance with LORS pertaining to oversize and overweight vehicles and the transport of hazardous materials. In addition, the public roadways will be restored to original pre-construction conditions.

The alternative project's parking, internal circulation and emergency access must comply with LORS. In addition, the parking, internal circulation and emergency access must meet development standards and commonly accepted engineering principles and practices for turning radius, sight distance and line-of-sight. Conditions of Certification **TRAN-8** and **TRANS-9** requires compliance with these LORS and proper development of parking, internal circulation and emergency access.

Refer to the **LAND USE** section of this Staff Assessment for discussion and analysis pertaining to motorized and non-motorized vehicle access. Conditions of Certification **LAND-5** and **LAND-6** provide mitigation for bicyclists using Brown Road. In addition, **TRANS-1** would require van pools and other TDM measures to mitigate the impacts to the intersection.

The alternative project would involve project related HTF pipelines, transmission lines and water pipeline activities affecting public roads. **TRANS-10** would require the project owner to comply with the LORS listed above and install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities, prior to transmission line cable stringing. In addition, **TRANS-10** would also require the project owner to submit plans, meeting the Kern County encroachment permit standards for project related transmission lines and water pipeline activities.

The alternative project would involve water pipeline construction,requiring 15 foot temporary driveway diversions within 10 feet immediately adjacent to the existing driveway location and phase the installation when necessary. **TRANS-11,** requires the project owner to provide driveway diversions during construction of the water pipeline.

The alternative project would generate glare associated with the mirrors that may impact military flight operations. Condition of Certification **VIS-4**, requires the provision of opaque or nearly opaque screening (berms, fencing, landscaping, or similar means) along the project boundaries.

C.10.5.3 CEQA LEVEL OF SIGNIFICANCE

Impacts associated with this alternative would be the same as the proposed project, except that the ingress and egress improvements, permitting and LORS compliance necessary for the southern access driveway would not be required. In addition, the

permitting and LORS compliance associated with the HTF pipeline would not be required. With the implementation of the same or slightly modified conditions of certification, the alternative project's impacts would be less than significant.

C.10.6 SOUTHERN UNIT ALTERNATIVE

The southern unit alternative would be the proposed project minus all facilities north of Brown Road(see Alternatives Figure 1). Regional access to the site would occur via United States Route 395 (US 395), State Road-14 (SR-14), SR-178 and China Lake Boulevard Local access is provided via Brown Road. **Traffic and Transportation Figure-1** illustrates regional and local roadways within the project's affected environment.

Traffic generated from construction operations would impact local and regional serving roadways. Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. Other components of the proposed project with the potential to affect traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines.

C.10.6.1 SETTING AND EXISTING CONDITIONS

The transportation system within the southern unit alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

The anticipated routes and distribution for construction traffic is the same as the proposed project. Traffic volumes and delay at intersections would be similar to the proposed project because facility construction would involve the same number of construction workers during the peak month. Other existing traffic and transportation aspects of the proposed northern unit alternative are not different from the proposed project, except that the HTF pipeline and transmission lines would not cross Brown Road.

C.10.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit alternative would present similar traffic and transportation impacts as the proposed project. Traffic and transportation aspects considered with this alternative that are different from the Northern Unit Alternative are listed below:

The alternative project's access and internal driveways must comply with LORS for encroachment permits and construction design standards. Condition of Certification **TRAN-3** requires compliance with these LORS and the project owner to construct temporary left turn lanes and acceleration and deceleration lanes on Brown Road. This condition of certification would be modified to eliminate the requirement for a left turn from Brown Road and acceleration lanes to and from Brown Road to the proposed project's northern portion since it is not a part of the alternative.

The alternative would not require the transmission lines to cross Brown Road. Condition of Certification **TRAN-10** would not apply to the transmission lines.

C.10.6.3 CEQA LEVEL OF SIGNIFICANCE

Impacts associated with this alternative would be the same as the proposed project, except that the ingress and egress improvements, permitting and LORS compliance necessary for the northern access driveway would not be required. In addition, the permitting and LORS compliance associated with the HTF pipeline and transmission lines would not be required. With the implementation of the same or slightly modified conditions of certification, the alternative project's impacts would be less than significant.

C.10.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The original proposed project alternative is a slightly modified version of the proposed project but it was partially located in a flood area. Regional access to the site would occur via United States Route 395 (US 395), State Road-14 (SR-14), SR-178 and China Lake Boulevard Local access is provided via Brown Road. **Traffic and Transportation Figure-1** illustrates regional and local roadways within the project's affected environment.

Traffic generated from construction operations would impact local and regional serving roadways. Construction of the RSPP project is anticipated to occur over approximately 28 months. Peak project construction workforce is anticipated to be 633 workers during the 11th month. Other components of the proposed project with the potential to affect traffic and transportation systems include: a water mainline, telecommunication and telemetry systems, access road(s) and 230 kV transmission lines.

C.10.7.1 SETTING AND EXISTING CONDITIONS

The transportation system within the original proposed project alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

The anticipated routes and distribution for construction traffic is the same as the proposed project. Traffic volumes and delay at intersections would be similar to the proposed project because facility construction would involve the same number of construction workers during the peak month. Other existing traffic and transportation aspects of the proposed northern unit alternative are not different from the proposed project.

C.10.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The original proposed project alternative would present the same traffic and transportation impacts as the proposed project. Conditions of certification **TRANS-1**

through **TRANS-12** mitigates traffic and transportation impacts or ensures compliance with traffic and transportation LORS for this alternative.

C.10.7.3 CEQA LEVEL OF SIGNIFICANCE

Impacts associated with this alternative would be the same as the proposed project. With the implementation of the same conditions of certification, this alternative project's impacts would be less than significant.

C.10.8 NO PROJECT/NO ACTION ALTERNATIVE

The No Project/No Action alternative would result in the proposed project site(s) not being developed by the applicant. RSPP related construction and operations impacts would not occur. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's CDCA, potentially including other renewable energy projects, recreational activities, etc.

C.10.8.1 SETTING AND EXISTING CONDITIONS

The transportation system within the No Project/No Action alternative's affected environment includes; existing and planned regional and local roads, routes and traffic patterns, public transportation operations, school bus routes, designated bikeways or pedestrian pathways, railways, airports, aircraft flight paths and patterns, transmission lines and pipelines and waterways.

C.10.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The No Project/ No Action alternative would not present traffic and transportation impacts:

- Without the proposed project the Brown Road, US 395 and China Lake Boulevard intersection would not be improved until Caltrans has the funding but other intersections would not be impacted by the projected traffic generation associated with the proposed project.
- Glare reflected from the mirror troughs would not pose a hazard on motorists
- Access and internal driveways would not be constructed.
- Security fencing or conversion of the project facilities would not be required.
- There would be no use of oversize and overweight vehicles and the transport of hazardous materials and damage public roadways would not occur.
- There would be no parking, internal circulation and emergency access requirements.
- A bicycle path would not be constructed.
- The preparation of a TDM program would not be required.
- There would be no HTF lines, transmission lines and water pipeline effects to public roadways.
- There would be no plumes to affect flight paths and pattens.

C.10.8.3 CEQA LEVEL OF SIGNIFICANCE

There would be no impacts and, therefore no significant impacts.

C.10.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Traffic and Transportation Table 9 provides a comparison of alternatives as it pertains to this technical area.

Traffic and Transportation Table 9
Comparison of Proposed Project and Alternatives

EFFECTS	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Brown Rd., US 395 and China Lake Blvd. LOS Degradation and Collision Rates	LOS would be degraded at the intersection and there is adequate basis for collision rates to increase. COC **TRANS-1** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No Impact
Glare on Motorists	Glare from the mirror troughs may affect motorists. COC **TRANS-2** and **VIS -4** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact.
Ingress and Egress Construction and Encroachment Permits	Ingress and egress left turn lanes and acceleration and deceleration lanes must be constructed and encroachment permits obtained. COC **TRANS-3** provides mitigation.	Same as Proposed Project, except to southern portion of the proposed project.	Same as Proposed Project, except to northern portion of the proposed project.	Same as Proposed Project.	No impact
Project Decom. and Closure	If the project is closed, transportation facilities would remain. COC **TRANS-4** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Oversize and Overweight Vehicles	The project would require oversize and overweight vehicles. COC **TRANS-5** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	
Hazardous Material Truck Trips	The project would require hazardous material truck trips. COC **TRANS-6** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Roadway Damage	The project would involve heavy truck and repetitive trips. COC **TRANS-7** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact

EFFECTS	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
Parking and Internal Circulation	The project would be required to provide parking and adequate internal circulation. COC **TRANS-8** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Emergency Access	The project would be required to provide adequate emergency vehicle access and provide proper turning radii, sight distances and lines-of-sight for internal movement. COC **TRANS-9** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
Franchise Agreement and Encroachment Permits for Trenching	The project would be required to obtain franchise agreements and encroachment permits for the HTF pipeline, transmission lines and water pipeline. COC **TRANS-10** provides mitigation.	Same as Proposed Project. Franchise agreements and encroachment permits are not required for the HTF pipeline.	Same as Proposed Project. Franchise agreements and encroachment permits are not required for the HTF pipeline and transmission lines.	Same as Proposed Project.	No impact
Driveway Diversions	The project would be required to provide driveway diversions along the waterline pipeline during pipeline construction. COC **TRANS-11** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact
FAA Notification	The project owner would be required to notify the FAA regarding vertical velocity plumes and visible water vapor plumes. COC **TRANS-12** provides mitigation.	Same as Proposed Project.	Same as Proposed Project.	Same as Proposed Project.	No impact

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.10.9 CUMULATIVE IMPACTS AND MITIGATION

The RSPP **CUMULATIVE IMPACTS** section of this staff assessment presents project effects in combination with foreseeable future projects. The affected environment includes the proposed project's construction and operation traffic and transportation impacts plus reasonably foreseeable future projects traffic and transportation impacts. Construction related traffic and transportation cumulative impacts occur when the proposed project construction overlaps reasonably foreseeable future projects' construction.

Cumulative Impacts Table 3 lists reasonably foreseeable future projects within the affected environment of the RSPP. Project generated traffic, the number of heavy haul trucks, the amount of hazardous materials delivery and the potential for highway and roadway damage of these projects together with the proposed project pose would result in cumulative impacts to the traffic routes and patterns. Traffic generated may also affect railways because it is likely that traffic would encounter railways within the project's affected environment.

A list of projects and anticipated construction schedule are as follows:

- City of Ridgecrest New Waste Water Treatment Plant – A request for qualifications was issued in October 2009. Staff attempted to contact Ridgecrest Public Works Department to inquire as to the timing of this project. If the environmental analysis has occurred, it is likely that a contractor would be selected and construction could begin in 2010. If the environmental analysis has not occurred, construction is not likely to occur for several years.
- China Lake Naval Air Weapons Station Base Realignment and Closure (BRAC)– A Final EIR was published in 2004. Several facilities are proposed or under construction. Traffic data generated by the construction of these facilities are unknown.
- Walmart – A final EIR was published in September 2009. It is likely that construction of the Walmart would coincide with the proposed project. The final EIR does not estimate construction trip generation.
- Freeman Gulch Four-Lane Project – Construction to start between 2012 – 2015, dependent on funding and will likely occur later than 2012.
- Inyokern Four-Lane Project - There is no funding available for this project and construction is unlikely to coincide with the proposed project.
- Solar Project - CACA 49511 – BLM issued a decision, status unknown
- Wind Project – CACA 050020 – test site, minimal impact
- Wind Project – CACA 048948 - test site, minimal impact
- Wind Project – CACA 050319 - test site, minimal impact

China Lake NAWS BRAC related projects would potentially contribute to the proposed RSPP traffic impacts. Similarly, the construction of the Walmart would potentially contribute to the proposed RSPP traffic impacts.

The construction traffic of these proposed projects, together with the construction traffic of the proposed project, are not likely to exceed highway and roadway design capacities. There is sufficient capacity on highways and roadways as discussed herein under **CONSTRUCTION TRAFFIC IMPACTS AND MITIGATION**. However, it is likely the intersection of Brown Road and SR-178 could operate below LOS D. **Traffic and Transportation Table 6** shows this intersection operating at LOS D with the proposed RSPP. **TRANS-1** would require the project owner to stagger work shifts.

C.10.10 LAWS, ORDINANCES, REGULATIONS, AND STANDARDS COMPLIANCE

As stated the proposed project would be located on BLM managed lands. BLM land use practices give deference to the local governments when making land use decisions. The BLM managed lands are located in Kern County. Kern County would be the local government with responsibility for enforcing compliance with LORS if BLM wasn't managing the lands.

Energy Commission staff consulted Kern County traffic and transportation LORS to ensure the proposed development project is developed consistent with similar uses in the community.

Traffic and Transportation Table 8 provides a general description of applicable statutes, regulations, and standards (LORS) pertaining to traffic and transportation adopted by the federal government, the State of California, Kern County and Ridgecrest. Compliance with LORS is assesses within the appropriate areas discussed. For example: compliance with Federal Aviation Administration (FAA) LORS is assessed in the discussion pertaining to direct and indirect impacts related to airport operations and mitigation. Conditions of certifications have been proposed to ensure project compliance with LORS.

Traffic and Transportation Table 8
Traffic and Transportation LORS Compliance

Applicable LORS	Description	Determination of Compliance				
Federal		**Proposed Project**	**Northern Unit Alternative**	**Southern Unit Alternative**	**Original Proposed Project Alternative**	**No Project Alternative**
Code of Federal Regulations Title 49, Sections 171-177	Governs the transportation of hazardous materials and related guidelines.	Yes. COC **TRANS-6** provides mitigation	Yes. COC **TRANS-6** provides mitigation	Yes. COC **TRANS-6** provides mitigation	Yes. COC **TRANS-6** provides mitigation	NA
Code of Federal Regulations Part 77, Federal Aviation Administration Regulations	Implements standards for determining obstructions in navigable airspace. Sets forth requirements for notice to the FAA of certain proposed construction or alteration. Also, provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace.	Yes.	Yes.	Yes.	Yes.	NA
Code of Federal Regulations Title 49, Sections 350-399 and Appendices A-G	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles who operate on public highways.	Yes. **TRANS-5** and **TRANS-6** provides mitigation	Yes. **TRANS-5** and **TRANS-6** provides mitigation	Yes. **TRANS-5** and **TRANS-6** provides mitigation	Yes. **TRANS-5** and **TRANS-6** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
Federal Land Policy and Management Act, 1976-43 CFR 1600, Sec. 501 [43 U.S.C. 1761] California Desert Conservation Area Plan and West Mojave Plan	The California Desert Conservation Area (CDCA) Plan is the land planning document for BLM managed lands for the California desert where the RSPP would be developed. CDCA includes policies and procedures for motorized vehicle access as an integral part of desert land planning. Originally adopted in 1980, the CDCA was re-published in 1999 and included several amendments. In March 2006, the BLM issued a Record of Decision amending the CDCA plan with the West Mojave Plan. Section 2.2.6 of the West Mojave Plan discusses the Public Land Motorized Vehicle Access Network.	Yes. See the **LAND USE** section of the Staff Assessment	Yes. See the **LAND USE** section of the Staff Assessment	Yes. See the **LAND USE** section of the Staff Assessment	Yes. See the **LAND USE** section of the Staff Assessment	NA
State						
California Vehicle Code Division 2, Chapter 2.5, Division 6, Chapter 7, Division 13, Chapter 5, Division 14.1, Chapter 1 and 2, Division 14.8, Division 15	Includes regulations pertaining to licensing, size, weight and load of vehicles operated on highways, safe operation of vehicles, and the transportation of hazardous materials.	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	Yes. COC **TRANS-5** and **TRANS-6** provides mitigation	NA
California Streets and Highway Code Division 1 and 2, Chapter 3 and Chapter 5.5	Includes regulations for the care and protection of State and County highways, and provisions for the issuance of written permits.	Yes. COC **TRANS-7** provides mitigation	Yes. COC **TRANS-7** provides mitigation	Yes. COC **TRANS-7** provides mitigation	Yes. COC **TRANS-7** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
California's Manual on Uniform Traffic Control Devices (Caltrans, 1/2010) and Caltrans Construction Manual, Chapter 2, Safety and Traffic.	Provides criteria, standards and measures for signage, traffic control and construction zone safety.	Yes. COC **TRANS-1** provides mitigation	Yes. COC **TRANS-1** provides mitigation	Yes. COC **TRANS-1** provides mitigation	Yes. COC **TRANS-1** provides mitigation	NA
Manual for Encroachment Permits on California State Highways	Encroachment permits would be required by Caltrans.	Yes. COC **TRANS-3** provides mitigation	Yes. COC **TRANS-3** provides mitigation	Yes. COC **TRANS-3** provides mitigation	Yes. COC **TRANS-3** provides mitigation	NA
Local						
The Kern Council of Governments Destination 2030, Kern County's Regional Transportation Plan (RTP) The Kern Council of Governments Bicycle Facilities Plan	It is a planning guide for the next 24 years beginning May 2007. It provides transportation and air quality goals, policies and actions for now and into the future, and includes programs and projects for congestion management, transit, airports, bicycles and pedestrians, roadways, and freight. It also provides a discussion of all mechanisms used to finance transportation and air quality program implementation.	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	Yes. Specific Elements of the RTP are discussed, evaluated and mitigation was recommended where appropriate. Compliance with Bicycle Facilities Plan. COC **VIS-4** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
County of Kern General Plan Circulation Element	Establishes goals, objectives and policies for roadways and roadway function, safety hazards, scenic routes, trucks routes and hazardous materials transport, airport compatibility and railroad crossings.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	Yes. Specific Elements of the Circulation Element are discussed, evaluated and mitigation was recommended where appropriate.	NA
County of Kern Municipal Code Chapter 10 Chapter 10, Section 10.04.525 Chapter 10, Section 10.08.020	Chapter 10 establishes processes and procedures for vehicles and traffic. Section 10.04.525 establishes speed limits for Kern County roads. Section 10.08.020 provides for maximum vehicle weights on Kern County roads.	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	Yes Section 10.04.525 was provided as background. Section 10.08.020 COC **TRANS-5** provides mitigation	NA
County of Kern Municipal Code Chapter 12 Chapter 12, Section 12.16 Chapter 12, Section 12.16.110	Chapter 12 establishes processes and procedures for Kern County roads, highways and bridges. Section 12.16 encroachment permits would be required by Kern County. Section 12.16.110, establishes trenching, stockpiling and crossing public roads procedures and standards.	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	Yes. Section 12.16 COC **TRANS-3** provides mitigation Section 12.16.110 COC **TRANS-11** provides mitigation	NA

Applicable LORS	Description	Determination of Compliance				
County of Kern Municipal Code Title 19 Section 19.80 and Section 19.82	Title 19 was adopted to promote and protect the public health, safety and welfare through the orderly regulation of land uses throughout the unincorporated area of the county. Section 19.80 establishes access drive composite standards, fire protection access safety and collection areas for recyclable materials. Section 19.82 establishes off-street parking and development standards.	Yes. COC **TRANS-8** provides mitigation	Yes. COC **TRANS-8** provides mitigation	Yes. COC **TRANS-8** provides mitigation	Yes. COC **TRANS-8** provides mitigation	
City of Ridgecrest General Plan Circulation-Transportation Element	Establishes goals, objectives and policies for roadways and roadway function, safety hazards, scenic routes, trucks routes and hazardous materials transport, airport compatibility and railroad crossings.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	Undetermined. The applicant has not provided data on Ridgecrest intersections and Ridgecrest intersections were not evaluated.	

C.10.11 NOTEWORTHY PUBLIC BENEFITS

The proposed project would result in improvements to the Brown Road, US 395 and China Lake Boulevard intersection. These improvements would provide interim relief until the intersection could be fully realigned and improved.

C.10.12 PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall Install a left turn lane from north bound US 395 to Brown Road, a deceleration lanes from south bound US 395 to Brown Road, a separate left turn lane from China Lake Boulevard to US 395 south bound, acceleration and deceleration lanes on US 395 from China Lake Boulevard and Brown Road and acceleration and deceleration lanes on Brown Road to US 395.

The project owner shall submit to Kern County and Kern Council of Governments (COG) a construction Traffic Control Plan and implementation program. The TCP must include but not be limited to the following measures:

- Prepare and distribute a map of the route for construction workers to use to access the proposed project site. The map shall denote critical intersections and advise drivers to take extra caution through intersections;
- Establish a TDM program in conjunction with Kern COG, including the project owner supplying vans for van pools, identifying off-site parking, and provide incentives for car pooling;
- Restrict heavy equipment and building materials deliveries from using China Lake Blvd. between 7:00 am and 9:15 am and from 2:30 pm to 400 pm;
- Construction workers shall be trained on precautionary measures for avoiding collisions with school busses and instructed to take extra precautions to avoid collisions with school busses, especially during midday hours.;
- Provide signing, lighting, and traffic control device placement during construction impacting regional and local roadways in accordance with Caltrans Manual on Uniform Traffic Control Devices, Caltrans Construction Manual, Chapter 2, Safety and Traffic;
- Use flagging, flag men, signage and cover open trenches.
- Contract with Caltrans to provide reduce speed warning signs, spread at intervals to adequately advise drivers well enough in advance of the Brown Road, US 395 and China Lake Boulevard intersection;
- Stagger construction work hours and arrival/departure times outside peak traffic periods, including Fridays between 4:00 pm and 7:00 pm;
- Prepare traffic diversion plans in coordination with the Kern County to ensure access during temporary lane/road closures;

- Ensure of access for emergency vehicles to the project site;
- Monitor construction related traffic to ensure it is not contributing to additional roadway safety problems and collisions. The monitoring would include monthly reporting of construction related traffic patterns and collision incidents;
- Provide employee training and driver education;
- Post law enforcement, flag men, informational and warning signage and reduce speeds during high traffic times;
- Coordinate with Kern COG to include railway transport of equipment, materials and supplies;
- Coordinate with Kern COG to manage and reduce truck traffic;
- Require hazardous materials delivery to only use SR-14 and US 395 (and Brown Road from the project site to US 395);

The project owner shall contribute fair share traffic impact fees toward the future planned interchange at Brown Road, US 395 and China Lake Boulevard. (DOT 2010a)

Verification: At least 30 days prior to the start of site mobilization, the project owner shall complete said improvements to the Brown Road, US 395 and China Lake Boulevard intersection.

At least 90 days prior to the start of site mobilization, the project owner shall submit a traffic control plan that outlines each component above to the Kern County and Kern County COG for review and comment and submit the construction traffic control plan to the Compliance Project Manager (CPM) and Chief Building Official (CBO) for review and approval. The CPM and CBO will consider comments received by the agencies and include such comments where appropriate.

At least 30 days prior to the start of site mobilization, the project owner shall submit evidence of traffic impact fee payments to the CPM.

TRANS-2 The project owner shall perform a line-of-sight study for Brown Road and US 395 to ensure the screening for glare impacts does not impact motorists**.**

Verification: At least 90 days prior to the start of site mobilization, the project owner shall perform the line-of-sight study and design the screening to ensure glare does not impact motorists on US 395 and Brown Road and submit the study and construction drawings illustrating lines-of-sight to the CBO and CPM for review and approval.

TRANS-3 The project owner shall to submit plans, meeting the Kern County encroachment permit standards, and construct temporary left turn lanes and acceleration and deceleration lanes on Brown Road.

The project owner shall provide cross-sections or designs demonstrating that the on-site internal driveways, paved and unpaved, can accommodate heavy trucks and maintenance vehicles.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County encroachment permit standards, and construct temporary left turn lanes and acceleration and deceleration lanes to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

At least 90 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County design standards, illustrating that the on-site internal driveways, paved and unpaved, can accommodate heavy trucks and maintenance vehicles and construct temporary to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

TRANS-4 At project closure, the project owner shall to offer the internal traffic and transportation facilities to BLM. If BLM accepts these areas, then the project owner shall improve these areas for recreational parking and recreational vehicle staging and ensure the driveways are converted to acceptable off-road vehicle trails or pedestrian paths. If BLM does not accept these areas, the project owner shall fence off such areas so as to protect BLM from liability

Verification: Not Applicable

TRANS-5 The project owner shall comply with US DOT, Caltrans, Kern County and Ridgecrest limitations on vehicle sizes, weights, and travel routes and ensure that drivers and handlers are trained and certified in the delivery of hazardous materials. In addition, the project owner shall obtain overweight and oversize vehicle and routing permits from theses agencies and use trailing warning vehicles or police control where necessary.

Verification: The project owner shall retain copies of any permits and supporting documentation in their compliance file for a period of six months.

TRANS-6 The project owner shall comply with US DOT, Caltrans, Kern County and Ridgecrest LORS regarding the delivery of hazardous materials and obtain the necessary permits from the appropriate federal, state and local agencies for the delivery of hazardous materials on public roadways.

Verification: The project owner shall retain copies of any permits and supporting documentation in their compliance file for a period of six months.

TRANS-7 The project owner shall repair any damage to roadways affected by construction activity, along US 395, China Lake Boulevard and Brown Road, to the pre-project construction condition.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall photograph, videotape, or digitally record images of the Brown Road, US 395 and China Lake Boulevard at least one mile in each direction for each road segment from the Brown Road, US 395 and China Lake Boulevard intersection that will be affected by any underground utility connection construction and heavy construction traffic. For China Lake Boulevard such recording is required for the entire length of the water pipeline. The project owner shall provide the CPM, CBO and Caltrans, Kern County and Ridgecrest with a copy of the images for the roadway segments under its jurisdiction.

Also prior to start of construction, the project owner shall notify the agencies about the schedule for project construction. The purpose of this notification is to postpone any planned roadway resurfacing and/or improvement projects until after the project construction has taken place and to coordinate construction-related activities associated with other projects.

Within 30 days before the commencement of project operations, the project owner shall meet with the CBO and Caltrans, Kern County and Ridgecrest to determine the actions necessary and schedule the repair of identified sections of public roadways and restore ROW to original or as near-original condition as possible. Following completion of any road improvements, the project owner shall provide to the CPM and CBO comments received from the agencies regarding work completed within public right-of-way and, with consideration given to the comments received by the agencies, ensure roads are restored satisfactorily.

TRANS-8 The project owner shall submit a site plan to Kern County Public Works Department, Engineering and Surveying Department, the CPM, and the CBO ensuring the provision of adequate parking, parking for persons with disabilities, per Title 24, loading lanes, and the design of parking and access according to the parking development standards and ensure adequate internal circulation within the project site.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit the site plan illustrating the provision of adequate parking, parking for persons with disabilities, per Title 24, loading lanes, and the design of parking and access according to the parking development standards and ensuring adequate internal circulation within the project site for review and comment to Kern County Public Works Department and Engineering and Surveying Department for review and comment and to the CPM and CBO for review and approval.

TRANS-9 The project owner shall submit construction plans ensuring adequate emergency access per Kern County Fire Department officials and showing adequate emergency access turning radius, sight distances, lines-of-sight, grades, lane widths, etc.

Verification: At least 90 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County emergency access standards and ensuring adequate emergency access within the project site by showing adequate emergency access turning radius, sight distances, lines-of-sight, grades, lane widths, etc to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

TRANS-10 The project owner shall provide construction drawings meeting Kern County standards pertaining to encroachment permits, franchise agreements, and trenching for the HTF pipelines, transmission lines and water pipeline. In addition, the project owner shall install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit construction drawings, meeting the Kern County encroachment permit and trenching standards for project related HTF pipelines, transmission lines and water pipeline activities to the Kern County Roads Department for review and comment to the CBO and CPM for review and approval.

At least 60 days prior to the start of site mobilization, the project owner shall provide franchise agreements to the CBO and CPM for review and approval.

The project owner shall install crossing structures and netting, if required by Kern County, across Brown Road as a safety precaution and to reduce the potential for damage from falling construction materials or equipment during cable-stringing activities during transmission line installation crossing Brown Road.

TRANS-11 The project owner shall provide 15 foot temporary driveway diversions within 10 feet immediately adjacent to the existing driveway location and phase the installation when necessary during water pipeline construction.

Verification: During water pipeline construction, the project owner shall notify the CPM of each driveway to be affected by the construction and provide evidence that the driveway diversion adequately provides access to public and private roads and driveways.

C.10.13 CONCLUSIONS

The Ridgecrest Solar Power Project (RSPP) would conflict with an applicable laws, ordinances, regulations, and standards (LORS) pertaining to State and Kern County's level of service (LOS) standards. LOS D is the minimum acceptable LOS standard for State highways and Kern County roads. The Brown Road, US 395 and China Lake Boulevard intersection currently operates at LOS B but project related construction trips would degrade the LOS for the intersection to LOS E. California Energy Commission staff's (staff) recommended conditions of certification would ensure that the proposed RSPP does not conflict with and would be in compliance with applicable LORS. Other transportation system aspects of the RSPP would be in compliance with applicable LORS related to traffic and transportation, including the Circulation Element of the County of Kern County General Plan and Municipal Code and the Circulation-Transportation Element of the Ridgecrest General Plan Circulation Element.

RSPP would introduce an impact (significant under CEQA) related to traffic safety. The Brown Road, US 395 and China Lake Boulevard intersection experiences a collision rate almost three times the State average for similar intersections. Project related construction trips are likely to significantly increase the collision rate at the intersection. Fifteen percent more vehicle trips (approximately 583) would encounter the intersection as a means to access the proposed RSPP site.

RSPP would introduce an impact (significant under CEQA) with respect to glare. The solar mirror troughs would reflect light or create glare posing a hazard to motorists.

RSPP induced impacts related to glare hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

RSPP would introduce impacts (significant under CEQA) related to vertical velocity plumes and glare affecting pilots. Military operations occur at low altitudes over the proposed project site. R2506 is a restricted military air space for the purposes of providing the military an area for performing low altitude maneuvers. In addition, civilian aircraft may fly over the proposed project site, with permission from the military. Further, the area within 20 miles of the Inyokern airport presents ideal conditions for sailplanes and pilot instruction due to the many atmospheric and geographic conditions of the eastern side of the Sierra Nevada Mountains.

Vertical velocity plumes are unseen currents of air exhausted upward from the Air Cooled Condenser (ACC) stacks that would pose a hazard to aircraft with direct over flight of these facilities. As presented above, there is a potential that military and civilian flight paths and patterns would occur over the proposed RSPP site. RSPP induced impacts related to the vertical velocity plume hazards would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

Similar to the affect glare or reflection may pose on motorists, the solar mirror troughs would reflect light or create glare that pose a hazard to civilian and to military flight operations. RSPP induced impacts related to hazards affecting pilots would be mitigated (reduced to less than significant under CEQA) with the implementation of staff's recommended conditions of certification.

C.10.14 REFERENCES

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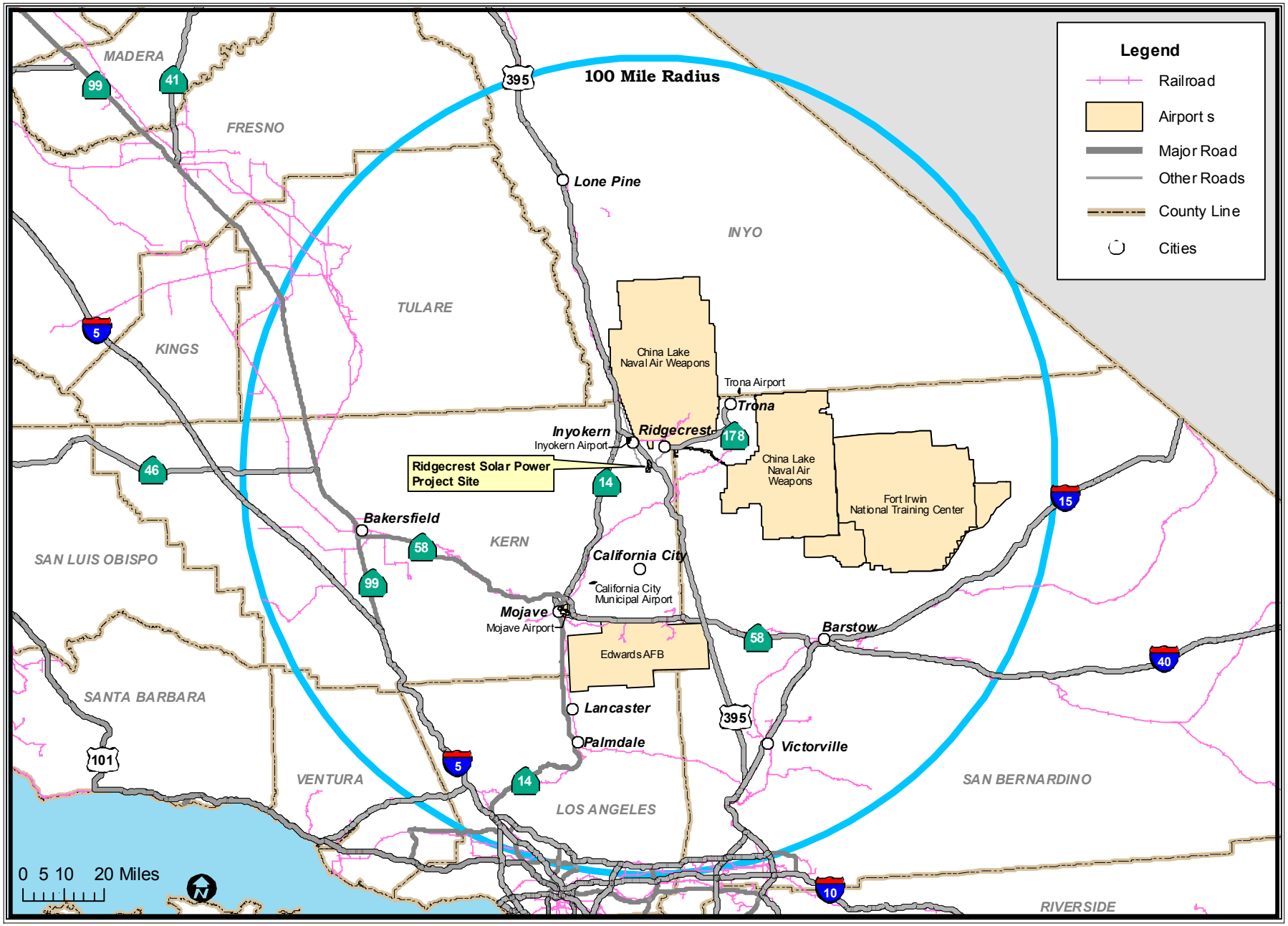
TRAFFIC AND TRANSPORTATION - FIGURE 1

Ridgecrest Solar Power Project - Regional Traffic and Transportation Related Facilities



