

May 20, 2013

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California Energy Commission <b>DOCKETED</b> <b>09-AFC-7C</b>
TN 70896 MAY 21 2013

**Subject: PALEN SOLAR HOLDINGS, LLC'S RESPONSE TO CEC STAFF DATA REQUEST SET 2 (19-39)  
PALEN SOLAR ELECTRIC GENERATING SYSTEM  
DOCKET NO. (09-AFC-7C)**

Dear Ms. Stora,

On behalf of Palen Solar Holdings, LLC, enclosed for filing with the California Energy Commission is the electronic version of **PALEN SOLAR HOLDINGS, LLC'S RESPONSE TO CEC STAFF DATA REQUEST SET 2 (19-39)**, for the Palen Solar Electric Generating System (09-AFC-7C).

Sincerely,



Scott A. Galati  
Counsel to Palen Solar Holdings, LLC

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**RESPONSE TO CEC STAFF DATA REQUEST SET 2 (19-39)**

In support of the

**PETITION TO AMEND**

for the

**PALEN SOLAR ELECTRIC GENERATING SYSTEM**

(09-AFC-7C)

Submitted to the:

California Energy Commission

Submitted by:

**PALEN SOLAR HOLDINGS, LLC**

Prepared by:

The logo for centerline, featuring the word "centerline" in a green, cursive script font, centered between two horizontal lines.

**MAY 2013**

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- DR 24-1        CULTURAL RESOURCES WORKPLAN FOR PSEGS**
- DR 37-1        PREVIOUS VISUAL SIMULATION DATA**
- DR 39-1        ADDITIONAL VISUAL SIMULATIONS**

## **INTRODUCTION**

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Attached are Palen Solar Holdings, LLC's (PSH) responses to California Energy Commission (CEC) Staff Data Request Set No. 2 (19-39) for the Palen Solar Electric Generating System (PSEGS or Modified Project) Petition for Amendment (09-AFC-7C). Staff issued Data Request Set No. 2 (19-39) to PSH on April 19, 2013.

The Data Responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as Staff presented them and are keyed to the Data Request numbers (19-39). Additional tables, figures, or documents submitted in response to a data request (e.g., supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, although they may have their own internal page numbering system.

For context the text of the Background and Data Request precede each Data Response.

## **BIOLOGICAL RESOURCES (19)**

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### **BACKGROUND: SAND TRANSPORT CORRIDOR**

*The northeastern portion of both the approved project and the proposed amendment lies within the Palen Dry Lake–Chuckwalla sand transport corridor. The sand transport corridor is divided into different zones based on the amount of sand transported (Zone I to Zone IV). For the approved project, staff was particularly concerned about the biological impacts to the Mojave fringe-toed lizard (*Uma scoparia*) and the sand transport corridor from direct and indirect impacts of the project on sand dunes and the processes that support them. Direct impacts include direct loss of sand dune habitat and indirect impacts include disruption of the sand transport corridor resulting in downwind impacts to sand dune habitat. As described fully in Geomorphic Assessment and Sand Transport Impacts Analysis, Palen Solar Power Project (Appendix C) included in the Revised Staff Assessment for the approved project, staff developed a sand transport model (PWA Sand Transport Model) for the Palen site to simulate sand transport within the sand transport corridor. The wind fence that was included as part of the approved project was assumed to be a complete barrier to sand transport across the project site as part of the model. Direct impacts were calculated by assuming the entire sand transport corridor was lost within the project boundary. Staff modeled the indirect impacts to the sand transport zones, including impacts by percent reduction in sand input to areas downwind of the approved project. The approved project's Reconfigured Alternatives 2 and 3 substantially reduced intrusion into the sand transport corridor, including the more sensitive Zone II, compared to the other alternatives proposed for the approved project. Specifically, Reconfigured Alternative 2 would have resulted in approximately 1,503 acres of direct impacts and 144 acres of indirect impacts, while Reconfigured Alternative 3 would have resulted in approximately 1,542 acres of direct impacts and 94 acres of indirect impacts. Impacts to sand dune habitat from Reconfigured Alternatives 2 and 3 would have been mitigated to less than significant levels through Condition of Certification **BIO-20**.*

*The project owner has proposed as part of the modified project to eliminate the approved project's 30-foot tall wind fence which contributed to disruption of the sand transport corridor. However, the modified project would still have a project boundary fence (security fence) and desert tortoise exclusion fencing. Any fence design could impede sand transport and result in downwind impacts to sand dune habitat. In addition, sand that would have been transported across the project footprint from upwind would also be potentially cut off by storm drainage channels and diversion channels and above ground infrastructure that are proposed as part of the modified project. In Section 5.1.2, page 5.1-2 of the Supplement No. 1 for the Petition to Amend (Petition), the project owner states that the impacts to the sand transport corridor would decrease to 1,479.2 acres of direct impacts and 39.7 acres of indirect impacts. Based on*

discussions in the workshop on April 17, 2013, the project owner assumed indirect impacts to the sand transport corridor would be reduced for the modified project as the project owner assumed that the heliostats would function in the same manner as plants and allow sand to flow freely through the solar array. Indirect impacts were assumed for loss of habitat resulting from the 39.7-acre private parcel in Zone III that is not part of the modified project, but is nearly surrounded by the modified project's solar arrays. The project owner has not demonstrated how the modified project footprint, configuration, and components of the modified project will result in less indirect impacts to the sand transport corridor as compared to either the approved Alternative 2 or Alternative 3 footprint. The boundary of the modified project footprint within the sand transport corridor has a different shape compared to either Alternative 2 or Alternative 3. In addition, the configuration and components of the modified project have changed compared to either the approved Alternative 2 or Alternative 3. Solar parabolic troughs and related facilities have been replaced by solar power tower technology, including two solar power towers, heliostats, and other related facilities. These modifications to the project could change the transport of sand through the sand transport corridor. Staff intends to conduct an independent analysis of impacts using the PWA Sand Transport Model or similar model.

**Data Request 19** Impacts of Modified Project to Sand Dune Ecosystem. Please provide an analysis of the potential indirect impacts of project construction and operation (for example, alteration of hydrology, dust palliatives, project fencing, solar towers and associated power blocks and heliostat fields, etc.) of the modified project on creation and maintenance of sand dunes, partially stabilized sand dunes and any other habitats potentially occupied by Mojave fringe-toed lizard. Please provide an analysis of any potential direct and indirect impacts to the sand dune ecosystem and Mojave fringe-toed lizard from the modified project, compared to the approved project in terms of changes to site configuration, project facilities (two adjacent solar fields and associated facilities), construction, operation and maintenance activities (e.g. road and utility corridor maintenance and vegetation management such as mowing, etc.), and any other new project features/activities. Please define which model was used to determine indirect impacts and provide the model output. For the indirect impact analysis, define the impact area (eg. Zone I to Zone III from the approved project) used to determine impacts.

**Data Response 19.      Potential Impact to Sand Dune Ecosystem**

See Attachment DR19-1.

## **CULTURAL RESOURCES (20-32)**

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### **ANALYTIC FRAMEWORK**

#### ***Project Description***

#### **BACKGROUND: ANALYTIC FRAMEWORK**

*Knowledge of the lateral and vertical extents of the various components of a proposed project is critical to the establishment of the appropriate framework for an environmental analysis. Specific data on the lateral extent, the height above ground, and the subsurface depth of different project components enable the environmental analyst to more tightly focus on the portions of a proposed project area that are germane to particular technical areas. Staff needs to know the complete complement of changes to the dimensions of the project that the amendment would entail, relative to the dimensions of the project as originally licensed. Staff therefore requests that the project owner draft and provide, at a minimum, a summary of any differences in gross subsurface design parameters, in both lateral and vertical dimensions, that would encompass the maximum anticipated extent of any differences in subsurface ground disturbance that the construction, operation, and maintenance of the amended project would cause. Staff believes it would be more efficient and cost-effective for the purpose of the cultural resources analysis, should the design data be available, to provide more specific information on any differences in the subsurface dimensions of the amended project. Such information may facilitate narrowing the scope of any subsurface investigations that may become necessary.*

**Data Request 20.** *Please draft and provide, with as much detail as the present state of the amended project's design will permit, a summary description of any changes to the lateral extent and the depth of each of the licensed project's components, the construction of which would entail excavation to a depth of greater than one meter below the present surface of the proposed amended project area. Alternately, please delineate and precisely describe a subsurface volume of ground beneath the present surface of the proposed project area that would encompass any anticipated changes to the subsurface lateral and vertical extents of each such component.*

#### **Data Response 20.            Subsurface Volume Estimates**

The following provides a summary description of the proposed project components, features or areas for which excavation to a depth greater than one meter below ground surface is anticipated. This information is based on the current site layout drawings, preliminary engineering and geotechnical studies completed for the project to date. Conservative estimates of the volume of material which may be excavated in these areas are listed in Table 20-1 followed by a description of the basis for the estimates.

Generally, the Modified Project features or areas that will require excavations greater than one meter in depth below ground surface are foundations for major equipment and underground features. Most of the major equipment requiring large foundations will be located in the power block including towers, steam turbine generators, air-cooled condensers, auxiliary boilers, and generator step-up transformers. Foundations will also be required for fire protection equipment, emergency generators, and tankage. In the common facilities area, foundations will be required for the administration building, fire protection equipment, emergency generators and tankage. Breakers located in the onsite switchyard will require foundations.

Underground features include the electrical power cable connecting each power block to the onsite switchyard and the natural gas pipeline.

Site layout drawings showing Modified Project features are included in Section 2.0 Project Description of the Petition and Section 3.2 Transmission System Engineering. Equipment foundations are described in Appendices 2-D and 2-E, Civil Engineering Design Package and Civil Engineering Design Criteria of the Petition. Foundations will generally consist of reinforced concrete and grout, designed as required for equipment loads, soil bearing pressures and other design considerations such as wind loads, seismic loads and drainage.

The anticipated volume of excavation for the features described above are summarized in Table 20-1. The basis for the estimates is described further below. The approach to derive the estimates is very conservative for simplicity, as well as to reflect the level of preliminary design that has been conducted on the project to date.

**Table 20-1  
Excavation Volume Estimates**

Project Feature/Area	Quantity	Length x Width (square feet)	Estimated Depth (bgs, feet)	Maximum	Volume (cubic feet x 10 <sup>3</sup> )
Power Block	2	486,000 sq ft (11.2 acres) ea.	12-0		11,700
Common Area					
Evaporation Ponds	2	87,120 sq ft (2 acres) ea.	10-0		870
Remaining Facilities	1	170,000 sq ft ( 3.9 acres)	3-0		510
Onsite Switchyard	1	126,000 sq ft (2.9 acres)	3-0		380
Natural Gas Line					
Offsite	1	12,000 sq ft (0.3 acres)	5-0		60
Onsite	1	97,000 sq ft (2.2 acres)	5-0		485
Underground Cable	1	208,000 sq ft (4.8 acres)	12-0 (max.)		2,500

**Power Blocks** – The proposed Modified Project will have two adjacent solar plants, Solar Plant 1 and 2 (located on the western and eastern portions of the site, respectively). Each solar plant will include an identical power block with major equipment as described above.

The Approved Project also contained a power block and associated equipment but utilized a different solar technology and different equipment layout. The lateral and vertical excavations for the power blocks for the proposed project are very conservatively estimated by assuming the entire area within the perimeter access road around the power block will be excavated to a depth of 12 feet. Based on these “worst-case” assumptions, the estimated volume of soil disturbance for this area is as shown in Table 20-1.

**Common Area** - The proposed Modified Project will include one common area containing facilities shared by each solar plant as described above.

A major feature in the common area will be two evaporation ponds. The Approved Project required a total of four 4-acre evaporation ponds while the proposed Modified Project will require only two 2-acre evaporation ponds, designed for a maximum liquid level of 6-0 feet deep. During construction of the ponds, the material excavated will be used to create earthen berms around each pond. Appendix 2-B of the Petition contains information on the Evaporation Pond Design Basis. For the purpose of this analysis, the depth of excavation is conservatively assumed to be 10 feet to allow for the pond lining material.

Remaining features in the common area include the administration building, emergency generator, and fire protection equipment and tankage for the building. It is not anticipated that excavation for equipment foundations will exceed a depth of one meter.

**Onsite Switchyard** – The Approved Project included an onsite switchyard. While the proposed Modified Project will utilize a different equipment layout, it is not anticipated that excavation required for breaker or control building foundations will exceed a depth of one meter. Drilled pier foundations will be employed to support bus work and H-frame structures. The piers will range in diameter from 3 to 8 feet and range in depth from 30 to 60 feet. The estimated quantity of drilled piers ranges from 36 to 45.

**Natural Gas Pipeline** – The Approved Project utilized propane fuel instead of natural gas and therefore did not include a pipeline for natural gas supply. The Modified Project will utilize a natural gas pipeline. A portion of the line will be routed under I-10, and is anticipated to utilize jack and bore construction.

The natural gas pipeline facilities required to supply fuel to the site boundary will be constructed by Southern California Gas Company. Estimates for excavated volumes for

the offsite facilities are based on the assumption that the maximum depth the pipeline will be buried is 5-0 feet.

The natural gas supply lines will be extended onsite to serve both power blocks.

**Underground Cable** – The Approved Project utilized overhead transmission lines to transport electricity generated at the power block to the onsite switchyard. The p Modified Project will utilize underground electric cables for this purpose. The cable from Solar Plant 2 will be routed to Solar Plant 1 adjacent to major access roads. Cables serving each Plant will then be routed in parallel to the onsite switchyard.

The cables will be constructed in a trench constructed adjacent to primary access roads. As described in Section 2.13.1.4 of the Petition For Amendment, the trenches are anticipated to be 2-3 feet wide and 3-6 feet deep, a few trenches may have widths and/or depths up to 12 feet. The transmission line trenches will range in width from 8 to 12 feet. Manholes with a depth of 8-10 feet will be required at intervals of approximately 1,000-2,000 feet along the cable route. Therefore, excavation volumes have been conservatively estimated for a maximum 12-0 foot depth along the entire route.