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

SOURCE: Solar Millennium LLC and Multinet 09

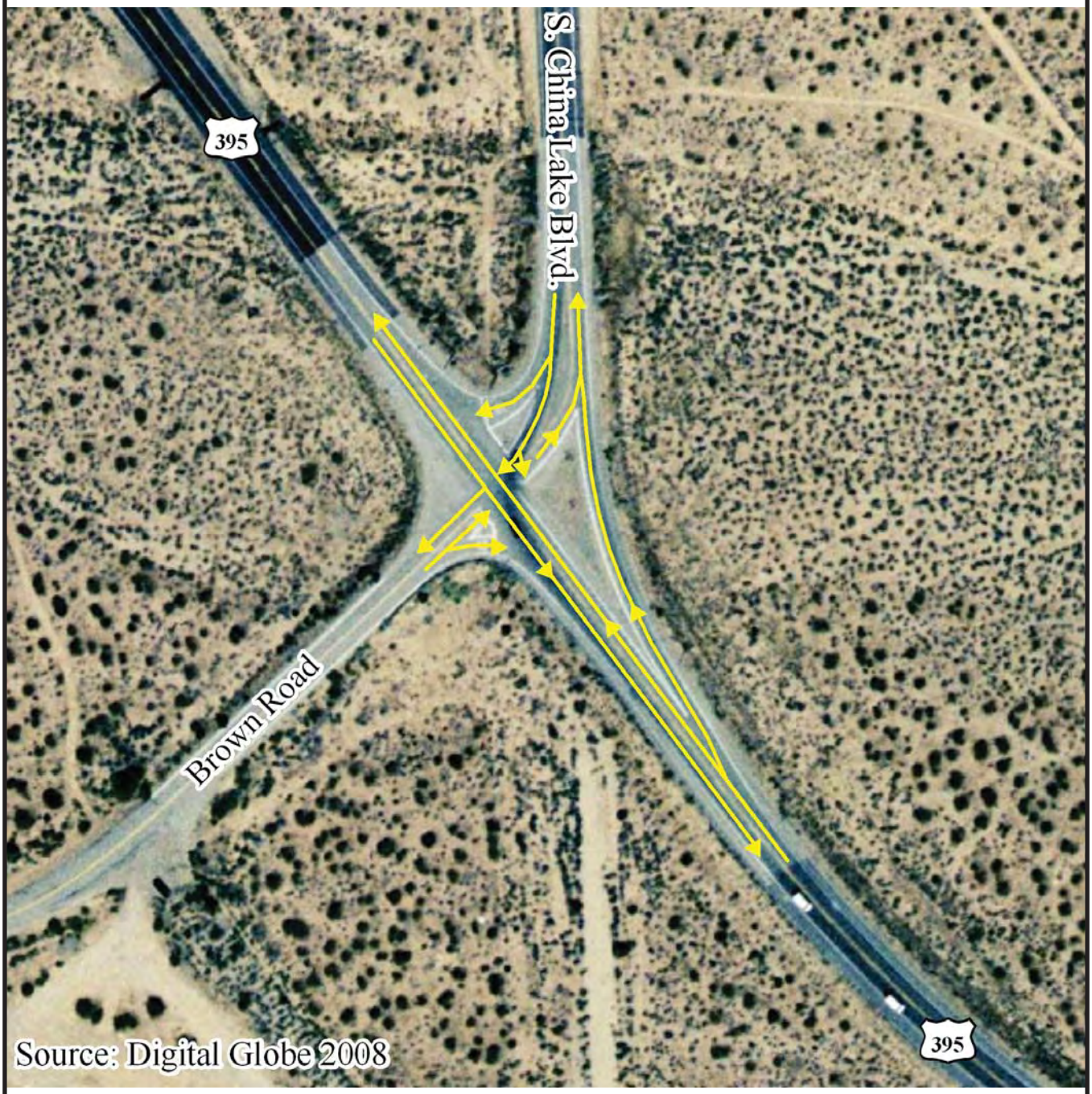
TRAFFIC AND TRANSPORTATION - FIGURE 2

Ridgecrest Solar Power Project - Brown Road, US 395 and China Lake Blvd. Intersection Grade Separation

SOURCE: California Energy Commission

TRAFFIC AND TRANSPORTATION - FIGURE 3

Ridgecrest Solar Power Project - US395, Brown Road, and S. China Lake Blvd



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

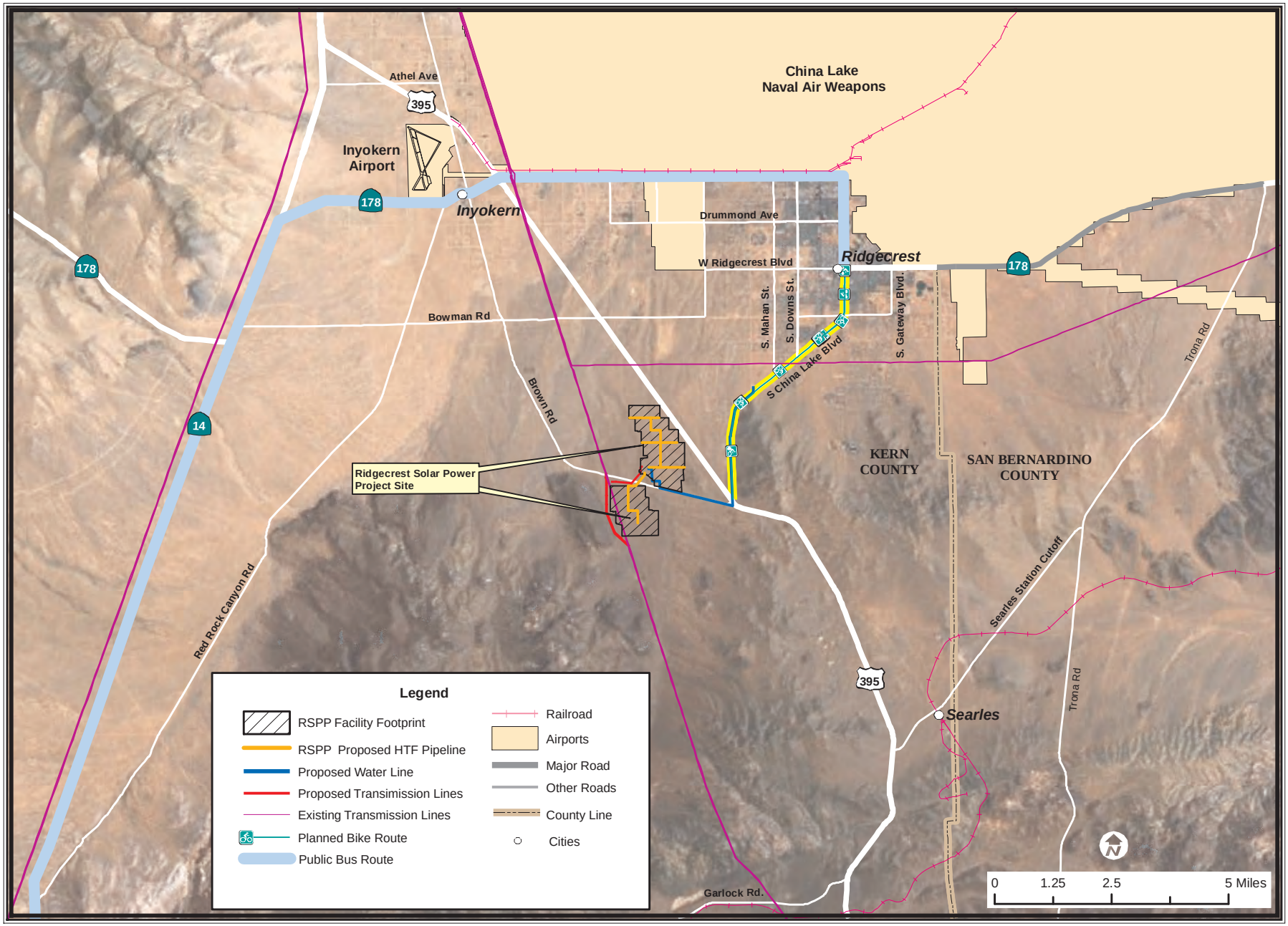
TRAFFIC AND TRANSPORTATION - FIGURE 4

Ridgecrest Solar Power Project - SR 178 and Brown Road

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

TRAFFIC AND TRANSPORTATION - FIGURE 5

Ridgecrest Solar Power Project - Localized Traffic and Transportation Related Facilities



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

SOURCE: Solar Millennium LLC and Multinet 09

C.11 TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

C.11.1 SUMMARY OF CONCLUSIONS

The applicant, Solar Millennium LLC, (Solar Millennium) proposes to transmit the power from the proposed Ridgecrest Solar Power Project (RSPP) to the Southern California Edison's (SCE's) transmission grid through the existing SCE 230-killovolt (kV) Inyokern/Kramer Junction transmission line passing west of the project site 300 feet from the project boundaries. The on-site tie-in line to be used for the project would be a 0.5-mile overhead 230-kV line connecting the project's proposed switchyard to a planned SCE Millennium 230-kV substation to the west, adjacent to the plant facility. It is from this new SCE substation that the connection would be made with the Inyokern/Kramer Junction line. Building RSPP would require relocation of two existing SCE transmission lines along the southwestern corner of the southern solar field. This line relocation would be under the jurisdiction of the California Public Utilities Commission (PUC) and the Bureau of Land management (BLM).Therefore, this staff analysis is for the tie-in project line as it stretches from the proposed on-site substation to the new SCE Millennium substation near the Inyokern/Kramer Junction line. Since the proposed tie-in line would be located in the SCE service area, it would be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards (LORS). The area around the proposed route is undisturbed desert land with the nearest residence located approximately 3,200 feet from the northwestern site boundary thereby eliminating the potential for residential electric and magnetic field exposures when the line is operating. With the four proposed conditions of certification, any safety and nuisance impacts from operating proposed tie-in line would be less than significant.

C.11.2 INTRODUCTION

The purpose of this Staff Assessment/Draft Plan Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) is to assess the proposed Ridgecrest Solar Power Project's (RSPP's) transmission line's design and operational plan to determine whether its related field and nonfield impacts would constitute a significant environmental hazard in the areas around the proposed route. Power from RSPP would be generated from two solar fields and transmitted to the Southern California Edison's (SCE's) power grid using an overhead single-circuit 230-kilovolt (kV) line that stretches across the 0.5- mile distance between the proposed RSPP switchyard and the connection point on a planned SCE substation adjacent to the Inyokern/Kramer Junction line to the west. This staff analysis is for the proposed RSPP tie-in line and the related on-site switchyard to be built and operated by the applicant. The potential impacts of concern are those to be encountered along the proposed 0.5-mile route. All related health and safety laws, ordinances, regulations, and standards (LORS) are currently aimed at minimizing such impacts along any given line corridor. Staff's

analysis focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

Section C.11.3 shows the federal, state, and local laws and policies that apply to the control of the field and nonfield impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

C.11.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry practices. These LORS and practices have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Transmission Line Safety and Nuisance (TLSN) Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" form (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
Kern County General Plan, Noise Element	Establishes policies and programs to ensure that noise levels are appropriate to land uses.
Kern County Noise Ordinance	Establishes performance standards for planned residential or other noise-sensitive land uses.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.

Applicable LORS	Description
Title 8, California Code of Regulations (CCR) section 2700 et seq. “High Voltage Safety Orders”	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

C.11.4 PROPOSED PROJECT

C.11.4.1 SETTING AND EXISTING CONDITIONS

As discussed by the applicant, Solar Millennium LLC, the two solar fields of the proposed Ridgecrest Solar Power would produce 250 megawatts (MW) of electric power and occupy a total of 1,760 acres of federal land currently managed by the Bureau of Land Management (BLM). The site is vacant undeveloped desert located southwest of U. S. Highway 395 and approximately 4.5 miles southwest of the City of Ridgecrest, California in northeastern Kern County (Solar Millennium 2009a, p 2-3). As more fully discussed by the applicant, the proposed RSPP would consist of two solar fields: Solar Field # 1 to the north of Brown Road and Solar field # 2 to the south of brown Road. The generated power would be transmitted to the SCE power grid from a common switchyard using the single-circuit overhead, 230-kV line that would connect to a new SCE Millennium substation adjacent to the plant. Connection to this existing SCE grid line (the Kramer/Inyokern line) would be made by routing the line around the project site and looping it into the new SCE 230-kV substation.

There are two SCE lines (one of 115 kV and another of 230 kV) that presently traverse the southern portion of the site. Building RSPP would require relocation of both lines by SCE. The applicant has identified a specific land corridor to be used for such relocation under the jurisdiction of the California Public Utilities Commission (CPUC) and the Bureau of Land Management, BLM (Solar Millennium 2009a, p. 2-3). Since this planned line relocation would be under CPUC jurisdiction, the design and construction of the line and the new related SCE Millennium substation would be implemented according to SCE guidelines in keeping with existing LORS.

The proposed project site is in an uninhabited open desert land with no existing structures other than the noted SCE lines to be relocated. The route of the proposed project tie-in line is largely uninhabited desert land with the nearest residence being more than one mile away (Solar Millennium 2009, p. 5.7-16). This general absence of residences in the immediate vicinity of the line right-of-way means that there would not be the type of residential field exposure that has been of health concern in recent years over power line operation.

PROJECT DESCRIPTION

The proposed RSPP 230-kV tie-in line would consist of the following individual segments:

- A new, single-circuit 230-kV overhead transmission line extending 0.5 miles west from the on-site project switchyard to the planned 230-kV SCE substation from which the power would be transmitted to the existing 230-kV Inyokern/Kramer Junction grid line; and
- The project's on-site 230-kV switchyard from which the conductors would extend to the planned SCE connection substation for the Inyokern/Kramer Junction line.

The conductors for the proposed PSPP line would be aluminum steel-reinforced cables supported on steel pole structures with a maximum height of 120 feet as typical of

similar SCE lines. The applicant (Solar Millennium 2009a, Figure 5.14-1) provided the details of the proposed support structures as related to line safety, maintainability, and field reduction efficiency.

C.11.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Direct IMPACTS and MITIGATION METHODS

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The requirements listed on **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (Solar Millennium 2009a, p, p. 5.14-6), these regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet from the runway. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from this runway. For heliports, the restricted space is an area that extends 5,000 feet.

The closest operational airports are the Inyokern Airport and the China Lake Naval Air Weapons Station approximately seven miles from the site respectively. As noted by the applicant, these airports would, at a seven-mile distance be too far away for the proposed line and the existing on-site SCE lines to pose an aviation hazard to utilizing aircraft. Also, the maximum height of 120 feet for the proposed line support structures (Solar Millennium 2009a p.2-27, and Figure 5.14-1) would be much less than the 200 feet height that triggers the concern over aviation hazard according to FAA requirements. Therefore, staff does not recommend any related condition of certification.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the

magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed project line would be built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not for 230-kV lines such as the proposed line. The line's proposed low-corona designs are used for all SCE lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Since the proposed line would traverse an uninhabited open space, staff does not expect any corona-related radio-frequency interference or related complaints and does not recommend any related condition of certification.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345 kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345 kV as proposed for RSPP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff's analysis in the **NOISE AND VIBRATION** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures for similar SCE lines would be implemented for the proposed project line (Solar Millennium 2009a, p. 5.14-10). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-3** is recommended to ensure compliance with important aspects of the fire prevention measures.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (Solar Millennium 2009a, p. 5.14-10) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). For the proposed project line, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the right-of-way.

The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices (Solar Millennium 2009a, p.5, 14-7). Staff recommends Condition of Certification **TLSN-4** to ensure such grounding for RSPP.

Electric and Magnetic Field Exposure

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

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

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

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State's Approach to Regulating Field Exposures

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line

voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors, and, in the case of magnetic fields, amount of current in the line.

Since the CPUC currently requires that most new lines in California be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project line according to existing SCE field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings specified in Decision D.06-1-42 of January 2006, did not point to a need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project line, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential significance would be the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern.

Industry's and Applicant's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short term, while the exposures from power lines are lower level, but long term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar SCE lines, specific field strength-reducing measures would be incorporated into the proposed line's design to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. Increasing the distance between the conductors and the ground to an optimal level;

2. Reducing the spacing between the conductors to an optimal level;

3. Minimizing the current in the line; and

4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

Since the proposed project line would have no residences in the immediate vicinity of its right-of-way, the long-term residential field exposures at the root of the health concern of recent years would not be a significant concern during operations. The field strengths of most significance in this regard would be as encountered at the edge of the line's 150-foot right-of-way. These field intensities would depend on the effectiveness of the applied field-reducing measures. The applicant (Solar Millennium 2009a, p. 5.14-9 and Figures 5.14-2 and 5.14-3) calculated the maximum electric and magnetic field intensities expected along the proposed route of the project line. Staff has verified the accuracy of the modeling approach used in the applicant's calculations with regard to parameters bearing on field strength dissipation and exposure assessment. The maximum electric field strength was calculated as 0.053 kV/m at the edge of the 150-foot right-of-way and is thus similar to those of SCE lines of the same voltage rating. The maximum magnetic field intensity of approximately 18.2 mG at the edge of this right-of-way is similar to that of SCE lines of the same current-carrying capacity (as required under current CPUC regulations) but is much less than the 200 mG currently specified by the few states with regulatory limits. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to validate the applicant's assumed reduction efficiency.

CLOSURE AND DECOMMISSIONING IMPACTS AND MITIGATION

If the proposed RSPP were to be closed, decommissioned and all related structures are removed as described in the **PROJECT DESCRIPTION** section, the minimal area aviation risk and electric shocks and fire hazards from the physical presence of this tie-in line would be eliminated. Decommissioning and removal would also eliminate the line's field impacts assessed in this analysis in terms of nuisance shocks, radio-frequency impacts, audible noise, and electric and magnetic field exposure. Since the line would be designed and operated according existing SCE guidelines, these impacts would be as expected for SCE lines of the same voltage and current-carrying capacity and therefore, at levels reflecting compliance with existing health and safety LORS.

C.11.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because its use would eliminate 42% of the proposed project area so all possible impacts are reduced proportionately, especially those related to desert washes, biological and cultural resources, and recreational land uses. Its use would also prevent building a solar facility in the Mojave Ground Squirrel Conservation Area (MGSCA). The boundaries of this alternative are as shown in **Alternatives Figure 1**.

C.11.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 176 solar collectors with a net generating capacity of 146 MW occupying 1,135 acres of land. This alternative would retain 58% of

the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. Please see the discussion of existing conditions within affected BLM lands under Section C.11.4.1

C.11.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

As with the proposed project, the power from the proposed Northern Unit Alternative would be transmitted to the SCE power grid through the planned SCE 230-kV Millennium Substation adjacent to the project site. The same 230-kV line would be used but the two existing on-line SCE lines would not need relocation. The field impacts on the line would be proportionately smaller. Since the line would be designed and operated according to the applicable SCE guidelines, the magnitude of the field and nonfield impacts of concern in this analysis would be as expected for SCE lines of the same voltage and current-carrying capacity. These impacts would manifest themselves as the noted effects on radio frequency communication, audible noise, hazardous and nuisance shocks, electric and magnetic field levels, fire hazards and aviation safety.

C. 12.5.3 CEQA LEVEL SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of this design (as required by the four recommended conditions for certification) to also result in impacts at less than-significant levels for both the proposed and reduced-acreage Northern Unit Alternative.

C.11.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar project located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because its use would eliminate 58% of the proposed area so that all impacts are reduced proportionately, especially impacts on desert washes, biological and cultural resources. The boundaries are as shown in **Alternatives Figure 2**.

C.11.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of 104 MW and occupying approximately 826 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed project. Building this alternative would prevent use of a large portion of the El Paso Wash and sensitive biological resources including areas mapped as occupied by the desert tortoise and the Mojave ground squirrel. The setting is generally the same as that described in Section C.11.4.1.

C.11.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

As with the proposed project, the power from the Southern Unit Alternative would be transmitted to the SCE power grid through the planned SCE Millennium substation adjacent to the project. The proposed project line would still be used to connect the project's on-site switchyard to the existing SCE 230-kV transmission line to the west. As with the proposed project, use of the Southern Alternative would require relocation of the two on-site SCE lines which would require 58.2 acres. Building and operating the smaller 104 MW project would lead to proportionately smaller impacts. Since the line would (a) be constructed, operated, and maintained according to SCE's guidelines for line safety and field management which conform to applicable laws, ordinances, regulations and standards and (b) would traverse undisturbed desert land with no nearby residents, its use would eliminate the concern over residential electric and magnetic field exposures.

C.11.6.3 CEQA LEVEL OF SIGNIFICANCE

With the four conditions of certification recommended for the proposed project, any safety and nuisance impacts from the proposed line would be less than significant.

C.11.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

The Original Proposed Project Alternative would be a 250 MW solar facility as originally proposed by Solar Millennium. This alternative is analyzed because its use would

reduce the amount of land developed within the Mojave Ground Squirrel Conservation Area while allowing for generation and transmission of the full 250 MW of power that Solar Millennium proposes.

C.11.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of 250 MW occupying approximately 1,760 acres of land. This alternative would occupy approximately 755 acres north of Brown Road and approximately 685 acres south of Brown Road. A shorter transmission interconnection would be needed, 1,250 feet as compared to 3,900 feet for the project. The boundaries are as shown in **Alternatives Figure 3**. This project footprint would includes two ephemeral desert washes that would require redirection and smaller dry desert washes that also traverse the site. In addition, the site is located on prime desert tortoise and Mojave ground squirrel habitat.

C.11.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff's analysis focuses on the transmission line required to serve the generation facility, and addresses the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

As with the proposed project, power from the Original Proposed Project Alternative would be transmitted to the SCE power grid through the planned SCE 230-kV substation located near the proposed project site. This alternative would also require relocation of the existing SCE transmission lines but the alignment of the required transmission line would require a line of 550 feet rather than the 0.5 miles currently proposed. This alternative is analyzed because its use would reduce the land developed within the Mojave Ground Squirrel Conservation Area (MGSCA). It would also allow for production of solar energy in the amount presently proposed. However, the area of potential field impacts would be much smaller than for the proposed project because of the shorter distance..

C.11.7.3 CEQA LEVEL OF SIGNIFICANCE

Since staff finds the potential impacts of line operations to be at less than significant levels for the proposed SCE design, staff would expect implementation of this design (as required by the four recommended conditions for certification) to potentially result in

less than significant impacts for both the proposed and the Original Proposed Project Alternative whose related tie-in line would be shorter, proportionately reducing the areas of field and nonfield impacts.

C.11.8 NO ACTION ALTERNATIVE

With the No Project/No Action Alternative, the proposed action would not be undertaken. Unless BLM implements an amendment to the CDCA Plan, the BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan.

C.11.8.1 SETTING AND EXISTING CONDITIONS

The setting for the No Project/No Action Alternative would include lands on which the proposed project would be located along with its linear facilities. Subsection C.11.4.1 (above) describes in detail the lands that would be affected.

C.11.8.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

In the No Project / No Action Alternative, the proposed action would not be undertaken. The BLM land on which the project is proposed would continue to be managed within BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality [43 U.S.C. 1781 (b)] in conformance with applicable statutes, regulations, policy and land use plan. For example, there are seven large solar projects proposed on BLM land within the area served by the BLM El Centro Field Office, and there are currently 70 applications for solar projects covering 611,692 acres pending with BLM in the California Desert District.

Under the No Project/No Action alternative, the transmission line safety and nuisance impacts of the Ridgecrest Solar Power Project would not occur at the proposed site. This would help reduce the total human exposure to area field and non-field impacts from electric power lines in general.

C.11.8.3 CEQA LEVEL OF SIGNIFICANCE

Under the No Project/No Action alternative, the transmission line safety and nuisance impacts from the proposed project line would not occur thereby contributing to the general effort to reduce these impacts on humans. However, given the potentially low levels of these line impacts, such contribution to exposure reduction would be less than significant.

C.11.9 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future

projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. Since the proposed project's transmission line would be designed, built, and operated according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

C.11.10 COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is SCE. Since the proposed project 230-kV line and related switchyards would be designed according to the respective requirements of the LORS listed in **TLSN Table 1**, and operated and maintained according to current SCE guidelines on line safety and field strength management, staff considers the proposed design and operational plan to be in compliance with the health and safety requirements of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-2**.

C.11.11 NOTEWORTHY PUBLIC BENEFITS

Since the proposed RSPP tie-in line would pose specific, although insignificant risks of the field and nonfield effects of concern in this analysis, its building and operation would not yield any public benefits regarding the effort to minimize any human risks from these impacts.

C.11.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

TLSN-1 The project owner shall construct the proposed transmission line (anywhere along the area identified by the applicant as available for its routing) according to the requirements of: (a) California Public Utility Commission's GO-95, GO-52, GO-131-D, Title 8, and Group 2, (b) High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and (c) Southern California Edison's EMF reduction guidelines.

Verification: At least 30 days before starting the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project

Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the line at the points of maximum intensity along the route for which the applicant provided specific estimates. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed no later than 6 months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission line are kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first 5 years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way and provide such summaries in the Annual Compliance Report on transmission line safety and nuisance-related requirements.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the right-of-way of the project-related lines are grounded according to industry standards regardless of ownership.

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

C.11.13 CONCLUSIONS

Since staff does not expect the proposed 230-kV transmission tie-in line to pose an aviation hazard according to current FAA criteria, we do not consider it necessary to recommend specific location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed RSPP and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for SCE lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be routed through an area with no nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable LORS. With implementation of the four recommended conditions of certification, any such impacts would be less than significant.

C.11.14 REFERENCES

Solar Millennium 2009a (tn:53100). Application for Certification for the Palen Solar Power Project, Volumes I and II. Submitted to the California Energy Commission on September 1, 2009.

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

National Institute of Environmental Health Services. 1998. *An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields*. A Working Group Report, August 1998.

C.12 VISUAL RESOURCES

Testimony of Michael Clayton

C.12.1 SUMMARY OF CONCLUSIONS

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

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

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

Energy Commission staff also concludes that the proposed project would likely result in adverse but less than significant visual impacts on views from the northern ridges of the El Paso Mountains though the extent to which glare and/or glint from project structures is visible from the El Paso Mountains could ultimately determine the significance of the visual impact experienced at that location.

Also, Energy Commission staff concludes that there are no Kern County General Plan goals, policies, or implementation measures pertaining to visual resources that would apply to the proposed project.

Finally, Energy Commission staff concludes that the project in combination with foreseeable future projects (both local and region-wide) would cause significant unavoidable cumulative visual impacts of two kinds:

1. Cumulative impacts in combination with foreseeable future solar, renewable, and other energy and development projects within the immediate project viewshed would be visible within the same field of view; and

2. Cumulative impacts in combination with foreseeable future solar and other renewable energy projects would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape along within the California Desert Conservation Area overall.

If the Energy Commission approves the project, Energy Commission staff recommends that all of the Energy Commission staff's proposed conditions of certification be adopted in order to minimize impacts to the greatest extent feasible. Conditions of certification referred to herein serve the purpose of both the Energy Commission's conditions of certification for purposes of CEQA and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA).

C.12. 2 INTRODUCTION

Visual resources are the natural and cultural features of the environment that can be viewed. This analysis focuses on whether the Solar Millennium Ridgecrest Solar Power Project (RSPP) would cause significant adverse visual consequences and whether the project would be in compliance with applicable laws, ordinances, regulations, and standards (LORS) including the guidelines of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). The determination of the potential for significant impacts to visual resources resulting from the proposed project is required by CEQA. The following section describes the visual resources methodology employed for the CEQA analysis (Energy Commission staff's methodology), as well as the thresholds for determining environmental consequences (as discussed above in the Summary of Conclusions section. BLM has agreed to utilize the Energy Commission's methodology for the purpose of this joint document and agrees that the conclusions would likely be similar. Therefore, Energy Commission staff's conclusions based on the staff's methodology will satisfy the NEPA requirements). In accordance with Energy Commission staff's procedure, conditions of certification are proposed as needed to reduce potentially significant impacts (under CEQA) to less than significant levels or to the extent possible, and to ensure LORS conformance, if feasible.

C.12.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

BLM has agreed to utilize the Energy Commission's methodology for the purpose of this joint document and agrees that the conclusions would likely be similar. Therefore, because of the similarity of the methodological inputs and outcomes of the Energy Commission staff's methodology compared to BLM's VRM methodology, Energy Commission staff concludes that the visual contrast and level of change determinations under the staff's method would be comparable to the visual contrast and level of change results of the Visual Contrast Rating methodology under the VRM System. Therefore, the visual analysis for PSPP utilized the Energy Commission staff's standard visual assessment methodology (Visual Sensitivity – Visual Change) to satisfy the requirements under CEQA <u>and</u> NEPA.

The approach is based on detailed analysis from representative Key Observation Points (KOPs). KOPs are generally selected to be representative of the most critical locations from which the project would be seen. KOPs are selected based on their usefulness in evaluating existing landscapes and potential impacts on visual resources with various levels of sensitivity, in different landscape types and terrain, and from various vantage points. Typical KOP locations for the proposed project and alternatives include (1) along major or significant travel corridors (U.S. 395); (2) local roads (Brown Road); (3) along

recreational access 4WD roads and trails; (4) at key vista points; (5) from publically accessible vantagepoints within designated Wilderness or other protected areas; and (6) at locations that provide good examples of the existing landscape context and viewing conditions.

At each KOP, the existing landscape was characterized. Where possible, photographs were obtained to indicate existing conditions without the project and then were modified to include a simulation of the project. Consequently, Energy Commission staff would typically have a visual representation of the viewshed before and after a project is introduced to assist in the analysis. However, in some cases, digital terrain (Google Earth) perspectives were developed to assist in the understanding of project visibility, particularly when existing conditions photographs and/or visual simulations were not available in time for the analysis. The Google Earth perspectives are not simulations and do not indicate what the project would look like, nor the degree of contrast in form, line, color, and texture. They do indicate location, project dominance and mass, and basic visibility from specific vantagepoints.

The following subsections describe the approach for analyzing the existing visual setting and project-induced environmental consequences as well as the thresholds for determining environmental consequences.

VISUAL SETTING

When analyzing existing conditions, Energy Commission staff considers the elements of visual quality, viewer concern, visibility, number of viewers, and duration of view. Those parameters are then factored into an overall rating of viewer sensitivity. Each rating component is discussed in the following paragraphs.

Visual Quality

Visual quality is an expression of the visual impression or appeal of a given landscape (landforms, rock forms, water features, vegetative patterns, and cultural features). Visual quality is rated from *low to high*. Landscapes rated *low* are often dominated by visually discordant human alterations. Landscapes rated high generally are memorable because of the way the components combine in a visual pattern. In addition, those landscapes are typically free from encroaching elements, thus retaining their visual integrity. Finally, landscapes with high visual quality are visually coherent and harmonious when each element is considered as part of the whole.

Viewer Concern

Viewer concern addresses the level of interest or concern of viewers regarding an area's visual resources and the potential for visible change in the landscape. Viewer concern is closely associated with viewers' expectations for a given viewshed (an area of land visible from a fixed vantage point) and reflects the importance placed on a given landscape based on the human perceptions of the intrinsic beauty and visual interest of the existing landscape characteristics. Official statements of public values and goals and adopted expressions of local public policy pertaining to visual resources (e.g. Conservation Plans, General Plans and Conservation Area designations) reflect viewers' expectations regarding a visual setting and are given great weight in determining levels of viewer concern.

Land uses associated with 1) designated parks, monuments, and wilderness areas, 2) scenic highways and corridors, 3) recreational areas, 4) conservation areas, and 5) residential areas are generally considered to have high viewer concern. However, existing landscape character may temper viewer concern on some State and locally designated scenic highways and corridors though, in general, people driving for pleasure or engaged in recreational activities tend to have high viewer concern.

Travelers on other highways and roads, including those in rural or agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features.

Commercial uses and their occupants, including business parks and hotels, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality, with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, that indicate high viewer concern.

Industrial uses typically have the lowest viewer concern because workers are focused on their work, and generally are working in surroundings with relatively low visual value. However, some areas of lower visual quality and degraded visual character may contain particular views of substantially higher visual quality or interest to the public.

Visibility

Visibility is a measure of how well an object can be seen. Visibility depends on the angle or direction of views; viewing distance; extent of visual screening; and topographical relationships between the object and existing homes, streets, or parks. Visibility takes into consideration any and all obstructions that may be in the sightline including trees and other vegetation, buildings, transmission poles or towers, general air quality conditions such as haze, and general weather conditions such as fog.

Number of Viewers

Number of viewers is a measure of the number of viewers per day who would have a view of the proposed project and can range from *low* to *high*. The types of viewers can include residents, motorists and recreationists.

Duration of View

Duration of view is the amount of time to view the site. For example, a high or extended view of a project site is one reached across a distance in two minutes or longer. In contrast, a low or brief duration of view is reached in a short amount of time—generally less than ten seconds.

Viewer Exposure

Viewer exposure is a function of three elements previously listed, *visibility*, *number of viewers*, and *duration of view*. Viewer exposure can range from a *low* to *high*. A partially obscured and brief background view for a few motorists represents a low value; and an unobstructed foreground view from a large number of residences represents a high value.

Visual Sensitivity

Visual sensitivity is derived from three elements previously listed, *visual quality*, *viewer concern*, and *viewer exposure* and is a concluding assessment as to an existing landscape's susceptibility to an adverse visual outcome. A landscape with a high degree of visual sensitivity is able to accommodate only a lower degree of adverse visual change without resulting in a significant visual impact. A landscape with a low degree of visual sensitivity is able to accommodate a higher degree of adverse visual change before exhibiting a significant visual impact. Visual sensitivity can range from *low* to *high*.

PROJECT-INDUCED VISUAL CHANGE

To determine the visual change that the project would cause, Energy Commission staff considered the elements of contrast, dominance and view blockage that would be experienced at each representative KOP. Where available, photographic simulations of the project were also utilized to assist in the analysis. Each component of the visual change analysis is discussed below.

Visual Contrast

Visual contrast concerns the degree to which a project's visual characteristics or elements —form, line, color, and texture — differ from the same visual elements in the existing landscape. The degree of contrast can range from *low* to *high*. A landscape with forms, lines, colors, and textures similar to those of the proposed energy facility is more visually absorbent; that is, more capable of accepting those characteristics than a landscape in which those elements are absent.[1] Generally, visual absorption is inversely proportional to visual contrast. Visual contrast ranges from *low* to *high*.

Dominance

Dominance is a measure of (a) the proportion of the total field of view occupied by the feature; (b) a feature's apparent size relative to other visible landscape features; and (c) the conspicuousness of the feature due to its location in the view.

A feature's level of dominance tends to be lower in a panoramic setting compared to a setting with confined sightlines with a focus on the feature itself. A feature's level of dominance is higher if it is (1) near the center of the view; (2) elevated relative to the viewer; or (3) has the sky as a backdrop. As the distance between a viewer and a feature increases, its apparent size decreases; and consequently, its dominance decreases. The level of dominance ranges from *subordinate* to *dominant*.

View Blockage

The extent to which any previously visible landscape features are blocked from view constitutes view blockage or impairment. The view is also impaired when the continuity of the view is interrupted. When considering a project's features, higher quality landscape features can be blocked by lower quality project features, thus resulting in adverse visual impacts. The degree of view blockage can range from *none* to *high*.

[1] Typically, the Energy Commission does not consider texture in its visual analyses.

Visual Change

Visual change is derived from the three elements – *contrast*, *dominance*, and *view blockage* and is a concluding assessment as to the degree of change that would be caused by a project. The degree of visual change can range from *low* to *high*.

THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The following regulatory criteria were considered in determining whether a visual impact would be significant under CEQA.

State

The CEQA *Guidelines* define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance." (Cal. Code Regs., tit.14, § 15382.) Appendix G of the *Guidelines*, under Aesthetics, lists the following four questions to be addressed regarding whether the potential impacts of a project are significant:

1. Would the project have a substantial adverse effect on a scenic vista?

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

4. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Local

Energy Commission staff considers any local goals, policies, or designations regarding visual resources. Conflicts with such laws, ordinances, regulations, and standards can constitute significant visual impacts. See Section C.12.10 for Applicable **LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)**.

C.12.4 PROPOSED PROJECT

C.12.4.1 SETTING AND EXISTING CONDITIONS

Regional Landscape

The proposed project landscape is part of the Great Basin section of Fenneman's Basin and Range physiographic province, a vast desert area of the western U.S. extending from eastern Oregon to western Texas, characterized by periodic north-south trending, highly eroded mountain ranges that rise sharply from and are separated by broad, flat desert valleys (Fenneman, 1931). The project site is located in the southern portion of Indian Wells Valley within the high elevation Mojave Desert. The site is adjacent and to the southwest of U.S. 395, approximately five miles southwest of Ridgecrest in

northeastern Kern County. The southern portion of the broad valley floor is an expansive, high desert plain bordered by the southern extent of the Sierra Nevada Mountains to the west, the Coso and Argus Ranges to the north, the Spangler Hills to the east and the El Paso Mountains to the south.

Project Site

At an elevation of approximately 2,700 feet, the project site is presently undeveloped and appears predominantly intact. As noted in the AFC, the natural features of the site form a strong, coherent pattern, and the visual integrity in the natural landscape is high (SM 2009a, page 5.15-7). The site landscape consists primarily of desert scrub vegetation and desert dry wash woodland composed largely of creosote bush and species typical of the riparian shrub woodland community respectively. The site is crossed by Brown Road and a desert wash. Two transmission lines also cross the western edge of the southern development area. U.S. 395 passes immediately adjacent and to the northeast of the site and there are numerous BLM 4WD roads and established 4WD tracks that provide recreational access through the site to the surrounding valley and hills. A railroad grade bike trail also passes immediately to the southwest to west of the site. **Visual Resources Figure 1**, *Characteristic Landscape of the Project Site*, presents a view of the project site and shows the primarily natural setting comprised of a mosaic of, shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils. The rugged ridges, angular forms and bluish hue of the Sierra Nevada Mountains to the west of the project site provide a contrast of visual interest to the flat, light-, earth-toned colored, horizontal landform of the valley floor and project site. The area immediately surrounding the project site is lightly populated (AFC, Page 5.15-7).