### **Project Area of Analysis**

#### **BACKGROUND**

*The “project area of analysis” (PAA) is a concept that staff employs to bound the geographic area in which staff believes that a proposed project has the potential to affect cultural resources. The effects that a project may have on cultural resources may be immediate, further removed in time, or cumulative. They may be physical, visual, auditory, or olfactory in character. The geographic area that would encompass a consideration of all such effects may or may not be one uninterrupted expanse. It may include a project area, which would be the site of the proposed plant (facility site), the routes of requisite transmission lines and water and natural gas pipelines, and other offsite ancillary infrastructure, in addition to one or several discontinuous areas where the project could potentially affect cultural resources.*

*The project description included in the Petition for Amendment (PSEGS 2012) states that the project will no longer use the parabolic trough technology, as originally licensed, but will instead use solar power towers, associated power blocks, and heliostat fields. After review of the petition and a site visit to the project site and surrounding area, staff has determined that the previous PAA is not adequate to analyze the potential effects that could occur, given this change in technology. Specifically, switching from relatively low profile parabolic troughs to two, 750-foot tall power towers has the potential to affect cultural resources much farther away; therefore, the PAA clearly needs to be expanded. Staff has observed in the field that the project will be plainly visible from at least 12 miles away. Therefore, staff has determined that, in order to adequately evaluate the new potential effects of the amended project, the revised PAA should probably include*

*all visible areas within approximately 15 miles of the project area boundary. Staff believes that this would constitute the geographic area across which the project may have the potential to cast significant visual effects on cultural resources. Figure 1 is a rough approximation of this area. The archaeological, ethnographic, and built-environment components of the PAA for the amendment vary with respect to the differences in the character of the inventory for each of these resource types and are addressed separately below.*

**Data Request 21.** *Staff has sketched out, in relatively broad strokes, a preliminary concept of what staff believes is the appropriate PAA for the proposed project. Please refine the concept that staff has set out, both above and below, adjust it on the basis of explicit argumentation, and plot out the boundaries of the project owner's iteration of the resultant PAA on a map of no less than a 1:24,000 scale. The project owner's iteration should include a delineation of the original project boundary and the new project boundary. Those areas from which the power towers will not be visible may be eliminated from the approximate 15-mile radius depicted in Figure 1. Please provide explicit justifications to support areas eliminated in this manner. The PAA is and will remain the fundamental basis for all subsequent requests for information related to the potential effects of the amended project on cultural resources. Staff's preliminary reiteration of it here is the foundation for the present cultural resources data requests. If the project owner's concept of the PAA differs significantly from staff's, staff would encourage the project owner to notify staff and, at the earliest possible date, seek to publicly resolve any substantive differences of opinion.*

**Data Response 21.        PAA**

PSH agrees with Staff's use of the PAA for its CEQA analysis for the PSEGS Amendment.

**ARCHAEOLOGICAL INVENTORY**

**Facility Site Inventory for Analysis of Physical Effects**

**BACKGROUND**

*Staff is not entirely clear that the cultural resources inventory for the amended project's physical footprint is complete. The cultural resources inventory for the bulk of the facility site has been drawn from the class III (100 percent) pedestrian archaeological surveys that were done in conjunction with the original licensing of the project. The fieldwork for those surveys (Tennyson and Apple 2010, and Tennyson 2010) was done in 2009 and 2010. The portion of the amended project area that includes the westerly shift of the proposed project's generation tie transmission line is said by the project owner (PSEGS*

2012:5.3-1) to have been surveyed before September 2010 for the Desert Sunlight Solar Farm Project (ECORP 2010). Staff is not aware, as of the publication date of the present requests, whether the project owner has provided the report for the Desert Sunlight survey for staff's review. The project owner acknowledges that the 1.8-mile natural gas pipeline route for the amended project has not been subject to survey and notes that such a survey can be completed, if necessary (PSEGS 2012:5.3-4).

Staff needs this basic information on the inventory of the cultural resources, particularly the archaeological resources, in the amended project's physical footprint that would potentially be subject to the direct physical effects of project construction and operation. This information would include the results of class III pedestrian archaeological surveys of the natural gas pipeline corridor and the corridor into which the generation tie transmission line has shifted. In addition, staff believes that the environmental context of the project area needs to be taken into account as the amendment to the licensed project undergoes consideration. The majority of the project area is spread across the sandy mid- and distal reaches of an alluvial fan system that emanates from the Chuckwalla Mountains approximately five miles to the southwest. The northeastern periphery of the project area reaches out into the dune fields and playa bottoms of lower Palen Dry Lake. Surface sediments, primarily sand, tend to be highly mobile and to rapidly expose and rebury archaeological deposits. Staff believes that the project owner would benefit from verifying that the original survey snapshot that was taken for the licensed project area, a snapshot that was a result of the pedestrian archaeological fieldwork of 2009 and 2010, did in fact provide a representative sample of the archaeological inventory there.

**Data Request 22.** *Please design and conduct a class III pedestrian archaeological survey, per the Energy Commission's siting regulations, of the natural gas pipeline corridor that would be associated with the construction and operation of the amended project.*

**Data Response 22.            Gas Pipeline Corridor Class III Survey**

The gas pipeline corridor Class III Survey was included in the original cultural resources survey reports docketed under confidential cover as part of the original AFC filing. Therefore, the Commission already has the requested information in its files.

**Data Request 23.** *Please submit a technical report of the above class III pedestrian survey for staff's review and approval.*

**Data Response 23.            Gas Pipeline Corridor Class III Survey Technical Report**

See Response to Data Request 22.

**Data Request 24.** *Please design and conduct a class II pedestrian archaeological survey of the original project area sufficient to verify the statistical validity of the cultural resources inventory for the project area as documented in 2009 and 2010.*

**Data Response 24.            Class II Pedestrian Survey of Original Project Area**

This Data Request has been the result of a collaboration with BLM. BLM, as lead for the Section 106 process, has requested a workplan (the Workplan) to describe specifically the work requested for purposes of circulation of it with proposed amendments to the Area of Potential Effect and the executed Programmatic Agreement. PSH has prepared the Workplan and submitted it to BLM and CEC. PSH received comments, immediately revised the Workplan and has resubmitted to BLM. A copy is attached as Attachment DR 24-1.

**Data Request 25.** *Please submit a technical report of the above class II pedestrian survey for staff's review and approval.*

**Data Response 25.            Class II Technical Report**

This work will be completed after BLM issues a field authorization to PSH archaeologists. PSH understands that at this time BLM has stated it will not be able to issue a field authorization until the comment period for the APE and or PA (of which the Workplan has been attached) is completed and comments, if any received, are incorporated into the Workplan.

PSH does not believe that this information is necessary for Staff to complete its analysis as it will have full pedestrian studies and a geoarchaeology report (submitted as part of Supplement 1 to the Petition for Amendment) for the complete disturbance area. As described in Supplement 1, PSH requests that the monitoring conditions be modified to apply only to those areas where excavation would be greater than 12 inches and in the northeast section of the solar field closest to the dunes areas.

**Data Request 26.** *Please submit a copy of the 2010 ECORP pedestrian archaeological survey for the Desert Sunlight Solar Farm Project, or another technical report for the portion of the amended project area that encompasses the corridor for the generation tie transmission line. The submitted report should conform to the Energy Commission's siting regulations with regard to such documentation.*

This report was docketed under a continued request for confidentiality on May 6, 2013.

### ***Extra-facility Site Inventory for Analysis of Setting Impacts***

#### ***BACKGROUND***

*The addition of two, 750-foot tall solar power towers to the licensed project stands to significantly increase the visibility of the project across that portion of Chuckwalla Valley, relative to the visibility of the project if it had been built as originally licensed. The project owner acknowledges (PSEGS 2012:5.3-4) that the amended project would be more visible and proposes to conduct, in consultation with Native Americans and other stakeholders, a series of key visual simulations of prominent and known ethnographic and archaeological resources for use in the development of mitigation measures, where such measures appear warranted. Borrowing terminology from the visual resources discipline, the project owner identifies a number of known places as being candidates for an ultimate set of key observation points. These prominent and known places include Alligator Rock, a landform; Corn Springs, McCoy Springs, and North Chuckwalla Mountains Petroglyph District, archaeological resources with rock art components; Palen Dry Lake ACEC, a prehistoric archaeological resource area; a Cocomaricopa Trail segment; and an unspecified set of Desert Training Center archaeological deposits, historical archaeological resources. As a proposal for an initial set of resources to include as part of the broader analysis of the potential character of the amended project's impacts on the setting of these cultural resources, the project owner's proposal would be fine. Staff needs this information as soon as possible, in addition to information that reports the results of more comprehensive efforts to identify and analyze archaeological resources that may be subject to the setting effects of the amended project.*

*The geographic area across which the amended project's 750-foot tall solar power towers would visually intrude is far larger than the area that would have been subject to the setting impacts of the licensed solar trough project. Staff believes, therefore, that efforts to identify and analyze the visual effects of the amended project on archaeological resources would be warranted for less prominent or entirely unknown archaeological resources, where such resources may be subject to the degradation of their historic integrity. Visual degradation of resource integrity has the potential to compromise the ability of archaeological resources to convey their significance, where such resources are determined to be significant for their associative or artistic values (Criteria 1 and 3) under the California Register of Historical Resources (CRHR). More specifically, staff needs to know whether the amended project threatens to visually degrade the integrity of such archaeological resources on the flanks of the Palen Mountains to the northeast of the proposed facility site and on the flanks of the Coxcomb Mountains to the north-northwest of the facility site. Staff believes that any*

*archaeological resources eligible for listing in the CRHR under Criteria 1 or 3 in that geographic proximity to the facility site may potentially be subject to significant visual degradation from the amended project. Areas further afield from the facility may also harbor archaeological resources that would be subject to the same type of degradation, but staff believes that the analysis of the visual effects to archaeological resources over any broader area beyond the southern Palen and Coxcomb mountains would constitute an unreasonable burden on the project owner.*

**Data Request 27.** *Please design and conduct reconnaissance pedestrian (class II) surveys of the portions of the southwestern Palen Mountains<sup>1</sup> and of the southern Coxcomb Mountains<sup>2</sup> that fall within sight of the solar power towers for proposed Units 1 and 2 of the amended project. The relatively exclusive focus of the surveys should be archaeological resources that have the potential to be eligible for listing in the CRHR under Criteria 1 and 3. Such resources would typically include, but would not be limited to, rock art, intaglios, caves that may evidence ritual use, apparent altars or shrines, cleared circles, rock cairns, and trail segments. An archaeological deposit that may represent locally atypical economic behavior may also qualify for consideration for its associative value as well as its inherent information value. Staff is aware that the majority of these survey areas are in remote places that lack vehicular access.*

**Data Response 27.                    Surveys of Coxcomb and Palen Mountains**

Since this was a joint request from CEC and BLM, BLM has required that the methodology for conducting the surveys requested by this data request be included in the Workplan. PSH has complied with BLM's request. Therefore, as described in response to Data Request 25 above, since the Workplan is being circulated for comment, BLM has not yet issued a fieldwork authorization to conduct this work. Additionally, PSH was told by BLM that it could not use a helicopter to support and facilitate this work effort.

PSH will be docketing by May 30, 2013 a complete visual analysis report with additional visual simulations, some of which show a representation of locations in the Coxcomb and Palen Mountains. PSH urges Staff to use those visual simulations to evaluate the

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<sup>1</sup> Staff envisions that the areal scope of the Palen Mountains reconnaissance be limited to the portions of the mountains in Secs. 13, and 24–26, T. 4 S., R. 17 E. and east of those sections into the unsectioned areas of T. 4 S., R. 18 E.; in Secs. 1 and 13, T. 5 S., R. 17 E., and east of those sections into the unsectioned areas of T. 5 S., R. 18 E.; and north of Secs. 31–33, T. 5 S., R. 18 E. into the unsectioned portions of that township.

<sup>2</sup> Staff envisions that the areal scope of the Coxcomb Mountains reconnaissance be limited to the portions of the mountains in Secs. 11 and 14, T. 4 S., R. 16 E. and northwest of those sections into the unsectioned areas of that township; in Sec. 22, T. 4 S., R. 16 E., and north of that section into the unsectioned areas of that same township; and in Sec. 16, T. 4 S., R. 16 E. and northeast into, again, the unsectioned portions of that township.

potential impacts to the resources that may be discovered during the surveys of the Coxcomb and Palen Mountains. PSH believes that such an analysis can be performed assuming cultural sites are located within the PAA and the viewshed of the Modified Project.

PSH did not object to providing actual survey results although they will involve a significant effort to access areas that are extremely remote and the work will need to be conducted in the heat of the summer. PSH will complete the surveys after receipt of the fieldwork authorization. However, it appears that the timing of the BLM approval process will conflict with the CEC Staff analysis schedule. In order to allow Staff to complete its analysis and conform to the Committee Scheduling Order for the PSEGS, PSH requests Staff to consider the following:

1. Based on available data there is a moderate probability that there will be cultural sites within the viewshed of the PSEGS; specifically within the canyons and at some ridgetops of the Coxcomb and Palen Mountains as outlined in this data request.
2. Use the Visual Simulations prepared by PSH of several locations in the Coxcomb and Palen Mountains<sup>3</sup> to represent the views from those potentially significant cultural assumed locations.
3. While PSH does not believe that the location of cultural sites within the viewshed mandates a finding of a significant impact, PSH proposes an enhancement measure to record up to five of these sites (three in the Palens and two in the Coxcombs) and to perform an ethnographic study specifically for such sites.

**Data Request 28.** *Please submit technical reports of the above reconnaissance pedestrian surveys for staff's review and approval.*

**Data Response 28.            Coxcomb and Palen Mountains Technical Report**

See Responses to Data Requests 24, 25 and 27.

**ETHNOGRAPHIC INVENTORY**

**BACKGROUND**

*The Chuckwalla Valley is a major prehistoric and ethnographic transportation corridor. The Halchidoma Trail or Coco Maricopa Trail system provided transportation routes between the Los Angeles Basin and the Phoenix Basin. Along this east-west axis, many*

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<sup>3</sup> Some of these locations were selected specifically due to input from Native Americans as potentially significant cultural locations.

north-south trending connector trails crossed or merged with the more prominent east-west trail system. Trails likely provided transportation routes from the north through Clarks Pass or Pinto Basin Pass, Granite Pass, and Palen Pass. From the south, likely routes would have included the Corn Springs Canyon, Graham Pass, and various avenues through and from the south of the Mule Mountains. Likely routes would have also linked places of water that might have included Buzzard Spring, Hayfield Summit Spring, Corn Spring, Chuckwalla Spring, Mule Tank, McCoy Spring, and Tank Spring. Beyond these two trail predictors, passes and water sources, trails connected travelers to seasonal camping places, hunting and gathering areas, lithic quarry sources, and ceremonial places. Staff needs to know trail locations in order to assess project effects to remnant segments, and to derive a predictive basis for the identification of sites, places, and areas that may be associated with those segments and on which project effects may also need to be assessed.

**Data Request 29.** Please conduct a records search at the Eastern Information Center for all prehistoric linear sites recorded in the new PAA described above or modified in response to these data requests. Please copy, convert to PDF, and provide staff with electronic copies of all site records. Please also include a list, in ascending order, of all site records retrieved.

#### **Data Response 29.            Records Search**

BLM requested this work be included in the Workplan. However, PSH recently received BLM authorization to begin this work while the Workplan is being circulated for comment and the work has begun. PSH anticipates being able to provide this information to Staff within the next 20 days.

**Data Request 30.** Please conduct an ethnographic, ethnological, ethno-historical literature search, which includes the use of historic maps, for prehistoric and ethnographic linear features in the new PAA described above or modified in response to these data requests. Some sources that may have relevant trail information are provided here<sup>4</sup>, but they should not be treated

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4            BLM GLO maps  
Alderson 1976  
Apple 2005  
Bean et al. 2004  
Bean and Toenjas 2012  
Cleland 2004  
Davis 1961  
Johnston 1980  
Johnston and Johnston 1957  
Laird 1976  
Lyneis et al. 1980  
McCarthy (Appendix c) in Carrico and Gallegos 1982  
McCarthy 1993

*as an exhaustive compilation. Please provide PDF copies of pertinent sections of documents that provide information on trail locations in the new PAA described above or modified in response to these data requests. Please provide staff with a bibliography of all sources retrieved.*

**Data Response 30.            Ethnographic Records Search**

See Response to Data Request 29.

**Data Request 31.** *Please produce and provide GIS coverages for all prehistoric and ethnographic linear features that are found as the result of the above research, and provide staff with both electronic copies of the subject coverages and hard copy maps of no less than a 1:24,000 scale to depict the various prehistoric and ethnographic linear resources documented.*

**Data Response 31.            Ethnographic Mapping**

See Response to Data Request 29.

***BUILT-ENVIRONMENT INVENTORY  
BACKGROUND***

*Due to the significant increase in the visual effect of the amended project, staff needs additional built-environment data in order to develop that portion of the cultural resources analysis for the preliminary staff assessment.*

**Data Request 32.** *Please provide a map showing the boundaries of the previous records search overlaid on the new PAA described above or modified in response to these data requests. Please obtain a records search update from the Eastern Information Center for the new PAA. Those areas that were previously researched can be updated to include any new information filed since the original records search for the licensed project, while areas outside of the previous search should be subject to a new comprehensive records search. Please provide, per the Energy Commission's siting regulations, copies of all site records and requisite reports in the new PAA that were not previously provided during the original licensing process.*

---

Roth 1977  
Sample 1950  
von till Warren et al. 1980  
von till Warren 1981

**Data Response 32.      Built Environment Mapping**

See Response to Data Request 29.

## **SOCIOECONOMIC RESOURCES (33-34)**

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### **BACKGROUND: ECONOMIC IMPACTS ANALYSIS**

*The PSEGS Petition to Amend presents estimates of the employment and labor income effects of the proposed project modifications generated using the IMPLAN economic impact software. To assess the reliability of the reported economic impact estimates, staff requires a clear explanation of the assumptions and input values used in the IMPLAN economic model, as well as a budget for project construction and operation that is as detailed as possible, based on the available estimates. Where appropriate, the applicant may submit this information with a request for confidentiality.*

**Data Request 33.** *Please provide a complete description of the input values and other assumptions used in the IMPLAN economic model for construction and operation of the PSEGS. Completeness will be evaluated based on staff's ability to recreate the applicant's findings using the information provided. This should include, at minimum, identification of the applicable event types, IMPLAN industry sectors, model input values (i.e. total industry sales, employment, employee compensation, proprietor income), event years, and local purchase percentages. Also, please identify the vintage and geographic extent of the IMPLAN data used in the analysis.*

### **Data Response 33. IMPLAN Modeling**

Staff withdrew this data request and instead requested at a Workshop that PSH provide an updated Table 6.2-1 which was provided in PSH's Responses to Workshop Queries and docketed on May 12, 2013.

**Data Request 34.** *Please provide a project budget for construction and operation that identifies, to the extent possible, all major expenditures on project related labor, equipment, and materials. Labor cost estimates should include associated employment numbers reported in job-years.<sup>5</sup> Where possible, please differentiate between expenditures, such as building construction, which would occur within Riverside County, and the purchase of heliostats and the solar receiver steam generators, which would occur outside of Riverside County.*

### **Data Response 34. Construction and Operation Budget**

Please see Response to Data Request 33 and Response to Workshop Query 2-1.

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<sup>5</sup> One job-year is the equivalent of one full-time job held for a period of one year. For example, this could equal one full-time job held for 12 months, two full-time jobs held for six months, three full-time jobs held for four months, or two half-time jobs held for one-year, and so on.

## VISUAL RESOURCES (35-39)

### BACKGROUND

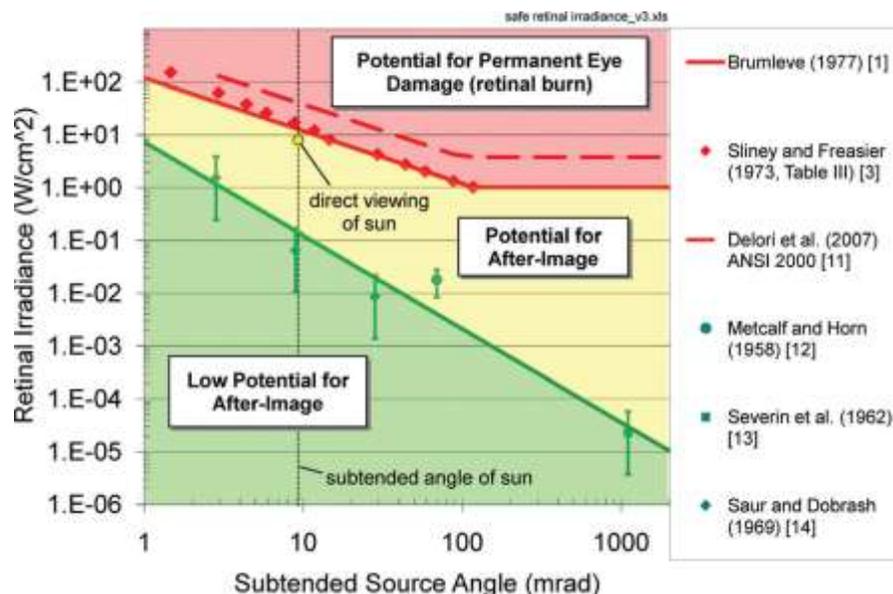
Glare from the solar receivers is anticipated to be a significant for the project.

**Data Request 35.** Please provide the predicted luminance of the solar receiver steam generators from each of the Key Observation Points (KOPs), including those described in Data Request 39, below.

### Data Response 35. Tower Luminance

The luminance of the receiver is lower than  $10^6$  cd/m<sup>2</sup>. The sun luminance at noon is  $1.6 \cdot 10^9$  cd/m<sup>2</sup>. The receiver luminance is computed as if you are viewing it from the same elevation as the receiver. The actual luminance on the ground should be slightly lower. Luminance does not change significantly with distance. However, the effect of an object of certain luminance on the retina depends on the angular size of the object, which decreases with distance.

The document by Sandia is the standard reference for the risk of receiver glare. On the top of page 2 there is a graph showing the effect on the retina for an object of certain luminance, depending in the angular size of the object. The luminance units are W/cm<sup>2</sup> (instead of cd/m<sup>2</sup>), in these units the sun has luminance 10, and the receiver has luminance less than  $1.E-2$  (=0.01).



The receiver has size about 20X20 meters, so at distance 1km, the receiver angular size is less than 30 mRad. As you can see in the graph above, at this angular size, the

threshold for retinal damage is about 2, and the threshold for possible after-image (non-damaging impact on retina) is slightly higher than 1.E-2, so there is no risk even of an after-image. At larger distances we are of course even safer in terms of these thresholds, as the angular size decreases linearly with the distance from the receiver (at 3km the angular size will be smaller than 10 mRad, at 30km smaller than 1mRad, and so on).

The KoP's referenced in the data request all exist at a significant distance (beyond 3 Km) from the receiver, thus, since the effect of an object's luminance on the retina is a function of its angular size which decreases linearly with distance, the perceived luminance (retinal irradiance) at each of the following KoP's can be stated to be less than 1.E-2 (ranging from 1.E-3 to non-perceivable, depending on distance and time of day).

### ***BACKGROUND***

*Inadvertent direct solar reflections off of the heliostats while in stow or cleaning positions, or in transition to and from stow or cleaning positions, could potentially result in 'glint' impacts to observers on the ground, including motorists and recreationists.*

**Data Request 36.** *Please discuss the extent to which heliostat positioning algorithms will be capable of avoiding inadvertent direct solar reflections to off-site ground observers. If such off-site reflections cannot be avoided, please describe these conditions, including the potential extent (areas of potential exposure) and frequency of visible off-site 'glint' (direct solar reflection).*

### **Data Response 36.      Heliostat Positioning Algorithms**

The Heliostat Positioning Plan (proposed as TRANS-6) has the specific objective of defining the site specific areas of concerns (Highway 10, adjacent PSEC Microwave Paths, nearby transmission powerlines) to provide for a programmatic solution intended to assure that each heliostat is restricted from the specific range that would be necessary to introduce orphan flux to an unintended receptor.

The implementation of the restrictions defined in the heliostat positioning plans are completed by programming appropriate restrictive algorithms in the Solar Field Control System (SFINCS).

In regards to un-intended off-site reflection, while unlikely, the conditions expected are likely to be short in duration (due to the constant rotation of the earth) and minimal in terms of impact. The following illustrates the range of worst case scenarios for a receptor of a rogue heliostat reflection.

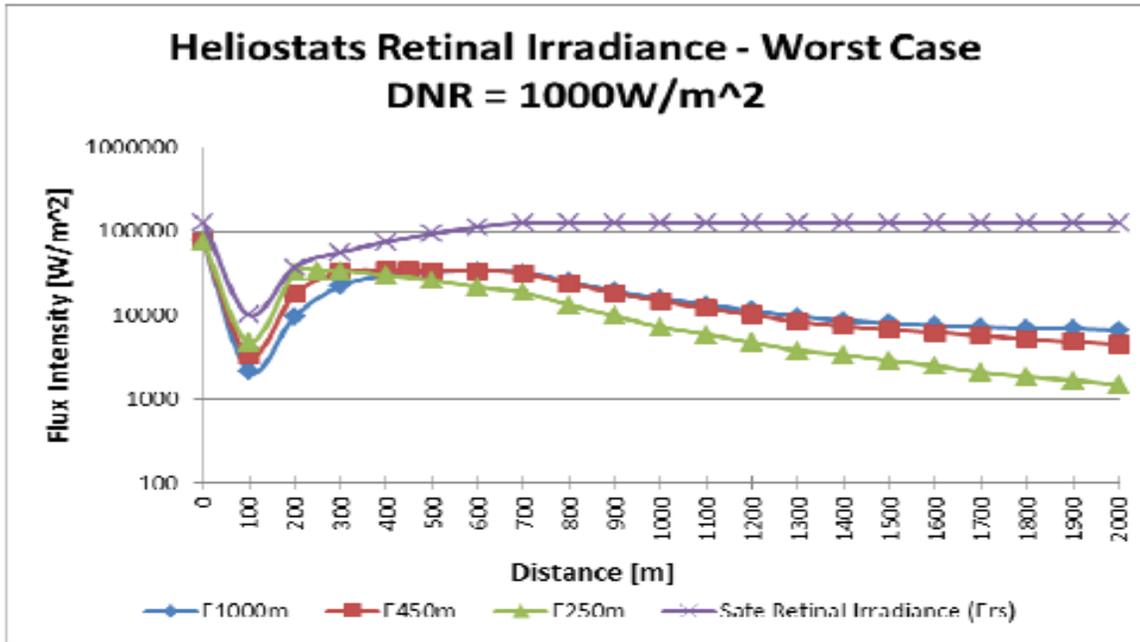
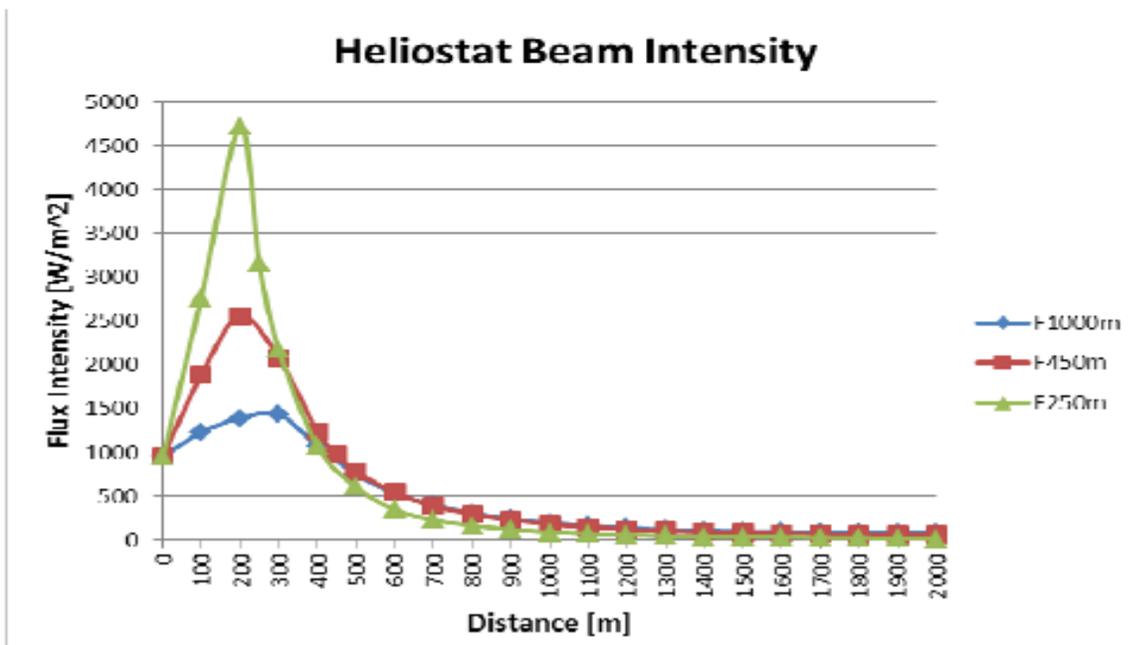


Figure DR149- 1: Heliostats retinal irradiance – worst case



**BACKGROUND**

To facilitate preparation of the Staff Assessment, and to conduct its analysis, staff requires high-resolution image files of photographs in the Application of Certification visual analysis located at [http://www.energy.ca.gov/sitingcases/palen/documents/applicant/afc/5.15%20%20Visua I.pdf](http://www.energy.ca.gov/sitingcases/palen/documents/applicant/afc/5.15%20%20Visua%20I.pdf).