Project Viewshed

The *viewshed* or area of potential visual effect (the area within which the project could potentially be seen) is extensive and encompasses much of Indian Wells Valley and many of the surrounding mountain ranges including the El Paso Mountains to the south, Scodie and Sierra Nevada Mountains to the west, Coso and Argus Ranges to the north, and the Spangler Hills to the east (see the orange colored area in **Visual Resources Figure 2**). The computer-generated viewshed mapping in **Visual Resources Figure 2** is based on the height of the proposed power block units and the 10-meter resolution (horizontal) USGS digital elevation model (DEM). A feature of this desert landscape is the potential for large projects to be seen over great distances where elevated viewpoints exist, due to the large open areas of level topography and absence of intervening landscape features.

Key Observation Points (KOPs)

Energy Commission staff evaluated the visual setting and proposed project in detail from several viewing areas represented by the following six key observation points including:

- **KOP 1** – U.S. 395, north of the project site in the vicinity of coordinates – Latitude: 35° 34’ 48.32” N, Longitude: 117° 44’ 19.83” W, viewing to the south.

- **KOP 2** – Westbound Brown Road, in the central project area in the vicinity of coordinates – Latitude: 35° 33’ 21.21” N, Longitude: 117° 44’ 40.05” W, viewing to the west-southwest.
- **KOP 3** – Eastbound Brown Road, in the central project area in the vicinity of coordinates – Latitude: 35° 33’ 27.88” N, Longitude: 117° 45’ 12.64” W, viewing to the east-northeast.
- **KOP 4** – Railroad Bed Bike Trail, southwest of the south development area, in the vicinity of coordinates – Latitude: 35° 32’ 32.82” N, Longitude: 117° 45’ 36.75” W, viewing to the north-northeast.
- **KOP 5** – West Hilltop, west of the south development area, in the vicinity of coordinates – Latitude: 35° 33’ 7.14” N, Longitude: 117° 46’ 14.36” W, viewing to the east.
- **KOP 6** – El Paso Mountains Wilderness, 4.5 miles southwest of the project, in the vicinity of coordinates – Latitude: 35° 30’ 47.39” N, Longitude: 117° 49’ 25.96” W, viewing to the northeast.

Each of these six key observation points is shown on **Visual Resources Figure 3**. At each KOP a visual analysis was conducted and a discussion of the visual setting for each KOP is presented in the following paragraphs and summarized in the figures following this section. Where available, existing conditions photographs are presented in **Visual Resources Attachment 1A-1D, 2A, 2B, 3A, 3B, 4A, and 4B** along with any available simulations and Google Earth perspectives.

KOP 1 – U.S. Highway 395

KOP 1 was selected to characterize the visual impact to travelers on U.S. 395 in the project vicinity. KOP 1 is located at the northeast corner of the north development area. The view is to the south and is depicted in the Google Earth perspective presented as **Visual Resources Figure 4A**. **Visual Resources Figure 4B** presents an existing view photograph from a nearby location on U.S. 395 approximately 0.5 mile further northwest. KOP 1 provides a panoramic, open and unobstructed view of the site. The foreground terrain is flat and supports desert scrub vegetation. The existing landscape appears predominantly natural in appearance with the exception of two transmission lines that pass along the southwest edge of the site (faintly visible in the image presented in **Visual Resources Figure 4B**). The project would be visible in the immediate foreground. The rugged, rolling to angular forms of the El Paso Mountains are visible in the background.

Visual Quality

Low-to-moderate. The foreground to middleground views from U.S. 395 encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the El Paso Mountains to the south. The mountain range adds visual interest and contributes to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes along the U.S. 395 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing high desert landscapes, such as those visible from KOP 1, are diminishing. Travelers on U.S. 395 (the primary north-south travel corridor east of the Sierra Nevada Mountains) would have expectations of observing higher quality landscape features while traveling through the northern high deserts within the designated conservation area (CDCA). Travelers would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing landscape, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

High. Site visibility is high in that the view of the site from KOP 1 is unobstructed at a foreground viewing distance. The number of viewers would be high and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence within the primary cone of vision of both northbound and southbound travelers on U.S. 395. The high visibility and number of viewers, combined with the extended duration of view, would result in high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on U.S. 395 in general and KOP 1 specifically, the low-to-moderate visual quality combined with high viewer concern and viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 2 – Westbound Brown Road

KOP 2 was selected to characterize the visual impact to travelers on Brown Road when viewing to the south toward the El Paso Mountains in the project vicinity. KOP 2 is located on westbound Brown Road in the central project area, approximately 0.1 mile northeast of the south development area. The view is to the west-southwest and is depicted in the Google Earth perspective presented as **Visual Resources Figure 5A**. **Visual Resources Figure 5B** presents an existing view photograph from a location on Brown Road approximately 1.25 miles further to the southeast, though that view is to the west-northwest. KOP 2 provides a panoramic, open and unobstructed view of the site, which is visible in the immediate foreground. The foreground terrain is flat and supports desert scrub vegetation and is backdropped by the rolling forms of the hill immediately adjacent and to the west of the south development area, and the El Paso Mountains beyond. The existing landscape is predominantly natural in appearance with the exception of two transmission lines that pass along the southwest edge of the site.

Visual Quality

Low-to-moderate. The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the hill west of the

project site and the El Paso Mountains to the south. Also visible are two transmission lines that pass along the western edge of the south development area. The hill and mountain range add visual interest and contribute to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley and along Brown Road (and the U.S. 395 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 2 is unobstructed at a foreground viewing distance. The number of viewers would be low-to-moderate and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence within the primary cone of vision of both westbound and eastbound travelers on Brown Road and off-road recreationists in the immediate project area. The high visibility, low-to-moderate number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on Brown Road in general and KOP 2 specifically, the low-to-moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 3 – Eastbound Brown Road

KOP 3 was selected to characterize the visual impact to travelers on Brown Road when viewing to the north and east across the valley. KOP 3 is located on eastbound Brown Road in the central project area, approximately 0.3 mile southwest of the power block. The view is to the east-northeast and is depicted in the Google Earth perspective presented as **Visual Resources Figure 6A**. **Visual Resources Figure 6B** presents an existing view photograph from a location on Brown Road approximately 1.1 miles further to the northwest, though that view is to the east-southeast. KOP 3 provides a panoramic, open and unobstructed view of the site, which is visible in the immediate foreground. The foreground terrain is flat and supports desert scrub vegetation and is backdropped by the rolling to angular forms of the Spangler Hills and Argus Range to the east and north, respectively. The existing landscape is predominantly natural in appearance.

Visual Quality

Low-to-moderate. The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat

valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the Spangler Hills to the east and the Argus Range to the north, both of which add visual interest and contribute to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley and along Brown Road (and the U.S. 395 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 3 is unobstructed at a foreground viewing distance. The number of viewers would be low-to-moderate and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence within the primary cone of vision of both westbound and eastbound travelers on Brown Road and off-road recreationists in the immediate project area. The high visibility, low-to-moderate number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on Brown Road in general and KOP 3 specifically, the low-to-moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 4 – Railroad Bed Bike Trail

KOP 4 was selected to characterize the visual impact to travelers on the Railroad Bed Bike Trail, when viewing to the north to northeast across the southern portion of Indian Wells Valley toward the Coso and Argus Mountain Ranges that define the northern extent of the valley. KOP 4 is located on the Railroad Bed Bike Trail, approximately 0.25 mile west of the south development area. The view is to the north-northeast and is depicted in the existing view photograph presented as **Visual Resources Figure 7A**. KOP 4 provides a panoramic, open and unobstructed view of the site, which is visible in the immediate foreground. The foreground terrain is flat and supports desert scrub vegetation and is backdropped by the horizontal to angular form of the distant Argus Range. The existing landscape is predominantly natural in appearance with the exception of two transmission lines that pass along the southwest edge of the site.

Visual Quality

Low-to-moderate. The foreground views from the Railroad Bed Bike Trail encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing

grasses and light-colored soils, backdropped by the horizontal to angular form of the distant Argus Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the low-to-moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley and along the Railroad Bed Bike Trail become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley, cyclists and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 4 is unobstructed at a foreground viewing distance. The number of viewers would be low and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence in views from the Bike Trail and the relatively slow travel speeds along the trail. The high visibility and low number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For travelers on the Bike Trail in general and KOP 4 specifically, the low-to-moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 5 – West Hilltop

KOP 5 was selected to provide an elevated view of the site and to characterize the visual impact to recreationists that would ascend the hill immediately west of the site to obtain a vista view of the southern portion of Indian Wells Valley. KOP 5 is located along the crest of the hill, viewing to the east. The elevated view is depicted in the existing view photograph presented as **Visual Resources Figure 8A**. This location provides panoramic vista views of the site, the valley and the distant hills and mountain ranges beyond. The foreground to background view encompasses the flat valley floor and a portion of a desert wash, backdropped by the rolling to angular forms of the Spangler Hills and the more distant Argus Range to the northeast. From this vantage point, much of the valley floor and hills southwest of Ridgecrest are predominantly natural in appearance.

Visual Quality

Low-to-moderate. The panoramic vista views from the hilltop encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the horizontal to angular form of the Spangler Hills

and distant Argus Mountain Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the moderate rating for visual quality.

Viewer Concern

High. As the landscapes within Indian Wells Valley become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking vista views of unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic vista views of the valley and the bordering mountain ranges and hills. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate-to-high. Site visibility is high in that the view of the site from KOP 5 is unobstructed at a foreground viewing distance. The number of viewers would be very low and the view duration (with uninterrupted sightlines) would be extended given the project's spatial prominence in views from the hilltop. The high visibility and very low number of viewers, combined with the extended duration of view, would result in moderate-to-high viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers on the hilltop, the moderate visual quality combined with high viewer concern and moderate-to-high viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

KOP 6 – El Paso Mountains

KOP 6 was selected to characterize the visual impact on views from the culturally sensitive El Paso Mountains. KOP 6 is located on a north ridge of the El Paso Mountains, approximately 4.5 miles southwest of the south development area. The elevated view to the northeast is depicted in the Google Earth perspective presented as **Visual Resources Figure 9**. This location provides an open but partially screened (by intervening terrain) panoramic vista view of the project site, Indian Wells Valley, and the surrounding mountains and is a view that would be experienced by recreationists seeking the backcountry and wilderness recreational experience. The foreground to background view encompasses a variety of landforms including valley floor, desert washes, rounded hills and angular mountain ranges. From this elevated vantage point, the existing landscape is predominantly natural in appearance and is absent any noticeable built features except for distant areas of development, such as Ridgecrest.

Visual Quality

Moderate-to-high. The foreground to background panoramic vista views from the ridges of the El Paso Mountains, encompass the broad expanses of Indian Wells Valley, ringed by rolling hills and rugged, angular mountain ranges. Visual integrity of the high desert landscape is relatively high with minimal intrusions of visually discordant built

features. The elevated perspective from KOP 5 enables views of considerable visual interest, and overall visual quality is rated moderate-to-high.

Viewer Concern

High. Recreationists seeking the backcountry desert wilderness experience and others visiting this culturally sensitive area would expect to find viewing opportunities that offer expansive views of intact and natural appearing desert landscapes with minimal if any industrial character. These backcountry visitors would be highly sensitive to the introduction of industrial character to this naturally appearing landscape, and would perceive such additions as an adverse visual change. Therefore, overall viewer concern is rated high.

Viewer Exposure

Moderate. Site visibility is moderate-to-high in that the elevated vista view of the site is somewhat distant (at 4.5 miles) and partially obstructed by intervening terrain. However, the large scale of the project will render the project prominent in the field of view to the northeast. While the number of viewers would be very low, the view duration would be extended from the vista viewpoints along the north ridges of the El Paso Mountains. The moderate-to-high visibility, very low numbers of viewers and extended duration of view would result in moderate viewer exposure.

Visual Sensitivity

Moderate-to-high. For viewers at KOP 6 and other nearby, elevated viewing locations within the El Paso Mountains Wilderness, the moderate-to-high visual quality combined with high viewer concern and moderate viewer exposure result in an overall moderate-to-high visual sensitivity of the visual setting and viewing characteristics.

C.12.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction Impacts

Construction of the proposed project would cause temporary visual impacts due to the presence of equipment, materials, and workforce. These impacts would occur at the proposed solar power plant site and along the transmission line route. Construction would involve the use of cranes, heavy construction equipment, temporary storage and office facilities, and temporary laydown/staging areas. Construction would include site clearing and grading, construction of the actual facilities, and site cleanup and restoration. Visible traffic would also increase along U.S. 395 and Brown Road during construction. Construction activities would be visible from U.S. 395 (the primary travel corridor in the region), Brown Road, nearby BLM recreational access roads, nearby residences, and El Paso Mountains Wilderness. Throughout the extensive construction period of approximately 28 months, the industrial character of the activities would constitute adverse and significant visual impacts. However, the vast majority of the area disturbed by construction would eventually be occupied by project facilities (see *Operation Impacts* below) though some areas of disturbed soil surfaces (characterized by high color, line and texture contrasts) would still remain and would be visible from the various viewing vantage points. These areas of residual disturbance would require

successful restoration. Proper implementation of Energy Commission staff's proposed restoration mitigation in Condition of Certification **VIS-2** would ensure that the visual impacts of residual disturbed areas associated with project construction remain less than significant. It is also anticipated that construction activity will take place at night. In order to ensure that significant construction lighting impacts do not occur, Energy Commission staff recommends the night lighting mitigation measures contained in Condition of Certification **VIS-3**, presented later in this analysis.

Operation Impacts

An analysis of operation impacts was conducted for the view areas represented by the key viewpoints selected for in-depth visual analysis. The results of the operation impact analysis are discussed below by KOP and presented in the Visual Analysis Summary Table included as **VISUAL RESOURCES APPENDIX VR-1**. The visual impacts of night lighting are discussed in a separate section of this analysis. For each KOP, an evaluation of visual contrast, project dominance, and view blockage is presented with a concluding assessment of the overall degree of visual change caused by the proposed project. Visual change is then considered within the context of the landscape's visual sensitivity to arrive at a determination of visual impact significance. Preceding the KOP evaluations is a brief tabular summation of the project facilities that would cause the visual change.

Project Features

The proposed project would convert approximately 2.25 square miles of naturally-appearing desert plain to an industrial facility characterized by complex, geometric forms and lines and industrial surfaces that are dissimilar to the surrounding natural landscape character. An additional 320 acres would be disturbed during construction. Much of the developed area would be covered with the arrays of parabolic mirrors that would be used to collect heat energy from the sun. **Visual Resources Attachments 1A through 1D** present images of the Kramer Junction SEGS project solar troughs, which are smaller than those proposed for RSPP. **Visual Resources Attachments 2A and 2B** present images of the type of solar collecting arrays that would be utilized for RSPP. Table C.12-1 provides a list of the major project features that would contribute to the apparent visual change of the landscape. A more detailed discussion of the proposed project is presented in Section B. In addition to the features listed in Table C.12-1 below, the proposed project would also include the installation of chain link fencing and desert tortoise fencing around the perimeter of the site for security and protection of sensitive biological resources. Additionally, a 30-foot high wind fence would be installed along the western and eastern borders of the individual development areas (see **Visual Resources Figure 3**). **Visual Resources Attachment 3A and 3B** present images of the wind fence construction.

Visual Resources Table C.12-1
Key Project Components

Component	Dimensions (LxWxH) (Feet) / Capacity	Footprint (square feet)
Switch Yard	13 x 92	1,200
Overflow Vessel And Expansion Vessel	124 x 154	19,000 Ea
Ullage Coolers And Vessel	79 x 20	1,000
Nitrogen System	Incidental	800
Heat Transfer Fluid Heater	50 x 22 x 80 Stack	1,100
Steam Generators	90 x 10 x 24 Ea	900
Weather Station Building	68 x 68 x 24 (Two Level Bldg)	4,600
Parking	18 x 60	1,080
Balance Of Plant Electrical Building	67 x 67 x 24 (Two Level Bldg)	4,500
Reheaters	32 x 10 Ea	320
MCC Cooling Tower	33 x 40 x 32 High	1,320
Steam Turbine	111 x 50 x 40 High	5,500
Deaerator	125 x 57	7,100
Vacuum System	19 x 35 x 24 High	665
Compressed Air System	25 x 25 x 24 High	625
Generator Circuit Breaker	20 x 30 x 20	600
Warehouse	68 x 146 x 30	10,000
Chemical Injection Skid	46 x 47 x 24	2,000
Generator Step-Up Transformers	48 x 32 x 24	1,500
Emergency Diesel Generator	40 x 10 x 20	800
Cooling Tower	33 x 40 x 32 High	1,300
Water Tank (Ro Concentrate) (Ps1 Only)	45 Dia x 24 High / 250,000 Gal	1,590
Service Water Pumps	23' x 12' x 16'	275
Take Off Tower	30' x 35' x 50'	1,000
Blowdown Tanks	28' Dia Ea	570
Auxiliary Boiler	40' x 73' x 32'	2,900
Air Cooled Condenser	245' x 296' 120' High	73,000
Sample Panel & Lab Building	84' x 48' x 24' High	1,100
Demineralized Water Tank	16' Dia x 24' High	200
Water Treatment Area	192 x 148	28,000
Administration Building	60 x 60 x 24 High	3,600
Control Building	68 x 68 x 24 High	3,900
High Voltage Line	4 Dia x 140 High Poles	
Pipe Rack	40 High Misc.	
Treated Water Tank (Also Firewater Storage)	91 Dia x 24 High / 1 Million Gal	6,500
Transmission Line	Approximately 0.5 mile	
Wind Fence (East and West)	54,200 linear feet	

Source: SM 2009a (AFC), Table 5.15-3 except for last entry whose source is SM 2010a.

KOP 1 – U.S. 395

Visual Resources Figure 4A presents a Google Earth perspective of the proposed project site from KOP 1 on U.S. 395 and illustrates the foreground visibility and location of the project area. The yellow-outlined shaded area in the perspective indicates the location of one of the 30-foot tall wind fences. The orange-outlined shaded area indicates the location of one of the development areas at a height of approximately 24 to 25 feet, which is the approximate height of many of the project features. Color assignment in the perspective is not significant and was merely selected to achieve ease of understanding. This perspective was prepared because a visual simulation from this location was not available at the time this Staff Assessment/Draft Plan

Amendment/Draft Environmental Impact Statement (SA/DPA/DEIS) was prepared. However, the visual simulation presented as **Visual Resources Figure 4C** was subsequently provided for a location on U.S. 395 approximately 0.5 mile further northwest. This location is approximately 0.45 mile north of the north development area and approximately 1.5 miles north of the power block. As shown in the simulation, the proposed project would be prominently visible in the foreground of views from U.S. 395.

Visual Contrast

High. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground landscape. The structures would exhibit considerable industrial character. Such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from U.S. 395. Depending on the viewing location along the highway, the project's apparent scale would be comparable to dominant relative to the existing valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 1, the wind fences, solar arrays and other project components (lower quality landscape features) would block from view substantial portions of Indian Wells Valley floor and the background El Paso Mountains and Spangler Hills (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 1, the values for visual contrast, project dominance, and view blockage, when taken together, constitutes a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 1 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of

Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 2 – Brown Road - Westbound

Visual Resources Figure 5A presents a Google Earth perspective of the proposed project site from KOP 2 on westbound Brown Road, approximately 0.1 mile northeast of the south development area, and illustrates the foreground visibility and location of the project area. The yellow outlined shaded area in the perspective indicates the location of one of the 30-foot tall wind fences. The orange-outlined shaded area indicates the location of one of the development areas at a height of approximately 24 to 25 feet, which is the approximate height of many of the project features. Color assignment in the perspective is not significant and was merely selected to achieve ease of understanding. This perspective was prepared because a visual simulation from this location was not available at the time this SA/DPA/DEIS was prepared. However, the visual simulation presented as **Visual Resources Figure 5C** was subsequently provided for a location on Brown Road approximately 1.25 miles further to the southeast, though that view is to the west-northwest and considerably more distant. This location is approximately 1.3 miles east of the south development area and approximately 1.4 miles east of the power block. As shown in the simulation, the proposed project would be prominently visible in the foreground to middleground of views from Brown Road.

Visual Contrast

High. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground landscape. The structures would exhibit considerable industrial character. Such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from Brown Road. Depending on the viewing location along the road, the project's apparent scale would be comparable to dominant relative to the horizontal form of the valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 2, the wind fences, solar arrays and other project components (lower quality landscape features) would block from view substantial portions of the background El Paso Mountains (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 2, the values for visual contrast, project dominance, and view blockage, when taken together, constitutes a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 2 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 3 – Brown Road - Eastbound

Visual Resources Figure 6A presents a Google Earth perspective of the north development area to the east-northeast from KOP 3 on eastbound Brown Road, approximately 0.3 mile southwest of the power block. The perspective illustrates the foreground visibility and location of the project area. The yellow outlined shaded area in the perspective indicates the location of one of the 30-foot tall wind fences. The orange-outlined shaded area indicates the location of one of the development areas at a height of approximately 24 to 25 feet, which is the approximate height of many of the project features. The blue outline and shaded area indicates the location of the power block. The purple area indicates the location of the 150-foot tall air-cooled condenser. Color assignment in the perspective is not significant and was merely selected to achieve ease of understanding. This perspective was prepared because a visual simulation from this location was not available at the time this SA/DPA/DEIS was prepared. However, the visual simulation presented as **Visual Resources Figure 6C** was subsequently provided for a location on Brown Road approximately 1.1 miles further to the northwest, though that view is to the east-southeast and considerably more distant. This location is

approximately 1.4 miles west of the power block. As shown in the simulation, the proposed project would be prominently visible in the foreground to middleground of views from Brown Road.

Visual Contrast

High. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground landscape. The structures would exhibit considerable industrial character. Such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from Brown Road. Depending on the viewing location along the road, the project's apparent scale would be comparable to dominant relative to the existing valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 3, the wind fences, solar arrays, power block, air-cooled condenser and other project components (lower quality landscape features) would block from view substantial portions of the background Spangler Hills and Argus Range (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 3, the values for visual contrast, project dominance, and view blockage, when taken together, constitute a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 3 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 4 – Railroad Bed Bike Trail

Visual Resources Figure 7B presents a visual simulation of the proposed project to the northeast from KOP 4 on Railroad Bed Bike Trail, immediately adjacent and to the southwest of the south development area. The simulated view to the north-northeast captures a substantial portion of the south development area, the power block, the air-cooled condenser, transmission lines and a portion of the north development area and illustrates the foreground visibility of the project area.

Visual Contrast

High. As is apparent from the simulation, the expansive solar fields and associated facilities would substantially transform the existing landscape with the complex industrial character of the project sharply contrasting with the predominantly natural appearing features. The proposed project would add highly visible, structurally complex industrial features to the foreground to middleground of views from the Bike Trail. The structures would exhibit considerable industrial character and such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-Dominant. The proposed project would be prominently visible from the Bike Trail. Depending on the viewing location along the Trail, the project's apparent scale would be comparable to dominant relative to the existing valley floor and background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the vicinity of KOP 4, the wind fences, solar arrays, power block, air-cooled condenser, transmission lines and other project components (lower quality landscape features) would block from view substantial portions of the background Argus Range (higher quality landscape features). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 4, the values for visual contrast, project dominance, and view blockage, when taken together, constitutes a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 4 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 5 – West Hilltop

Visual Resources Figure 8B presents a visual simulation of the proposed project from the elevated perspective of KOP 5 on the hilltop, immediately adjacent and to the west of the south development area. The simulated view to the east-northeast captures a majority of the north development area, the power block, air-cooled condenser, transmission lines and a portion of the south development area, and illustrates the foreground visibility of the project area.

Visual Contrast

High. As is apparent from the simulation, the expansive solar fields and associated facilities would substantially transform the existing landscape with the complex industrial character of the project sharply contrasting with the predominantly natural appearing features. Because of the elevated perspective, the entire facility would be visible from the hilltop and would add highly visible, structurally complex industrial features to the foreground to middleground of views from the hilltop. The structures would exhibit considerable industrial character and such characteristics are not found in the existing landscape. The reflection off the parabolic mirrors could also cause visual distraction and exacerbate the contrast associated with the project facilities. The resulting visual contrast caused by these characteristics would be High (see the Visual Analysis Summary Table presented as **VISUAL RESOURCES APPENDIX VR-1**).

Project Dominance

Co-dominant-to-dominant. The proposed project would appear highly prominent given the spatial prominence of the proposed facility within (a) the center of valley floor view and (b) the center of a primary field of view toward the Argus Range, Ridgecrest and Spangler Hills. The proposed project would appear comparable in prominence to the

broad, horizontal form of the valley floor, and dominant to the more distant horizontal to angular forms of the background hills and mountains. Overall project dominance would be co-dominant-to-dominant.

View Blockage

Moderate-to-high. From the hilltop (KOP 5), the project facilities (lower quality landscape features) would block from view a substantial portion of the southern Indian Wells Valley (higher quality landscape feature). The resulting view blockage would be moderate-to-high.

Overall Visual Change

Moderate-to-high. From KOP 5, the values for visual contrast, project dominance, and view blockage, when taken together, would constitute a moderate-to-high level of overall visual change.

Visual Impact Significance

Significant and unavoidable. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the moderate-to-high visual change that would be perceived from KOP 5 would cause a significant and unavoidable visual impact.

Mitigation

Given the large scale of the impact area, no available mitigation measures were identified that would be adequate to mitigate the significant visual impacts to levels that would be less than significant. However, if the project is approved, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; V**IS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

No measures were identified by Energy Commission staff to fully address impacts. Impacts would remain significant and unavoidable.

KOP 6 – El Paso Mountains Wilderness

Visual Resources Figure 9 presents a Google Earth perspective of the proposed project site and illustrates the visibility of the project area from the elevated perspectives available along the northern ridges of the El Paso Mountains Wilderness, a viewing distance of approximately 5.5 miles southwest of the power block. This perspective was prepared because an appropriate visual simulation was not available at the time this SA/DPA/DEIS was prepared. The yellow lines in the perspective indicate approximate locations for the 30-foot high wind fence. The orange lines indicate the approximate boundaries of the various development areas at a height of approximately 24 to 25 feet (a typical height of many of the project components). The blue area indicates the

location of the power block and the purple area indicates the location of the air-cooled condenser. As shown in the perspective, the project would be partially screened from view by intervening terrain.

Visual Contrast

Low-to-moderate. The proposed project would convert a noticeable portion of the existing, natural-appearing desert valley landscape to an industrial facility that would be characterized by geometric forms and complex to strong horizontal and vertical lines and industrial surfaces. Because of the elevated perspective, much of the facility would be visible including the wind fences, solar arrays, overflow and expansion vessels, steam turbine, warehouse and support facilities, air cooled condenser, water treatment facilities, chain-link fencing and transmission line, though at this viewing distance (approximately 5.5 miles) many structural details would not be discernible. However, not all of the facility would be visible because of the screening provided by intervening terrain. The introduced industrial characteristics are not found in the existing landscape. Furthermore, while there is the potential for this location to experience reflective glare/glint off the parabolic mirrors, which could cause visual distraction, the effect is not expected to substantially increase visual contrast. Therefore, visual contrast would remain low-to-moderate.

Project Dominance

Subordinate-to-co-dominant. The proposed project would appear quite noticeable given the spatial prominence of the proposed facility within the center of the view to the northeast toward the Argus Range. Although the extent of the development area is considerable, the site is partially screened by intervening terrain and at this viewing distance, the proposed project would appear subordinate to the broad, horizontal form of the valley floor and co-dominant relative to the rolling to angular forms of the background mountains. Overall project dominance would be subordinate.

View Blockage

Low-to-moderate. From the vicinity of KOP 6, the project facilities (lower quality landscape features) would block from view a noticeable portion of Indian Wells Valley floor (higher quality landscape feature). The resulting view blockage would be low-to-moderate.

Overall Visual Change

Low-to-moderate. From KOP 6, the values for visual contrast, project dominance, and view blockage, when taken together, would constitute a low-to-moderate level of overall visual change.

Visual Impact Significance

Adverse but less than significant. When considered within the context of the overall moderate-to-high visual sensitivity of the existing landscape and viewing characteristics, the low-to-moderate visual change that would be perceived from KOP 6 could cause an adverse but less than significant visual impact.

Mitigation

Given the large scale of the impact area, Energy Commission staff recommends the following conditions of certification to minimize structure contrast and lighting and glare impacts to the extent possible: **VIS-1**, Surface Color Treatment of Structures; **VIS-2**, Revegetation of Disturbed Soil Areas; **VIS-3**, Temporary and Permanent Exterior Lighting; **VIS-4**, Reduction of Glint and Glare; and **VIS-5,** Project Design.

Residual Impact Significance After Mitigation

Following mitigation, impacts would remain adverse but less than significant. However, it should also be noted that while KOP 6 is evaluating the visual impact of the proposed project on views from the El Paso Mountains (considered a sacred area by native Americans), it is also understood that there are several locations within the project footprint that have been traditionally used as staging areas for religious pilgrimages into the El Paso Mountains and an unobstructed view toward the mountains from the starting point of the pilgrimage is evidently of major importance. Clearly the adverse visual impact of the project on views from the pilgrimage starting points would be significant unless the starting points were situated south of any development area or facility component. Depending on the spiritual values associated with a particular starting point and the ability to relocate the starting point (if necessary), the visual impact may or may not be mitigable.

Project Closure and Decommissioning

After the end of the project's useful life, it would require decommissioning. However, no Draft or Decommissioning Plan has been prepared and even the complete removal of the facility would leave a very prominent visual impact over the entire site due to the strong color contrast created between graded, disturbed soil areas and undisturbed soil areas in the vicinity of the project site. In addition, revegetation of areas in this desert region are difficult and generally of limited success. Thus, visual recovery from land disturbance of closure and decommissioning would likely occur only over a very long period of time.

C.12.4.3 CEQA LEVEL OF SIGNIFICANCE

This analysis considered the potential impacts of the proposed project in relation to the four significance criteria for visual resource impacts listed in Appendix G of the CEQA Guidelines, under Aesthetics, specified below.

1. Would the project have a substantial adverse effect on a scenic vista?

Yes. Although no designated scenic vistas were identified in the study area, panoramic and highly scenic vistas are available to backcountry recreationists that access the hilltop immediately adjacent and to the west of the project site, the El Paso Mountains to the south, Scodie and Sierra Nevada Mountains to the west, Coso and Argus Ranges to the north, and the Spangler Hills to the east. While all of these areas overlook Indian Wells Valley and the project site, only the scenic vista views from the adjacent west hilltop would be substantially effected by the proposed project (see **Visual Resources Figure 8B**). The considerable viewing distances or intervening terrain would prevent the project from appearing prominent in views from the other locations. For example, as

shown in **Visual Resources Figure 9**, the project would be noticeably visible from the El Paso Mountains. But the viewing distance of approximately 5.5 miles and the presence of intervening terrain that would partially screen the project from certain views would limit the project's visual contrast and prominence. The resulting visual impact on the scenic vista views from the west hilltop would be adverse and significant.

2. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No. Indian Wells Valley in the project area consists primarily of desert scrub vegetation with some desert wash woodlands. The project site is located adjacent to U.S. 395, which is not listed as an eligible State Scenic Highway in this area and there are no notable scenic features or historic structures located within the site. Therefore, the project would not substantially damage scenic resources such as trees, rock outcroppings, or historic buildings within a state scenic highway.

3. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Yes. As discussed in a previous section of this analysis, the proposed project would introduce prominent structures with industrial character into the foreground to middleground views from U.S. 395, Brown Road, BLM recreational access roads, the Railroad Bed Bike Trail, and nearby residences in the vicinity of Brown Road. The resulting visual change would be moderate-to-high when viewed from five of the six KOPs, resulting in a substantial degradation of the existing visual character or quality of the site and its surroundings.

4. Would the project create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area?

Yes. The project has the potential to create a new source of substantial light that would adversely affect nighttime views in the area. While not specifically identified, lighting plans for other similar projects (Blythe Solar Power Project and Palen Solar Power Project) call for security lighting in the power block and solar fields to operate approximately 3,600 hours per year during non-operating, non-sunlight hours, which is assumed would be the case for RSPP. However, Energy Commission staff believes that with effective implementation of Condition of Certification **VIS-3**, night lighting impacts could be mitigated to levels that would be less than significant for most off-site viewers. However, it is understood that stargazer groups from the China Lake Astronomical Society use the site at least once a month and have done so for at least 20 years. Clearly, nighttime plant lighting would adversely affect visibility of the night sky from the site and potential nearby sites, and the silhouettes of structures against the horizon would obstruct low horizon observations (the southern end of Indian Wells Valley is essentially shaped like a shallow bowl). This impact would be significant and unavoidable for any on-site or nearby stargazing locations.

Potentially. Daytime glare is also a major issue of concern for the proposed project, not only for aesthetic reasons, but also for safety reasons due to the proximity of U.S. 395, Brown Road, nearby residences, and nearby BLM recreational access roads. Potentially

affected receptors would include travelers and recreationists on the nearby roads and BLM recreational access roads and nearby residences. Any visible glare or reflected light would draw viewer's attention to the facility, even from more distant locations. As noted in the Applicant's response to comment DR-VIS-248, *"It is possible that the back reflected light or light not absorbed by both the envelope and steel annulus of the Heat Collecting Element (HCE) can be seen in the reflection of the parabolic mirror at certain angles above the horizon* [from an elevated perspective such as the adjacent Hilltop, El Paso Mountains or Spangler Hills].*"* Also, see **Visual Resources Attachments 1C, 4A and 4B** for examples of visible glint and reflected light at the existing Kramer Junction SEGS project.

An independent third-party analysis of glare potential has determined that, once the solar troughs are past moving into or out of stow position, they will reflect the sky and a portion of sunlight by diffuse refraction. Furthermore, at the time of moving into or out of stow position, the troughs have the potential to produce "bright spots," which are the product of spread reflection of the direct image of the sun. These bright spots can be characterized as "blurry" or "hazy" and will move as the observer changes position relative to the sun and mirror, with the result that the bright spot appears to "follow" the observer. Since the moving bright spot is several orders of brightness greater than the reflected sky and clouds on the mirrors, it may prove to be an especially annoying distraction.

C.12.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA). The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.12.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative is contained within the originally proposed ROW boundary north of Brown Road (north development area) though it extends the solar fields further to the north (along U.S. 395) and retracts the western boundary to stay east of the desert wash. Because the Northern Unit Alternative would still be located within the previously evaluated ROW boundary (which is more expansive then the originally proposed project development area boundaries), the setting and existing conditions descriptions would be the same as for the proposed project. The reader is referred to Section C.12.4.1 above for a complete discussion of the existing visual setting for the proposed project, which would also be the same for the Northern Unit Alternative.

C.12.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Although the solar field would extend further along U.S. 395 (see KOP 1), the slight increase in visual prominence would not affect the visual change determination or impact significance conclusions (significant and unavoidable). All other KOPs (2 through 6) would experience visual impacts similar to those of the proposed project and the visual change descriptions and impact significance conclusions would remain the same. The reader is referred to Section C.12.4.2 above for a complete discussion of the visual impacts that would be experienced at each KOP as a result of the proposed project, which would be the same or similar for the Northern Unit Alternative. In the case of KOP 2 (westbound Brown Road), the west-southwest view orientation illustrated in the Google Earth perspective provided as **Visual Resources Figure 5A** would not be applicable. However, the view could simply be oriented to the north and a similar visual impact would be experienced with the same impact characterization and significance conclusion. In the case of KOP 4 (Railroad Bed Bike Trail), the south unit would not be visible in the simulation shown in **Visual Resources Figure 7B** though the north unit would be visible. While the impact would be lessened, both the impact characterization and significance conclusion would remain the same as for the proposed project. The same would be true for KOPs 5 and 6.