**Data Request 37.** *Please provide high-resolution image files of individual photos for the Amendment Supplement, including simulations and character photos, in jpg or tif format. Please do not provide 'paired' before and after page layouts, but rather the individual image files at a resolution suitable for printing in ledger-size format (11"X17").*

**Data Response 37.            Previous Visual Simulation Data**

See Attachment DR 37-1.

***BACKGROUND***

*The simulations provided in Amendment Supplement 2 are shown as parts of wider photo panoramas. Consequently the actual field of view of the simulations is not known, and the actual visual scale and magnitude of the simulated views cannot be determined or evaluated.*

**Data Request 38.** *Please specify the camera model and lens focal length setting for the photographs used in each of the KOP simulations. Please specify the horizontal angle/field of view of each of the simulations and describe how these values were determined.*

**Data Response 38.            Photographic Data**

All photographs were taken using a RICO Caplio 500SE camera. The lens focal length for all photographs was 28mm.

The following is the procedure that URS used to determine the most accurate horizontal angle of view for the index images on the PSEGS.

1. Using Google earth established the camera position based on the Latitude and Longitude recorded at the time of the photography.
2. Elevation of the view was Google earth ground elevation.
3. Three sided polygon was created with one end at the camera position.
4. The other two end points were adjusted to create a side of the polygon that pointed to a point on the terrain which matched the image.
5. Once the edges were established, the bearing of each of the lines was determined by using the ruler tool in Google earth.

6. The algebraic difference of the magnetic bearings was used to establish the horizontal angle of view of each index image.

The horizontal angle of view for each KOP is as follows:

- KOP 1: 62.6 deg.
- KOP 2: 64.8 deg.
- KOP 3: 62.9 deg.
- KOP 4: 74.0 deg.
- KOP 5: 65.7 deg.
- KOP 6: 64.7 deg.
- KOP 7: 85.7 deg.
- KOP 8: 105.0 deg.
- KOP 9: 66.3 deg.

### **BACKGROUND**

*To complete its analysis, staff requires simulations of representative KOPs within affected Wilderness Areas similar to those provided in the Revised Staff Assessment for the Palen Solar Power Project (<http://www.energy.ca.gov/2010publications/CEC-700-2010-007/CEC-700-2010-007-REV-PT1.PDF> and <http://www.energy.ca.gov/2010publications/CEC-700-2010-007/CEC-700-2010-007-REV-PT2.PDF>).*

**Data Request 39.** *Please provide simulations from two additional KOPs, corresponding to KOPs 4 (Figure 7B, elevated view from the Palen-McCoy Wilderness; Data Response VIS-255-1b) and 5 (Figure 8B, elevated view from within Chuckwalla Mountains Wilderness; Data Response VIS-256-1b) of the Revised Staff Assessment for the Palen Solar Power Project. Along with the simulations, please provide the 35mm camera focal length equivalent, and/or the actual horizontal angle of view, of the photos used.*

### **Data Response 39.            Additional Visual Simulations**

See Attachment DR 39-1.

**ATTACHMENT DR 19-1**  
**PRELIMINARY SAND TRANSPORT SUMMARY**

# **SUMMARY: SAND TRANSPORT IN AND ADJACENT TO THE PALEN SOLAR ELECTRIC GENERATION STATION (PSEGS) PROJECT AREA – A RE-EXAMINATION OF POTENTIAL EFFECTS OF FACILITY CONSTRUCTION AND OPERATION**

Prepared by  
Fred Nials\*  
For  
**Centerline**

## **Introductory Comments**

A solar generation facility (PSEGS) has been proposed for the Chuckwalla Valley, Riverside County, southern California. The proposed project footprint is situated on the Corn Springs alluvial fan (Figure 1), near the Sonoran Desert/Mojave Desert border in the Great Basin physiographic province. Distal portions of this fan coincide with a 70 mile-long sand transport corridor (STC) in which sand from various sources is transported southeastward from the Dale Lake area to near Blythe, CA. Corridor sands in some areas in and near the proposed project footprint provide suitable habitat for the Mojave Fringe-Toed Lizard (MFTL).

Collison, et al. (2010), in a study related to the then-proposed Palen Solar Power Project, analyzed several iterations of the proposed project in relation to parts of the STC and concluded that construction of that facility would have serious effects on natural sand entrainment, transport, and deposition processes that would impact MFTL habitat. The Collison, et al. model is a reasonable attempt to predict sand movement, but did not incorporate significant natural variables, and did not recognize that dune sands in that portion of the corridor adjacent to the PSEGS appear to be in an on-going state of erosion and degradation due to a variety of off-site natural and human-related processes and features. Since completion of the Collison, et al. model, the solar generation project has been significantly revised. A re-examination of the STC leads to the conclusion that because of revisions to facility footprint location, modifications to facility design, and pre-existing conditions and processes not considered in the Collison, et al. model, the model no longer applies to the proposed facility. Pertinent preliminary conclusions are summarized below.

## **Changes in Footprint Location, Technology, and Design**

Aspects of previously-proposed site locations, design, and technology that no longer apply to the PSEGS project include:

- a. The original facility footprint has changed to minimize intrusion into the sand transport zone.
- b. The original facility boundary has been modified to minimize boundary irregularities within the STC that act as sand traps.
- c. Collison, et al.'s model was based on solar trough technology with reflectors within the STC oriented at steep angles to prevailing wind direction. The revised PSEGS design replaces solar trough technology with two 750-foot tall towers surrounded by concentrically-arranged heliostats. In most areas where heliostats intrude into the STC, the orientation is such that the long axis is parallel or oblique to prevailing wind direction, further minimizing wind resistance and turbulence.
- d. The Collison model assumes significant grading of the project footprint. This has been modified to limited grading in most of the footprint, with a perimeter road and the minimum number possible on-site roads within the perimeter. Vegetation will not be eradicated, but will be mowed to a height of 18-24 inches.
- e. The model asserts that new sand that would have been transported across the project footprint from the upwind direction will potentially be cut off by drainage ditches. There are no drainage ditches in the proposed PSEGS footprint.
- f. Collison, et al. correctly states that if a project is built into a wind corridor it will create a 'sand shadow' area where dune deflation occurs over time. His model, however, assumes "a perimeter sand fence that is 30 feet high and is designed to stop sand from entering the solar array" (2010: 21). Such a fence could exert a

significant localized wind-steering effect in addition to sand deprivation. He cites (2010: 8) several studies that showed that downwind sand dunes experienced deflation and surface coarsening within 4-17 years of the erection of a “relatively small wind barrier” consisting of a single line of tamarisk trees. As shown in Figure 1 and described in text below, however, his model ignores existing date palm orchards and fields. The



Figure 1. Imagery showing location of the proposed PSEGS project footprint. Note the large area of previously existing date palm orchards and fields west and north of the footprint.

modeled effects of the fence no longer apply, because the boundary fence has been re-designed to a configuration composed of an 18-inch tortoise fence surmounted by a 8-foot chain link fence that is significantly more permeable to wind than the original 30-foot design and that will exert less “steering effect” to wind. The re-designed perimeter fence will still present some interference to wind velocity, causing deposition of some sand on both upwind and downwind sides of the fence (Figure 2), particularly if the fence is not maintained and cleared of wind-blown debris. In addition, long fence segments situated in the most active parts of the STC have been redesigned to minimize project fenceline corners and for structures to be primarily parallel to prevailing winds.

- g. A major weakness in any analysis of aeolian activity and MFTL habitat in the PSEGS footprint area is the lack of long-term local weather data. The Collison, et al. model is primarily based on short-term observations, and the few longer-term wind records in his model are from as far away as Blythe, where wind patterns are significantly different. It must be pointed out that observations of dune activity described herein suffer the same limitations. Insofar as possible, we have attempted to base interpretations of long-term trends in sand movement and dune activity in this report on the distribution and morphology of larger aeolian landforms that are relatively less sensitive to high-frequency weather phenomena.



Figure 2. Photograph showing accumulation of sand at the base of a chain link fence near Blythe, CA. The age of the fence is unknown, but is probably more than 10 years old. There is no indication of regular maintenance or clearing of debris at the base of the fence.

## Pre-existing Conditions Not Considered in the Collison, et al. Model

1. The STC was largely deposited during the Pleistocene, under climate conditions significantly different than exist today. Sand deposits in large areas of the corridor have been dissected by fluvial erosion and/or no longer supply or transport previous quantities of sand through the corridor (e.g., Clark's Pass area, south side of Coxcomb Mts).
2. Comparison of historic imagery suggests that aeolian landforms (sand sheets, coppice accumulations, relict dunes, active dunes) in those portions of the STC in and adjacent to the proposed PSEGS are not in a general state of equilibrium as suggested by Collison, et al.. Occasional relict patches of aeolian accumulations attest to the fact that sand was more extensive in the past than at present.
  - a. Re-direction of natural fan-surface drainage by I-10 construction-related features has led to the fluvial erosion and degradation of part of the corridor suitable for MFTL habitat in and adjacent to the proposed PSEGS footprint.
  - b. Pre-existing agricultural features (date orchards, fields, windbreaks) are upwind from, and immediately adjacent to, the proposed PSEGS footprint. These features, not considered in Collison, et al.'s model, are situated in parts of the STC, and create a far more effective wind barrier and sand trap than the proposed facility.
  - c. Similar agricultural features for a distance of 10 miles and more upwind from the proposed PSEGS footprint have already deprived large portions of the STC of part of its sand supply.
  - d. Pinto Wash formerly supplied and re-distributed large amounts of sand to the eastern side of Palen Dry Lake basin. This ephemeral stream has essentially ceased to be a significant factor in sand transport. Groundwater pumping for agricultural purposes in the western side of Chuckwalla Valley is probably a factor.
  - e. In many areas of Zone II, there is evidence of wind erosion of older dune deposits. In and near the corridor dune tops are eroding, but sand is accumulating in vegetation-stabilized depressions between dunes. As a result, dunes are degrading and the quantity of sand being transported is diminished. Kenney (2010) notes that active aeolian sand deposits within Zone II (along portions of the northeastern perimeter fence) typically do not exhibit active avalanche faces and are generally moderately to strongly vegetated. In addition, there are abundant older degrading coppice dunes within Zone II.
3. Collison, et al. (2010) recognizes that the STC is a dynamic assemblage of landforms, and that it has undergone major changes in distribution with climate and weather variations during and since the Pleistocene. This fact has not been incorporated into understanding of MFTL ethology. We know that the corridor has undergone major and minor changes through time; it is likely that MFTL distribution has similarly changed.

While the Collison, et al. model no longer appears applicable, we do not mean to imply that the proposed PSEGS facility configuration will not have effects on unimpeded sand deposition and erosion. Sand will accumulate at the base of the tortoise/chain link fence, but in significantly less quantity than suggested in the model. Similarly, some deflation will occur downwind from the fence. A preliminary conservative estimate is that less than 10% of the amount of deflation suggested in Collison, et al.'s model will actually take place with the revised configuration. A diagram showing the subjective interpretation of deflation loci will be included in the final report.

\*This summary has drawn heavily on previous work in the PSEGS area by Dr. Miles Kenney without adequate attribution. Dr. Kenney will be a co-author on the final report, but because he has not had adequate time to review this document, I accept full responsibility for the conclusions described.

## **REFERENCES**

Collison, A., C. Nilsen, J. Gregory

2010 Biological Resources, Appendix C. Geomorphic Assessment and Sand Transport Impacts Analysis Palen Solar Power Project. Prepared for the California Energy Commission and Aspen Environmental by Philip Williams and Associates, Ltd., August 18, 2010.

Kenney, M.

2010 Geomorphology Report of the Aeolian Sand System in the Palen Dry Lake Region, Proposed Palen Solar I Energy Project, Chuckwalla Valley, Riverside County, California. Draft copy submitted to AECOM Environment, Camarillo, CA., April 16, 2010.

**ATTACHMENT DR 24-1**  
**CULTURAL RESOURCES WORKPLAN FOR PSEGS**

**Cultural Resources Work Plan for  
Palen Solar Electric Generating Station Project,  
Riverside County, California**

**May 13, 2013**

**By Centerline**

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## **Palen Solar Electric Generating Station Project**

### **Cultural Resources Work Plan**

#### **A) Introduction**

The Palen Solar Project was replaced by the Palen Solar Energy Generating System (PSEGS) Project. The PSEGS Project is a 500 MW concentrated solar thermal project with two 750-foot tall solar power tower receivers and 170,000 associated heliostats and a dedicated steam turbine generator/power block on approximately 3,900 acres. Both solar fields will share common facilities. The project is located about 10 miles east of Desert Center, CA, in Riverside County. It is entirely located on public lands managed by the Bureau of Land Management (BLM), Palm Springs Field Office. The change in technology from solar trough to solar power tower reduces the amount of grading for the main footprint, reduces the necessary acreage by 11% and increases the visual effects due to the 750-foot tall power towers.

AECOM completed a Class III cultural resources survey for the Palen Solar Project Project (Tennyson and Apple 2010; Tennyson 2010) as well as a built environment inventory (Meiser 2009, 2010).

The project has since been modified (Figure 1) by reducing the footprint's acreage on the northeast corner and by extending the project's footprint to the south in two small areas. Additional studies have been requested by the BLM and the CEC. These additional studies include:

- 1) Updated Class I Survey for PSEGS up to a 15-mile radius;
- 2) Class II sample survey of part of the PSEGS Project, including the re-evaluation/re-recordation of all historic and prehistoric sites within the PSEGS area of potential effects ( direct effects APE) and a reconnaissance survey of part of the base of the Coxcomb Mountains and the Palen Mountains;
- 3) Class III inventory of new project components and the southern expansion of the PSEGS footprint
- 4) Subsurface testing at the two PSEGS power tower locations;
- 5) Update for the built environment AECOM report up to 15 miles from the project;

- 6) Ethnographic literature review; and
- 7) Evaluation of indirect effects (visual) for the solar towers.

The purpose of the additional studies is to meet the requirements for section 106 of the National Historic Preservation Act (NHPA) and the National Environmental Policy Act (NEPA) for BLM and the California Environmental Quality Act (CEQA) for the California Energy Commission (CEC). The BLM, CEC, Palen Solar, and the California State Historic Preservation Office (SHPO) have developed a Programmatic Agreement (Agreement) to take into account any adverse effects to historic properties from this undertaking. The additional studies also meet the needs of the Agreement. Pursuant to Stipulation II (b) of the Agreement, if the APE for the Project is modified, the BLM and/or the CEC may request additional studies to consider any potential direct or indirect effects to historic properties, in consultation with the Signatories, Invited Signatories, and Concurring Parties to the Agreement. This work plan serves as the BLM and CEC request for additional studies under the Agreement.