Because the visual impacts resulting from this alternative would be essentially the same as those of the proposed project, the mitigation measures proposed and residual impacts remaining after mitigation would remain the same as for the proposed project. The reader is referred to the individual KOP discussions in Section C.12.4.2 above for a complete discussion of the mitigation measures (conditions of certification) that are recommended for the proposed project, which would also apply to the Northern Unit Alternative.

C.12.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources. The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42% of the proposed solar array loops and would affect 42% of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the wash area and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.12.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative is contained within the originally proposed ROW boundary south of Brown Road and is fairly close to the original boundaries of the south solar field. Because the Southern Unit Alternative would still be located within the

previously evaluated ROW boundary (which is more expansive then the originally proposed project development area boundaries), the setting and existing conditions descriptions would be the same as for the proposed project. The reader is referred to Section C.12.4.1 above for a complete discussion of the existing visual setting for the proposed project, which would also be the same for the Southern Unit Alternative.

C.12.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit Alternative would eliminate the north solar field, which would reduce the visual impact on U.S. 395 and residences located north of Brown Road. However, the elimination of the north solar field would not affect the visual change determination or impact significance conclusions (significant and unavoidable) for the various KOPs given that the south solar field would still be visible as would the power block and air-cooled condenser north of Brown Road, along with the transmission line. In the case of KOP 3 (eastbound Brown Road), the east-northeast view orientation illustrated in the Google Earth perspective provided as **Visual Resources Figure 6A** would still capture the power block and air-cooled condenser though the north solar field would not be visible. However, the view could simply be oriented to the south and a visual impact similar to that of the proposed project would be experienced with the same impact characterization and significance conclusion. In the case of KOP 6 (El Paso Mountains Wilderness), the north unit would not be visible in the perspective provided as **Visual Resources Figure 9**. Only a small portion of the south solar field, power block, and air-cooled condenser would be visible, which would substantially reduce the visual impact on KOP 6 and the El Paso Mountains. However, the impact characterization and significance conclusion (adverse but less than significant) would be the same as for the proposed project. All other KOPs would experience visual impacts similar to or the same as those of the proposed project and the visual change descriptions and impact significance conclusions would remain the same. The reader is referred to Section C.12.4.2 above for a complete discussion of the visual impacts that would be experienced at each KOP as a result of the proposed project, which again, would be the same or similar for the Southern Unit Alternative except as clarified above.

Because the visual impacts resulting from this alternative would be essentially the same as those of the proposed project, the mitigation measures proposed and residual impacts remaining after mitigation would be the same as for the proposed project. The reader is referred to the individual KOP discussions in Section C.12.4.2 above for a complete discussion of the mitigation measures (conditions of certification) that are recommended for the proposed project, which would also apply to the Southern Unit Alternative.

C.12.7 NO PROJECT / NO ACTION ALTERNATIVE

C.12.7.1 NO PROJECT/NO ACTION ALTERNATIVE #1: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND ON CDCA LAND USE PLAN AMENDMENT

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM <u>would not</u> amend the CDCA

Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the views of the site are not expected to change noticeably from existing conditions under this alternative and, therefore, this No Project/No Action Alternative would not result in adverse visual, light, and glare impacts at this location. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.12.7.2 NO PROJECT/NO ACTION ALTERNATIVE #2: NO ACTION ON RIDGECREST SOLAR POWER PROJECT AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA AVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. As a result, it is possible that views of the site could change substantially based on the required buildings and structures on the site for the different solar technologies. Different solar technologies would create different visual effects based on the technology components. It is expected that the views of the site could change substantially with a different solar technology, similar to the changes in views under the proposed project. Therefore, this No Project/No Action Alternative could result in adverse visual, light, and glare impacts similar to the impacts under the proposed project.

C.12.7.3 NO PROJECT/NO ACTION ALTERNATIVE #3: NO ACTION ON RIDGECREST SOLAR POWER PROJECT APPLICATION AND AMEND THE CDCA LAND USE PLAN TO MAKE THE AREA UNAVAILABLE FOR FUTURE SOLAR DEVELOPMENT

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its

existing condition, with no new structures or facilities constructed or operated on the site. As a result, the views of the site are not expected to change noticeably from existing conditions under this alternative and, therefore, this No Project/No Action Alternative would not result in adverse visual, light, and glare impacts. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.12.8 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Visual Table 2
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action*
	The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character.	The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character.	Slightly reduced impact on U.S. 395 and El Paso Mountains Wilderness.	The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character.	#'s 1 and 2 The project would substantially degrade the existing visual character or quality of the site and its surroundings as a result of the addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. #3 No visual impact.
	The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	Slightly reduced impact on U.S. 395 and El Paso Mountains Wilderness.	The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area.	#'s 1 and 2 The project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area. #3 No impact.
Ranking	**4**	**3**	**2**	**4**	**1** - #3 **4** - #'s 1 and 2

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.12.9 CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). This concept is very similar to that of NEPA, which states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

Cumulative impacts to visual resources would occur where project facilities occupy the same field of view as other built facilities or impacted landscapes, and an adverse change in the visible landscape character is perceived. In some cases, a cumulative impact could also occur if a viewer perceives that the general visual quality or landscape character of a localized area (Indian Wells Valley or U.S. 395 corridor) or larger region (California Desert District) is diminished by the proliferation of visible structures or construction effects, even if the changes are not within the same field of view as existing (or future) structures or facilities. The result is a perceived "industrialization" of the existing landscape character.

There is the potential for substantial future development in the Ridgecrest area and throughout the California Desert District. As shown on **Cumulative Impacts Figures 1** and 2 and Cumulative Impacts Tables 1A and 1B, solar and wind applications for use of BLM, State and private land, cover approximately 1 million acres of the California Desert Conservation Area. Analysis of cumulative impacts is based in part on data provided in the Cumulative Impacts section and includes:

- **Cumulative Impacts Figure 1**, Regional Renewable Applications
- **Cumulative Impacts Figure 2**, Renewable Energy Applications in the Ridgecrest District Area
- **Cumulative Impacts Figure 3**, Existing and Future/Foreseeable Projects in the Ridgecrest Area
- **Cumulative Analysis Table 1A**, Renewable Energy Projects in the California Desert District
- **Cumulative Analysis Table 1B**, Renewable Energy Projects on State and Private Lands in the California Desert District
- **Cumulative Analysis Table 2**, Existing Projects in the Ridgecrest Area
- **Cumulative Scenario Table 3**, Future Foreseeable Projects in the Ridgecrest Area

The analysis in this section first defines the geographic area over which cumulative impacts to visual resources could occur. The cumulative impact analysis then describes the potential for cumulative impacts to occur as a result of implementation of the proposed project along with the listed local and regional projects.

C.12.9.1 GEOGRAPHIC EXTENT

Cumulative impacts could occur if implementation of the Ridgecrest Solar Power Project (RSPP) would combine with those of other local or regional projects. RSPP is potentially associated with two types of cumulative impact:

1. Cumulative impacts within the immediate project viewshed (local projects within fifteen miles of RSPP), essentially comprising existing and foreseeable future projects in Indian Wells Valley and along the nearby stretches of U.S. 395; and

2. Cumulative impacts of existing and foreseeable future solar, renewable and other energy and development projects within Indian Wells Valley and the Ridgecrest area (beyond the local viewshed), other broad basin of the project's affected landscape type, or the California Desert District as a whole (regional projects).

The following discussion of cumulative impacts will address the RSPP's contribution to cumulative impacts within the context of the existing cumulative conditions and within the context of future foreseeable projects.

C.12.9.2 EFFECTS OF PAST AND PRESENT PROJECTS

There has been limited development and/or industrialization of the project landscape within the RSPP viewshed (extending out 15 miles). One existing project – the China Lake Naval Weapons Center, falls within the viewshed of RSPP though it is located on the north side of the City of Ridgecrest, which would substantially separate the two viewsheds (see **Cumulative Impacts Table 2** and **Cumulative Impacts Figure 3**). The Naval Weapons Center is a military industrial complex covering approximately 1.1 million acres of land to the north of the City of Ridgecrest, approximately 10 miles northeast of the project site. Elements of the Weapons Center possess industrial character (complex forms or lines) similar to that of an energy facility such as RSPP though much of the Weapons Center is enclosed within the geometric forms of buildings. Also, the close proximity of the Weapons Center to Ridgecrest, contributes to the appearance of the Weapons Center almost as an industrial district of the City. Thus, while RSPP could cause cumulatively significant effects when considered in the context of the Weapons Center, most travelers in the area would not associate the two projects as sufficiently similar to constitute a cumulative impact either within the same field of view or as contributory to the proliferation of energy or industrial facilities within the CDCA. Therefore, RSPP is not expected to cause a cumulatively significant effect within the context of existing cumulative conditions established by the China Lake Naval Weapons Center.

C.12.9.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

The cumulative contribution of RSPP must also be considered within the context of future foreseeable projects, including future projects within the project area and future projects within the larger contexts of California Desert as a whole.

Foreseeable Projects in the Project Area.

Cumulative Impacts Table 3 and **Cumulative Impacts Figure 3** list 9 future and foreseeable projects that would be located within RSPP's viewshed of 15 miles including:

- China Lake Naval Weapons Air Center Base Realignment and Closure
- Super Wal-Mart in Ridgecrest, CA
- Freeman Gulch Four-Lane Project
- Inyokern Four-Lane Project
- City of Ridgecrest New Waste Water Treatment Plant
- Solar Project – CACA 49511
- Wind Project – CACA 050020
- Wind Project – CACA 048948
- Wind Project – CACA 050319

The base realignment, commercial and road projects (first four projects in the list above) would not share similar visual characteristics with RSPP. The last five projects in the list above would share similar visual characteristics with RSPP and would contribute to the conversion of natural desert landscapes to landscapes with prominent industrial character (complex industrial forms and lines and surface textures and colors not found in natural desert landscapes). Therefore, there would be a significant cumulative impact to visual resources from the combination of RSPP and the last five foreseeable projects listed above, both individually (each project plus RSPP) and collectively (all five projects plus RSPP).

Foreseeable Renewable Projects in the California Desert.

In a regional context, **Cumulative Impacts Tables 1A and 1B** and **Cumulative Impacts Figures 1 and 2** identify 96 renewable energy projects scattered throughout the California Desert Conservation Area. The number of projects shown in Figure 1 is so great that there will not be a single major travel corridor through the Southern California Desert that will not experience at least some visible "industrialization" due to the presence of nearby energy projects. As a result, travelers will encounter numerous industrial landscapes en-route to regionally and nationally significant desert destinations such as Anza-Borrego Desert State Park, the Salton Sea, Joshua Tree National Park, Mojave National Preserve, Death Valley National Park, and the Colorado River. Therefore, as a result of this collective industrialization of the Conservation Area landscapes, RSPP would contribute a significant cumulative visual impact to visual resources in combination with foreseeable renewable projects in the California desert.

C.12.9.4 OVERALL CUMULATIVE IMPACT CONCLUSION

The RSPP would not result in a significant cumulative visual impact in the context of existing cumulative conditions. However, RSPP's contribution to the visible industrialization of the desert landscape would constitute a significant visual impact when considered with existing and future foreseeable projects, both within the

immediate project viewshed (extending 15 miles from the project site) and in a broader context that encompasses the whole of the California Desert Conservation Area.

C.12.10 COMPLIANCE WITH LORS

The proposed project would be subject to the laws, ordinances, regulations, and standards (LORS) of the U.S. Government (Bureau of Land Management – BLM) and State of California. Compliance with these LORS is summarized in the following paragraphs and presented in more detail in Table C.12-3.

C.12.10.1 COMPLIANCE WITH FEDERAL LORS

The project was found to be in compliance with the impact disclosure requirements of the California Desert Conservation Area (CDCA) Plan (through the visual impact analysis presented here).

C.12.10.2 COMPLIANCE WITH STATE LORS

The proposed project was found to be in compliance with the State Scenic Highway Program as pertains to compliance with scenic highway management objectives (the adjacent U.S. 395 is neither an eligible or designated scenic highway under the state program).

C.12.10.3 COMPLIANCE WITH LOCAL LORS

With the exception of a portion of the underground water supply pipeline (which would not be visible above ground), the project would be located entirely on public lands administered by the U.S. Bureau of Land Management, which is outside the jurisdiction of Kern County. However, a review of the County LORS was conducted but no County LORS pertaining to the protection or management of visual resources was identified as applicable to the proposed project. It should be noted that the County has recommended a condition of certification requiring the landscaping of a minimum of 5% of the developed area with xeriscape or drought tolerant plantings and the continuous maintenance of such in good condition, in accordance with the requirements of Chapter 19.86 of the Zoning Ordinance. Although the Energy Commission does give consideration to local LORS, a condition of certification pertaining to landscaping was not required in the Visual Resources SA/DPA/DEIS because such landscaping would impart essentially no mitigating effect on the significant visual impact that would result from a project the scale of RSPP. Furthermore, it would be somewhat impractical to implement such a measure given the large area, remote location and arid conditions of the site, and maintenance of the landscaping in good condition would be extremely difficult to achieve. Since such a measure would have no mitigating benefit (for visual impacts), the request for landscaping is considered more appropriately addressed in the Land Use section.

Visual Resources Table C.12-3
Laws, Ordinances, Regulations and Standards

Applicable LORS	Description	Consistency (assumes implementation of Energy Commission staff-recommended Conditions of Certification)
Federal		
California Desert Conservation Area (CDCA) Plan	RSPP is located within the California Desert Conservation Area Plan, which is the BLM Resource Management Plan applicable to the project site (USDOI, 1980, as amended). BLM manages the project site pursuant to the CDCA Plan, as amended by the West Mojave (WEMO) Plan in 2006. The CDCA and WEMO Plans organize BLM-managed lands into one of four multiple-use classes (MUCs). The RSPP site is located on lands classified as MUC L (Limited Use) and non-classified lands. MUC L protects sensitive, natural, scenic, ecological, and cultural resource values. Lands within the WEMO planning area that are designated as MUC L are "…managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished." For MUC L lands, wind and solar electric generation facilities may be allowed after NEPA requirements are met. Although the CDCA Plan did not include Visual Resource Management (VRM) inventory or management classes, the Recreation Element of the Plan specifies that VRM objectives and the Contrast Rating procedure be used to manage visual resources.	**Consistent**. Solar electrical generation plants are specifically allowed for under the Multiple Use Class (MUC) L Guidelines if NEPA requirements are met.
State		
State Scenic Highway Program	The California State Department of Transportation (Caltrans) identifies a state system of eligible and designated scenic highways, which, if designated, are subject to various controls, intended to preserve their scenic quality (Ca. Streets and Highways Code, Sections 260 through 263). U.S. 395 within the project viewshed is not listed as an eligible State Scenic Highway.	**Consistent**. U.S. 395 within the project viewshed is not an eligible or designated State scenic highway.

Applicable LORS	Description	Consistency (assumes implementation of Energy Commission staff-recommended Conditions of Certification)
Local		
None identified. It should be noted that with the exception of a portion of the underground water supply pipeline (which would have no above-ground visual impacts) the project site is located entirely on public lands administered by the U.S. Bureau of Land Management .		

C.12.11 NOTEWORTHY PUBLIC BENEFITS

No noteworthy public benefits in the area of visual resources were identified.

C.12.12 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

The Energy Commission staff recommends the following conditions of certification:

SURFACE TREATMENT OF PROJECT STRUCTURES AND BUILDINGS

VIS-1 The project owner shall treat the surfaces of all project structures and buildings visible to the public such that a) their colors minimize visual intrusion and contrast by blending with the existing tan and brown color of the surrounding landscape; b) their colors and finishes do not create excessive glare; and c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

Following in-field consultation with the CEC/BLM Visual Resources specialist and other representatives as deemed necessary, the project owner shall submit for Compliance Project Manager (CPM) review and approval, a specific Surface Treatment Plan that will satisfy these requirements. The treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes based on the BLM Environmental Color Chart or other appropriate source;

B. A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. A specific schedule for completion of the treatment; and

E. A procedure to ensure proper treatment maintenance for the life of the project.

The project owner shall not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the project owner receives notification of approval of the treatment plan by BLM's Authorized Officer and the CPM. Subsequent modifications to the treatment plan are prohibited without BLM's Authorized Officer and CPM approval.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to BLM's Authorized Officer and the CPM for review and approval and simultaneously to Riverside County for review and comment. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a plan with the specified revision(s) for review and approval by BLM's Authorized Officer and the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to BLM's Authorized Officer and the CPM for review and approval.

Prior to the start of commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that surface treatment of all listed structures and buildings has been completed and they are ready for inspection and shall submit to each one set of electronic color photographs from the same key observation points identified in (d) above. The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) maintenance activities that occurred during the reporting year; and c) the schedule of maintenance activities for the next year.

REVEGETATION OF DISTURBED SOIL AREAS

VIS-2 The project owner shall revegetate disturbed soil areas to the greatest practical extent, as described in Condition of Certification **BIO-7**. In order to address specifically visual concerns, the required Closure, Revegetation and Rehabilitation Plan shall include reclamation of the area of disturbed soils used for laydown, project construction, and siting of the substation and other ancillary operation and support structures.

Verification: Refer to Condition of Certification **BIO-19**.

TEMPORARY AND PERMANENT EXTERIOR LIGHTING

VIS-3 To the extent feasible, consistent with safety and security considerations, the project owner shall design and install all permanent exterior lighting and all temporary construction lighting such that a) lamps and reflectors are not visible from beyond the project site, including any off-site security buffer areas; b) lighting does not cause excessive reflected glare; c) direct lighting does not illuminate the nighttime sky, except for required FAA aircraft safety lighting (which should be an on-demand, audio-visual warning system that is triggered by radar technology); d) illumination of the project and its immediate vicinity is minimized, and e) the plan complies with local policies and ordinances. The project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a lighting mitigation plan that includes the following:

A. Location and direction of light fixtures shall take the lighting mitigation requirements into account;

B. Lighting design shall consider setbacks of project features from the site boundary to aid in satisfying the lighting mitigation requirements;

C. Lighting shall incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated;

D. Light fixtures that are visible from beyond the project boundary shall have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security;

E. All lighting shall be of minimum necessary brightness consistent with operational safety and security; and

F. Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied.

Verification: At least 90 days prior to ordering any permanent exterior lighting or temporary construction lighting, the project owner shall contact BLM's Authorized Officer and the CPM to discuss the documentation required in the lighting mitigation plan. At least 60 days prior to ordering any permanent exterior lighting, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a lighting mitigation plan. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a revised plan for review and approval by BLM's Authorized Officer and the CPM.

The project owner shall not order any exterior lighting until receiving BLM Authorized Officer and CPM approval of the lighting mitigation plan.

Prior to commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that the lighting has been completed and is ready for inspection. If after

inspection, BLM's Authorized Officer and the CPM notify the project owner that modifications to the lighting are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify BLM's Authorized Officer and the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a lighting complaint, the project owner shall provide BLM's Authorized Officer and the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify BLM's Authorized Officer and the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to BLM's Authorized Officer and the CPM within 30 days.

REDUCTION OF GLINT AND GLARE

VIS-4 The project owner shall install slatted fencing along the perimeters of the solar fields (development areas) such that intrusive glare and bright spots (which are the product of spread reflection of the direct image of the sun on the parabolic mirrors) are substantially screened from the views of motorists on U.S. 395 and Brown Road, travelers on nearby BLM recreational access roads and nearby residents. The project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a glare mitigation plan that describes how the slatted fence (and wind fence) design will reduce both the potential for retinal damage and potentially intrusive and distracting brightness.

Verification: At least 90 days prior to ordering any permanent fencing materials, the project owner shall contact BLM's Authorized Officer and the CPM to discuss the documentation required in the glare mitigation plan. At least 60 days prior to ordering any permanent fencing materials, the project owner shall submit to BLM's Authorized Officer and the CPM for review and approval and simultaneously to the County of Kern for review and comment a glare mitigation plan. If BLM's Authorized Officer and the CPM determine that the plan requires revision, the project owner shall provide to BLM's Authorized Officer and the CPM a revised plan for review and approval by BLM's Authorized Officer and the CPM.

The project owner shall not order any fencing materials until receiving BLM Authorized Officer and CPM approval of the glare mitigation plan.

Prior to commercial operation, the project owner shall notify BLM's Authorized Officer and the CPM that the fencing has been completed and is ready for inspection. If after inspection, BLM's Authorized Officer and the CPM notify the project owner that modifications to the fencing are needed, within 30 days of receiving that notification the project owner shall implement the modifications and notify BLM's Authorized Officer and the CPM that the modifications have been completed and are ready for inspection.

Within 48 hours of receiving a glare complaint, the project owner shall provide BLM's Authorized Officer and the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a

schedule for implementation. The project owner shall notify BLM's Authorized Officer and the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to BLM's Authorized Officer and the CPM within 30 days.

C.12.13 Conclusions

Energy Commission staff concludes that the proposed project would result in a substantial adverse impact to existing scenic resource values as seen from several viewing areas and Key Observation Points in the project vicinity including:

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

Energy Commission staff concludes that these visual impacts would be significant in terms of three of the four criteria of CEQA Appendix G, (the project would have a substantial adverse effect on scenic vistas, the project would substantially degrade the existing visual character or quality of the site and its surroundings, and the project would create a new source of substantial light or glare that would adversely affect daytime or nighttime views in the area). Also, Energy Commission staff concludes that these visual impacts would be significant in terms of the context and intensity of the effects in general. Specifically, the context of the project is one of a broad open desert valley with panoramic vista views of the surrounding rugged mountain ranges and designated wilderness areas including the El Paso Mountains (and Wilderness) to the south, Scodie and Sierra Nevada Mountains to the west, Coso and Argus Ranges to the north, and the Spangler Hills to the east. The panoramic vista views are largely unobstructed and encompass wide-open desert spaces. The proposed project would introduce a densely developed and geographically extensive industrial feature into a landscape presently absent similar features. Also of concern is the potential for discomfort or disability glare from the solar reflectors; and the cumulative visual effects of renewable projects along the U.S. 395 corridor and within Indian Wells Valley and the CDCA as a whole.

Energy Commission staff has concluded that the potentially significant visual impacts at the locations cited above could not be mitigated to less than significant levels and would thus, result in significant and unavoidable impacts under CEQA.

Energy Commission staff also concludes that the proposed project would likely result in adverse but less than significant visual impacts on views from the northern ridges of the El Paso Mountains though the extent to which glare and/or glint from project structures is visible from the El Paso Mountains could ultimately determine the significance of the visual impact experienced at that location.

Because the project has the potential to result in exposure of travelers on U.S. 395, Brown Road and local four-wheel drive (4WD) roads, as well as hikers to solar radiation

and glare reflected from project facilities, **VISUAL RESOURCES** Condition of Certification **VIS-4** are recommended to ensure that potential glare from the project is minimized to the maximum extent possible and does not pose a health and safety risk. Energy Commission staff, however, concludes that with these measures, remaining glare may represent a hazard and could represent a visually prominent feature as seen from the viewing areas identified above. Remaining glare could alter the character of views within this portion of Indian Wells Valley and from the surrounding mountains and wilderness areas, affecting the public's ability to enjoy those views, though not preventing them.

Also, Energy Commission staff concludes that there are no Kern County General Plan goals, policies, or implementation measures pertaining to visual resources that would apply to the proposed project.

Finally, Energy Commission staff concludes that the project in combination with foreseeable future projects (both local and region-wide) would cause significant unavoidable cumulative visual impacts of two kinds:

1. Cumulative impacts in combination with foreseeable future solar, renewable, and other energy and development projects within the immediate project viewshed would be visible within the same field of view; and

2. Cumulative impacts in combination with foreseeable future solar and other renewable energy projects would contribute to a perceived sense of industrialization of the open, undeveloped desert landscape along within the California Desert Conservation Area overall.

As stated, Energy Commission staff concludes that the project would have significant unavoidable adverse impacts in both a direct and cumulative context. However, if the Energy Commission approves the project, Energy Commission staff recommends that all of staff 's proposed conditions of certification be adopted in order to minimize impacts to the greatest feasible extent. Conditions of certification referred to herein serve the purpose of both the Energy Commission's conditions of certification for purposes of CEQA and BLM's Mitigation Measures for purposes of NEPA.

The visual impacts of the proposed project alternatives, "Northern Unit Alternative" and "Southern Unit Alternative", would be similar to those of the proposed project, though the Southern Unit Alternative would result in a slightly reduced impact on U.S. 395and El Paso Mountains Wilderness. Therefore, the proposed project's impact significance conclusions and conditions of certification would also apply to the proposed project alternatives.

C.12.14 REFERENCES

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VISUAL RESOURCES APPENDIX VR-1
SUMMARY OF ANALYSIS

APPENDIX VR – 1
RIDGECREST SOLAR POWER PROJECT SA/DPA/DEIS - SUMMARY OF VISUAL RESOURCES ANALYSIS

VIEWPOINT		EXISTING VISUAL SETTING							VISUAL CHANGE					IMPACT SIGNIFICANCE	
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure: Visibility	Viewer Exposure: Number of Viewers	Viewer Exposure: Duration of View	Viewer Exposure: Overall Viewer Exposure	Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change	Mitigation / Conditions	Impact Significance with Mitigation
KOP 1 **U.S. 395** **Figure 4A** **(see also) Figures 4B/C**	View to the south from southbound U.S. 395, at the northeast corner of the north development area.	**Low to Moderate** The foreground to middleground views from U.S. 395 encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the El Paso Mountains to the south. The mountain range adds visual interest and contributes to the low-to-moderate rating for visual quality.	**High** As the landscapes along the U.S. 395 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing high desert landscapes, such as those visible from KOP 1, are diminishing. Travelers on U.S. 395 (the primary north-south travel corridor east of the Sierra Nevada Mountains) would have expectations of observing higher quality landscape features while traveling through the northern high deserts within the designated conservation area (CDCA). Travelers would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing landscape, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley.	**High**	**Low**	**Extended**	**High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**
KOP 2 **WESTBOUND BROWN ROAD** **Figure 5A** **(see also) Figures 5B/C**	View to the west-southwest from westbound Brown Road, in the central project area, approximately 0.1 mile northeast of the south development area.	**Low to Moderate** The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the hill west of the project site and the El Paso Mountains to the south. Also visible are two transmission lines that pass along the western edge of the south development area. The hill and mountain range adds visual interest and contributes to the low-to-moderate rating for visual quality.	**High** As the landscapes within Indian Wells Valley and along Brown Road (and the I-10 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley.	**High**	**Low to Moderate**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**
KOP 3 **EASTBOUND BROWN ROAD** **Figure 6A** **(see also) Figures 6B/C**	View to the east-northeast from eastbound Brown Road, in the central project area, approximately 0.3 mile southwest of the power block.	**Low to Moderate** The foreground views from Brown Road encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the rolling to angular forms of the Spangler Hills to the east and the Argus Range to the north, both of which add visual interest and contribute to the low-to-moderate rating for visual quality.	**High** As the landscapes within Indian Wells Valley and along Brown Road (and the I-10 corridor) become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic views of the mountains framing the southern Indian Wells Valley.	**High**	**Low to Moderate**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**

APPENDIX VR – 1
RIDGECREST SOLAR POWER PROJECT SA/DPA/DEIS - SUMMARY OF VISUAL RESOURCES ANALYSIS

VIEWPOINT		EXISTING VISUAL SETTING							VISUAL CHANGE					IMPACT SIGNIFICANCE	
Key Observation Point (KOP)	Description	Visual Quality	Viewer Concern	Viewer Exposure: Visibility	Viewer Exposure: Number of Viewers	Viewer Exposure: Duration of View	Viewer Exposure: Overall Viewer Exposure	Overall Visual Sensitivity	Description of Visual Change	Visual Contrast	Project Dominance	View Blockage	Overall Visual Change	Mitigation / Conditions	Impact Significance with Mitigation
KOP 4 **RAILROAD BED BIKE TRAIL** **Figures 7A / 7B**	View to the north-northeast from the Railroad Bed Bike Trail, approximately 0.25 mile west of the south development area.	**Low to Moderate** The foreground views from the Railroad Bed Bike Trail encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the horizontal to angular form of the distant Argus Mountain Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the low-to-moderate rating for visual quality.	**High** Recreationists seeking the backcountry desert experience would expect to find viewing opportunities that offer expansive views of intact and natural appearing desert landscapes with minimal if any industrial character. These backcountry visitors would be highly sensitive to the introduction of industrial character to this predominantly natural appearing landscape, and would perceive such additions as an adverse visual change.	**High**	**Low**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of noticeable geometric and structurally complex forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be prominently visible at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable)**
KOP 5 **WEST HILLTOP** **Figures 8A / 8B**	View to the east from the hilltop, immediately adjacent and to the west of the south development area.	**Moderate** The panoramic vista views from the hilltop encompass a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat valley floor with shrubby vegetation of pale greens and tans, low-growing grasses and light-colored soils, backdropped by the horizontal to angular form of the Spangler Hills and distant Argus Mountain Range. Also visible are two transmission lines that pass along the western edge of the south development area. The mountain ranges that border the valley add visual interest and contribute to the low-to-moderate rating for visual quality.	**High** As the landscapes within Indian Wells Valley become more developed, opportunities for expansive, panoramic views of intact and natural appearing high desert landscapes are diminishing. Thus, travelers within the valley and off-road recreationists seeking vista views of unspoiled landscapes would be highly sensitive to the introduction of industrial character to this predominantly naturally appearing valley landscape, and would perceive such as an adverse visual change, particularly when such facilities would impair panoramic vista views of the valley and the bordering mountain ranges and hills.	**High**	**Very Low**	**Extended**	**Moderate to High**	**Moderate to High**	Addition of prominent geometric forms with horizontal to vertical to curvilinear lines and complex industrial character. Facilities would be visible and co-dominant-to-dominant at this foreground to middleground viewing distance.	**High**	**Co-Dominant to Dominant**	**Moderate to High**	**Moderate to High**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Significant and Unavoidable**
KOP 6 **EL PASO MOUNTAINS WILDERNESS** **Figure 9**	View to the northeast from a north ridge in the El Paso Mountains Wilderness, approximately 4.5 miles southwest of the south development area.	**Moderate to High** Although built features are visible in the vicinity of the span, much of the landscape visible to the north and south of I-10 is characterized by a broad, open and predominantly undeveloped landscape consisting of a relatively non-descript, flat, grass- and shrub-covered mesa, which is backdropped by the rolling to angular forms of the McCoy Mountains, north of I-10. The mountains add visual interest.	**High** As the landscapes along the I-10 corridor become more and more industrialized with the addition of built features with industrial character, opportunities for expansive views of natural appearing desert landscapes are rapidly diminishing. Combined with the high volume of travelers on I-10 (the primary travel corridor between Southern California and Phoenix) and viewer expectations of observing higher quality landscape features while traveling through a designated conservation area (CDCA), travelers would be highly sensitive to the introduction of additional industrial character to this predominantly naturally appearing landscape, which would be perceived as an adverse visual change.	**Moderate to High**	**Very Low**	**Extended**	**Moderate**	**Moderate to High**	Addition of prominent linear forms with horizontal to vertical and curvilinear lines and simple industrial character. Facilities would be visible but subordinate-to-co-dominant at this viewing distance.	**Low to Moderate**	**Subordinate to Co-Dominant**	**Low to Moderate**	**Low to Moderate**	**Energy Commission Staff's Conditions:** **VIS-1** **VIS-2** **VIS-3** **VIS-4** **VIS-5**	**Adverse but Less than Significant**

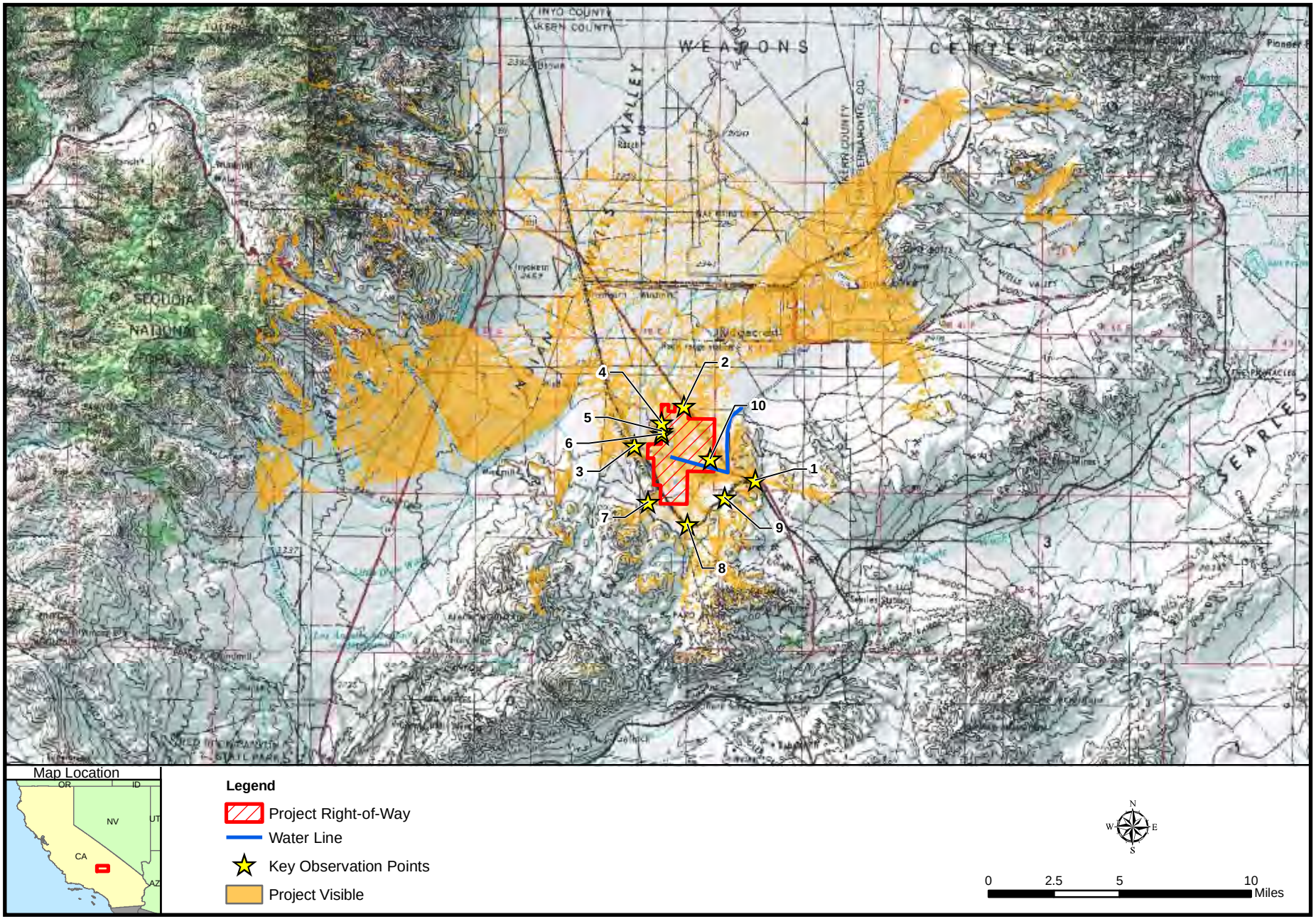
VISUAL RESOURCES - FIGURE 1

Ridgecrest Solar Power Project - Characteristic Landscape of the Project Site

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 2

Ridgecrest Solar Power Project - Project Viewshed

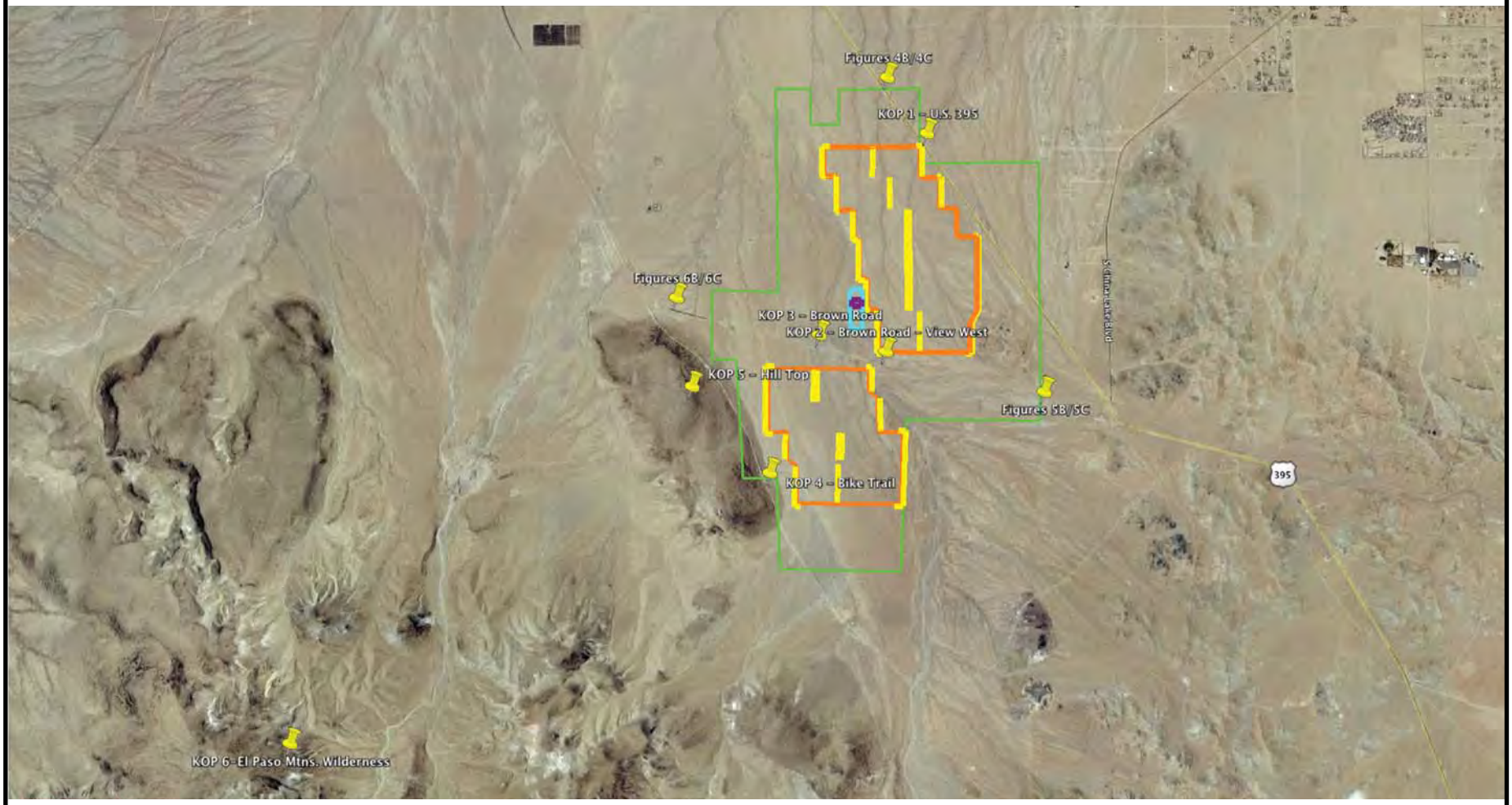


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: AFC

VISUAL RESOURCES - FIGURE 3

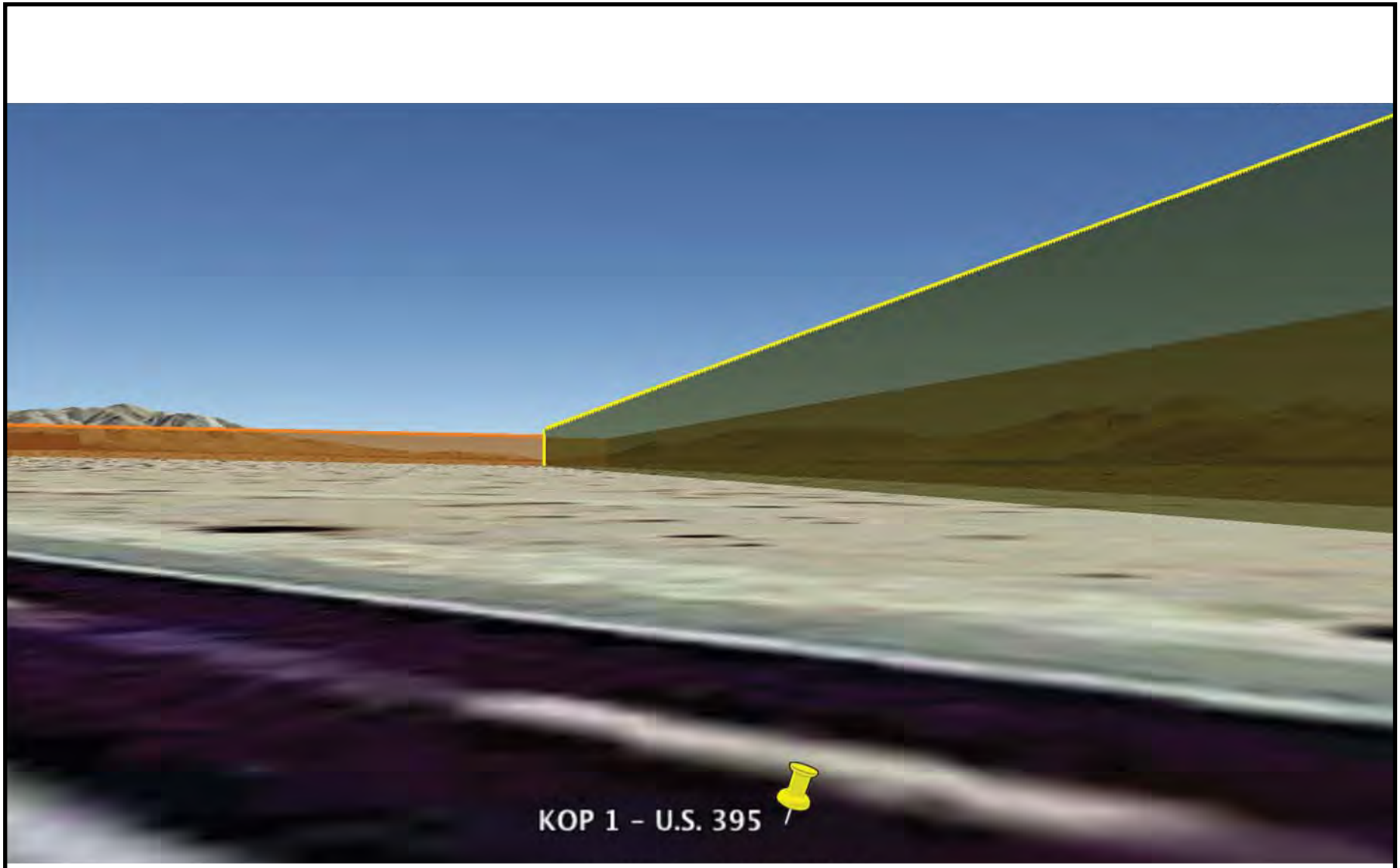
Ridgecrest Solar Power Project - Location of Key Observation Points (KOPs)



SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 4A

Ridgecrest Solar Power Project - KOP 1 - Southbound U.S. 395, Google Earth Perspective of the Project Site



SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 4B

Ridgecrest Solar Power Project - KOP 1 - Southbound U.S. 395, Existing View of the Project Site

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

SOURCE: Michael Clayton

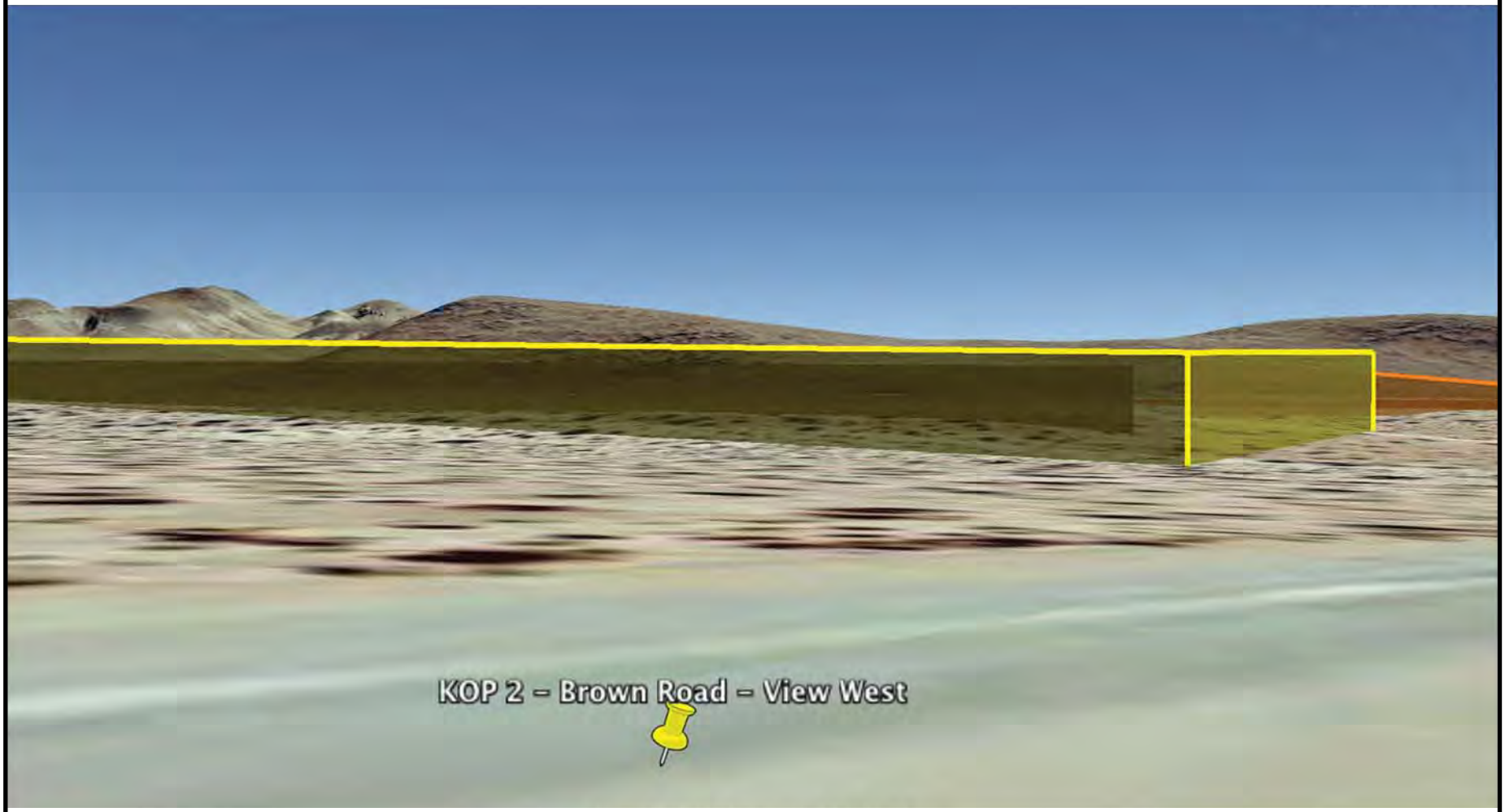
VISUAL RESOURCES - FIGURE 4C

Ridgecrest Solar Power Project - KOP 1 - Southbound U.S. 395, Visual Simulation of the Proposed Project

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 5A

Ridgecrest Solar Power Project - KOP 2 - Westbound Brown Road, Google Earth Perspective of the Project Site



SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 5B

Ridgecrest Solar Power Project - KOP 2 - Westbound Brown Road, Existing View of the Project Site

SOURCE: Michael Clayton

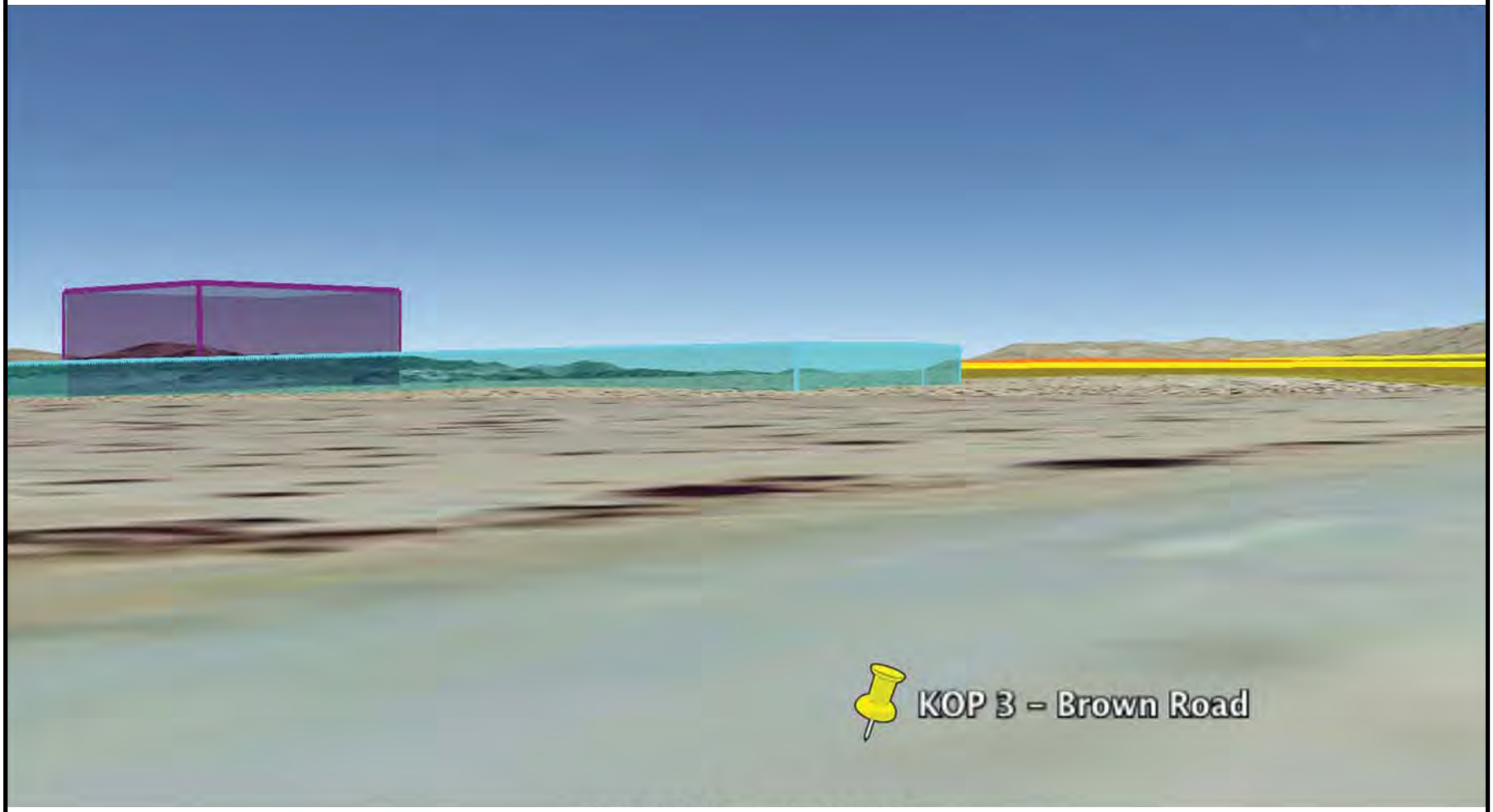
VISUAL RESOURCES - FIGURE 5C

Ridgecrest Solar Power Project - KOP 2 - Westbound Brown Road, Visual Simulation of the Proposed Project

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 6A

Ridgecrest Solar Power Project - KOP 3 - Eastbound Brown Road, Google Earth Perspective of the Project Site



SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 6B

Ridgecrest Solar Power Project - KOP 3 - Eastbound Brown Road, Existing View of the Project Site

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 6C

Ridgecrest Solar Power Project - KOP 3 - Eastbound Brown Road, Visual Simulation of the Proposed Project

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 7A

Ridgecrest Solar Power Project - KOP 4 - Adjacent Railroad Bed Bike Trail, Existing View of the Project Site

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 7B

Ridgecrest Solar Power Project - KOP 4 - Adjacent Railroad Bed Bike Trail, Visual Simulation of the Proposed Project

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 8A

Ridgecrest Solar Power Project - KOP 5 - Adjacent Hilltop to the West, Existing View of the Project Site

SOURCE: Michael Clayton

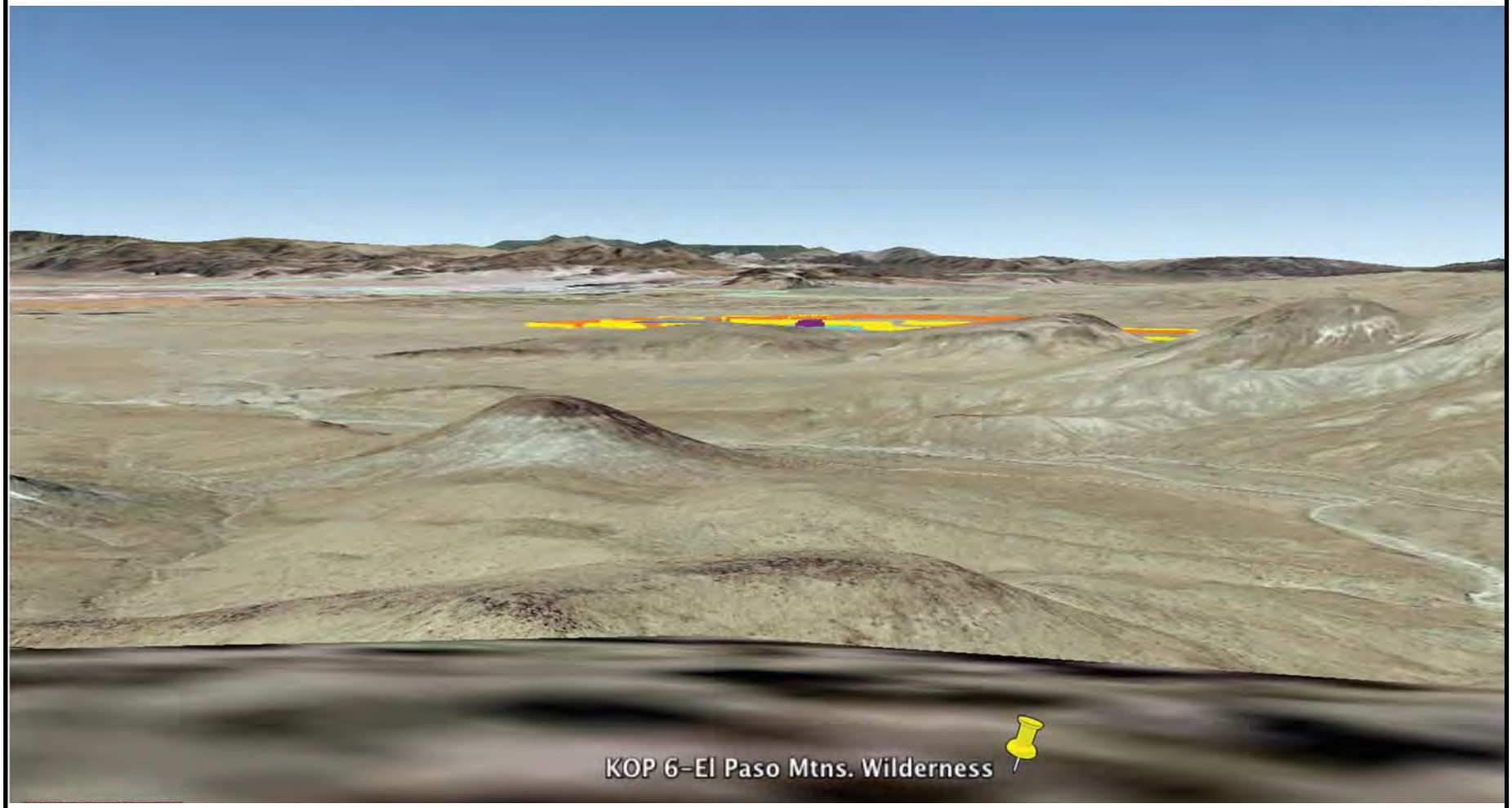
VISUAL RESOURCES - FIGURE 8B

Ridgecrest Solar Power Project - KOP 5 - Adjacent Hilltop to the West, Visual Simulation of the Proposed Project

SOURCE: Michael Clayton

VISUAL RESOURCES - FIGURE 9

Ridgecrest Solar Power Project - KOP 6 - El Paso Mountains Wilderness, Google Earth Perspective of the Project Site



SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1A

Ridgecrest Solar Power Project - Existing View to the North toward the Kramer Junction SEGS Project

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1B

Ridgecrest Solar Power Project - Existing View to the Southwest toward the Kramer Junction SEGS Project

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

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1C

Ridgecrest Solar Power Project - Existing View to the West-Southwest toward the Kramer Junction SEGS Project

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 1D

Ridgecrest Solar Power Project - Existing View to the Northwest toward the Kramer Junction SEGS Project

SOURCE: Michael Clayton

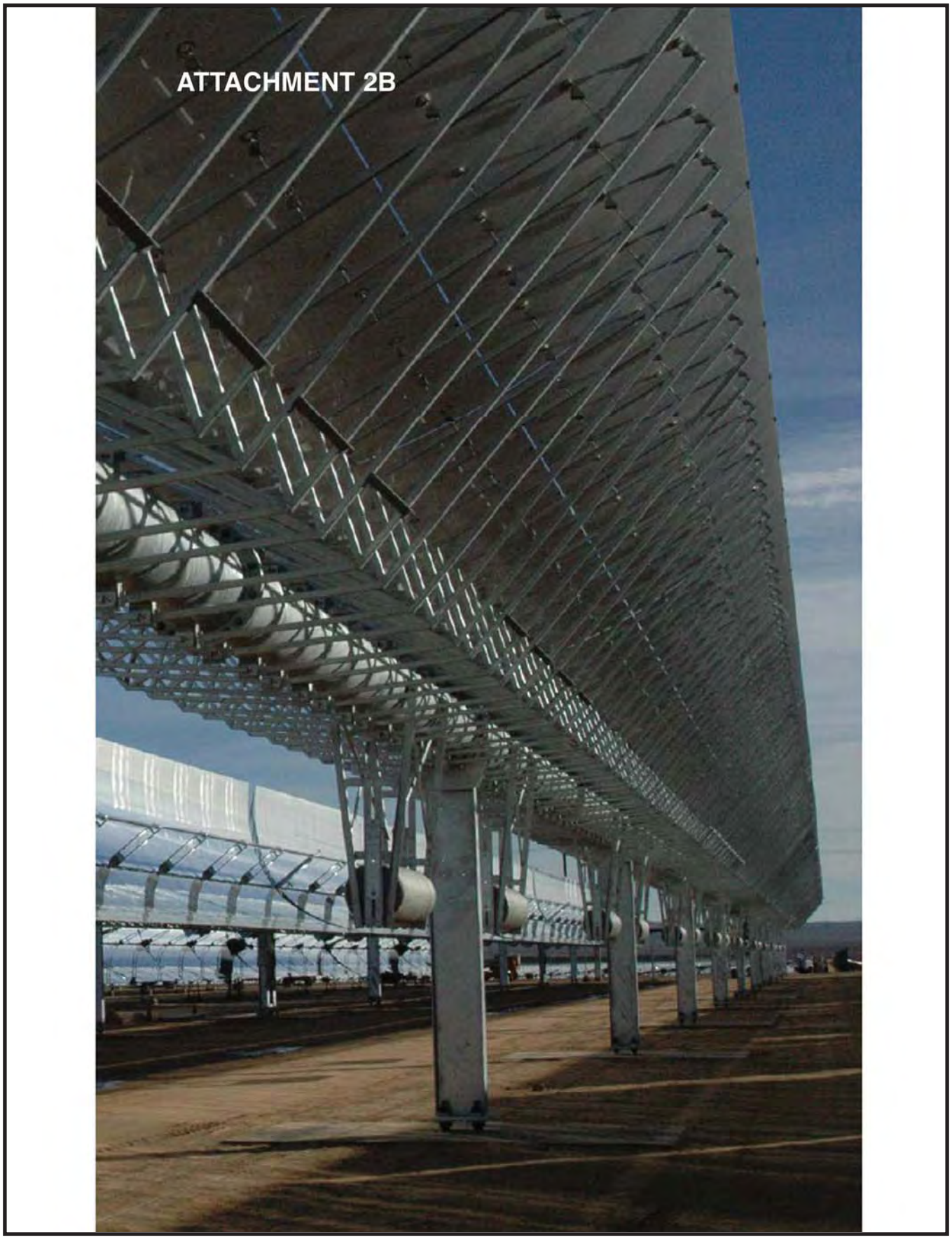
VISUAL RESOURCES - ATTACHMENT 2A

Ridgecrest Solar Power Project - Same SCA to be Installed (View from Front)

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 2B

Ridgecrest Solar Power Project - Same SCA to be Installed (View from Below)



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

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 3A

Ridgecrest Solar Power Project - Framing of the Wind Fence prior to Installation of the Horizontal Steel Ropes and Iron Mesh

SOURCE: Michael Clayton

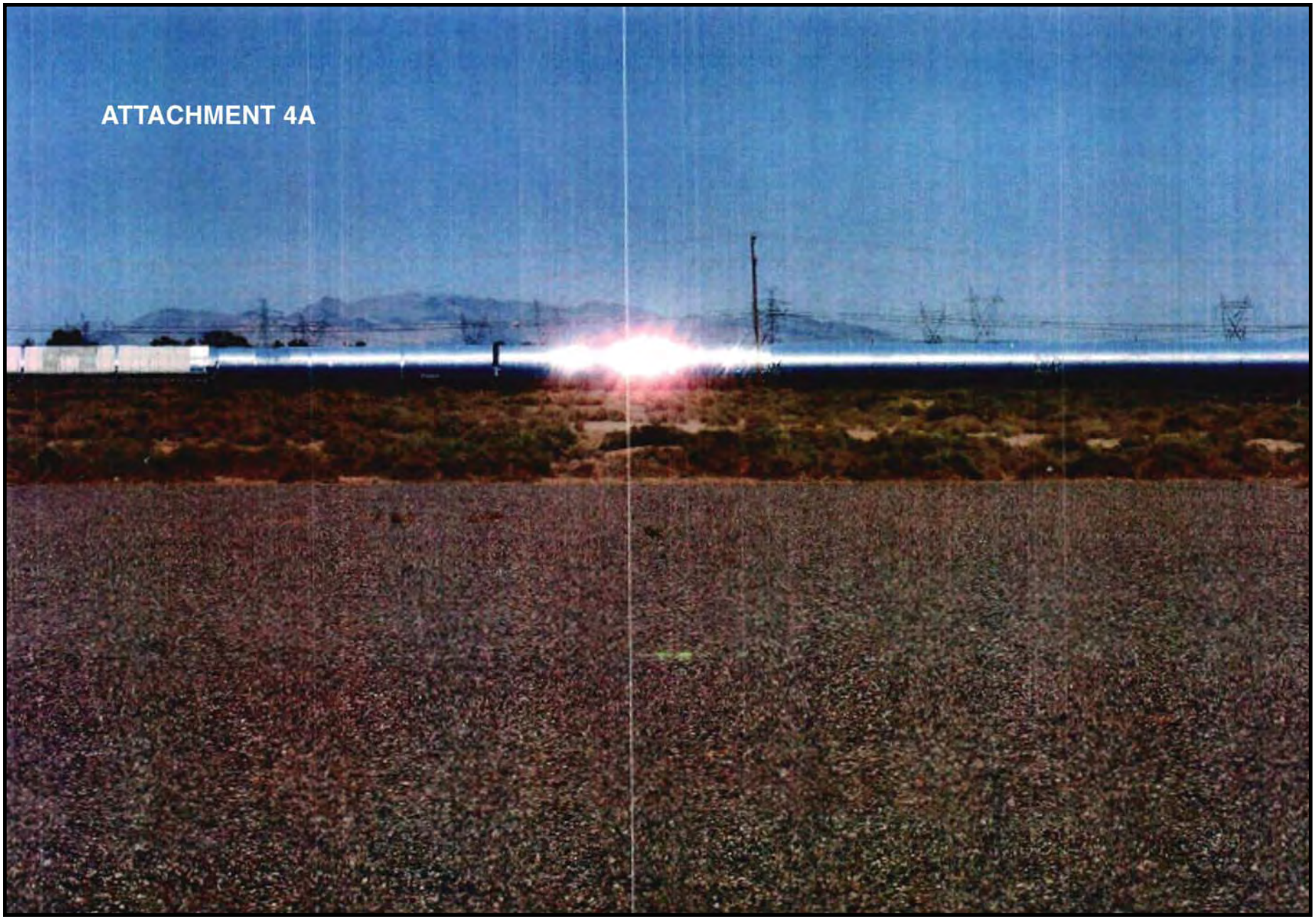
VISUAL RESOURCES - ATTACHMENT 3B

Ridgecrest Solar Power Project - Close-up View of Wind Fence

SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 4A

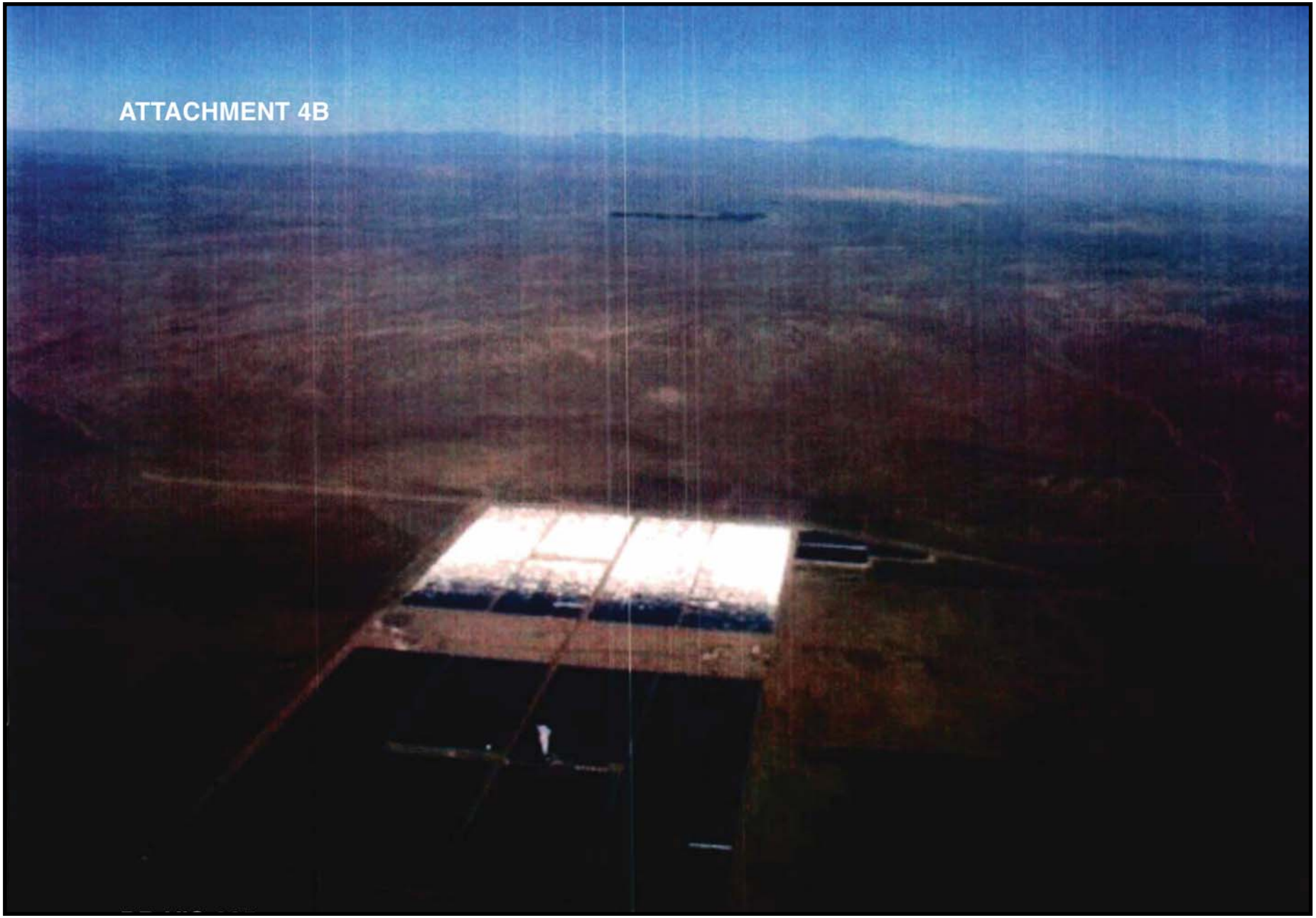
Ridgecrest Solar Power Project - Example of Glint off of the Kramer Junction SEGS Project (Ground-Level View)



SOURCE: Michael Clayton

VISUAL RESOURCES - ATTACHMENT 4B

Ridgecrest Solar Power Project - Example of Glint off of the Kramer Junction SEGS Project (Aerial View)



SOURCE: Michael Clayton

C.13 WASTE MANAGEMENT

Testimony of Suzanne Phinney, D.Env.

C.13.1 SUMMARY OF CONCLUSIONS

Management of the waste generated during construction, operation and closure/decommissioning of the Ridgecrest Solar Power Project (RSPP or proposed project) would not generate a significant adverse impact under the California Environmental Quality Act (CEQA) guidelines (Appendix G: Environmental Checklist Section XVI- Utilities and Service Systems). There is sufficient landfill capacity, and the project would be consistent with the applicable waste management laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification (AFC) and California Energy Commission (Commission) staff's proposed conditions of certification are implemented. Similar to the proposed project, Commission staff considers project compliance with CEQA guidelines; applicable waste management laws, ordinances, regulations, and standards; and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Southern Unit Alternative, Northern Unit Alternative, or Original Proposed Project Alternative. No cumulative waste management impacts would occur.

C.13. 2 INTRODUCTION

This section presents an analysis of issues associated with wastes generated from the construction, operation and closure/decommissioning of the proposed project. The technical scope of this analysis encompasses solid and liquid wastes existing onsite and wastes that would likely be generated during facility construction, operation and closure/decommissioning. Management and discharge of wastewater is addressed in the **SOIL AND WATER RESOURCES** section of this document. Additional information related to waste management may also be covered in the **WORKER SAFETY** and **HAZARDOUS MATERIALS MANAGEMENT** sections of this document.

The objectives of the Bureau of Land Management (BLM) and California Energy Commission (Commission) in conducting this waste management analysis are to ensure that:

- The management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction, operation and closure/decommissioning of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not adversely impact existing waste disposal facilities.
- The site is managed in such a way that project wastes and waste constituents would not pose a risk to humans or the environment.

C.13.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

In accordance with CEQA guidelines (Appendix G: Environmental Checklist Section XVI- Utilities and Service Systems), Commission staff evaluated project wastes in terms of landfill capacity and LORS compliance. The federal, state, and local environmental LORS listed in **Waste Management Table 1** have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment.

Waste Management Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code (U.S.C.), §6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • Waste labeling practices and use of appropriate containers; • Use of a manifest when transporting wastes; • Submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, U.S.C., §9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as *Superfund*, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • Reporting requirements for releases of hazardous substances; • Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; • Liability of persons responsible for releases of hazardous substances or waste; and

Applicable Law	Description
	• Requirements for property owners/potential buyers to conduct "all appropriate inquiries" into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA "all appropriate inquiries" requirements.
Title 40, Code of Federal Regulations (C.F.R.), Subchapter I – Solid Wastes	These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is an RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 49, C.F.R., Parts 172 and 173. Hazardous Materials Regulations	These regulations address the United States Department of Transportation (DOT) established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, Section 262.20.
Federal Clean Water Act, 33 U.S.C. § 1251 *et seq.*	The Clean Water Act controls discharge of wastewater to the surface waters of the U.S.
State	
California Health and Safety Code (Health and Safety Code), Chapter 6.5, §25100, et seq. Hazardous Waste Control Act of 1972, as amended	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (Cal. Code Regs.), Division 4.5.	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes.