Coordination between Centerline archaeological and geoarchaeological staff and the contracting archaeological company is required prior to and during the project. The Centerline archaeological contact is Mary Barger and the geoarchaeological contact is Fred Nials. No on-site work can begin prior to authorization by BLM on BLM lands; a research permit on Joshua Tree National Park for NPS' lands; and verbal approval by Mary Barger on NPS and BLM lands. All additional field work on BLM lands will require a BLM fieldwork authorization for survey and testing.

A single report will be generated from tasks 1-3, as requested by BLM. Separate reports will be generated for the subsurface testing task (#4), the ethnographic literature review (#6), as well as the evaluation of indirect effects (visual) on historic properties (eligible or listed) or traditional cultural properties/sacred sites or use areas identified through the ethnographic literature search (#7) or through past discussions with the tribes.

## **B) Research Issues and Themes**

AECOM (2010) developed research issues and themes for the cultural resource inventories that were completed for the proposed Palen Solar Power Project. For prehistoric sites, these are chronology, prehistoric settlement and lithic technology. For historic sites, these are transportation, mining, agriculture/ranching, and military training activities. These research issues and themes will remain relevant for the proposed project (Attachment 1).

## **C) Tasks and Methodologies**

### **1. Updated BLM Class I survey**

The purpose of this Class I survey is to update the Class I survey that was completed for the Palen Solar Project.

### **a) Methodology**

The contractor will conduct a literature review and a records search with the Eastern Information Center, the BLM, and other appropriate research and curatorial facilities. The BLM Class I survey will cover an area 15 miles from any project component. This will be an amendment/update to the work already completed for the 2009 and 2010 work for the Palen Solar Project. Information from the BLM Class I survey shall be plotted on topographic maps which will be a deliverable to both Mary Barger and the BLM. The information plotted will include existing sites, surveyed areas identified by project name or number, and any General Land Office (GLO) maps, historic maps or county record information. The contractor will check county records and General Land Office (GLO) records for historical site information about historic sites outside of the project area since this is important in evaluating indirect effects from the proposed project. Any new site records identified since the Class I was completed for the Palen Solar Project will be included as an appendix in the report. If new site types are found during the Class I survey that were not found during the Palen Solar Project Class I survey, a discussion of relevant research interests should be included in the Class I, Class II and Class III final report.

The results of the BLM Class I survey will be provided in the final report for the BLM Class II and Class III surveys(see C)The survey report discussion will address any GLO features or other known sites/features (identified during the Class I survey) that were/were not found in the project area.

### **2) BLM Class III Survey**

Due to the change in the PSEGS footprint from the Palen Solar Project footprint, two parcels were not surveyed for the Palen Solar Project that require a BLM Class III inventory: parcel 1(~95 acres on the southern end of the project just south/southwest of Power Block 2 in the center and the SE ¼ of section 4, T 6 South, R 17 East) and parcel 2 (~15 acres on the more southeastern part of the project area in the NW ¼of section 2 and the NE ¼ of section 3, T 6 South, R 17 East) (Figure 2). Both parcels shall have a 200' buffer extending outside of the PSEGS ROW application area boundary.

### **a) Methodology**

The purpose of the field inventory will be to 1) identify and record all archaeological resources within the project area (including updating previously recorded sites); 2) evaluate the significance of the archaeological resources to the National Register of Historic Places (NRHP) and the California Register of Historic Resources (CRHR); and 3) assess the potential effects of the project on any historic properties. A copy of the BLM permit stipulations and permit will be submitted to Mary Barger prior to initiating any fieldwork. The Contractor will go outside of the buffer for the project

area to record sites located during the survey. The field supervisor shall maintain daily field notes of events including schedule, field crew members, weather, isolated find information, and basic site information. These notes will be a deliverable with the preliminary draft report.

In order to record historic archaeological sites and determine whether or not they are related to the Desert Training Center (DTC) activities, an historic archaeologist with background or experience in applying the DTC criteria identified in the Field Manual for Documenting the Desert Training Center and California-Arizona Maneuver Area (Allen, Bischoff, and Baxter 2011) will need to be on each survey crew.

The field inventory and recordation of archaeological resources will be done at the same time. Recordation shall not require an additional trip to the field. This pedestrian survey will be conducted at 20 meter intervals. Sites are defined as an individual feature or 4 or more artifacts within 30 meters of each other. All surveyed areas will be plotted on a USGS 7.5' quadrangle. A mapping grade GPS unit will be used for the survey and recording all sites and isolated finds.

Site maps shall have a north arrow and clearly indicate site boundaries, topography, datum, location of features, diagnostic artifacts, and clusters of artifacts. At least one 3 x 5 inch, black and white or color photograph should be included with each site form. All sites shall be recorded on Department of Parks and Recreation (DPR) 523 forms. All features and diagnostic artifacts shall be photographed and sketched using appropriate scales (metric for prehistoric and English for historic).

No artifacts shall be collected. All artifact analysis should be conducted in the field, on site.

### **3. Statistical Class II Sample Survey**

The geoarchaeological investigation (Nials 2013) showed that some areas are more prone to on-going erosion than others. This is particularly true of the northeastern corner of the project area, in downslope (distal) portions of the alluvial fan in areas where aeolian sand is transported transverse to natural drainage direction. Previous archaeological surveys have shown that this part of the fan and sand transport zone is also the place where most prehistoric sites have been found. In this limited area, occasional discharge in small ephemeral channels conceivably could have eroded or exposed artifacts that were not exposed during the original archaeological survey. In addition, deflation of existing sand accumulations of the Corn Springs alluvial fan could expose previously-buried archaeological manifestations, particularly on the northern and western sides of dunes. As a means of further evaluating the potential for archaeological manifestations buried by shallow mantles of alluvial or aeolian sand, it is recommended that this part of the footprint be subjected to resurvey in search of artifacts that may have been exposed since the original surveys (Tennyson and Apple 2010; Tennyson 2010). Two additional 80-acre parcels are also demarcated for re-survey at the BLM Class III level. These two parcels are located near

the southern boundary of the PSEGS footprint (Figure 3), on alluvial fan surfaces that could potentially be modified by flow in multiple small channels. The five parcels selected for re-survey are all located on alluvial fan surfaces. Parcels 1 – 3 are in that portion of the fan where archaeological sites are most likely to be modified by on-going erosional processes. Parcels 4 and 5 are on relatively stable, older fan surfaces where archaeological sites are unlikely to be further disturbed by natural processes.

#### **a) Methodology**

The five parcels include approximately 607 acres of the revised PSEGS footprint. Parcel 1 is 137 acres, Parcel 2 is approximately 140 acres, Parcel 3 is 70 acres, and Parcels 4 and 5 are each approximately 80 acres. Each of these parcels will be 100% surveyed at 30-meter intervals oriented parallel to the long axis of the parcel. Parcels were purposely oriented as close to perpendicular to natural slope and drainage as possible where natural processes exert extensive modern influence. The 30-meter interval is deemed adequate to confirm previous survey findings.

Of particular importance to Parcels 1 - 3, locations of any artifacts should be clearly described in relation to nearby existing drainage channels and dune accumulations as a means of evaluating whether or not the exposure is a result of recent exposure. For example, it is expected that most newly exposed artifacts would be more likely to occur within alluvial channels or on the northwestern sides of aeolian accumulations.

The purpose of the field inventory will be to 1) identify and record all archaeological resources within the project area (including updating previously recorded sites); 2) evaluate the significance of the archaeological resources to the National Register of Historic Places (NRHP) and the California Register of Historic Register (CRHR); and 3) assess the potential effects of the project on any historic properties. A copy of the BLM permit stipulations and permit will be submitted to Mary Barger prior to initiating any fieldwork. The Contractor can go outside the project area buffer to record sites located during the survey. The field supervisor shall maintain daily field notes of events including schedule, field crew members, weather, basic site information, isolated find information. These notes will be a deliverable with the preliminary draft report.

In order to record historic archaeological sites and determine whether or not they are related to the Desert Training Center (DTC) activities, an historic archaeologist with background or experience in applying the DTC criteria identified in the Field Manual for Documenting the Desert Training Center and California-Arizona Maneuver Area (Allen, Bischoff, and Baxter 2011) will need to be on each survey crew.

Field inventory and recordation of archaeological resources will be done at the same time.

All surveyed areas will be plotted on a USGS 7.5' quadrangle. A mapping grade GPS unit will be used for the survey and recording all sites and isolated finds.

Site maps shall have a north arrow and clearly indicate site boundaries, topography, datum, and location of features, diagnostic artifacts, and clusters of artifacts. At least one 3 x 5 inch, black and white or color photograph should be included with each site form. All sites shall be recorded on DPR forms. All features and diagnostic artifacts shall be photographed and sketched using appropriate scales (metric for prehistoric and English for historic). In the report, include photographs of the area that show the aeolian accumulations as well as the alluvial channels.

No artifacts shall be collected. All artifact analysis should be conducted in the field, on site.

The report of this Class II sample survey will be included in the report that includes Tasks 1,2, and 3.

## **b) Update All Previously Recorded Archaeological Sites**

### **1) Re-evaluation/Re-recording of Prehistoric Sites**

Three prehistoric sites located within the footprint and along the transmission line corridor will require re-visitation may require re-recording. Two other prehistoric sites are located close to the project boundary and will require locational confirmation that they are outside the project area, including outside of the 200' buffer zone. If they are not, they may similarly need to be re-recorded. For this effort, the sites should be field-checked. If there are changes at any of the sites, such as new features exposed or artifacts exposed due to erosional events from aeolian activities or alluvial run-off, the site form will need to be updated by using a continuation sheet and, if necessary, a new site map. The contractor will need to coordinate with Fred Nials when this is completed, as he will need to be present for this field re-evaluation/recording task. The prehistoric sites are: SMP-P-2023, SMP-P-2018, and SMP-M-MT-001. The prehistoric sites located along the northern boundary are SMP-P-2015 and SMP-P-2014.

The results of this re-evaluation/re-recording of sites will be included in the Class I, Class II and Class III survey report.

### **2) Re-evaluation/Re-recording of Historic Sites**

A sample of historic sites within the project footprint will also need to be re-evaluated and re-recorded if changes are identified. The emphasis will be on determining if there have been any changes that would affect eligibility recommendations. An historic archaeologist with experience in recording DTC sites should be on the crew. A continuation sheet will be used to make changes to the site form, if necessary. The Field Manual for Documenting the Desert Training Center and California-Arizona Maneuver Area (Allen, Bischoff and Baxter, December

2011) will be used to aid for site documentation. Sites will include: SMP-H-1001, SMP-H-1002, SMP-H-2008, SMP-H-401, SMP-H-JR-103, SMP-H-JR-105, SMP-H-JR-107, SMP-H-JR-108, and SMP-H-RMA-1. A 10% sample of other historic sites located within the direct effects of PSEGS will also be done. These sites will be identified by Mary Barger.

### **c) Class II Reconnaissance Survey**

In addition, the CEC has requested a Class II reconnaissance survey of the portions of the southwestern Palen Mountains and the southern Coxcomb Mountains that fall within sight of the two solar power towers. The focus of this survey is to investigate rock outcrops and desert pavement areas to identify and record any rock art, intaglios, caves that may evidence ritual use, apparent altars or shines, cleared circles, rock cairns and trail segments. The Palen Mountain foothills include: sections 13 and 24-26, T 4 S, R 17 E and the east of those sections in an unsectioned area in T 4 S, R 17E; sections 1 and 13 in T 5 S, R 17E, and east of those sections into the unsectioned area in T 5 S, R 18 E; and north of sections 31-33, T 5 S, R 18 E into the unsectioned portions of that township (Figure 4). The Coxcomb Mountain foothills include: sections 11 and 14, T 4S, R 16 E, and northwest of those sections into the unsectioned areas of that township; and section 22, in T 4 S, R 16 E, and north of that section into the unsectioned areas of that same township; and in section 16, T 4S, R 16 E, and northeast into, again, the unsectioned portions of that township. The survey will be focused on areas that show a difference between the original Palen Solar Project viewshed and the PSEGS viewshed.

#### **1) Methodology**

##### **a) Outcrop Areas**

Areas of bedrock outcrops tend to be rugged, and tend to contain certain types of archaeological manifestations. These manifestations tend to be concentrated in specific topographic settings. For this reason, areas deemed likely to have high potential for rock art, tinajas, or areas of water or vegetative concentrations tend to be located in drainage bottoms and/or ridge tops. This survey will involve a single transect up each canyon to the point where solar towers are no longer visible (i.e. the project viewshed) and down the adjacent ridge top within the above area. Each of these transects will involve rapid reconnaissance and will deviate into areas deemed likely to have high potential for the above type of sites. If allowed by BLM and/or NPS, a helicopter could also be used to ferry crew members into remote locations as a means of minimizing dangers to worker health due to excessive heat.

##### **b) Desert Pavement Areas**

Areas mantled by desert pavement are more likely to manifest trails, intaglios, cleared circles, etc. A preliminary evaluation of these surfaces will be conducted through the use of remote imagery, and areas deemed likely to contain such sites will be the focus of the pedestrian reconnaissance. If allowed by BLM and/or NPS, a helicopter may be used to confirm potential features and land to record the features that are identified through analysis of remote imagery. If allowed by BLM and/or NPS, a helicopter could also be used to ferry crew members into remote locations as a means of minimizing dangers to worker health due to excessive heat.

#### **4. Subsurface Testing**

##### **a) Background**

Previous archaeological surveys resulted in the discovery of an extremely low-density scatter of approximately 200 prehistoric lithic isolates distributed over 5,100 acres of the original Palen Solar Project footprint. The nature and distribution of artifacts suggest an extremely low-density, primarily transient prehistoric use of the proposed revised PSEGS site.

Based on recommendations from BLM, a trenching program has been designed to further evaluate the two tower base locations for the PSEGS project. Tower bases are octagonal, and 195 feet (60 m) in diameter. Tower foundations will be dug to a depth of approximately 4 meters (12 ft). As shown in Figures 2 and 3, both towers are to be located in the mid-fan portion of the Corn Springs alluvial fan. Mid-fan sediments have been modified by weak pedogenesis, and Holocene erosion of Pleistocene surfaces and are subject to continuing occasional erosion or deposition in ephemeral alluvial channels. Further disturbance has occurred through bioturbational processes, primarily rodent activity. These processes are likely to result in dislocation of artifacts and/or modification of any archaeological features that may be present. Although neither tower location is in a concentration of currently active washes, runoff occasionally flows in small natural channels traversing the fan surface in both locations. Channel directions closely parallel the northeastward (N40°E) slope direction, with an incline varying between about 15-18 m/km (75-100 ft/mi) in the area of the towers. No test excavations were conducted in the tower base areas in previous archaeological or geoarchaeological studies, and no prehistoric isolated finds, archaeological sites or features were discovered in either tower location (Tennyson and Apple 2010). Subsequent geoarchaeological investigations of the area (Nials 2013) suggest that additional features or sites are unlikely, although the possibility of additional manifestations cannot be entirely dismissed.

The combination of low surface artifact density, lack of prior subsurface testing, and degree of proposed construction disturbance suggest that subsurface testing in the tower base areas could better inform us regarding the possibility of buried archaeological sites, features or artifacts.

A BLM Archaeological Resources Protection Act (ARPA) permit will be required for this work effort.

### **b) Research Questions**

In addition to the research questions already described, several additional questions will guide the excavation of backhoe trenches and their examination for surface and/or subsurface artifacts or features: 1) if surface artifacts and/or subsurface features or artifacts are present, is there a relationship between their distributions? 2) If surface artifacts and/or subsurface features or artifacts are present, is it possible to determine if the spatial or stratigraphic integrity of site features or artifacts have been compromised by natural processes? 3) Is there a possibility of intact archaeological features or *in situ* archaeological materials? and 4) If present, what is the stratigraphic relationship and/or the spatial association of any artifacts or features that might be discovered?

### **c) Methodology**

The cultural resources consultant will coordinate with tribes regarding participation during identification efforts including survey and testing. BLM will provide the list of tribal contacts.

Prior to trenching, each of the tower footprint trench locations will be re-surveyed for archaeological manifestations, and any artifact locations will be flagged. This pedestrian re-survey will be 10 meters in width and 50 meters long. We propose to dig one (1) backhoe trench in each of the two (2) proposed tower base locations approximately 0.6 meters wide, 50 meters long and 1.50 meters deep (~60 in.) Distribution of heavily patinated desert pavement remnants suggest that high-energy erosional and depositional processes have dominated in both tower locations since terminal Pleistocene times (Nials 2013, Kenney 2010). The depth of 1.5 meters is thought to be sufficient to encounter Pleistocene (pre-archaeological) sediments. Should it become apparent during trenching that Pleistocene sediments have not been encountered, the trench will be deepened, if possible due to safety concerns. It is important to note that excavation to depths greater than 1.5 meters require shoring, and in some cases, even with shoring, safety issues may make excavation to depths greater than 1.5 meters unsafe. In this situation, excavations will stop at the depth of 1.5 meters. It is important to realize that sediments not meeting the safety requirements are likely to represent high-energy depositional environments not suitable for *in situ* archaeological preservation.

Trenches will be oriented perpendicular to drainage orientation, and precise trench location within either tower base area will be adjusted by the geoarchaeologist to minimize the effects of natural channel erosion/deposition or historic disturbance. Trench locations will be precisely mapped and included with the report. The Principal Investigator or a geoarchaeologist will be present at all times during trenching operations. Centerline's geoarchaeologist will be present during all trenching activities, including identifying placement of the trenches. Should any archaeological features be encountered near the ends of a trench, the trench would be extended,

if necessary, to allow and ensure complete description, documentation and evaluation of the feature.

At all times, excavation procedures will adhere to Office of Safety and Health Administration (OSHA) safety standards; e.g. depth of trenches, hard hats and safety vests worn by all personnel, and shoring for excavations greater than 1.5 meters in depth. If trenches remain open overnight, safety fencing or warning barricades will be emplaced for safety purposes, per OSHA requirements. Shoring will be required if trenching exceeds 1.5 meters in depth.

The sediments/soils of each vertical profile will be examined in detail by an archaeologist and geomorphologist/geoarchaeologist for the presence of archaeological artifacts or features. In addition, backdirt will be visually examined as each backhoe bucket is emptied. To assist in this visual examination, a shovel will be used to periodically expose additional portions of the sediment. Random shovels-full of backdirt (approximately 1 shovel per 3 backhoe buckets at appropriate stratigraphic levels) will be screened through ¼ inch mesh hardware cloth as a further examination of the sediments. The depositional context of any archaeological materials will be examined in order to determine, insofar as possible, their primary spatial and stratigraphic integrity. Should archaeological manifestations be observed in the trench or backdirt, sediments in that immediate area will be similarly screened to search for additional artifacts. In addition, the trench may be modified to accommodate proper interpretation of artifact concentrations, features, etc. that might be encountered. For example, trenches might be widened or the exact location modified during the trenching process.

A minimum of two representative stratigraphic profiles per trench will be prepared, showing soil/depositional unit boundaries, and locations of any artifacts or archaeological features that may be discovered. Determinations of soil horization, boundaries, texture, structure, etc. will be conducted in the field, and each profile will be described using standard USDA Soil Survey horizon nomenclature and descriptors and Munsell color designations. A drawing of each profile will be made, showing horizons and pertinent aspects of the profile. Profiles will be drawn in locations where artifacts are found, unless they are located in a clearly re-deposited context. In addition, each profile will be photographed and the profile location accurately located on a project map.

If a feature or artifacts should be located during the trenching process, trenching will be immediately stopped and the finds examined by the archaeologist and geoarchaeologist to determine sedimentary context and potential for displacement. This examination could involve troweling, shovel-scraping, screening or modifying the trench. If necessary, hand-excavated trenches or 1 X 1 meter units will be placed appropriately in order to interpret the archaeological find to aid in the determination if it is intact. If an intact feature or potential archaeological site is confirmed by the archaeologist and geoarchaeologist, Mary Barger should be immediately notified. Ms. Barger or Mr. Nials will immediately notify the BLM Renewable Energy

Coordination Office Archaeologist and BLM Palm Springs Field Office Archaeologist of any identified features or sites. Work will not proceed until directed by the BLM.

Once BLM has authorized the work to proceed, the backhoe may be used to extend the trench or excavate a bisecting trench into the surrounding area by removing overburden to the level of the find in order to facilitate locating additional features, artifacts or site boundary. Upon excavation to the proper level, hand-excavated 1 X 1 meter units will be placed and backdirt screened. If no additional features or artifacts are encountered within 3 horizontal meters, excavation will be discontinued.

Archaeological features (sites) will be described in detail, including preparation of a plan view map and profile. Isolated artifacts will not be collected but will be provenienced, recorded and described. Any diagnostic artifact will be drawn and photographed. Should intact features be observed, artifacts may be collected from the features to ensure accurate and complete identification. Because of the nature of proposed construction disturbance, intact features will be entirely excavated. Half of the feature will be excavated and a profile drawn of the feature's stratigraphy, followed by exaction of the remaining half of the feature. All site or feature excavation will be completed by hand-troweling or shovel-scraping in 10cm levels until sterile sediments are encountered. If necessary, excavation may exceed backhoe trench depth, upon taking proper safety measures. Any features will have samples collected for paleobotanical analysis, faunal analysis and flotation. If any charcoal is encountered, collections will be made for radiocarbon (C14) dating. All sediments within a site will be screened through ¼ inch mesh, except sediments in features, which will be screened through a 1/8 inch mesh. All features and diagnostic artifacts will be drawn and photographed. Any subsurface artifacts associated with a feature (site) will be provenienced, collected, analyzed and submitted for curation at a facility approved by the BLM Palm Springs Field Office as described in the ARPA permit along with all photographs, field notes and reports.

The report describing the results of the trenching effort will include an evaluation of any sites for inclusion in the NRHP and the CRHR.

If human remains are encountered, all activities will stop and Ms. Barger or Mr. Nials will be notified by cell phone who will then contact the Riverside County Coroner by telephone and the BLM Archaeologist by telephone and e-mail. An area within 10 meters of that find will be taped off for exclusion but work can continue in other areas of the trench. BLM will be responsible for the Native American Graves Protection and Repatriation Act (NAGPRA) notification procedures to the tribes of interest.

Trenches will be backfilled after completion of stratigraphic analysis, examination of trench sidewalls for archaeological content, and any necessary archaeological analysis. Barring unforeseen circumstances, it is estimated that each trench will be open for a maximum of one 8-10 hr. period, during daylight hours. No shoring will be necessary to fulfill OSHA safety

requirements unless it becomes necessary to excavate deeper than 1.5m. An OSHA-qualified competent person must be in the field during excavation processes.

## **5. Update of the Built Environment**

This will become an addendum (as a separate report) to the previous two AECOM reports, Historic Architecture Field Survey Report for the Proposed Palen Solar Project Riverside County, California and Addendum I (Meiser 2009, 2010). BLM has requested a built environment survey for a 15-mile radius from PSEGS. This report will only add onto previous work that was done and will include the town of Desert Center and anything else within a 15-mile radius of the project. The procedures followed in the 2009 report will be followed for this field work and reporting. A map shall be included showing the boundaries of the previous records search as well as areas field checked for the 2009 and 2010 projects. The map will include any new resources recorded as a result of this effort. Resources identified from the Desert Harvest and Desert Sunlight projects shall be used and evaluated. In addition, include a search of the Lake Tamarisk area for early historic features.

## **6. Ethnographic Literature Review**

### **a) Methodology**

The contractor shall do a literature search for documents and information relating to the ethnographic use of the project area up to a 15-mile radius. Documents that have been completed by BLM for nearby projects (such as Rio Mesa and McCoy), and by the CEC for other nearby solar projects will be reviewed and information incorporated, where appropriate. Any ethnographic assessments or Traditional Cultural Property studies that have been conducted in or around the project area should be reviewed for resources of tribal interest in the project area, which includes a 15-mile radius around the project. A records search at the Eastern Information Center for all prehistoric linear sites will be completed. Additional resources to be searched include the 17 items on the CEC list from Data Request 30 (Attachment 2). Any locations of religious or cultural interest to the tribes should be included in the report. Copies of all site records will be provided as well as a list, in ascending order, of all site records retrieved. All prehistoric trails or other linear features will be shown on maps at a scale where their locations are clear (where possible). A shape file of linear sites will be completed for this effort. The site records and the linear sites shape files will be included as a confidential appendix.

A separate report will be completed for the ethnographic literature review. This report should discuss: what resources were searched, date(s) of searches (if facilities were visited), identify significant tribal values, list locations evaluated for eligibility in the NRHP, a summary of information found for this project and whether it is within the viewshed of the project or within the footprint of any project features, and draw any features, trails or locations of interest on a map to be included in the report. This report will be considered sensitive, and not to be shared except by the approval of BLM.

## **7. Evaluation of Indirect Effects of the Two PSEGS Power Towers**

This evaluation will be to determine the indirect effects for known historic properties (found during the updated Class I survey) as well as known TCPs or sites of tribal interest up to a 15-mileradius. A list of locations to be evaluated will be identified by Mary Barger prior to the field/written evaluation. One source for the evaluation includes the Key Observation Points (KOPs) completed for the project. KOP locations have been established for a number of points of interest to the tribes. The other source for this analysis will be to look at NRHP or CRHR-eligible sites located within the viewshed and evaluating what makes the site eligible with whether or not the PSEGS project will affect those criteria from visual, auditory or atmospheric changes. This should also be done for any known eligible historic resources, e.g. DTC sites. The primary focus of this evaluation will be looking at the criteria under which any NRHP and CRHR-eligible sites would be affected by the project. The use of KOPs may assist this evaluation for visual effects.

### **a) Methodology**

This evaluation will focus on indirect visual, auditory and atmospheric effects of the project, discussing the effects from any known archaeological and built environment resources that are eligible for, or included in, the NRHP and CRHR. This report will discuss the potential effects of the project on the criteria that make the sites eligible and if the visual, auditory and atmospheric effects from the project may affect that eligibility criteria. Use of the KOPs may provide a baseline to discuss visual effects. Only sites within two miles of the project should be considered for auditory.

Personnel conducting the evaluations need to have some experience in this process.

### **G) Deliverables**

Tasks 1-3 will be combined in one report. A separate report will be completed for Task 4 (Subsurface testing), Task 6 (Ethnographic literature review) and for Task 7 (Evaluation of indirect effects). Preliminary draft reports will be submitted to Mary Barger, for review and comment. Once comments are incorporated, the report will be submitted to the BLM and the CEC within 5 calendar days of receipt of comments from Ms. Barger. If a site is discovered and excavated during subsurface testing, a letter report will be due in 30 calendar days and the due date for the preliminary report for that task will be extended to 90 calendar days. The BLM archaeologist and CEC staff will review the document and provide any comments to Mary Barger and the cultural resources consultant. Once comments are received, a final draft will be due within 15workingdays. The contractor may submit individual sections or subsections for review to hasten the final review process and to provide data to the appropriate agencies in an expedient fashion. The final report will be distributed by the BLM to all Consulting Parties to the Agreement.

## **Report 1**

This report, which includes the Class I, Class II, and Class III surveys shall include an abstract and sections for the following: 1) summary of previous work done for the project; 2) a discussion of the methodology and results of the Class I survey; 3) a discussion of the Class III survey methodology and results of the new Class III survey; 4) a discussion of the methodology and results of the Class II survey; and 5) a discussion of methodology and results of updating of previously documented archaeological sites. The report shall include: overview photographs of the project area, a sample of photographs showing project areas that were surveyed, maps showing the location of newly recorded sites and isolates as well as previously recorded sites. If BLM has additional report requirements from the fieldwork authorization, they should also be met. Follow the standards for reporting from the BLM 8100 Manual.

## **Report 2**

The report for Task 4, subsurface testing, will be separate. It will include an abstract, discussion of methodology, discussion of what was expected according to the Nials (2013) report and what was found, profile drawings and photographs, description of sediments, photographs of the trenching effort and a discussion of Pleistocene/Holocene stratigraphy to the extent possible. If an intact site is discovered, the report will also include a description of any artifacts or sites, description of the effort to recover the site, description of excavation efforts, description of any artifacts, samples, and the results of any analyses. Photographs and plan drawings of all excavation units will be included.

## **Report 3**

The report for Task 5, update of the built environment up to a 15-mile radius, will be a separate report as an addendum to the work done for Palen Solar Project (Meiser 2009, 2010). This report will follow the same outline as previous reports, including photographs and maps of buildings and structures, including Desert Center.