Applicable Law	Description
Environmental Health Standards for the Management of Hazardous Waste	Hazardous waste generators must obtain identification numbers; prepare manifests before transporting the waste off site; and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CAL. CODE REGS. include: • Identification and Listing of Hazardous Waste (Chapter 11, §66261.1, et seq.). • Standards Applicable to Generator of Hazardous Waste (Chapter 12, §66262.10, et seq.). • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §66263.10, et seq.). • Standards for Universal Waste Management (Chapter 23, §66273.1, et seq.). • Standards for the Management of Used Oil (Chapter 29, §66279.1, et seq.). • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §67450.1, et seq.). The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.
Health and Safety Code, Chapter 6.11 §§25404 – 25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure (SPCC) Plans. • Hazardous Materials Release and Response Plans and Inventories (Business Plans). • California Accidental Release Prevention (CalARP) Program. • Hazardous Materials Management Plan / Hazardous Materials Inventory Statements. • Hazardous Waste Generator / Tiered Permitting Program. • Underground Storage Tank Program. The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. The Kern County Environmental Health Services Department is the CUPA for the RSPP. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.
Title 27, Cal. Code Regs., Division 1, Sub-division 4, Chapter 1, §15100, et seq.	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410).

Applicable Law	Description
Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	• Article 10 – Business Reporting to CUPAs (§§15600–15620).
Public Resources Code, Division 30, §40000, et seq. California Integrated Waste Management Act of 1989	The California Integrated Waste Management Act (CIWMA) establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.
Title 14, Cal. Code Regs., Division 7, §17200, et seq. California Integrated Waste Management Board	These regulations implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.
Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four-year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, Cal. Code Regs., §67100.1 et seq. Hazardous Waste Source Reduction and Management Review	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
Title 23, Cal. Code Regs., Division 3, Chapters 16 and 18	These regulations relate to hazardous material storage and petroleum UST cleanup, as well as hazardous waste generator permitting, handling, and storage. The DTSC Imperial County CUPA is responsible for local enforcement.

Applicable Law	Description
California Water Code Section 13000 et seq. Porter-Cologne Water Quality Control Act	The Act controls discharge of any waste material that could affect the quality of the surface waters or groundwaters of California. Its policies are to protect the quality of all the waters of the State, to regulate all activities and factors affecting the quality of water to attain the highest water quality within reason, and protect the quality of water from degradation with full power and jurisdiction of the State. It established the State Water Resources Control Board and nine Regional Water Quality Control Boards to implement its provisions.
Title 24, CCR, Part 9 California Fire Code	These regulations are based on the 2006 Edition of the International Fire Code. They provide for safeguarding to a reasonable degree, life and property from the hazards of fire and explosion; dangerous conditions arising from the storage, handling and use of hazardous materials and devices; and hazardous conditions in the use or occupancy of buildings or premises The CFC also contains provisions to assist emergency response personnel.
Local	
Kern County General Plan, Chapter 4.9 Safety Element	The element describes the County's policies and siting criteria identified in the Kern County and Incorporated Cities Hazardous Waste Management Plan including encouragement of innovative technologies to manage hazardous waste streams and facility compliance with the Uniform Fire Code.
Kern County Code, Chapters 8.04 and 8.28 Health and Safety	These regulations establish permits and fee requirements, as well as requirements for the generation, storage, transportation, and disposal of solid wastes within the County.
Kern County Code, Chapter 17.32 Kern County Fire Code	The County Fire Code adopts, with additions and exceptions, the California Fire Code.

C.13.4 PROPOSED PROJECT

C.13.4.1 SETTING AND EXISTING CONDITIONS

The RSPP would use parabolic trough technology to generate 250 MW. The proposed site is approximately 5 miles southwest of Ridgecrest, off Brown Road on the west side of U.S. Highway 395. It is on 3,995 acres with 2,002 disturbed acres of undeveloped public land administered by the BLM (ROW# CACA 49016). The site has no existing structures, but features 115-kV and 230-kV Southern California Edison power lines (in the southwest portion), a former Southern Pacific Railroad Right of Way (ROW) (in the western portion), Brown Road (bisecting east to west), and over 10 miles of unpaved roads. Miscellaneous trash and debris consistent with household dumping are located throughout the site. World War II-era unexploded ordnance (UXO) may also be present. A burn dump (which received municipal waste from surrounding towns prior to the 1970s) is located on an adjacent property.

Two solar fields, a northern field located north of Brown Road and a southern field located south of Brown Road, would have acreages of 894 acres and 554 acres, respectively. The Applicant staggered the rows of arrays to avoid the El Paso Wash. The two fields would feed into a single power block, located north of Brown Road. Major components of the power block would include administration, control, warehouse, maintenance, and lab buildings; HTF pumping and freeze protection system; solar steam generator; propane-fired auxiliary boiler; steam turbine generator; air-cooled condenser; generator step-up transformer; transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment. Soil contaminated with spills and leaks from the HTF system would be treated in an 8-acre land treatment unit (LTU) (which includes stockpile and bioremediation areas), to be located north of Brown Road in the eastern portion of the site. A new 3.2-acre, 230-kVswitchyard would tie into SCE's InyoKern-Kramer transmission line, with a 3,900 foot long onsite gen-tie; the Applicant expects an Interconnection Agreement in the fourth quarter of 2010. Propane for quick startup and heat transfer fluid freeze protection (not energy generation) would be trucked to the site. The project would be dry-cooled, reducing water use. Approximately 150 acre feet per year of groundwater would be supplied by a new 5-mile pipeline from the Indian Wells Valley Water District (IWVWD); the pipeline route would follow China Lake Boulevard and Brown Road.

There are seven Class III landfills in Kern County that accept non-hazardous waste. The facility closest to the proposed project site is the Ridgecrest-Inyokern Sanitary Landfill at less than 7 miles away; remaining capacity at this landfill is 5,000,989 cubic yards with an estimated closure date of 2014. Two Class I facilities – Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County – could accept hazardous wastes generated by the RSPP. They have a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity.

The Applicant expects construction to begin late 2010 and last approximately 28 months. Commercial operation would begin mid-2013 for a planned operational life of 30 years. The RSPP could operate for a longer or shorter period depending on economic or other circumstances (SM 2009a sections 2, 3, and 5.16; AECOM 2009; SM 2010a DR-ALT-49).

Refer to **SECTION B.1, PROJECT DESCRIPTION,** for a more detailed description of the proposed project and accompanying figures identifying project features and facilities.

C.13.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This waste management analysis addresses: a) existing project site conditions and the potential for contamination associated with prior activities on or near the project site, and b) the impacts from the generation and management of wastes during project construction, operation and closure/decommissioning.

Existing Project Site Conditions and Potential for Contamination

For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the CEQA significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant under CEQA by Commission staff.

As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an AFC. The Phase I ESA is conducted to identify any conditions indicative of releases and threatened releases of hazardous substances at the site and to identify any areas known to be contaminated (or a source of contamination) on or near the site.

In general, the Phase I ESA uses a qualified environmental professional to conduct inquiries into past uses and ownership of the property, research hazardous substance releases and hazardous waste disposal at the site and within a certain distance of the site, and visually inspect the property, making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional then provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional may also give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were major gaps in the information available about the site, if an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

In conducting its assessment of a proposed project, staff will review the project's Phase I ESA and work with the appropriate oversight agencies as necessary to determine if additional site characterization work is needed and if additional mitigation is necessary to ensure protection of human health and the environment from hazardous substance releases and on-site contamination.

[1] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

A Phase I ESA, dated June 2009, was prepared by AECOM, Inc. in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs, and is included as Appendix I of the project's AFC. The Phase I ESA addressed conditions on subject parcels in Township 28 South, Range 39 East and Township 27 South, Range 39 East, but did not encompass the offsite water pipeline from the IWVWD. The pipeline would follow public roads (China Lake Boulevard and Brown Road), and potential contamination would likely have already been encountered during road construction and maintenance. Staff therefore does not consider an additional Phase I ESA for the pipeline necessary.

The Phase I ESA did not identify any Recognized Environmental Conditions (RECs) in connection with historic or current site operations. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicated an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

Impacts from Generation and Management of Wastes during Construction, Operation and Project Closure/Decommissioning

As mentioned previously, Commission staff considers project waste management to result in no significant adverse impacts, as defined per CEQA guidelines in Checklist Section XVI, if there is available landfill capacity and the project complies with LORS. Commission staff thus reviewed the applicant's proposed solid and hazardous waste management methods regarding the management of project-related wastes generated during construction, operation, and closure/decommissioning of the proposed project to determine whether the methods proposed are consistent with the LORS identified for waste disposal and recycling. Staff then reviewed the capacity available at off-site treatment and disposal sites to determine whether or not the proposed power plant's waste would impact the available capacity.

The handling and management of waste generated by the RSPP would follow the hierarchical approach of source reduction, recycling, treatment, and disposal as specified in California Public Resources Code Sections 40051 and 40196. The first priority of the project owner is to use materials that reduce the waste that is generated. The next level of waste management would involve reusing or recycling wastes. For wastes that cannot be recycled, treatment would be used, if possible, to make the waste nonhazardous. Finally, waste that cannot be reused, recycled, or treated would be transported off site to a permitted treatment, storage, or disposal facility.

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated and closed in compliance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission. This Compliance Plan will include Conditions of Certification identified in the following sections.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions

The RSPP ROW is 3,995 acres, and consists of 9 contiguous parcels of BLM administered land in Township 28 South, Range 39 East; and Township 27 South, Range 39 East. The actual project footprint would disturb a total of 2,002 acres.

Photographs, maps, and other historic records indicate the site has been historically undeveloped with buildings or structures, but has been traversed by SCE 115-kV and 230-kV power lines, Southern Pacific Railroad (the Terese Siding), Brown Road, and unpaved access roads. The transmission lines are depicted by the 1943 topographic map, but not in the 1915 map. The railroad was constructed in 1908 to support construction of the Los Angeles Aqueduct. According to the BLM, it stopped operating in the early 1980s and the tracks were removed in the late 1990s. A 1915 topographic map depicts the present day Brown Road as U.S. Highway 395; the highway's current configuration was later developed. Numerous unimproved roads show up in the 1972 topographic map. In addition, a water well is depicted in the southwestern portion of the site in a topographic map from 1953, but is not on record with the Kern County Environmental Health Services Department (AECOM 2009).

AECOM did not identify any RECs or HRECs in connection with the RSPP site, and did not observe hazardous waste during its February 16 and 17, 2009 site reconnaissance. Miscellaneous trash and debris consistent with household dumping was observed at various locations throughout the site. No discolored soil, water, unusual vegetative conditions, staining, or evidence of hazardous materials release was observed. Similarly, no aboveground storage tanks and no evidence of underground storage tanks were observed. Although transmission lines cross the site, no evidence of transformers or PCB-containing equipment was observed. The Southern Pacific Railroad ROW remains, and includes raised berms, bridges, and stormwater conveyances. AECOM (on April 23, 2009) located the water well depicted in the 1953 map, and observed it is no longer in use and has been filled with rocks (AECOM 2009).

The California Hazardous Material Incident Report System (CHMIRS) lists a hazardous materials incident on the site, in the dirt parking/driveway area on the south side of Brown Road. The spill occurred in 1989, and is not associated with any other contamination-related listing. AECOM does not consider the listing to represent a REC at the project site. The site also featured mining claims in the area of the rocky knoll northwest of the Highway 395 and Brown Road intersection. BLM indicated that prospecting, but no successful mining activities occurred on the property (AECOM 2009).

A burn dump (which received municipal waste from surrounding towns prior to the 1970s) is located in an adjacent property, 550 feet south of the RSPP site. The dump site contains burned debris (including some tires and pieces of glass, plaster, brick, ceramic, and metal), but is unlikely to have contaminated groundwater (which is approximately 100 to 200 feet below ground surface in the area). As soil was likely the only media potentially impacted by the dump, AECOM does not expect the adjacent site to present a concern to the subject property (AECOM 2009).

AECOM observed World War II-era unexploded ordnance (UXO) on the site, south of Brown Road. Historical information indicates that the site is located approximately 10 miles south of the historic United States Naval Ordnance Test Station (NOTS), a present day Naval Weapons Test Center associated with China Lake (AECOM 2009). The Applicant provided a summary of orphan sites in the project vicinity listed by Environmental Data Resources (EDR). No listed orphan sites are located on the proposed RSPP site; however, the orphan site study was not able to determine if activities from the China Lake Naval Weapons Test Center have left any Munitions and Explosives of Concern (MECs) or UXO at the site. There are 10 listed orphan sites within 5 miles of the project site, and 4 orphan sites (associated with the Ridgecrest Landfill) 0.63 miles away. Based on distance from the project site and/or the non-contamination nature of the listings, staff concurs with the Applicant that the orphan sites are unlikely present a concern to the RSPP (SM 2010a DR-WASTE-244 and 245).

The AECOM Phase I ESA recommended that the potential presence of UXO be investigated in geophysical surveys performed by a company with specific expertise in UXO identification, and that remnants of munitions or bullets identified during development of the subject property be removed and disposed of in accordance with applicable LORS. Commission staff proposes Condition of Certification **WASTE-1**, which would require further UXO training, investigation, removal, and disposal.

In the event that contamination is identified during any phase of construction, Commission staff proposes Condition of Certification **WASTE-2**, which would require that an experienced and qualified Professional Engineer or Professional Geologist be available for consultation in the event contaminated soil is encountered. If contaminated soil is identified, **WASTE-3** would require that the Professional Engineer or Professional Geologist inspect the site, determine what is required to characterize the nature and extent of contamination, and provide a report to the Energy Commission Compliance Project Manager (CPM), BLM Authorized Office (AO) and DTSC with findings and recommended actions.

Proposed Project

Proposed Project - Construction Impacts and Mitigation

Site preparation and construction of the proposed solar project and its associated facilities would last approximately 28 months and generate non-hazardous, universal, and hazardous wastes in solid and liquid forms. Before construction begins, the project owner would develop and implement a Construction Waste Management Plan to ensure that waste is recycled when possible and properly landfilled as necessary. Proposed Condition of Certification **WASTE-4** would require the project owner to submit the Construction Waste Management Plan to the CPM and AO at least 30 days prior to the start of construction activities.

Non-Hazardous Waste

Construction activities would generate an estimated 70 cubic yards per week of non-hazardous solid wastes, consisting of scrap wood, concrete, steel, glass, plastic, paper,

insulating materials, aluminum, and food waste. For all construction waste, recyclable materials would be separated and removed to recycling facilities; non-recyclable materials would be disposed of at a Class III landfill.

Non-hazardous liquid wastes would be generated during construction, and would include storm water runoff, sanitary waste, dust suppression drainage, and equipment wash water. Storm water runoff would be managed in accordance with appropriate LORS. Sanitary wastes would be pumped to tanker trucks by licensed contractors for transport to a sanitary water treatment plant. Potentially contaminated equipment wash water would be contained at designated wash areas and transported to a wastewater treatment facility via a licensed hauler. Please see the **SOIL AND WATER RESOURCES** section of this document for more information on the management of project wastewater.

Universal Waste

Anticipated universal waste generated during construction would include spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) and empty or nonempty aerosol cans. Estimated quantities are 30 spent batteries (in 2 ½ years) and eight drums of aerosol cans (per year). Spent batteries and aerosol cans would be recycled by licensed universal waste handlers.

Universal waste would be accumulated for less than one year and recycled off site.

Hazardous Waste

During construction, anticipated hazardous waste includes: empty hazardous material containers; solvents, used oil, paint, and oily rags; heat exchanger cleaning waste (chelant-type solution); and flushing and cleaning wash water. Estimated quantities are: one cubic yard of empty containers (per week); 175 gallons of solvents, used oil, paint, and oily rags (every 90 days); 1,000 gallons of heat exchanger cleaning waste (once per power plant unit); and variable amounts of flushing and cleaning wash water. Empty hazardous material containers would be returned to the vendor or disposed of at a hazardous waste facility; solvents, used oils, paint, and oily rags would be disposed of at a hazardous waste facility, recycled, or used for energy recovery; heat exchanger cleaning waste would be disposed of at a permitted hazardous waste disposal facility; and flushing and cleaning wash water would be recycled, used for energy recovery, or disposed of depending on specific waste stream characteristics (SM 2009a, pages 5.16-13 to 5.16-15).

In the unlikely event that contaminated soil is encountered during excavation activities, the soil would be segregated, sampled, and tested to determine appropriate disposal and treatment options. If the soil is classified as hazardous, the Kern County Environmental Health Services Department would be notified and the soil hauled to a Class I landfill or other appropriate soil treatment and recycling facility, as required. The Kern County Environmental Health Services Department would be notified also if previously unknown wells, tanks, or other underground storage facilities are discovered during construction. Subsequent removal of such equipment, including potential remediation activities, would be conducted in accordance with applicable LORS (SM 2009a, pages 5.16-14 to 15). Commission staff finds that proposed Conditions of

Certification **WASTE-2** and **-3** would be adequate to address any soil contamination contingency that may be encountered during construction of the project and would further support compliance with LORS.

The generation of hazardous waste requires a unique hazardous waste generator identification number. The hazardous waste generator number is determined based on site location and therefore, both the construction contractor and the RSPP project owner/operator could be considered the generator of hazardous wastes at the site. The RSPP project owner would obtain a unique hazardous waste generator identification number for the site prior to starting construction. This would ensure compliance with California Code of Regulation Title 22, Division 4.5. Proposed Condition of Certification **WASTE-5** would require the RSPP project owner to submit the notification and issued identification number documentation to the CPM and AO.

Hazardous wastes would be collected in hazardous waste accumulation containers and stored in a laydown area, warehouse area, or storage tank on equipment skids for less than 90 days (or less than 180 days in the case of lead acid batteries). The accumulated wastes would then be properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal firms. Commission staff reviewed the disposal methods and concluded that all wastes would be disposed of in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM and AO whenever the owner becomes aware of such action.

Commission staff has reviewed the proposed waste management methods described in AFC section 5.16.3.1 and concludes that project construction wastes would be managed in accordance with all applicable LORS. Absent any unusual circumstances, staff considers project compliance with LORS and staff's proposed conditions of certification to be sufficient to ensure that no significant adverse impacts would occur (per CEQA Guidelines) as a result of construction waste management activities.

Proposed Project - Construction and Demolition (C&D) Waste Diversion and Mitigation

The Integrated Waste Management Act of 1989 [Assembly Bill (AB) 939, Sher, Chapter 1095, Statutes of 1989] set landfill waste diversion goals of 50% (by 2000) for local jurisdictions. To meet this goal, many jurisdictions require applicants for construction and demolition projects to submit a reuse/recycling plan for at least 50% of C&D materials prior to the issuance of a building or demolition permit. While the proposed project is not responsible to a local jurisdiction (neither Ridgecrest nor Kern County has a construction and demolition waste diversion ordinance), Commission staff will require the applicant to meet the 50% waste diversion rate. Adoption of Condition of Certification **WASTE-7** will ensure the applicant meets the waste diversion goals of the C&D program.

Proposed Project - Operation Impacts and Mitigation

The proposed project would generate non-hazardous, universal, and hazardous wastes in solid and liquid forms under normal operating conditions. Table 5.16-6 of the project AFC summarizes the anticipated operation waste streams, estimated waste volumes and generation frequency, and proposed management methods. This information is presented below in **Waste Management Table 2**.

Waste Management Table 2
Summary of Operation Waste Streams and Management Methods

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Soil contaminated with HTF (>10,000 mg/kg) – Non-RCRA Hazardous	Solar array equipment leaks	10 cy/year	Intermittent	Accumulate for <90 days	Dispose at Class I landfill or soil thermal treatment facility
Soil contaminated with HTF (< 10,000 mg/kg) – Non-hazardous	Solar array	750 cy/year	Intermittent	Bioremediation or land farming at LTU	Dispose at permitted waste management facility
Spent batteries – Universal waste	Batteries containing heavy metals such as alkaline dry cell, nickel-cadmium, or lithium ion.	<10/month	Continuous	Accumulate for <one year	Recycle
Spent carbon – RCRA Hazardous	Spent activated carbon from air pollution control of HTF vent	60,000 pounds/ year	Intermittent	Contained in engineered process vessel; no accumulation outside of process	Regeneration at a permitted management facility
Spent batteries – Hazardous (exempt if managed as prescribed by Title 22 CCR Chapter 16).	Lead acid	20 every two years	Intermittent	Accumulated for <180 days	Recycle
Spent fluorescent bulbs or high-intensity discharge lamps – Universal waste	Facility lighting	< 50 per year	Intermittent	Accumulate for <one year	Recycle
Dirty shop rags – recyclable material	Maintenance cleaning operations	50 pounds/ month	Routine	None	Clean and recycle at commercial laundry

Waste Stream and Classification[1]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Oil absorbent, and oil filters – Non-RCRA hazardous	Various	Five 55-gallon drums/ month	Intermittent	Accumulate for <90 days	Recover or dispose at Class I landfill
Effluent from oily water separation system – Non-RCRA hazardous	Plant wash down area/oily water separation system	3,000 gallons/ year	Intermittent	None	Recycle
Used hydraulic fluid, oils, and grease – Non-RCRA hazardous	HTF system, turbine, and other hydraulic equipment	50,000 gallons/year	Intermittent	Accumulate for <90 days	Recycle
Spent demineralizer resin – Non-hazardous	Demineralizer	250 cubic feet (ft^3)	Once every three years	None	Recycle
Reverse Osmosis (RO) Membrane Cleaning Waste – Non-hazardous	Acidic and/or caustic chemicals	3,000 to 6,000 gallons per cleaning	Up to four times per year	Adjust pH and use as dust suppressant	Dispose at permitted waste management facility
RO system concentrate – Inert or liquid designated waste	Auxiliary cooling tower and boiler blowdown	TBD	Routine	Used for dust control if inert waste	Dispose at permitted waste management facility if designated waste
Auxiliary cooling tower basin sludge – Nonhazardous	Auxiliary cooling tower	1,000 pounds/ year	Annually	None	Dispose at permitted waste management facility
Spent softener resin – Non-hazardous	Softener	500 ft^3	Once every 3 years	None	Recycle
Damaged parabolic mirrors – Non-hazardous	Metals and other materials	TBD	Variable	None	Recycle for metal content and/or other materials or send for landfill disposal
Sanitary wastewater - Non-hazardous	Toilets, washrooms	2,800 gallons/day	Continuous	Septic leach field	None

[1] Classification under Title 22 CCR Division 4.5, Chapters 11, 12, and 23.

The project owner would develop and implement an Operations Waste Management Plan. In addition, the project owner would be required to document the project's actual operational waste stream and obtain approval for the Operations Waste Management Plan prior to the start of construction per proposed Condition of Certification **WASTE-8**. These measures would ensure that operational wastes are treated in compliance with all LORS and that an accurate record of the project's waste generation, storage, and disposal practices is maintained.

Heat Transfer Fluid Releases

The RSPP would use Therminol VP-1™ (a synthetic oil consisting of diphenyl ether and biphenyl) for the heat transfer fluid (HTF). Approximately 8,300 metric tons (1.3 million gallons of Therminol VP-1™ would be present within the solar system, including the piping and necessary expansion tanks; no additional HTF would be stored on site (SM 2009a, page 5.6-17).

Occasional spills of HTF from either equipment failure or human error can result in the generation of contaminated soil. HTF spills typically spread laterally on the bare ground and soak down to a relatively shallow depth. The contaminated soil is regulated as a hazardous material by the State of California due to the constituent biphenyl. Biphenyl is listed in Title 22, CCR, Chapter 11 Appendix X (list #299) as an extremely hazardous waste. The listing of a chemical in Appendix X creates the regulatory presumption that a waste containing that chemical (i.e. HTF contaminated soil) is hazardous unless determined otherwise, pursuant to specified procedures. The determination is required to be based on criteria and lists in Title 22, California Code of Regulations, Section 66261.1 et seq., which identify hazardous wastes subject to regulation. DTSC made a 1995 determination that a 10,000 mg/kg concentration of HTF would be assumed hazardous for SEGS III-VI at Kramer Junction. This determination, however, cannot be extrapolated to the proposed project, and DTSC has indicated that determination of whether a discharge of HTF constitutes a hazardous waste would have to be made on a case by case basis (CEC2009t). Once a history of discharges has been established, the applicant may petition DTSC for their concurrence on a standardized waste classification for HTF contaminated soils generated at the facility (Title 22, CCR, section 66260.200(d)). Depending on DTSC findings an operator could modify their operations to standardize treatment and eliminate the need for case by case determinations.

Title 22, CCR, section 66260.200(f) places the responsibility of determining whether a waste must be classified as hazardous on the generator of that waste. The RSPP project owner would therefore be required to assess the waste classification for HTF-impacted soils at the RSPP facility in consultation with the CEC, AO, DTSC, and Lahontan Regional Water Quality Control Board (RWQCB).

The applicant estimates generating 750 cubic yards per year of soil with HTF concentrations less than 10,000 mg/kg and10 cubic yards per year of soil with higher concentrations. (see **Waste Management Table 2**). The two solar fields would share the same LTU to bioremediate or land farm the contaminated soils. The LTU would be constructed with a clay liner at least five feet deep per Title 27 requirements; monitoring would be used to evaluate liner integrity (see **SOIL AND WATER RESOURCES** section). The applicant anticipates that bioremediation would be used for soils with HTF

levels between 1,000 and 10,000 mg/kg and land farming would be used for soils with HTF levels between 100 mg/kg and 1,000 mg/kg. Soils with HTF levels below 100 mg/kg would be stockpiled on site and used on site for fill as needed (SM 2009a, page 5.16-19 to 20).Soils with an HTF concentration greater than 10,000 mg/kg would be disposed of at a Class I landfill or soil thermal treatment facility (SM 2009a, page 5.16-19 to 20). The nearest soil thermal treatment facility is TPST Soil Recyclers of California in Adelanto, 75 miles south of the site.

The RSPP project owner would develop and implement an Operations Waste Management Plan per Mitigation Measure WM-2, which would include: a discussion of the appropriate frequency for characterizing HTF-contaminated soils; the level of HTF in soil that would be considered hazardous waste; and sampling and testing protocols for HTF-contaminated soils. In addition, the project owner would be required to document the project's actual operational waste stream and obtain approval for the Operations Waste Management Plan prior to the start of construction per proposed Condition of Certification **WASTE-8**. These measures would ensure that HTF-contaminated soils are treated in compliance with all LORS.

The applicant's proposed treatment and disposal methods are generally consistent with and would provide for compliance with the Requirements for Waste Discharge established by the Lahontan RWQCB and presented in the **SOIL AND WATER RESOURCES** section of this document. Commission staff proposes Condition of Certification **WASTE-9** to address the Requirements of Waste Discharge. This would require the applicant to comply with the requirements for accidental discharges of HTF associated with the operation of the project and ensure that hazardous concentrations of contaminated HTF-soil will not be treated in the LTU. With implementation of Condition of Certification **Waste-9** there would be no significant adverse impacts under CEQA due to HTF spills during project operation.

Non-Hazardous Waste

Proposed project operation would generate an estimated 20 cubic yards per week of non-hazardous solid waste. Non-hazardous solid wastes generated during project operations would consist of dirty shop rags, soil contaminated with heat transfer fluid (HTF), spent demineralizer resin, auxiliary cooling tower basin sludge, spent softener resin, damaged parabolic mirrors, used air filters, office paper, newsprint, aluminum cans, plastic and glass containers, and other miscellaneous domestic and office waste. Estimated quantities are: 50 pounds of dirty shop rags (per month); 750 cubic yards of soil contaminated with HTF at less than 10,000 milligrams per kilogram (per year); 250 cubic feet of spent demineralizer resin (once every three years); 1,000 pounds of auxiliary cooling tower basin sludge (per year); 500 cubic feet of spent softener resin (once every three years); and variable amounts of damaged parabolic mirrors and other waste.

Dirty shop rags would be sent to a commercial laundry for cleaning and recycling; spent demineralizer resin would be recycled; auxiliary cooling tower basin sludge would be disposed of at a permitted waste management facility; spent softener resin would be recycled; and damaged parabolic mirrors would be recycled to the extent possible and the remainder disposed of at a Class III facility.

Occasional spills and leaks of HTF are anticipated as a result of unavoidable equipment failures during operation of the proposed project. As discussed above, soil contaminated with HTF at a concentration less than 10,000 milligrams per kilogram (or other threshold value to be determined by DTSC) would be treated on site at one of the project's two land treatment units, stockpiled on site, and used on site as fill material as needed.

The remaining non-hazardous solid wastes would be recycled to the greatest extent possible, and the remainder would be removed on a regular basis for disposal in a Class III landfill.

Non-hazardous liquid wastes would be generated during facility operation and would include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, sanitary wastewater, and storm water runoff. Quantities would include 3,000 to 6,000 gallons of reverse osmosis membrane cleaning waste per cleaning (up to four times per year) and 2,800 gallons of sanitary wastewater (per day). The quantity of reverse osmosis system concentrate has not yet been determined, but would be classified as either inert or designated waste.

Reverse osmosis membrane cleaning waste would be adjusted to neutralize its pH and used as a dust suppressant on site or disposed of at a permitted waste management facility. Sanitary waste water would be piped to an on-site septic system and leach field. Reverse osmosis system concentrate would be used for dust control if determined to be inert or disposed of at a permitted waste management facility if determined to be designated waste.

Stormwater runoff is discussed in the **SOIL AND WATER RESOURCES** section of this document.

Universal Waste

Project operations would generate universal waste, including: spent batteries (e.g., alkaline dry cell, nickel-cadmium, and lithium ion) and spent fluorescent bulbs or high-intensity discharge lamps. Estimated annual quantities are less than 120 spent batteries and less than 50 spent fluorescent bulbs.

Universal waste would be accumulated for less than one year and recycled off site.

Hazardous Waste

Project operations would generate hazardous wastes including: used hydraulic fluid, oils, and grease associated with the HTF system, turbine, and other hydraulic equipment; effluent from the oily water separation system resulting from plant wash down; oil adsorbent and oil filters; spent carbon from air pollution control of the HTF vent; soil contaminated with HTF as a result of solar array equipment leaks; and spent lead acid batteries. Estimated quantities include: 50,000 gallons of used hydraulic fluid, oils, and grease (per year); 3,000 gallons of effluent from the oily water separation system (per year); five 55-gallon drums of oil adsorbent and oil filters (per month);

60,000 pounds of spent carbon (per year); 10 cubic yards of soil contaminated with HTF at concentrations greater than or equal to 10,000 milligrams per kilogram (per year); and 20 lead acid batteries (every two years).

Used hydraulic fluid, oils, and grease would be recycled; effluent from the oily water separation system would be recycled; oil adsorbent and oil filters would be sent offsite for recovery or disposal at a Class I landfill; spent activated carbon would be sent off site for regeneration at a permitted management facility; HTF-contaminated soil (concentration greater than 10,000 mg/kg) would be sent off site for disposal at a Class I landfill or to a soil thermal treatment facility; and spent lead acid batteries would be recycled (SM 2009a, pages 5.16-16).

The RSPP project owner would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the RSPP project owner's unique hazardous waste generator identification number, obtained prior to construction, would be retained and used for the handling and disposal of hazardous waste generated during facility operation.

Proper hazardous material handling, good housekeeping practices, and personnel training would help keep spill wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, Commission staff proposes Condition of Certification **WASTE-10,** requiring the project operator to document, clean up, and properly manage and dispose of wastes from any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information related to hazardous materials management is provided in the **HAZARDOUS MATERIALS MANAGEMENT** section of this document.

The hazardous wastes generated during proposed project operations would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, Cal. Code Regs., §66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-6** to notify the CPM and AO when advised of any such action.

Proposed Project - Closure and Decommissioning Impacts and Mitigation

The closure or decommissioning of the proposed project would produce both hazardous and non-hazardous solid and liquid waste. Required elements of a facility's closure would be outlined in a facility closure plan as specified in Conditions of Certification **COMPLIANCE 11, 12, and 13** [(see **Section E.1**). To ensure adequate review of a planned project closure, the RSPP project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM and AO) prior to commencement of closure activities. The facility closure plan will document non-hazardous and hazardous waste

management practices including: the inventory, management, and disposal of hazardous materials, contaminated soils and wastes; and permanent disposal of permitted hazardous materials and waste storage units.

Conditions of Certification **WASTE-2**, **-3**, and **-5** through **-10** would continue to apply to the proposed project during closure and decommissioning of the project.

Proposed Project - Impact on Existing Waste Disposal Facilities

Non-Hazardous Waste

Construction of the proposed project would generate 70 cubic yards per week and project operations would generate approximately 20 cubic yards per week of nonhazardous solid waste. The waste would be stored on site in appropriate containers and recycled or disposed of in a Class III landfill on a regular basis.

Table 5.16-4 of the project AFC identifies seven Class III waste disposal facilities in Kern County that could potentially accommodate the non-hazardous construction and operation wastes generated by the proposed project. Table DR-242-3 of the Applicant's responses to Commission staff data requests (SM 2010a) provides further details about which types of project wastes could potentially be handled at the Ridgecrest-Inyokern, Bakersfield Metropolitan, Shafter-Wasco, and Taft Sanitary Landfills. The facility closest to the proposed project site is the Ridgecrest-Inyokern Sanitary Landfill at less than 7 miles away; remaining capacity at this landfill is 5,000,989 cubic yards with an estimated closure date of 2014. All seven landfills have a combined remaining capacity of over 66.6 million cubic yards (SM 2009a page 5.16-9).

The total amount of non-hazardous solid waste generated from project construction is estimated to be 8,500 cubic yards (70 cubic yards per week for 28 months), and the total amount from lifetime operations is estimated to be 31,000 cubic yards or more (20 cubic yards per week for 30 years or more). These quantities include both recyclable and non-recyclable wastes, and the operations waste stream value includes a substantial amount of HTF-contaminated soil that would be treated and reused on site. If reverse osmosis membrane cleaning waste is not combined with dust control water and spread on roads, up to 3,600 cubic yards could require disposal over the project lifetime.

The non-recyclable, non-reusuable component of the waste streams would contribute less than 0.06% of the available Class III landfill capacity in Kern County. Staff finds that disposal of the non-hazardous solid wastes generated by the proposed project could occur without impacting the capacity or remaining life of the seven Class III facilities in Kern County.

Hazardous Waste

Table 5.16-4 of the project AFC identifies two Class I waste disposal facilities that are currently accepting waste and could be used to manage proposed project wastes: the Clean Harbors Buttonwillow Landfill in Kern County and the Chemical Waste Management Kettleman Hills Landfill in Kings County. In total, there is a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity at

these landfills, with at least 30 years remaining in their operating lifetimes (SM 2009a, page 5.16-10). In addition, the Kettleman Hills facility is in the process of permitting an additional 4.6 to 4.9 million cubic yards of disposal capacity (Waste Management 2009). Table DR-242-2 of the Applicant's responses to Commission staff data requests provides further information about these facilities, along with Filter Recycling Services, Inc. in Rialto (which could accept the project's spent batteries and fluorescent bulbs; aerosol cans; flushing and cleaning wash water; used oils and hydraulic fluid; and oil adsorbent and filters) and Siemen's Water Technology Carbon Regeneration Facility in Parker, Arizona (which accepts spent carbon).

Hazardous wastes generated during construction, operation and closure/decommissioning would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility. As calculated from waste streams presented in AFC Tables 5.16-5 and 5.16-6 (SM 2009a, pages 5.16-13 through 5.16-17), approximately 135 cubic yards of recyclable and non-recyclable hazardous waste would be generated over the 28-month construction period. Up to 790 cubic yards of non-recyclable hazardous waste would be generated over the 30-year operating lifetime; however a portion of this quantity could be recovered (oil absorbent and oil filters) or treated (HTF contaminated soil) and not require landfill disposal. Thus the quantity of hazardous wastes from the proposed project requiring off-site disposal would be less than 0.001% of the combined remaining capacity of the two Class 1 waste facilities.

C.13.4.3 CEQA LEVEL OF SIGNIFICANCE

Absent any unusual circumstances, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

The existing available capacity for the Class III landfills that may be used to manage nonhazardous project waste exceeds 66.6 million cubic yards. The total amount of non-hazardous waste generated from construction, operation and closure/decommissioning of the proposed project would contribute much less than 1% of the projected landfill capacity. Therefore, disposal of project-generated non-hazardous waste would have a less-than-significant adverse impact on Class III landfill capacity.

In addition, the two Class I disposal facilities that could be used for hazardous waste generated by the construction, operation and closure/decommissioning of the proposed project have a combined remaining capacity in excess of 10 million cubic yards, with another 4.6 to 4.9 million cubic yards of proposed capacity. The total amount of hazardous wastes generated by the proposed project would not impact the remaining Class I landfill capacity.