## **Report 4**

The report for Task 6, the ethnographic literature review, shall include an abstract, a discussion of methodology, locations and sources that were checked, a map of what was found showing the project area, and a list of ethnographic resources identified. This will be considered a sensitive document, not for public distribution. Site forms and site location maps will be included in a confidential appendix.

## **Report 5**

The report for Task 7, the evaluation of indirect effects for the solar power towers, shall include an abstract, a discussion of methodology, a discussion of points of interest including KOPs, map(s) showing the viewshed for the solar power towers to a 15-mile radius, map(s) showing

locations of KOPs, a discussion of the visual effects from each KOP using guidance from the BLM Visual Resource Management program and a discussion of any NRHP listed or eligible resources within the 15-mile APE and potential project effects to the criteria that make these sites eligible. Photographs from each KOP should be incorporated into the report.

Weekly status reports and preliminary letter reports may be submitted to Mary Barger, the BLM and/or the CEC as necessary for any of the above tasks. Status reports may be verbal.

#### **D) Discovery of Human Remains**

If human remains and/or cultural items, as defined by NAGPRA, are encountered on BLM lands, all activities will stop and Ms. Barger or Mr. Nials will be immediately notified by cell phone by the Field Supervisor, who will then contact the Riverside County Coroner by telephone and the BLM archaeologist by telephone and e-mail. An area within 10 meters of that find will be taped off for exclusion. The BLM would then implement internal procedures for complying with NAGPRA.

Similarly, if human remains and/or cultural items, as defined by NAGPRA, are encountered, on NPS lands, all activities will stop and Ms. Barger or Mr. Nials will be immediately notified by cell phone by the Field Supervisor, who will then contact the Riverside County Coroner by telephone and the NPS archaeologist by telephone and e-mail. An area within 10 meters of that find will be taped off for exclusion. The NPS would then implement internal procedures for complying with NAGPRA.

#### **E) Health and Safety**

In performing the work required by this work plan, the contractor shall comply with all applicable Federal, State, or local safety, health, or industrial safety codes, including the latest effective standards promulgated by the Secretary of Labor for the Department of Labor and Health Administration, Safety and Health Standards (29 CFR 1910). If there is a conflict between the requirements of the applicable Federal, State, or local safety, health, or industrial safety codes, the more stringent requirements shall prevail.

Hand-outs describing precautions to be taken for dehydration, heat-related dangers, and other safety concerns related to working in a desert environment will be distributed to all crew. A safety meeting will be held at the beginning of each work week to go over safety concerns. Field gear will include proper foot attire and clothing. Each crew will have at least one cell phone in case of an emergency. Water will be provided and available for each crew. Each crew chief will have emergency phone numbers for the local hospital. Crews will check in before leaving for the field and when they return from the field. Each crew member will have medical information on file.

#### **F) Personnel and Qualifications**

Centerline contact personnel are Mary Barger (archaeologist) and Fred Nials (geoarchaeologist).

The Principal Investigator and the Field Supervisor will meet the Secretary of Interior's standards (below). At least one of them will be in the field with crews at all times for oversight. They will be listed on the BLM field work authorization and the NPS research permit.

An archaeologist with knowledge of DTC-related artifacts and other historic artifacts will be a member of each crew.

An architectural historian will be in charge of all work related to the built environment.

An individual with experience researching ethnographic literature shall be involved in the ethnographic literature review.

A crew chief may be assigned to each survey crew who will be responsible for completing forms and taking field notes. The crew chief will report to the Field Supervisor.

Field inventory and testing shall be carried out by or under the direct supervision of a person or persons meeting at a minimum, the *Secretary of the Interior's Professional Qualifications Standards* for archaeology, history, or architectural history, as appropriate (48 FR. 44739).

### **G) Conferences and Meetings**

Within one week of contract award, a teleconference meeting will be held. Topics will include security, safety, special access requirements, answering any questions and critical scheduling requirements. Additional meetings, if needed, may be called on short notice by Mary Barger, BLM or the CEC staff as needed, these will be held at a mutually agreeable time and place.

At least one field visit of newly recorded sites or re-visited sites may be necessary.

### **H) Schedule**

The Class I survey tasks are expected to commence about June 1, 2013. Field surveys for archaeological sites and the built environment will commence about mid to late June, 2013. Work related to the indirect effects and the ethnographic literature review can start at the same time as the Class I surveys (June 1, 2013). The subsurface testing will commence within 2 weeks of receiving the BLM ARPA permit. A draft report for the Class I, II, and III surveys will be submitted within 30 calendar days of completion of field work. The draft reports for the built environment, the ethnographic literature review, and evaluation of indirect effects will be submitted within 30 calendar days of completion of field work. The draft report for the subsurface testing will be submitted within 30 days of completion of field work if no archaeological sites are found. If archaeological sites are found, a letter report will be due within 30 calendar days; and the draft report will be due calendar 90 days after completion of field work.

## I. References

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## **ATTACHMENT 1**

### Research Issues and Themes

EXCERPTED IN ITS ENTIREITY FROM: Tennyson, M., 2010, Cultural Resources Class III Report for the Proposed Palen Solar Project, Riverside County, California, pp. 72-75. Prepared for Palen Solar I, LLC. AECOM, San Diego.

## RESEARCH ISSUES AND THEMES

Research issues in the Colorado Desert region include questions that relate to both prehistoric and historic archaeological sites. Research issues can be categorized into research themes designed to answer questions about the past. Questions relevant to the region can be addressed by identification and analysis of cultural resources. Site types listed above can be assigned to various themes that may be used to answer questions about the use and development of the PSPP over time.

### Prehistoric Research Themes

#### Chronology

Chronology building continues to be a major research emphasis in the Colorado Desert. Most of

The known sites are surface sites consisting of lithic artifacts and ceramics. Stratified sites of any kind are very rare in the region as a whole (Cleland and Apple 2003; Schaefer 1994b). The general concentration of populations within the lower river valleys has meant that the majority of sites with intact, datable deposits have been removed from the archaeological record by fluvial action. Thus, various factors have conspired to hinder the development of an adequate culture chronology in the region. In view of this, one of the most important aspects of a prehistoric research program for the Colorado Desert should be to aid in the refinement of the regional chronological framework. Any site that contains organic cultural remains suitable for radiocarbon dating could prove useful in this endeavor. Beyond this general observation, key chronometric topics that might be addressed include (1) the reliability of regional dating methods, (2) issues regarding the earliest phases of human occupation of the region, (3) problems related to the Archaic period occupation, and (4) refinements of the regional ceramic sequence. Additional areas of research include lithic technology, site formation processes, and trade and travel.

Site types that may be associated with this theme include lithic scatters with temporally diagnostic projectile points, ceramic scatters and pot drops, and habitation sites.

#### Prehistoric Settlement

The PSPP is located in an area that has been categorized as containing highly mobile populations

into the Late Prehistoric period (Singer 1984). Archaeological research in the Colorado Desert has not fully answered questions regarding early occupation and adaptations to unstable lacustrine environments (Schaefer 1994b). Archaeological sites along prehistoric shorelines in the Mojave Desert to the north show evidence of a wide

resource procurement strategy that included both small and large game, indicating that a range of habitats was utilized (Sutton et al. 2007:237).

Studies of lacustrine environments in the Colorado Desert have mostly focused on Lake Cahuilla in the Coachella Valley beginning with Rogers (1945). Wilke's (1978) archaeological excavations helped to confirm that the late Holocene saw a sequence of inundations at Lake Cahuilla. Working primarily around the northern end of the lake, Wilke focused largely on settlement and subsistence issues. He concluded that lake-stands were of sufficient duration and that the lacustrine environment was sufficiently productive to support year-round habitation of residential sites.

However, evidence by Weide (1974) indicated that Lake Cahuilla filled and receded rapidly. As such, the viability of permanent shoreline settlements was called into question. Weide suggested that inland spring-fed streams provided more reliable and stable resources than shorelines could. Augmenting the argument, Weide and Barker (1974:106--107) suggested that the wide fluctuations of Lake Cahuilla prove to be too unstable to support permanent habitation or large population shifts. Rather, small, seasonal camps were the only habitation sites possible along prehistoric shorelines.

This debate has fueled research across the Colorado Desert in subsequent years. Research orientations surrounding lacustrine environments are primarily focused on establishing sustainable population sizes within sites. This proves a challenging task because of the considerable variables involved, including site size, midden thickness/depth, artifact density, artifact variability, presence of multiple cremations or cremation grounds, presence of ceremonial artifacts, and other signs of sustained presence at a residential base for hunter-gatherer societies (Schaefer 1994b:69).

Other aspects of lacustrine environments in the Colorado Desert are particularly relevant to the PSPP. Namely, areas where alluvial fans come abruptly down on to shorelines are likely to have more densely concentrated site clusters. Research has indicated that shallow midden deposits exist at these sites (Schaefer 1994b:70). The alluvial fan descending from the Chuckwalla Mountains toward the Palen playa may fit this physiologic characterization. Subsurface midden or charcoal associated with hearth features or temporary campsites may contribute new information to the chronology of the Colorado Desert.

Sites in the PSPP that may relate to this theme include lithic scatters and flaking stations, ceramic scatters and pot drops, habitation sites, cleared circles, rock rings, cremations and human remains, and groundstone tools.

## Lithic Technology

The ways that hunter-gatherers chose to organize the procurement, manufacture, and discard of

flaked stone tools varies in relationship to several factors, including the relative availability and quality of toolstone within their territorial range, intended tool functions, the frequency and nature of residential moves, organization of work groups, and division of labor (e.g., Bamforth 1990; Beck et al. 2002; Eerkens et al. 2007; Kelly 1988). Hence, the recording of lithic technology can be useful in addressing more general questions regarding territoriality, mobility, settlement patterns, and down-the-line exchange. For example, highly mobile peoples may "gear up" when they encounter knappable toolstone (Kelly and Todd 1988). In doing so, they discard curated tools, often from distant sources. Changes in toolstone procurement behavior may be reflective of intensified subsistence procurement within more restricted territories and/or changes in the scheduling and directionality of seasonal subsistence-related residential mobility.

Because of high transport costs, groundstone tools are often cached or left in situ in places to which mobile groups intend to return though, high costs of groundstone transport may have been reduced by river transport (Schneider 2006). Because of this cost, these tool types may be good indications of a location of relatively frequent and/or long-term use. Groundstone procurement patterns have been studied along the lower Colorado River (Huckell 1986; Schneider 2006). The Bullhead City quarry, approximately 100 miles north of the PSPP on the Colorado River, produced a material variously referred to as alkali-olivine basalt or andesite used in the manufacture of metates (Schneider 2006). Huckell (1986) and Schneider (2006) both document Bullhead City (aka Big Bend) quarry. Huckell notes that the quarry appears to have been utilized by the Mohave for a period of a few hundred years (1986:55). Huckell further argues that the specialized nature and geographic range of metates is indicative of production and exchange of groundstone tools rather than simple procurement for personal use (1986:56).

Site types that may relate to this theme include lithic scatters, flaking stations, and groundstone tools.

## Historic Research Themes

Previous cultural surveys indicate that historic period resources are present in lower frequency than prehistoric resources. Not surprisingly, as a result, previous research efforts have similarly focused on prehistory, leaving historic period research questions relatively underdeveloped. From the inventory work that has been accomplished in the region, it appears that the following themes are most relevant to the PSPP: transportation, mining, agriculture/ranching, and military training activities.

Today, the main route through the Chuckwalla Valley is I-10. According to historic topographic maps, Chuckwalla Valley Road (Highway 60/70) was the main road through the valley. In addition to established roads, numerous unpaved routes are present throughout the Colorado Desert. Two-track roads, unimproved roads, and graded dirt roads often are the remnants of early wagon or automobile routes.

Material culture associated with early routes is evident on the landscape as well. Historic debris from early travel across the desert is evident in the form of cans or other refuse associated with vehicle maintenance. Oftentimes,

debris associated with early automobile use is found adjacent to modern roadways, which may indicate the age and historic use of the route through time.

Though large-scale mining was not a major endeavor in the Chuckwalla Valley or surrounding mountains, evidence of mining activities is still visible on the landscape. Remnants of prospect mining for various raw materials and claim posts with historic cans or jars may indicate that prospecting has taken place. Likewise, historic cairns may also indicate mining activities. Other signs include prospect pits, tailings, and debris located near a cairn or claim post.

Historic references indicate that mining took place in the region well into the 20th century. Identifying mining activities, no matter the scale, informs the past development of the Project area and the region as a whole.

California's agricultural economy boomed with the advent of the Gold Rush and further developed in the late 19th century with the passage of the Homestead Act in 1862 and the Desert Land Act of 1877. Passage of these acts allowed agriculture to develop in the Palo Verde Valley to the east. Agricultural development did not develop near the Project area, despite numerous Desert Land Entries filed in the PSPP. As agriculture and farming required larger tracts of land in order to achieve success, homesteading became marginalized over time. Though agriculture and ranching never became major industries near the PSPP before later in the 20th century (see Chapter 2), early attempts at agriculture and ranching may still be evident on the surface.

Lastly, one of the most significant research issues surrounds the area's use as a military training facility. The history of the DTC has been well documented (see Bischoff 2000; Henley 1992; Meller 1946) though the material culture of the base is not well defined in all areas. The DTC was the largest military training facility ever operated and physical evidence of its use is visible throughout the region. Various activities may be identified due to the material remains of the DTC. One of the starkest pieces of evidence of DTC activities are tank tracks that have survived for decades. Just as prehistoric trails feature tamped surfaces from use over time, tank tracks leave a semipermanent mark on the land.

WWII -related military activity was not the only military presence in the PSPP in the past. Subsequent to Patton and the DTC, Operation Desert Strike (discussed in Chapter 2 above) encompassed portions of the current PSPP. Based on maps of the maneuver area, the PSPP was not a part of the active exercise. A water source was located near the PSPP, though it was not located in the Project area (Desert Strike n.d.).

Debris from military activities is also evident on the surface. While tin cans tend to have wide dates of manufacture, other aspects, such as opening method, can date to very specific points in time. Tin cans are often overlooked in terms of their potential to yield information about a site, especially when artifacts like bottles are more easily dated. This can lead to archaeologists ignoring or not giving proper attention to their details (Busch 1981:102). However, proper identification and documentation of cans as one of several lines of evidence have the potential to narrow the range of historic archaeological sites.