C.13.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42% of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources

(desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58% of the proposed solar array loops and would affect 58% of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.13.5.1 SETTING AND EXISTING CONDITIONS

This alternative includes the northern solar field as proposed for the RSPP, but eliminates the southern solar field. The setting for the northern solar field would not change from that for the proposed project. Routes for the water pipeline and transmission interconnection would remain the same, but the relocation of the two existing SCE transmission lines would not be required. The power block would remain in the same place, but its components would be reduced in scale by 42%.

C.13.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Northern Unit alternative would generate similar types of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. In accordance with the 42% reduction in the number of solar arrays, the quantities of waste would be reduced, for the most part, by 42%. Waste streams which may see less of a reduction include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, and sanitary wastewater quantities. Under these assumptions, the amount of non-hazardous and hazardous solid wastes generated under a Northern Unit alternative that would require landfill/treatment over the life of the project would thus be reduced to approximately 22,900 cubic yards and 540 cubic yards, respectively. Wastes would comply with LORS, and would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1 through -10** and **COMPLIANCE-11 through 13)** would apply. .

C.13.5.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Northern Unit alternative.

C.13.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project.

The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.13.6.1 SETTING AND EXISTING CONDITIONS

This alternative includes the southern solar field as proposed for the RSPP, but eliminates the northern solar field. The setting for the southern solar field would not change from that for the proposed project. Routes for the water pipeline and transmission interconnection would remain the same, and the proposed relocation of the two existing SCE transmission lines would take place. The power block would remain in the same place, but components would be reduced in scale by 58 percent.

C.13.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Southern Unit alternative would generate similar types of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. In accordance with the 58 percent reduction in the number of solar arrays, the quantities of waste would be reduced for the most part by 58 percent. Waste streams which may see less of a reduction include reverse osmosis membrane cleaning waste, reverse osmosis system concentrate, and sanitary wastewater quantities. Under these assumptions, the amount of non-hazardous and hazardous solid wastes generated under a Southern Unit alternative that could require landfill/treatment over the life of the project would thus be reduced to approximately 16,600 cubic yards and 390 cubic yards, respectively. Wastes would comply with applicable LORS and would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1 through -10** and **COMPLIANCE-11 through 13)** would apply.

C.13.6.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Southern Unit alternative.

C.13.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

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

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land. A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed.

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

C.13.7.1 SETTING AND EXISTING CONDITIONS

This alternative includes the southern and northern solar fields and other components as proposed for the RSPP, but with a slightly more compact configuration. The setting would not change from that for the proposed project. Linear routes would be slightly altered (onsite), and the power block would be on the south rather than north side of Brown Road. The power block components would be the same scale as the proposed project.

C.13.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The Original Proposed Project alternative would generate similar types and quantities of hazardous and non-hazardous wastes from construction, operation and closure/decommissioning of the project. The amount of non-hazardous and hazardous solid wastes generated under an Original Proposed Project alternative that would require landfill/treatment over the life of the project would be up to approximately 39,500 cubic yards and 925 cubic yards, respectively. Similar to the proposed project, wastes requiring off-site disposal would not impact the remaining capacity of off-site disposal facilities. Disposal methods would remain the same as for the proposed project and the same Conditions of Certification (**WASTE-1 through -10** and **COMPLIANCE-11 through 13)** would apply.

C.13.7.3 CEQA LEVEL OF SIGNIFICANCE

Similar to the proposed project, staff considers project compliance with LORS and staff's conditions of certification to be sufficient to ensure that no significant adverse impacts would occur as a result of waste management associated with the Original Proposed Project alternative.

C.13.8 NO PROJECT/NO ACTION ALTERNATIVES

C.13.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1:

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and

BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no new wastes would be generated. This No Project/No Action Alternative would not result in impacts to waste management at this location. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations

C.13.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2:

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with another solar technology. Different solar technologies would create different amounts and types of wastes based on the technology components and requirements; however, it is expected that the construction of all solar technologies at the site would generate waste. As such, impacts to waste management from the solar project would likely be similar to impacts to waste management from the proposed project. Therefore, this No Project/No Action Alternative could result in waste management impacts similar to the impacts under the proposed project.

C.13.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3:

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no wastes would be generated from the construction or operation of the

proposed project under this alternative. Therefore, this No Project/No Action Alternative would not result in impacts to waste management. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.13.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Waste Management Table 3 provides a comparison of the project alternatives.

Waste Management Table 3
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	Northern Unit (146 MW)	Southern Unit (104 MW)	Original Proposed Project (250 MW)	No Project/No Action
Conforms with LORS	Yes	Yes	Yes	Yes	N/A
Exceeds landfill capacity	No	No	No	No	N/A

C.13.10 CUMULATIVE IMPACTS

A project may result in an adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

There is the potential for substantial future development throughout the southern California desert region. Analysis of cumulative impacts is based on data provided in the following tables and maps (see **Section B.3, CUMULATIVE SCENARIO**):

- Cumulative Impacts Table 1A, Renewable Energy Projects in the BLM California Desert District
- Cumulative Impacts Table 1B, Renewable Energy Projects on State and Private Lands in California Desert District Counties
- Cumulative Impacts Table 2, Existing Projects in the Ridgecrest Area
- Cumulative Impacts Table 3, Future Foreseeable Projects in the Ridgecrest Area
- Cumulative Impacts Figure 1, Renewable Energy Applications in the California Desert District
- Cumulative Impacts Figure 2, Renewable Energy Applications in the Ridgecrest District Area
- Cumulative Impacts Figure 3, Existing and Future/Foreseeable Projects in the Ridgecrest Area.

The analysis in this section first defines the geographic area over which cumulative impacts related to waste management could occur. The cumulative impact analysis itself describes the potential for cumulative impacts to occur as a result of implementation of the RSPP project along with the listed local and regional projects.

C.13.10.1 GEOGRAPHIC EXTENT

Cumulative impacts can occur if implementation of the RSPP Project could combine with those of other local or regional projects. Cumulative impacts could also occur as a result of development of some of the many proposed solar and wind development projects that have been or are expected to be under consideration by local governments, the BLM and the Energy Commission in the near future. Many of these projects are located within the California Desert District.

C.13.10.2 CUMULATIVE IMPACT ANALYSIS

This analysis evaluates the cumulative contribution of RSPP project waste disposal in two categories: (1) future projects in the Ridgecrest area, and (2) future renewable energy projects in the California desert.

Local Projects

The RSPP project waste disposal volumes would combine with the waste volumes from the following proposed projects within an approximate 15-20 mile radius around the project site: China Lake Naval Weapons Air Center Base Realignment and Closure, City of Ridgecrest New Wastewater Treatment Plant, Super Walmart, Caltrans Freeman Gulch and Inyokern highway upgrades, a 600 MW solar photovoltaic plant, and three wind projects (Cumulative Impacts Table 3). Other smaller commercial and residential projects would also likely occur in the area. Although the waste volumes would be greatest during construction, the actual construction schedule of each project would not likely be coincident such that local landfill daily disposal limitations would be exceeded. Routine (operation) waste disposal of all foreseeable commercial, residential, and energy projects in the Ridgecrest area may combine to occasionally exceed the 701 ton per day limit at the Ridgecrest-Inyokern Sanitary Landfill without adversely impacting the 5 million cubic yards of remaining capacity. The Ridgecrest-Inyokern Sanitary Landfill is the nearest Class III disposal site for these Ridgecrest area projects and would likely be the first choice for disposal. However, several other landfills are located within 100 miles of RSPP with much larger daily disposal limits. The total amount of available solid waste landfill capacity in Kern County exceeds 66.6 million cubic yards. Therefore, even if all of the abovementioned reasonably foreseeable projects in the Ridgecrest area were constructed, Commission staff concludes that the waste generated by the RSPP project would not result in adverse cumulative waste management impacts.

Regional Projects

As shown in Cumulative Impacts Figure 1 and Table 1A, solar and wind applications for use of BLM and private land cover approximately 1 million acres of the California Desert District. Additional renewable projects are proposed on private and state lands, including at least 7 solar projects and 6 wind projects in Kern County (Cumulative Impacts Table 1B). Implementation of the multiple solar and wind projects proposed to

be developed in the California Desert, and other planned non-energy projects, would result in an increase in generation of hazardous and non-hazardous solid and liquid waste and would add to the total quantity of waste generated in throughout the desert. However, project wastes would be recycled wherever practical and sufficient capacity is available throughout the region, especially with the addition of the Mesquite Regional Landfill with a capacity of 600 million tons and scheduled to be fully operational in 2011/2012 (Mesquite Regional Landfill 2010). Therefore, impacts of the RSPP project, when combined with impacts of the future solar and wind, and other development projects currently proposed within the California desert, would not result in adverse and unavoidable cumulative impacts, under CEQA, with regard to waste management.

C.13.10.3 CUMULATIVE IMPACT CONCLUSION

Impacts of the RSPP project would combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to local and regional cumulative impacts related to waste management.

The amount of non-hazardous and hazardous wastes generated during construction, operation and closure/decommissioning of the RSPP project would add to the total quantity of hazardous and non-hazardous waste generated in Kern County. However, sufficient capacity is available at treatment and disposal facilities to handle the volumes of wastes that would be generated by the projects. Therefore, Commission staff concludes that the waste generated by the RSPP project would not result in adverse cumulative waste management impacts, under CEQA, either locally or regionally.

C.13.11 COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed project would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose of hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the proposed project would be required to obtain a hazardous waste generator identification number from U.S. EPA. The proposed project would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees in accordance with state and federal hazardous waste management requirements.

C.13.12 NOTEWORTHY PUBLIC BENEFITS

Commission staff has not identified any noteworthy public benefits associated with waste management.

C.13.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

As required by CEQA and Energy Commission regulations, Commission staff recommends the following Conditions of Certification:

WASTE-1 The project owner shall prepare a UXO Identification, Training and Reporting Plan to properly train all site workers in the recognition, avoidance and reporting of military waste debris and ordnance. The project owner shall submit the plan to the CPM for review and approval prior to the start of construction. The plan shall contain, at a minimum, the following:

- A description of the training program outline and materials, and the qualifications of the trainers; and
- Identification of available trained experts that will respond to notification of discovery of any ordnance (unexploded or not); and
- Work plan to recover and remove discovered ordnance, and complete additional field screening, possibly including geophysical surveys to investigate adjacent areas for surface, near surface or buried ordnance in all proposed land disturbance areas.

The project owner shall provide documentation of the plan and provide survey results to the CPM and AO.

Verification: The project owner shall submit the UXO Identification, Training and Reporting Plan to the CPM and AO for approval no less than 60 days prior to the initiation of construction activities at the site. The results of geophysical surveys shall be submitted to the CPM and AO within 30 days of completion of the surveys.

WASTE-2 The project owner shall provide the résumé of an experienced and qualified Professional Engineer or Professional Geologist to the CPM and AO for review and approval. The résumé shall show experience in remedial investigation and feasibility studies. This Professional Engineer or Professional Geologist shall be available during site characterization (if needed), excavation, grading, and demolition activities. The Professional Engineer or Professional Geologist shall be given authority by the project owner to oversee any earth-moving activities that have the potential to disturb contaminated soil and impact public health, safety, and the environment.

Verification: At least 30 days prior to the start of site mobilization the project owner shall submit the resume to the CPM and AO for review and approval.

WASTE-3 If potentially contaminated soil is identified during site characterization, excavation, grading, or demolition at either the proposed site or linear facilities—as evidenced by discoloration, odor, detection by handheld instruments, or other signs—the Professional Engineer or Professional Geologist shall inspect the site; determine the need for sampling to confirm the nature and extent of contamination; and provide a written report to the project owner, representatives of Department of Toxic Substances Control

(DTSC) or Regional Water Quality Control Board (RWQCB), and the Compliance Project Manager (CPM) stating the recommended course of action.

Depending on the nature and extent of contamination, the Professional Engineer or Professional Geologist shall have the authority to temporarily suspend construction activity at that location for the protection of workers or the public. If in the opinion of the Professional Engineer or Professional Geologist significant remediation may be required, the project owner shall contact the CPM and representatives of the DTSC or RWQCB for guidance and possible oversight.

Verification: The project owner shall submit any reports filed by the Professional Engineer or Professional Geologist to the CPM within 5 days of their receipt. The project owner shall notify the CPM and AO within 24 hours of any orders issued to halt construction.

WASTE-4 The project owner shall submit a Construction Waste Management Plan to the CPM and AO for review and approval prior to the start of construction. The plan shall contain, at a minimum, the following:

- A description of all construction waste streams, including projections of frequency, amounts generated and hazard classifications;
- A survey of structures to be demolished that identifies the types of waste to be managed; and
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods, and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/reduction plans.

Verification: The project owner shall submit the Construction Waste Management Plan to the CPM and AO for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-5 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (USEPA) prior to generating any hazardous waste during project construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation and notification and receipt of the number to the CPM and AO in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM and AO is only needed once unless there is a change in ownership, operation, waste generation, or waste characteristics that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to the CPM and AO in the next scheduled compliance report.

WASTE-6 Upon notification of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM and AO of any such action taken or proposed against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts, and describe how the violation will be corrected.

Verification: The project owner shall notify the CPM and AO in writing within 10 days of becoming aware of an impending enforcement action. The CPM and AO shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-7 The project owner shall prepare and implement a waste diversion plan for at least 50 percent of construction waste and demolition materials prior to any building or demolition. The waste diversion plan shall provide for the means of achieving the recycling, reuse, composting, and/or salvage of a minimum of 50 percent by weight of construction waste and demolition materials generated on site. The project owner shall provide documentation of compliance to the CPM and AO, including a waste diversion summary report, receipts, and records of measurement. Project mobilization and construction shall not proceed until the CPM and AO issue an approval document.

Verification: At least 60 days prior to the start of any construction or demolition activities, the project owner shall submit a waste diversion plan to the CPM and AO for review and approval. The project owner shall ensure that project activities are consistent with the approved waste diversion plan and provide adequate documentation of the types and volumes of wastes generated, how the wastes were managed, and volumes of wastes diverted. Project mobilization and construction shall not proceed until the CPM and AO issues an approval document. Not later than 60 days after completion of project construction, the project owner shall submit documentation of compliance with the diversion program requirements to the CPM and AO. The required documentation shall include a waste diversion summary report along with all necessary receipts and records of measurement from entities receiving project wastes.

WASTE-8 The project owner shall submit the Operation Waste Management Plan to the CPM and AO for review and approval. The plan shall contain, at a minimum, the following:

- A detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- Management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to ensure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control

regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;

- A detailed description of how facility wastes will be managed and any contingency plans to be employed, in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM and AO for approval no fewer than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM and AO within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year, provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan, and update the Operation Waste Management Plan as necessary to address current waste generation and management practices.

WASTE-9 The project owner shall submit to the CPM, AO and DTSC for approval the applicant's assessment of whether the HTF-contaminated soil is considered hazardous or non-hazardous under state regulations. HTF-contaminated soil that exceeds the hazardous waste levels must be disposed of in accordance with California Health and Safety Code (HSC) Section 25203. HTF-contaminated soil that does not exceed the hazardous waste levels may be discharged into the land treatment unit (LTU). For discharges into the LTU, the project owner shall comply with the Waste Discharge Requirements contained in the Soil & Water Resources section of this document.

Verification: The project owner shall document all releases and spills of HTF as described in Condition of Certification **WASTE-10** and as required in the Soil & Water Resources section of this document. Cleanup and temporary staging of HTF-contaminated soils shall be conducted in accordance with the approved Operation Waste Management Plan required in Condition of Certification of **WASTE-8**. The project owner shall sample HTF-contaminated soil in accordance with the United States Environmental Protection Agency's (USEPA) current version of "Test Methods for Evaluating Solid Waste" (SW-846). Samples shall be analyzed in accordance with USEPA Method 8015 or other method to be reviewed and approved by DTSC and the CPM.

Within 14 days of an HTF spill the project owner shall provide the results of the analyses and their assessment of whether the HTF-contaminated soil is considered hazardous or non-hazardous to DTSC and the CPM for review and approval.

If DTSC and the CPM determine the HTF-contaminated soil is considered hazardous it shall be disposed of in accordance with California Health and Safety Code (HSC)

Section 25203 and procedures outlined in the approved Operation Waste Management Plan required in Condition of Certification **WASTE-8** and reported to the CPM in accordance with Condition of Certification **WASTE-10**.

If DTSC and the CPM determine the HTF-contaminated soil is considered non-hazardous it shall be retained in the LTU and treated on-site in accordance with the Waste Discharge Requirements contained within in the Soil & Water Resources section of this document.

WASTE-10 The project owner shall ensure that all accidental spills or unauthorized releases of hazardous substances, hazardous materials, and hazardous waste are documented and remediated, and that wastes generated from accidental spills and unauthorized releases are properly managed and disposed of in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document management of all accidental spills and unauthorized releases of hazardous substances, hazardous materials, and hazardous wastes that occur on the project property or related linear facilities. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; how release was managed and material cleaned up; amount of contaminated soil and/or cleanup wastes generated; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. A copy of the accidental spill or unauthorized release documentation shall be provided to the CPM and AO within 30 days of the date the release was discovered.

C.13.14 CONCLUSIONS

Consistent with the three main objectives for Commission staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

After review of the applicant's proposed waste management procedures, Commission staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that construction, demolition, and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled or reused to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated on site in accordance with maximum allowable accumulation times, and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. In addition, disposal of project-generated non-hazardous wastes would not have an adverse impact on Class III landfill capacity, and disposal of project-related hazardous wastes would not have an adverse impact on Class I landfill capacity.

However, to help ensure and facilitate ongoing project compliance with LORS and to minimize impacts on local landfills, Commission staff proposes Conditions of Certification **WASTE-1** through **-10**. These conditions would require the project owner to:

- Ensure the project site is investigated and remediated for any unexploded ordnance that may pose a risk to construction personnel or the environment (**WASTE-1**);
- Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-2** and **-3);**
- Obtain approval for the Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-4** and **-8**);
- Obtain a hazardous waste generator identification number from the United States Environmental Protection Agency (**WASTE-5**);
- Report any waste management-related LORS enforcement actions and how violations will be corrected (**WASTE-6**);
- Comply with waste recycling and diversion requirements (**WASTE-7**);
- Comply with stipulations for treatment of HTF-contaminated soils (**WASTE-9**); and
- Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-10**)

Commission staff concludes that management of the waste generated during construction and operation of the proposed project would not result in any adverse impacts, and would comply with applicable LORS, if the waste management practices and mitigation measures proposed in the staff's proposed conditions of certification are implemented.

C.13.15 REFERENCES

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Cal. Code Regs. 2008 – California Environmental Quality Act (CEQA) Guidelines. Title 14, California Code of Regulations, section 15000 and the following (Cal. Code Regs., tit. 14, §15000 et seq.).

CEC 2009t – California Energy Commission/E. Solorio (tn: 51934). CEC Staff Dialogue with DTSC Regarding HTF, dated 6/9/09. Submitted to CEC/Docket Unit on 6/11/09.

Mesquite Regional Landfill 2010 – Mesquite Regional Landfill Site Information. http://mrlf.org/index.php?pid=5. Accessed February 9, 2010.

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Waste Management 2009 – Kettleman Hills Facility Project Update. http://www.kettlemanhillsfacts.com/project_update.html. Accessed March 18, 2009.

C.14 WORKER SAFETY AND FIRE PROTECTION

Testimony of Alvin Greenberg, Ph.D.

C.14.1 SUMMARY OF CONCLUSIONS

U.S. Bureau of Land Management (BLM) and Energy Commission staff (hereafter jointly referred to as staff) concludes that if the applicant for the proposed Ridgecrest Solar Power Project (RSPP) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Energy Commission staff's recommended Conditions of Certification **WORKER SAFETY-1**and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-9**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

The proposed facility would be located in an area that is currently served by the Kern County Fire Department (KCFD). In staff's initial review, staff determined that the ability to respond to fire, hazmat, and Emergency Medical Services (EMS) events at the proposed facility would not pose significant added demands on local fire protection services. In written correspondence, the KCFD did not identify an impact stating that they were unsure of impacts (KCFD 2009). However, the County indicated that in general, services provided by the County which included police, fire, and EMS services may be impacted by this project and in a personal communication at a March 2, 2010 meeting, the KCFD did indicate a cumulative impact would exist and provided verbal substantiation of this impact. Upon consideration of this view, staff concurred that a cumulative impact would exist if the proposed RSPP is built. Therefore, because both the KCFD and Energy Commission staff have identified and substantiated an impact, Energy Commission staff recommends mitigation in the form of proposed Condition of Certification **WORKER SAFETY-7.**

C.14.2 INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Staff Assessment/Plan Amendment/Draft Environmental Impact Statement (SA/PA/DEIS) is to assess the worker safety and fire protection measures proposed by the RSPP and to determine whether the applicant has proposed adequate measures to:

- Comply with applicable safety LORS;
- Protect the workers during construction and operation of the facility;
- Protect against fire; and
- Provide adequate emergency response procedures.

C.14.3 METHODOLOGY AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by Cal/OSHA regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff reviews and evaluates the local fire department capabilities and response time in each area and interviews the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

Staff has also established a procedure when a local fire department has identified either a significant incremental project impact to the local agency or a significant incremental cumulative impact to a local agency. Staff first conducts an initial review of the position and either agrees or disagrees with the fire department's determination that a significant impact would exist if the proposed power plant is built and operated. A process then starts whereby the project applicant can either accept the determination made by staff or refute the determination by providing a Fire Needs Assessment and a Risk Assessment. The Fire Needs Assessment would address fire response and equipment/staffing/location needs while the Risk Assessment would be used to

establish that while an impact to the fire department may indeed exist, the risk (chances) of that impact occurring and causing injury or death is less than significant.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code (USC) section 651 et seq (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
Title 29 Code of Federal Regulation (CFR) sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the federal requirements found in 29 CFR sections 1910.1 to 1910.1500.
State	
Title 8 California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 Cal Code Regs. section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Kern County Municipal Code, Title 8	Includes specific codes to regulate permits, activities, and administrative penalties.
Kern County Municipal Code, Title 17	Includes specific codes for various building standards, including the fire code.
2007 California Fire Code	Addresses the prevention, control, and mitigation of dangerous conditions that may cause fires. Enforced by the Kern County Fire Department.

C.14.4 PROPOSED PROJECT

C.14.4.1 SETTING AND EXISTING CONDITIONS

The proposed facility would be located in Kern County approximately five miles southwest of the City of Ridgecrest, and would consist of one unit producing a nominal output of 250 MW. The project layout (which has been slightly revised since the original AFC) is described and depicted in Data Response ALT-49 and accompanying figures (SM 2010a). Fire support services to the site would be under the jurisdiction of the Kern County Fire Department (KCFD). The nearest fire stations would be Station #73 and Station #77, both located about 8 miles from the project site with a response time of about 10 minutes. Station #73 is located at 6919 Monache Mtn. Ave. in Inyokern, and Station #77 is located at 815 W. Dolphin Ave. in Ridgecrest. The next closest station would be Station #74, located at 139 E. Las Flores Ave. in Ridgecrest, approximately 9 miles away, with a response time of between 12 to 15 minutes. All three stations are staffed with three personnel per shift and have at least one Engine and one Patrol vehicle. None of the stations in the project vicinity have Ladder Companies. However, as opposed to a natural gas fired power plant which has structures of several stories high, solar power plants contain structures of one or two stories. All KCFD personnel are trained to at least Emergency Medical Technician (EMT) Level-1 and as first responders for hazardous materials incidents. There are currently no paramedics assigned to the fire stations in the project's vicinity (KCFD 2009).

The applicant has stated that certain on-site power plant personnel would be trained as a hazardous materials response team and that one or more spill response kits would be available on-site (SM 2009a, Section 5.6.4.2). In the event of a large incident involving hazardous materials, backup support would be provided by the KCFD which has a hazmat response unit capable of handling any incident at the proposed RSPP. The nearest KCFD Hazmat unit is located at 3000 Landco Dr. in Bakersfield, about 120 miles away, and would respond within 2 hours (KCFD 2009).

Worker Safety and Fire Protection Table 2
Fire and Emergency Response for the RSPP*

KCFD Station	Total Response Time**	Distance to RSPP	EMS/HazMat Capability***
Fire Station #77	10 min	8 miles	Y/Y
Fire Station #73	10 min	8 miles	Y/Y
Fire Station #74	12-15 min	9 miles	Y/Y

*Source: E-mail communications with Captain Bill Brickey, Kern County Fire Department (KCFD 2009)
**Total response times are estimated from the moment a 911 call is made to arrival at the site and are dependent upon traffic conditions and other variables.
***All personnel are trained to EMT-1 level and first responder for hazardous materials incidents.

In addition to construction and operations worker safety issues, the potential exists for exposure to contaminated soil during site preparation. The Phase I Environmental Site Assessment conducted for this site in 2009 found no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage, or disposal of

hazardous substances on the site, nor was there any other environmental concern that would require remedial action (SM 2009a, Section 5.16.2.3 & Appendix I). To address the unlikely possibility that soil contamination would be encountered during construction of the RSPP, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

C.14.4.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed RSPP would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the RSPP to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase “Safety and Health Program” to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

Workers at the RSPP would be exposed to hazards typical of construction and operation of a solar thermal electric power generating facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 Cal Code Regs. § 1509)
- Construction Fire Prevention Plan (8 Cal Code Regs. § 1920)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 1514 — 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would include:

- Electrical Safety Program

- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program
- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Articulating Boom Platforms Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Back Injury Prevention Program
- Ergonomics Program
- Heat and Cold Stress Monitoring and Control Program
- Lock Out/Tag Out Safety Program
- Pressure Vessel and Pipeline Safety Program
- Solar Components Safe Handling Program

The Application for Certification (AFC) includes adequate outlines of each of the above programs (SM 2009a, Section 5.18.3.1). Prior to the start of construction of RSPP, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the KCFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at RSPP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 Cal Code Regs. § 3203)
- Fire Protection and Prevention Program (8 Cal Code Regs. § 3221)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 3401 to 3411)
- Emergency Action Plan (8 Cal Code Regs. § 3220)

In addition, the requirements under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would be

applicable to the project. Written safety programs for RSPP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (SM 2009a, Section 5.18.3). Prior to operation of RSPP, all detailed programs and plans would be provided to the CPM and KCFD pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The IIPP would include the following components as presented in the AFC (SM 2009a, Section 5.18.3.1):

- Identity of person(s) with authority and responsibility for implementing the program;
- Safety and health policy of the plan;
- Definition of work rules and safe work practices for construction activities;
- System for ensuring that employees comply with safe and healthy work practices;
- System for facilitating employer-employee communications;
- Procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- Methods for correcting unhealthy/unsafe conditions in a timely manner;
- Safety procedures; and
- Training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 Cal Code Regs. § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (SM 2009a, Section 5.18.3.2). The plan would accomplish the following:

- Determine general program requirements (scope, purpose, and applicability);
- Determine potential fire hazards;
- Develop good housekeeping practices and proper handling and materials storage;
- Determine potential ignition sources and control measures for these sources;
- Determine persons responsible for equipment and system maintenance;
- Locate portable and fixed fire-fighting equipment in suitable areas;

- Establish and determine training and instruction requirements; and
- Define recordkeeping requirements.

Commission staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the KCFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 Cal Code Regs. §§ 3380 to 3400). The RSPP operational environment would require PPE.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and would carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee must be provided with the following information pertaining to the protective clothing and equipment:

- Proper use, maintenance, and storage;
- When to use the protective clothing and equipment;
- Benefits and limitations; and
- When and how to replace the protective clothing and equipment.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 Cal Code Regs. § 3220). The AFC contains a satisfactory outline for an emergency action plan (SM 2009a, Section 5.18.3.2).

The outline lists plans to accomplish the following:

- Establish scope, ,purpose, and applicability;
- Identify roles and responsibilities;
- Determine emergency incident response training;
- Develop emergency response protocols;
- Specify evacuation protocols;
- Define post emergency response protocols; and
- Determine notification and incident reporting.

Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "Construction Safety and Health Program" in this Worker Safety and Fire Protection section.

Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

Additional Safety Issues

This solar power plant will present a unique work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750°F. The pipe containing the HTF will reach temperatures at the mirror focal point as high as 1100 °F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides will be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. Finally, workers will inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors will also be conducted on a routine schedule. All these activities will take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115 °F and above.

The applicant has indicated that workers will be adequately trained and protected, but has not included precautions against heat stress and exposure to herbicides. Therefore, to ensure that workers are indeed protected, Commission staff has proposed additional requirements to proposed Conditions of Certification **WORKER SAFETY-1** and **2**. These requirements consist of the following provisions:

- A worker heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395) requiring heat illness prevention; and
- The development and implementation of Best Management Practices (BMP) for the storage and application of herbicides used to control weeds beneath and around the solar array.

Staff believes that effective implementation of a Heat Stress Protection Plan will mitigate the potential for significant risks to workers from heat during both construction and operations. A BMP requiring proper herbicide storage and application will mitigate potential risks to workers from exposure to herbicides and reduce the chance that herbicides will contaminate either surface water or groundwater. Staff suggests that a BMP follow either the guidelines established by the U.S. EPA (EPA 1993), or more recent guidelines established by the State of California or U.S. EPA.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.
- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- To improve their safety and health performance;
- To assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- To prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- To recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent*

Person is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, Commission staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of solar power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- Lack of posted confined space warning placards/signs;
- Confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- Confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- Dangerous placement of hydraulic elevated platforms under each other;
- Inappropriate placement of fire extinguishers near hotwork;
- Dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- Construction of an unsafe aqueous ammonia unloading pad;
- Inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- Lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

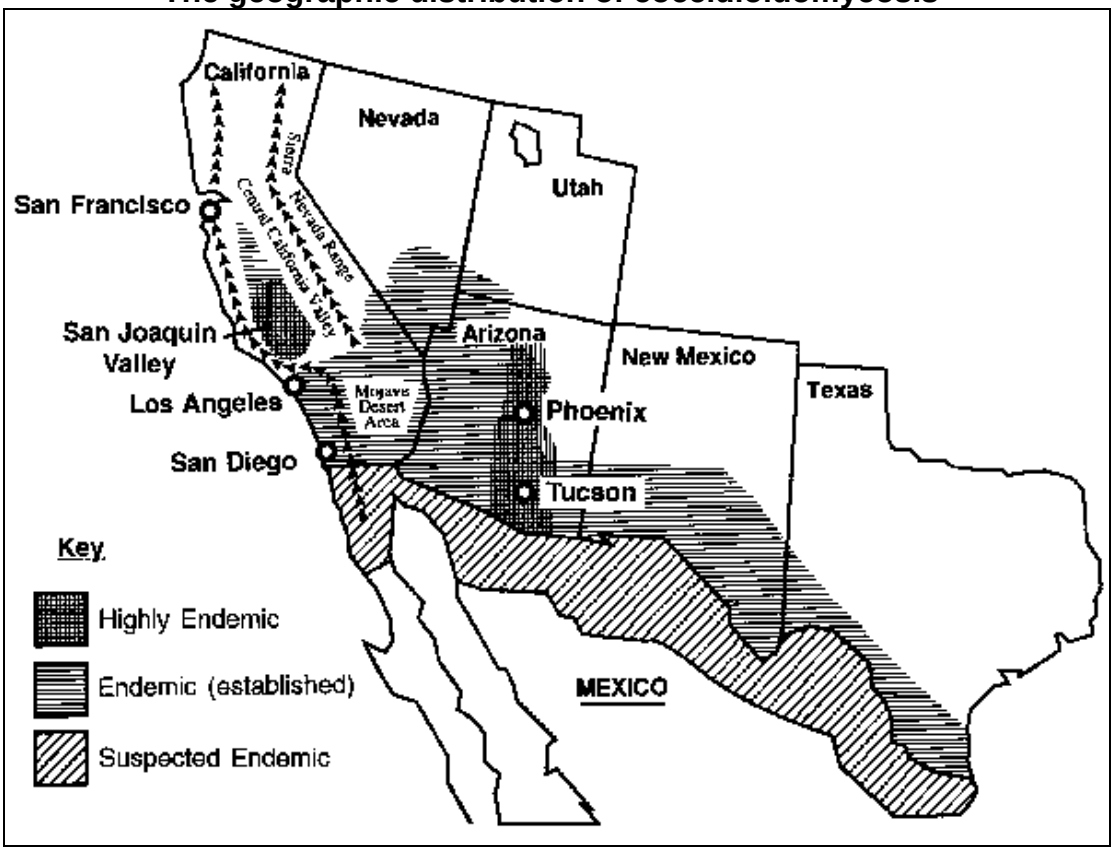
In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve

as an “extra set of eyes” to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team’s findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Valley Fever (Coccidioidomycosis)

Coccidioidomycosis or "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California. It is caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion. The disease usually affects the lungs and can have potentially severe consequences, especially in at-risk individuals such as the elderly, pregnant women, and people with compromised immune systems. Trenching, excavation, and construction workers are often the most exposed population. Treatment usually includes rest and antifungal medications. No effective vaccine currently exists for Valley Fever. VF is endemic to the San Joaquin valley in California, which presumably gave this disease its common name. Kern County, located at the southern end of San Joaquin valley, is where valley fever occurs most frequently (Valley Fever Vaccine Project of the Americas 2010; KCDPH 2008). Depending on the particular year, either Tulare or Fresno county have the second highest rates of VF.

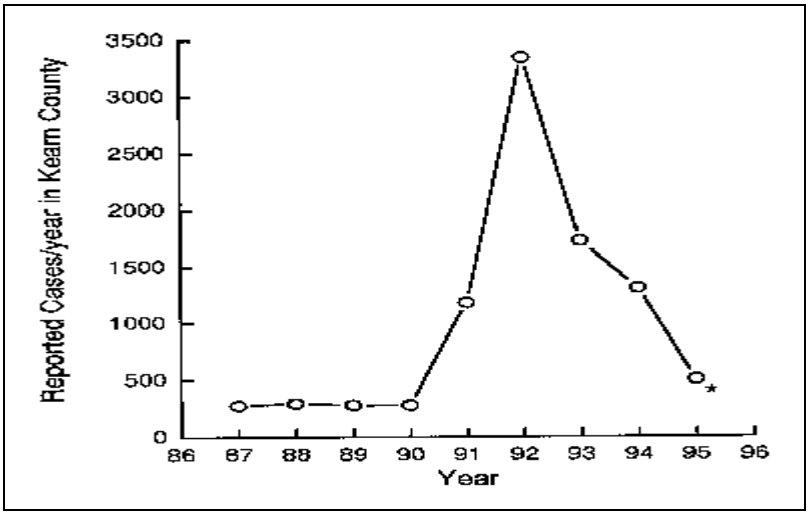
Worker Safety Figure 1
The geographic distribution of coccidioidomycosis*



*Source: CDC 2006, Figure 2

In 1991, 1,200 cases of VF were reported to the California Department of Health Services (CDHS) compared with an annual average of 428 cases per year for the period of 1981 to 1990. In 1992, 4,516 cases were reported in California, and 4,137 cases in 1993. Seventy percent of VF cases were reported from Kern County (CDC 1994; Flaherman 2007; CDHS 2010).

Worker Safety Figure 2
Number of coccidioidomycosis cases identified by serologic Testing at the Kern County Public Health Laboratory between 1986 and 1996*



*Source: CDC 2006, Figure 4

A 2004 CDC report found that the number of reported cases of coccidioidomycosis in the US increased by 32% during 2003-2004, with the majority of these cases occurring in California and Arizona. The report attributed these increases to changes in land use, demographics, and climate in endemic areas, although certain cases might be attributable to increased physician awareness and testing (CDC 2006).

According to the CDC Morbidity and Mortality Weekly Report of February 2009, incidences of valley fever have increased steadily in Arizona and California in the past decade. Cases of coccidioidomycosis averaged about 2.5 per 100,000 population annually from 1995 to 2000 and increased to 8.0 per 100,000 population between 2000 and 2006 (incident rates tripled). In 2007 there was a slight drop in cases, but the rate was still the highest it has been since 1995. The report identified Kern County as having the highest incidence rates (150.0 cases per 100,000 population), and non-Hispanic blacks having the highest hospitalization rates (7.5 per 100,000 population). In addition, between the years 2000 and 2006, the number of valley fever related hospitalizations climbed from 1.8 to 4.3 per 100,000 population (611 cases in 2000 to 1,587 cases in 2006) and then decreased to 1,368 cases in 2007 (3.6 per 100,000 population). Overall in California, during 2000-2007, a total of 752 (8.7%) of the 8,657 persons hospitalized for coccidioidomycosis died (CDC 2009).

A 2007 study published in the Emerging Infectious Diseases journal of the Center for Disease Control and Prevention (CDC), found the frequency of hospitalization for coccidioidomycosis in the entire state of California to be 3.7 per 100,000 residents per year for the period between 1997 and 2002 (see Table 1 below). There were 417

deaths from VF in California in those years, resulting in a mortality rate of 2.1 per 1 million California residents annually. The data shows that Kern County had the highest total number and highest frequency of hospitalizations (Flaherman 2007).

Worker Safety Table 1
Hospitalizations for Coccidioidomycosis, California, 1997–2002*

Category	Total hospitalizations	Total person-years (× 10^6)	Frequency of hospitalization**	Frequency of hospitalization for coccidioidal meningitis**
Total	7,457	203.0	3.67	0.657
Year				
1997	1,269	32.5	3.90	0.706
1998	1,144	32.9	3.50	0.706
1999	1,167	33.4	3.5	0.61
2000	1,100	34.0	3.23	0.62
2001	1,291	34.7	3.7	0.58
2002	1,486	35.3	4.2	0.71
Highest incidence counties				
Kern	1,700	3.97	42.8	
Tulare	479	2.21	21.7	
Kings	133	0.77	17.4	
San Luis Obispo	170	1.48	11.5	

*Source: Flaherman 2007
**Per 100,000 residents per year

A 1996 paper that tried to explain the sudden increase in Coccidioidomycosis cases that began in the early 90s found that the San Joaquin Valley in California has the largest population of C. immitis, which is found to be distributed unevenly in the soil and seems to be concentrated around animal burrows and ancient Indian burial sites. It is usually found 4 to 12 inches below the surface of the soil (CDC 2006). The paper also reported that incidences of coccidioidomycosis vary with the seasons; with highest rates in late summer and early fall when the soil is dry and the crops are harvested. Dust storms are frequently followed by outbreaks of coccidioidomycosis (CDC 2006). A modeling attempt to establish the relationship between fluctuations in VF incident rates and weather conditions in Kern County found that there is only a weak connection between weather and VF cases (weather patterns correlate with up to 4% of outbreaks). The study concluded that the factors that cause fluctuations in VF cases are not weather-related but rather biological and anthropogenic (i.e. human activities, primarily construction on previously undisturbed soil) (Talamantes 2007).

Data from the Kern County Department of Public Health (KCDPH) on the period between 1995 and 2008 shows that VF cases increased in Kern County during the early 1990's, decreased during the late 1990's, increased again between 2000 and 2005, and have been declining slightly in the last several years. The KCDPH data also shows that the particular area of Ridgecrest does not have high incident rates of VF. The majority

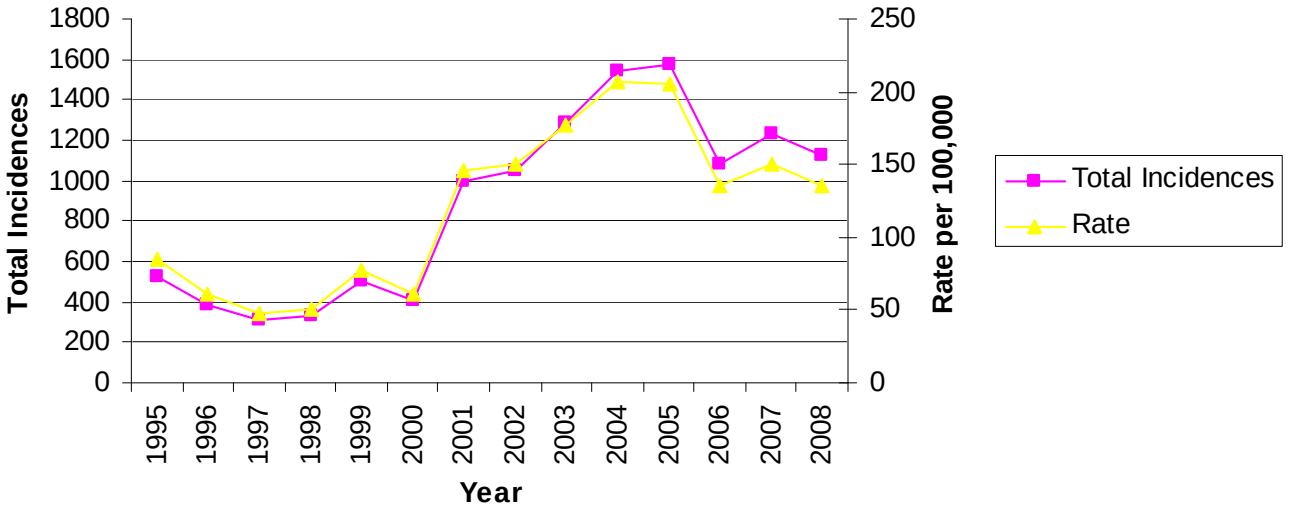
of VF cases are recorded in the Bakersfield area where 50 to 70 percent of all Kern County VF cases occur. Delano, Lamont, and Taft have the next highest recorded incidences of VF. With the exception of the year 2004 when 26 cases of VF were reported in the Ridgecrest area, less than 15 cases have been recorded annually in Ridgecrest since 1995, representing less than 5% of the total cases recorded in Kern County (KCDPH 2008).

Worker Safety Table 2
Valley Fever Cases In Kern County 1995 – 2008*

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Kern County Cases	523	382	307	328	504	406	994	1055	1281	1540	1578	1081	1229	1128
Rate per 100,000	84.5	61	48.3	51.2	77.1	61	145.7	150.9	177.7	206.9	204.9	135.2	150.4	135.1

*Source: KCDPH 2008, Table 1

Figure 3: VF Cases in Kern County 1995 - 2008*



*Source: KCDPH 2008, Figure 2

During a phone conversation with Dr. Michael MacLean of the Kings County Health Department, he noted that according to his experience and of those who study VF, it is very hard to find the fungus in soil that was previously farmed and irrigated, which greatly reduces the risk of infection resulting from disturbance of farmed lands (MacLean 2009). This does not apply to previously undisturbed lands where excavation, grading, and construction may correlate with increases in VF cases. Dr. MacLean feels that with the current state of knowledge, we can only speculate on the causes and trends influencing VF cases and he does not feel that construction activities are necessarily the cause of VF outbreaks (KCEHS 2009).

Valley Fever is spread through the air. If soil containing the fungus is disturbed by construction, natural disasters, or wind, the fungal spores get into the air where people can breathe in the spores. The disease is not spread from person to person.

Occupational or recreational exposure to dust is an important consideration. Agricultural workers, construction workers, or others (such as archeologists) who dig in the soil in the disease-endemic area of the Central Valley are at the highest risk for the disease (CDC 2006; CDHS 2010). The risk for disseminated coccidioidomycosis is much higher among some ethnic groups, particularly African-Americans and Filipinos. In these ethnic groups, the risk for disseminated coccidioidomycosis is tenfold that of the general population (CDC 2006).

A VF website claims that most cases of valley fever do not require treatment. Even though 30-60% of the population in areas where the disease is highly prevalent - such as in the southern San Joaquin Valley of California - have positive skin tests indicating previous infection, most were unaware of ever having had valley fever ("Valley Fever Vaccine Project of the Americas" 2010).

Worker Safety Table 3
Disease Forms

CATEGORIES	NOTES
Asymptomatic	• Occurs in about 50% of patients
Acute Symptomatic	• Pulmonary syndrome that combines cough, chest pain, shortness of breath, fever, and fatigue. • Diffuse pneumonia affects immunosuppressed individuals • Skin manifestations include fine papular rash, erythema nodosum, and erythema multiforme • Occasional migratory arthralgias and fever
Chronic Pulmonary	• Affects between 5 to 10% of infected individuals • Usually presents as pulmonary nodules or peripheral thin-walled cavities
Extrapulmonary/Disseminated Varieties	
Chronic skin disease	• Keratotic and verrucose ulcers or subcutaneous fluctuant abscesses
Joints / Bones	• Severe synovitis and effusion that may affect knees, wrists, feet, ankles, and/or pelvis • Lytic lesions commonly affecting the axial skeleton
Meningeal Disease	• The most feared complication • Presenting with classic meningeal symptoms and signs • Hydrocephalus is a frequent complication
Others	• May affect virtually any organ, including thyroid, GI tract, adrenal glands, genitourinary tract, pericardium, peritoneum

Given the available scientific and medical literature on Valley Fever, it is difficult for staff to assess the potential for VF to impact workers during construction and operation of the proposed RSEP with a reasonable degree of certainty. However, the higher number of cases reported in Kern County indicates that the project site may have an elevated risk for exposure, despite the fact that the Ridgecrest area itself has recorded less than 15 cases per year since 1995. To minimize potential exposure of workers and also the public to coccidioidomycosis during soil excavation and grading, extensive wetting of the soil prior to and during construction activities should be employed and dust masks should be worn at certain times during these activities. The dust (PM10) control measures found in the Air Quality section of this SA/DEIS should be strictly adhered to in order to adequately reduce the risk of contracting VF to less than significant. Towards that, Commission staff proposes Condition of Certification **WORKER SAFETY-9** which would require that the dust control measures found in proposed Conditions **AQ-SC3** and **AQ-SC4** be supplemented with additional requirements.

Fire Hazards

During construction and operation of the proposed RSPP project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires of heat transfer fluid such as that proposed for use in the solar panels at RSPP are rare. Compliance with all LORS would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and spoke to representatives of the KCFD to determine if available fire protection services and equipment would adequately protect workers and to determine the project's impact on fire protection services in the area. The project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the KCFD (KCFD 2009).

Construction

During construction, the permanent fire protection systems proposed for the RSPP would be installed as soon as practical; until then portable fire extinguishers would be placed throughout the site at appropriate intervals and periodically maintained. Safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Plan (SM 2009a, Section 2.5.7.3).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the 2007 California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements, with the exception of providing a secondary access point for emergency response vehicles. Both the California Fire Code (24 CCR Part 9, chapter 5, and section 503.1.2) and the Uniform Fire Code (sections 901 and 902) require that access to the site be reviewed and

approved by the fire department. All power plants licensed by the Energy Commission have more than one access point to the power plant site. This is sound fire safety procedure and allows for fire department vehicles and personal to access the site should the main gate be blocked. The proposed RSPP has only one access point, that being through the main gate (via a new road connecting to Brown Road), and the AFC makes no mention of a secondary access point through the perimeter fence (SM 2009a, Section 2.3). Staff finds that a second access point is necessary to ensure fire department access. This access point can be restricted to emergency use only and, if possible, should be equipped with the fire department's Opticom System for remote keyless entry. Therefore, in order to comply with the requirements of LORS, staff proposes a Condition of Certification **WORKER SAFETY-6** that would require the project owner to identify and provide a second access point to the site for emergency vehicles and equip this secondary gate with either the Opticom System or a keypad for fire department personnel to open the gate.

Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The fire water would be groundwater supplied from the Indian Wells Valley Water District (IWVWD) and stored in a water storage tank with a dedicated fire protection supply of 360,000 gallons. One electric and one diesel-fueled backup firewater pump would ensure water supply to the fire protection loop, and an electric jockey pump would maintain pressure in the system (SM 2009a, Section 5.18.3.2).

Fire hydrants would be installed throughout the site per NFPA requirements and a sprinkler deluge system would be installed in areas of risk including the transformer, HTF expansion tank, and HTF circulating pump area. A sprinkler system would be installed at the STG and in administrative buildings. In addition to the fixed fire protection system, appropriate classes of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals. The solar fields would be protected by isolation valves that would allow only a finite amount of HTF to burn before extinguishing (SM 2009a, Section 5.18.3.2).

According to NFPA standards and UFC requirements, the fire protection system must have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. Staff has determined that these systems will ensure adequate fire protection.

The applicant would be required by Conditions of Certification **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Program to staff and to the KCFD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

Liquefied Petroleum Gas (LPG)

Propane would be used at the proposed RSPP to fuel the auxiliary boilers and to prevent HTF from freezing. Up to 18,000 gallons of propane would be stored in a pressurized carbon steel tank equipped with a secondary containment structure. Propane is a flammable gas and poses a risk of fire and/or explosion. The applicant

stated that due to the use of propane as a fuel, a Risk Management Plan (RMP) including an Off Site Consequence Analysis (OCA) is not required (SM 2009a, Section 5.6.3.3). Staff agrees with this determination.

Even though an OCA is not required by regulation, the applicant has modeled the worst-case accidental release scenario of propane from the proposed project. The worst-case release involves the complete failure of the 18,000-gallon propane storage tank, resulting in two scenarios: 1) a vapor cloud explosion which results in a blast wave that can damage structures and cause injuries, and 2) a boiling liquid expanding vapor explosion (BLEVE) which results in thermal exposure that can cause skin injuries. EPA's RMP Offsite Consequence Analysis Guidance was used to prepare the modeling. See Tables 5.6-4 and 5.6-5 for the assumptions and parameters used in the modeling of each scenario (SM 2009a).

The modeling results for the two worst-case scenarios show that blast effects would extend 1640 feet (500 meters) from the point of origin and thermal exposure would extend 1902 feet (580 meters; SM 2009a, Table 5.6-6). The propane tank is proposed to be located about 820 feet (250 meters) from the nearest fenceline, so modeled impacts of the worst-case scenarios would extend off-site. However, the applicant noted that there are no public receptors within this area, making the impacts of a propane release insignificant according to the RMP program which defines impact as occurring at a public receptor (SM 2009a, Section 5.6.3.3). However, the blast impacts would extend to Brown Road which will have public traffic, cyclists, and hikers. Therefore, it is staff's opinion that should a fire start at or near the propane tank, Brown Road would have to be closed.

Staff also evaluated the potential for a fire or explosion of the propane/LPG tank to impact or damage the PSPP and off-site receptors. Staff also assessed the need for additional protective measures such as a water spray system to reduce the chances that a fire at the LPG tank would result in a further spread to the HTF system or in an explosion. In this manner, mitigation would serve to protect critical power plant components from a fire or explosion of LPG. Staff reviewed several models that agencies and the private sector use to assess the potential for explosions of pressurized liquid petroleum gas cylinders to impact structures and people. Staff relied on methodology published by the U.S. Department of Commerce National Institute of Standards and Technology (NIST 2000) to assess the thermal radiation impacts and the model from the U.S. Department of Housing and Urban Development (HUD) standard (49 CFR 51.200 et seq.) to determine an Acceptable Separation Distance from an explosion. Both NIST and HUD utilize an acceptable thermal radiation exposure level of 31.5 kW/m^2 (10,000Btu/h/f^2) for structures and 1.4 kW/m^2 (450 Btu/h/ft^2) for people. HUD uses an overpressure of 0.5 psi as criteria for impacts from an explosion. The structures protected by this standard are assumed to be wood and thus this standard affords a large safety margin for sturdier power plant equipment.

To assess the risk of a propane/LPG explosion, staff utilized the HUD procedure that specifically assessed as an example a propane tank fire. Based on the volume of a propane tank and using Figure 1 from the HUD standard, staff determined that the minimum acceptable separation distance for structures and people would be 400 feet for an 18,000 gallon propane or LPG tank. And, thermal effects on people would be

significant up to ~950 feet distant. Since the distance from the LPG tanks to the nearest power plant structures are well within the 400-foot range, and workers would be located within 950 feet, staff believes that a fire at the LPG tank presents a significant risk to critical power plant components and to workers.

Given this analysis that shows a potential for significant damage to power plant structures and injury to workers should a fire or explosion occur, staff conducted a further assessment of the factors staff considers in proposing mitigation requirements for propane or LPG storage facilities:

1. Code requirements for mitigation and type of mitigation.
2. Proximity of off-site receptors.
3. Adequacy of the local fire and emergency services (numbers and capability).
4. Response time of local fire and emergency services.
5. Worker safety.
6. Triggering of DHS Top-screen analysis.
7. Likelihood of a BLEVE occurring.
8. Likelihood of on-site fire escalation due to a fire or BLEVE.
9. Likelihood of off-site consequences from a BLEVE.
10. Power Generation Infrastructure protection.

In considering these factors for the PSPP site, staff has determined that Factors 1, 2, 3, 5, 8, and 10 apply and that a water spray system would be appropriate and adequate mitigation. However, while there are no code requirements in the United States for a water spray system to cool an LPG vessel (there is such a requirement in the U.K.), the safety of LPG tanks is addressed in California Fire Code section 3804 which requires compliance with NFPA 58, the *Liquefied Petroleum Gas Code*. Section 6.25 of NFPA 58 also does not require a water spray system but if one is installed, the system shall comply with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*. It requires that where water spray fixed systems are used, they shall be automatically actuated by fire responsive devices and by manual actuation. Other NFPA codes that address LPG tank safety include NFPA 850A and NFPA 54.

As discussed above, the proximity to Brown Road places the off-site public at risk should a fire or explosion occur at the project site. Also discussed earlier in the staff assessment, the Kern County Fire Department claims it will be impacted by the operation of this solar project and that its equipment may be inadequate to respond effectively. Worker safety is an issue as an LPG fire or a HTF fire that threatens the LPG tank would pose a significant risk of both thermal radiation exposure and of blast effects. A water spray system over the tanks would provide more time for notification and safe evacuation of employees. The amount of LPG stored on-site is less than the threshold quantity for the U.S. Department of Homeland Security regulations on

chemical storage (see the staff assessment section on **SITE SECURITY** in the **HAZARDOUS MATERIALS MANAGEMENT** section of this **Staff Assessment /DEIS** for a more detailed analysis of this topic) and thus would not trigger a "Top-Screen" analysis and federal requirements for security measures. While staff has not quantitatively assessed the likelihood of a BLEVE (Boiling Liquid Expanding Vapor Explosion), staff believes that although it may be a low probability event, the consequences are very high. Additionally, the likelihood of an escalation of an LPG fire or BLEVE to cause fires in the remainder of the solar power plant is also very high, due to the amount (2,100,000 gal) of highly flammable HTF present on-site. Finally, the investment and reliance on renewable power in California's power infrastructure requires that a high level of engineering and administrative controls be implemented to protect power generation. Given all these considerations, staff believes that a simple and effective method of cooling the LPG tanks should a fire occur is required. Staff therefore proposes Condition of Certification **WORKER SAFETY-8** which would require the placement of a water spray system above the LPG tank.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff or the response time is significantly greater than 15 minutes. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrhythmias resulting from industrial accidents or other non-work related causes.

Commission staff proposes Condition of Certification **WORKER SAFETY-5,** which would require that a portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

Closure and Decommissioning Impacts and Mitigation

Closure of the proposed RSPP (temporary or permanent) would follow a facility closure plan prepared by the applicant and designed to minimize public health and environmental impacts. Staff expects that impacts from the closure and

decommissioning process would represent a fraction of the impacts associated with the construction or operation of the proposed RSPP. Therefore based on staff's analysis for the construction and operation phases of this project, staff concludes that hazardous materials-related impacts from closure and decommissioning of the RSPP would be insignificant.

C.15.4.3 CEQA LEVEL OF SIGNIFICANCE

Staff's analysis of Worker Safety and Fire Protection impacts from the proposed RSPP has determined that impacts would be below the level of significance with implementation of recommended mitigation.

C.15.5 NORTHERN UNIT ALTERNATIVE

The Northern Unit Alternative would be a 146 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because (1) it eliminates about 42 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources (desert tortoise and Mohave ground squirrel), cultural resources, and recreational uses, and (2) avoids constructing a solar facility in the Mohave Ground Squirrel Conservation Area (MGSCA).

Similar to the proposed project, the Northern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block covering approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road within the proposed project footprint. The proposed 16.3 acre water line would remain at the location as proposed by the project. The Northern Unit Alternative would not require the relocation of the two existing SCE transmission lines.

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

C.15.5.1 SETTING AND EXISTING CONDITIONS

The Northern Unit Alternative would consist of 167 solar collector array loops with a net generating capacity of approximately 146 MW. The total disturbance area would be approximately 1134 acres of land. This alternative would retain 58 percent of the

proposed solar array loops and would affect 58 percent of the land of the proposed 250 MW project. The boundaries of the Northern Unit Alternative are shown in **Alternatives Figure 1**.

C.15.5.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction of the Northern Unit Alternative is likely to require fewer employees which would not reduce the impacts to worker safety or fire protection because the same level of safety and fire detection and suppression would be required regardless of the size of the solar power plant. Even if this alternative may have slightly smaller amounts of flammable/hazardous materials and potential ignition sources, the level of fire protection would be essentially the same as with other alternatives. Any reduced impacts in the area of Worker Safety and Fire Protection would be so minor so as to be not quantifiable or distinguishable, and staff has determined that the project as proposed would have less than significant impacts (pursuant to CEQA) in the area of Worker Safety and Fire Protection with staff's proposed mitigation.

C.15.5.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Northern Unit Alternative, as both the project as proposed and the Northern Unit Alternative would, with mitigation, have impacts below the level of significance (pursuant to CEQA). The same conditions of certification would be required for the Northern Unit Alternative and the project as proposed.

C.15.6 SOUTHERN UNIT ALTERNATIVE

The Southern Unit Alternative would be a 104 MW solar facility located within the boundaries of the proposed project as defined by Solar Millennium. This alternative is analyzed because it eliminates about 58 percent of the proposed project area so all impacts are reduced, especially those related to desert washes, biological resources, and cultural resources.

Similar to the proposed project, the Southern Unit Alternative would transmit power to the grid through the planned SCE 230-kV substation to be located near the proposed project site. The power block, spanning approximately 18 acres, would remain north of Brown Road, as proposed by the project and would include all operational power facilities, structures, transmission lines and related electrical system; potable and treated water tanks; and auxiliary equipment (i.e., water treatment system, diesel-powered emergency generator, and firewater system). The proposed transmission line alignment is 3,900 ft and would connect to the proposed switchyard (3.2 acres) adjacent to the existing SCE 230kV transmission line, west of the proposed project. In addition, the site would require access roads, a parking lot, bio-remediation unit and main office building (3 acres) all of which are proposed north of Brown Road. The proposed 16.3 acre water line would remain at the location as proposed by the project. Similar to the proposed project, the Southern Unit Alternative would require the relocation of the two existing SCE transmission lines; this realignment would require approximately 58.2 acres.

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

C.15.6.1 SETTING AND EXISTING CONDITIONS

The Southern Unit Alternative would consist of 119 solar array loops with a net generating capacity of approximately 104 MW. The total disturbance area would be approximately 908 acres of land. This alternative would retain 42 percent of the proposed solar array loops and would affect 42 percent of the land of the proposed 250 MW project. The boundaries of the Southern Unit Alternative are shown in **Alternatives Figure 2**. This area was would avoid a large portion of the El Paso Wash and sensitive biological resources, including areas that were mapped as occupied tortoise and Mohave ground squirrel habitat (live tortoise and/or active burrows and sign).

C.15.6.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Construction of the Southern Unit Alternative is also unlikely to have reduced impacts in the area of Worker Safety and Fire Protection because the same level of safety and fire detection and suppression would be required regardless of the size of the solar power plant. Even if this alternative may have slightly smaller amounts of flammable/hazardous materials and potential ignition sources, the level of fire protection would be essentially the same as with other alternatives. Any reduced impacts in the area of Worker Safety and Fire Protection would be so minor so as to be not quantifiable or distinguishable, and staff has determined that the project as proposed would have less than significant impacts (pursuant to CEQA) in the area of Worker Safety and Fire Protection with staff's proposed mitigation.

C.15.6.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Southern Unit Alternative, as both the project as proposed and the Southern Unit Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Southern Unit Alternative and the project as proposed.

C.15.7 ORIGINAL PROPOSED PROJECT ALTERNATIVE

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

Similar to the proposed project, the Original Proposed Project Alternative would transmit power to the grid through the planned SCE 230-kV substation located near the proposed project site and would require infrastructure including main office building (3 acres), power block, water line, transmission line, switch yard, access roads, parking

area, bio-remediation unit and maintenance building. The 18-acre off-site water line route would follow the same route as the proposed project. The bioremediation unit would be located north of Brown Road, within the proposed project footprint; the power block and ancillary facilities would be located south of Brown Road on approximately 18 acres in addition to the transmission line and switch-yard (5.5 acres). The Original Proposed Project Alternative would require the relocation of the two existing SCE transmission lines.

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

C.15.7.1 SETTING AND EXISTING CONDITIONS

The Original Proposed Project Alternative would consist of 278 solar array loops with a net generating capacity of approximately 250 MW. The total disturbance area would be approximately 1,794 acres of land A shorter transmission interconnection – 1,250 feet as compared to the proposed project interconnection of 3,900 feet – would be needed. The boundaries of the Original Proposed Project Alternative are shown in **Alternatives Figure 3**. This project footprint contains two desert ephemeral washes that would require redirection and smaller dry desert washes also traverse the site. In addition this site is the location of prime desert tortoise and Mojave ground squirrel habitat.

C.15.7.2 ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Potential impacts associated with worker safety and fire protection would likely be similar to those estimated for the RSPP as proposed and staff's analysis has determined that some significant impacts may be expected for the RSPP as proposed. As stated above, the same level of safety and fire detection and suppression would be required regardless of the size of the solar power plant. Any reduced impacts in the area of Worker Safety and Fire Protection would be so minor so as to be not quantifiable or distinguishable, and staff has determined that the project as proposed would have less than significant impacts (pursuant to CEQA) in the area of Worker Safety and Fire Protection with staff's proposed mitigation.

C.15.7.3 CEQA LEVEL OF SIGNIFICANCE

The CEQA level of significance for Worker Safety and Fire Protection would not change with the Original Proposed Project Alternative, as both the project as proposed and the Original Proposed Project Alternative would have impacts below the level of significance. The same conditions of certification would be required for the Original Proposed Project Alternative and the project as proposed.

C.15.8 NO PROJECT/NO ACTION ALTERNATIVES

C.15.8.1 NO PROJECT/NO ACTION ALTERNATIVE #1

No Action on Ridgecrest Solar Power Project application and on CDCA land use plan amendment

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, no construction safety and health and project operations and maintenance safety and health programs would be required and no impacts on local fire protection services would be created. However, the land on which the project is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.15.8.2 NO PROJECT/NO ACTION ALTERNATIVE #2

No Action on Ridgecrest Solar Power Project and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the project site.

Because the CDCA Plan would be amended, it is possible that the site will be developed with another solar technology. Construction and operation requirements for solar technologies vary. However, it is expected that construction safety and health and project operations and maintenance safety and health programs would be required for all solar technologies and impacts to local fire protection services would be potentially generated. As such, it is expected that the impacts to worker safety and fire protection from a different solar technology would likely be similar to impacts from the proposed project.

C.15.8.3 NO PROJECT/NO ACTION ALTERNATIVE #3

No Action on Ridgecrest Solar Power Project application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the proposed Ridgecrest Solar Power Project would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the project site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended so no solar projects can be approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no construction or operation of a solar facility. No construction safety and health and no maintenance safety and health programs would be required and no demands on local fire protection services would be made. Therefore, this No Project/No Action Alternative would not result in impacts to worker safety and fire protection. However, in the absence of this project, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

C.15.9 COMPARISON OF ALTERNATIVES AND PROPOSED PROJECT

Worker Safety Table 4
Comparison of Proposed Project and Alternatives

	Proposed Project (250 MW)	**Northern Unit (146 MW)**	**Southern Unit (104 MW)**	**Original Proposed Project (250 MW)**	**No Project/No Action***
Risk of potential fire causing severe damage, injury, or loss of life	Less than significant	Less than significant (same level of worker safety, fire detection, and fire suppression would be required. Differences would, not be quantifiable or distinguishable	Less than significant (same level of worker safety, fire detection, and fire suppression would be required. Differences would, not be quantifiable or distinguishable	Less than significant (same level of worker safety, fire detection, and fire suppression would be required. Differences would, not be quantifiable or distinguishable	Less than significant

*All No Project/No Action alternatives assume that the RSPP project would not be built on the proposed site

C.15.10 CUMULATIVE IMPACTS ANALYSIS

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (California Code Regulation, Title 14, section 15130). NEPA states that cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR §1508.7).

C.15.10.1 GEOGRAPHIC EXTENT

The geographic areas considered for cumulative impacts on Worker Safety/Fire Protection are within the project boundaries and the regional area within the jurisdiction of the local fire department.

C.5.10.2 EFFECTS OF PAST AND PRESENT PROJECTS

For this analysis, there is one project in the area or region that may require the response from off-site fire departments for fire, HazMat, or EMS emergencies. That is the existing China Lake Naval Weapons Center. However, this facility is not considered by staff to have had an impact on the area because of the on-site emergency response capability of the U.S. Navy.

Staff has analyzed the potential for Worker Safety/Fire Protection cumulative impacts at many other power plant projects in California. A significant cumulative Worker Safety/Fire Protection impact is defined as the simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond. Staff believes that, for most power plants, while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control fires, HazMat releases, and injuries/accidents and the location of existing facilities which are not distant from KCFD fire stations such that the response times are adequate. Staff therefore believes the impacts of past and present projects on the local fire department are insignificant (pursuant to CEQA).

C.5.10.3 EFFECTS OF REASONABLY FORESEEABLE FUTURE PROJECTS

Foreseeable Projects in the Project Area

Worker Safety/Fire Protection at the proposed project may also be affected by reasonably foreseeable future projects, including the proposed Super Wal-Mart, a waste water treatment plant, one solar project, and three wind projects.

The construction of the RSPP is expected to result in short term adverse impacts related to Worker Safety/Fire Protection during construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under

construction the same time as the RSPP and therefore short term impacts related to Worker Safety/Fire Protection during construction of those cumulative projects may occur.

The operation of the RSPP is also expected to result in long term adverse impacts during operation of the project related to Worker Safety/Fire Protection. Staff has analyzed the potential for Worker Safety/Fire Protection cumulative impacts at many other power plant projects in California. A significant cumulative Worker Safety/Fire Protection impact is defined as the simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond.

The KCFD stated that the potential impacts of this project on their ability to serve their jurisdiction are unknown at the time staff contacted the KCFD in early December 2009. The KCFD noted that several engine companies are 10 - 15 minutes away, which in staff's opinion would not be expected to impact the surrounding communities with extended response times if a significant event happened at the project site. However, the County indicated that in general, services provided by the County which included police, fire, and EMS services may be impacted by this project and in a personal communication at a March 2, 2010 meeting, the KCFD did indicate a cumulative impact would exist and provided verbal substantiation of this impact. Upon consideration of this view, staff concurred that a cumulative impact would exist if the proposed RSPP is built.

Although the applicant will develop and implement a fire prevention program for the RSPP independent of any other projects considered for potential cumulative impacts, staff believes that mitigation will be required because of the added demands and great distances that response teams would travel. With the additional mitigation measures proposed by Commission staff, any impact on fire, HazMat, or EMS response will be reduced to a less than significant level (pursuant to CEQA).

Foreseeable Renewable Projects in the California Desert

As noted above, cumulative impacts in the area of Worker Safety and Fire Protection can only occur in the general vicinity of the project and therefore impacts to the greater region are not feasible.

C.5.10.4 OVERALL CONCLUSIONS

Commission staff finds that this project will have a significant cumulative burden on the KCFD's ability to respond to a fire, HazMat spill, or medical emergency and recommends mitigation in the form or proposed Condition of Certification **WORKER SAFETY-7** to reduce this impact to less than significance (pursuant to CEQA).

C.15.11 COMPLIANCE WITH LORS

Staff concludes that construction and operation of the RSPP project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

C.15.12 NOTEWORTHY PUBLIC BENEFITS

In regards to Worker Safety and Fire protection, staff has not identified any noteworthy public benefits.

C.15.13 PROPOSED CONDITIONS OF CERTIFICATION/MITIGATION MEASURES

As required under CEQA and Energy Commission regulations, Commission staff proposes the following Conditions of Certification:

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- A Construction Personal Protective Equipment Program;
- A Construction Exposure Monitoring Program;
- A Construction Injury and Illness Prevention Program;
- A Construction heat stress protection plan that implements and expands on existing Cal OSHA regulations as found in 8 CCR 3395;
- A Construction Emergency Action Plan; and
- A Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, the Heat Stress Protection Plan, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Kern County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Kern County Fire Department stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- An Operation Injury and Illness Prevention Plan;
- An Operation heat stress protection plan that implements and expands on existing Cal OSHA regulations (8 CCR 3395);
- A Best Management Practices (BMP) for the storage and application of herbicides;
- An Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 3401—3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, Heat Stress Protection Plan, BMP for Herbicides, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Kern County Fire Department for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Kern County Fire Department stating the fire department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- Have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;
- Assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- Assure that all construction and commissioning workers and supervisors receive adequate safety training;
- Complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and

- Assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- Record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- Summary report of safety management actions and safety-related incidents that occurred during the month;
- Report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- Report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification Worker Safety-3, and for implementing all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least 60 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in its use and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

WORKER SAFETY-6 The project owner shall identify and provide a second access point for emergency personnel to enter the site. This access point and the method of gate operation shall be submitted to the Kern County Fire Department for review and comment and to the CPM for review and approval.

Verification: At least sixty (60) days prior to the start of site mobilization, the project owner shall submit to the Kern County Fire Department and the CPM preliminary plans showing the location of a second access point to the site and a description of how the gate will be opened by the fire department. At least thirty (30) days prior to the start of site mobilization, the project owner shall submit final plans to the CPM review and approval. The final plan submittal shall also include a letter containing comments from the Kern County Fire Department or a statement that no comments were received.

WORKER SAFETY-7 The project owner shall either (1) reach an agreement with the Kern County Fire Department regarding funding of its project-related share of capital costs to provide appropriate equipment as mitigation of project-related impacts on fire protection, HazMat, and/or EMS services along with an annual payment to maintain and provide these services, **or**, if no agreement can be reached shall (2) fund its share of the capital costs in the amount of $350,000 plus provide an annual payment of $100,000 to the KCFD for the support of additional fire department staff commencing with the date of site mobilization and continuing annually thereafter on the anniversary until the final date of power plant decommissioning.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall provide to the CPM either a copy of the agreement or documentation that the $350,000 payment and the first annual payment has been made.

In the annual compliance report submitted to the CPM, the project owner shall provide documentation that the annual payment has been made unless an agreement is reached with the KCFD that an annual payment is not required.

WORKER SAFETY-8 The project owner shall place a water spray system on the two LPG storage tanks. The engineering design plans shall comply with NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection* and be provided to the CPM for review and approval prior to commencing construction of the water spray system.

Verification: At least thirty (30) days prior to site mobilization, the project owner shall provide the engineering design plans to the CPM for review and approval.

At least thirty (30) days prior to the delivery of any LPG to the facility, the project owner shall provide a written statement to the CPM that the LPG tank water spray system has been built and successfully tested.

WORKER SAFETY-9 The project owner shall develop and implement an enhanced Dust Control Plan that includes the requirements described in **AQ-SC3** and additionally requires:

i) site worker use of dust masks (NIOSH N-95 or better) whenever visible dust is present;

ii) site monitoring for the presence of Coccidioides immitis in soil before site mobilization and monthly thereafter; and

iii) Implementation of enhanced dust control methods (increased frequency of watering, use of dust suppression chemicals, etc. consistent with **AQ-SC4**) immediately whenever visible dust comes from or onto the site.

After three consecutive months of not finding significant soil levels of Coccidioides immitis, the project owner may ask the CPM to re-evaluate and revise this testing requirement.

Verification: At least 60 days prior to the commencement of site mobilization, the enhanced Dust Control Plan shall be provided to the CPM for review and approval.

C.15.14 CONCLUSIONS

Commission staff concludes that if the applicant for the proposed RSPP project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Condition of Certification **WORKER SAFETY-3** through**-9**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant with mitigation will not significantly impact the local fire department either individually or cumulatively.

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