## **ATTACHMENT 2**

California Energy Commission's Data Request 30

**PALEN SOLAR ELECTRIC GENERATING SYSTEM (09-AFC-7C)  
DATA REQUESTS – SET 2**

between the Los Angeles Basin and the Phoenix Basin. Along this east-west axis, many north-south trending connector trails crossed or merged with the more prominent east-west trail system. Trails likely provided transportation routes from the north through Clarks Pass or Pinto Basin Pass, Granite Pass, and Palen Pass. From the south, likely routes would have included the Corn Springs Canyon, Graham Pass, and various avenues through and from the south of the Mule Mountains. Likely routes would have also linked places of water that might have included Buzzard Spring, Hayfield Summit Spring, Corn Spring, Chuckwalla Spring, Mule Tank, McCoy Spring, and Tank Spring. Beyond these two trail predictors, passes and water sources, trails connected travelers to seasonal camping places, hunting and gathering areas, lithic quarry sources, and ceremonial places. Staff needs to know trail locations in order to assess project effects to remnant segments, and to derive a predictive basis for the identification of sites, places, and areas that may be associated with those segments and on which project effects may also need to be assessed.

**DATA REQUESTS**

29. Please conduct a records search at the Eastern Information Center for all prehistoric linear sites recorded in the new PAA described above or modified in response to these data requests. Please copy, convert to PDF, and provide staff with electronic copies of all site records. Please also include a list, in ascending order, of all site records retrieved.
30. Please conduct an ethnographic, ethnological, ethno-historical literature search, which includes the use of historic maps, for prehistoric and ethnographic linear features in the new PAA described above or modified in response to these data requests. Some sources that may have relevant trail information are provided here<sup>3</sup>, but they should not be treated as an exhaustive compilation. Please provide PDF copies of pertinent sections of documents that provide information on trail locations in the new PAA described above or modified in response to these data requests. Please provide staff with a bibliography of all sources retrieved.

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<sup>3</sup> BLM GLO maps  
Alderson 1976  
Apple 2005  
Bean et al. 2004  
Bean and Toenjas 2012  
Cleland 2004  
Davis 1961  
Johnston 1980  
Johnston and Johnston 1957  
Laird 1976  
Lyneis et al. 1980  
McCarthy (Appendix c) in Carrico and Gallegos 1982  
McCarthy 1993  
Roth 1977  
Sample 1950  
von till Warren et al. 1980  
von till Warren 1981

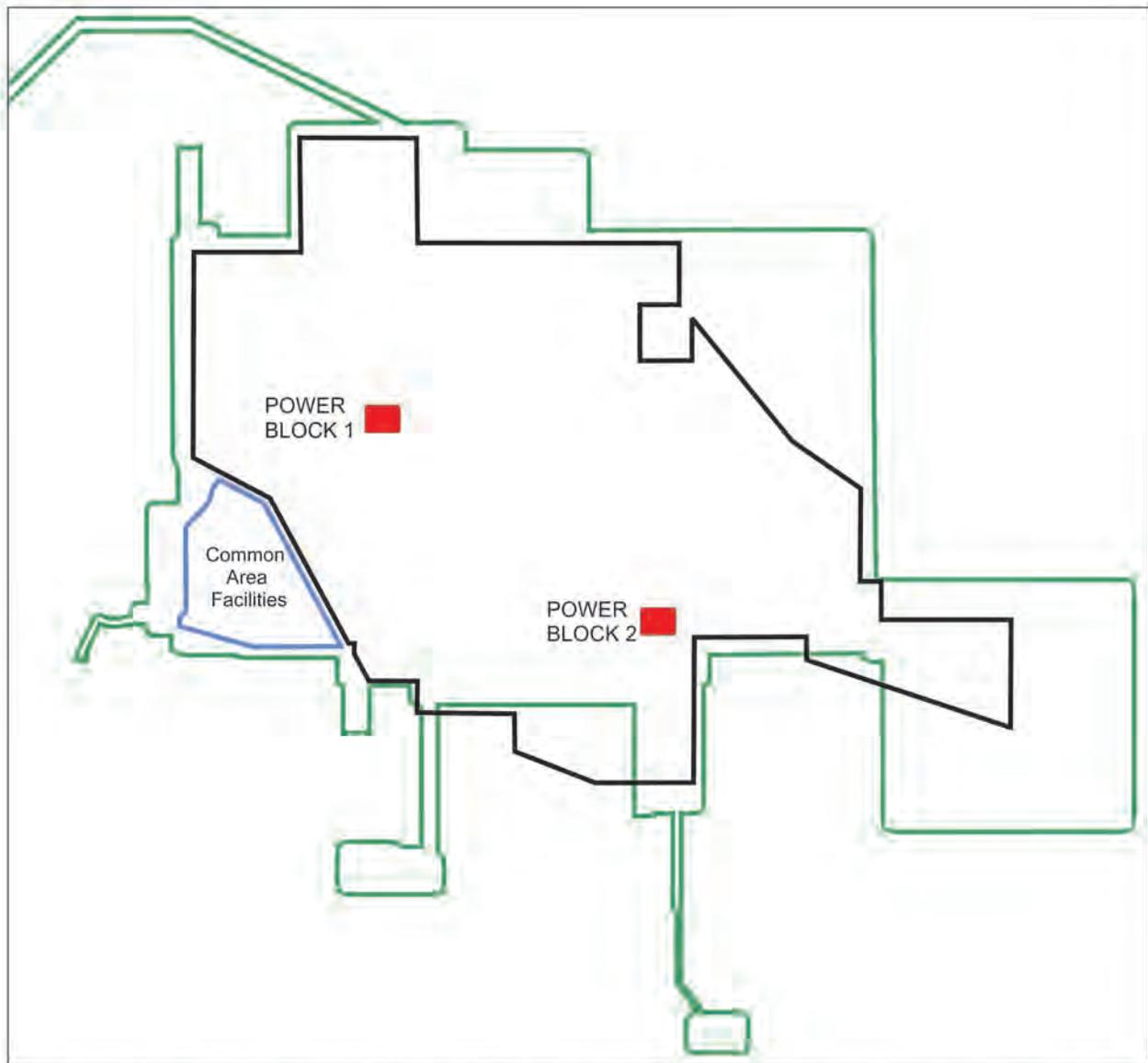


Figure 1. Map showing revised PSEGS footprint (black line) and previously surveyed area (green line). Tower bases are included within Power Blocks 1 and 2, but are too small to be shown at this scale. Backhoe trenching for archaeological purposes will be conducted in each of the tower bases (see text)

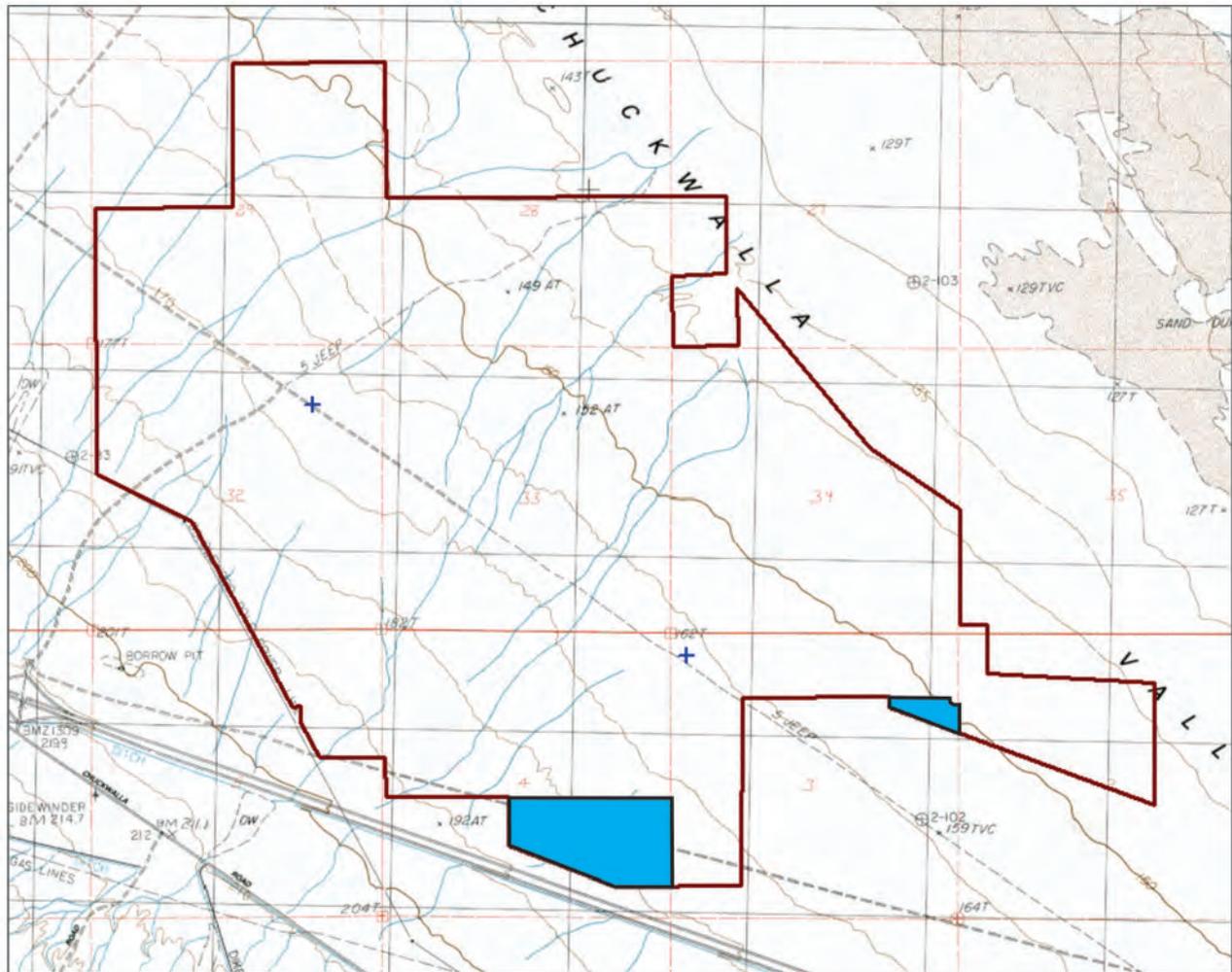


Figure 2. Map of revised PSEGS footprint area showing areas not previously surveyed for archaeology (in blue). These areas are designated for Class III archaeological surveys. Topographic map base is USGS 7.5' Sidewinder Well Quadrangle.

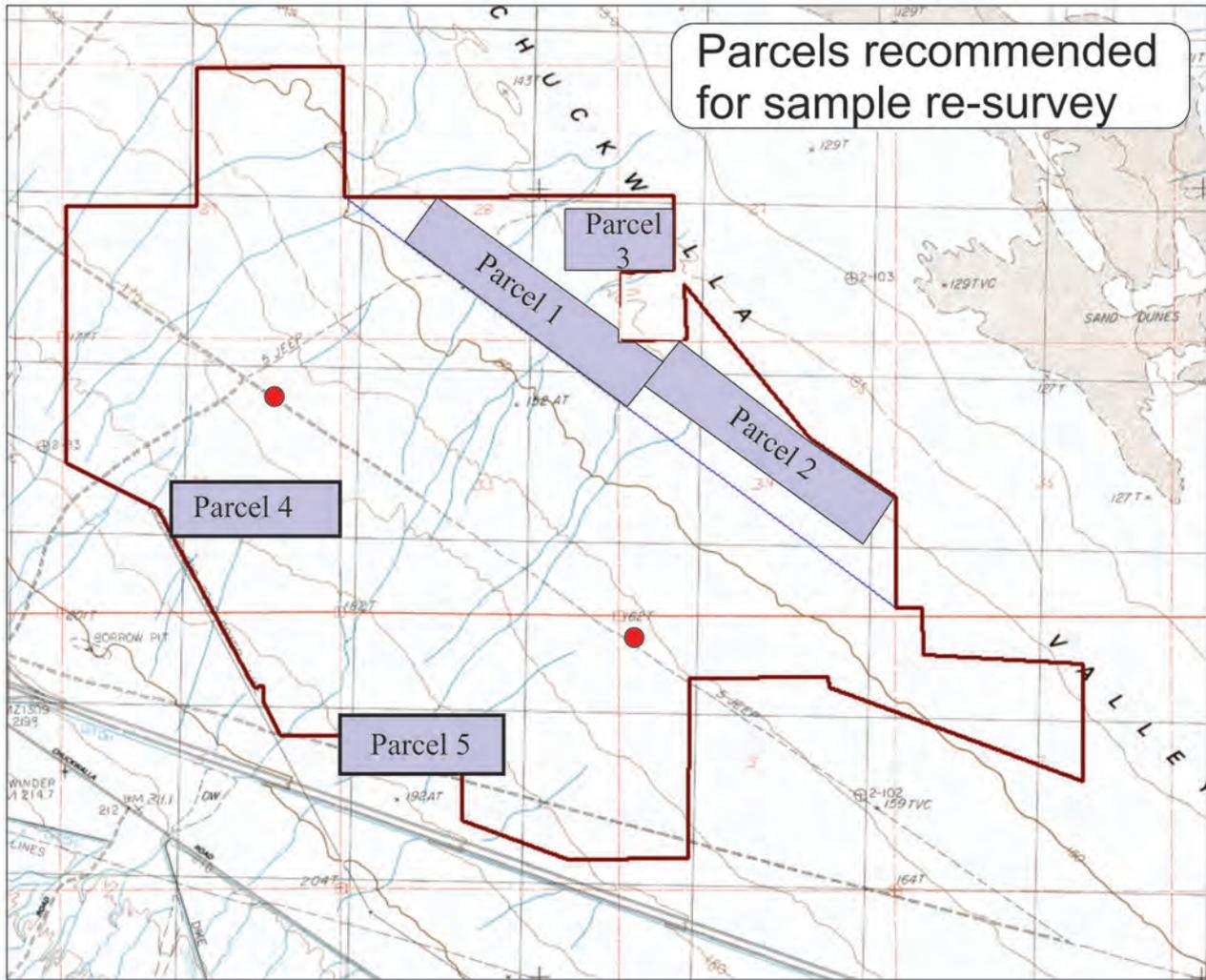


Figure 3. Map of revised PSEGS footprint showing area recommended for Class II archaeological survey (yellow area- approximately 525 ac.). Parcels 1, 2, and 3 encompass approximately 347 acres, and will be 100% surveyed at 30-meter intervals oriented with the long axis of the parcel (approximately perpendicular to natural drainage lines). Two additional 80-acre parcels within the footprint area will be 100% re-surveyed at 30-meter intervals oriented parallel to the long axis of each parcel. The total area that will be completely resurveyed encompasses approximately 685 acres. The three parcels encompass approximately 347 acres. Red circles show approximate location of proposed power towers. Topographic map base is USGS 7.5' Sidewinder Well Quadrangle.

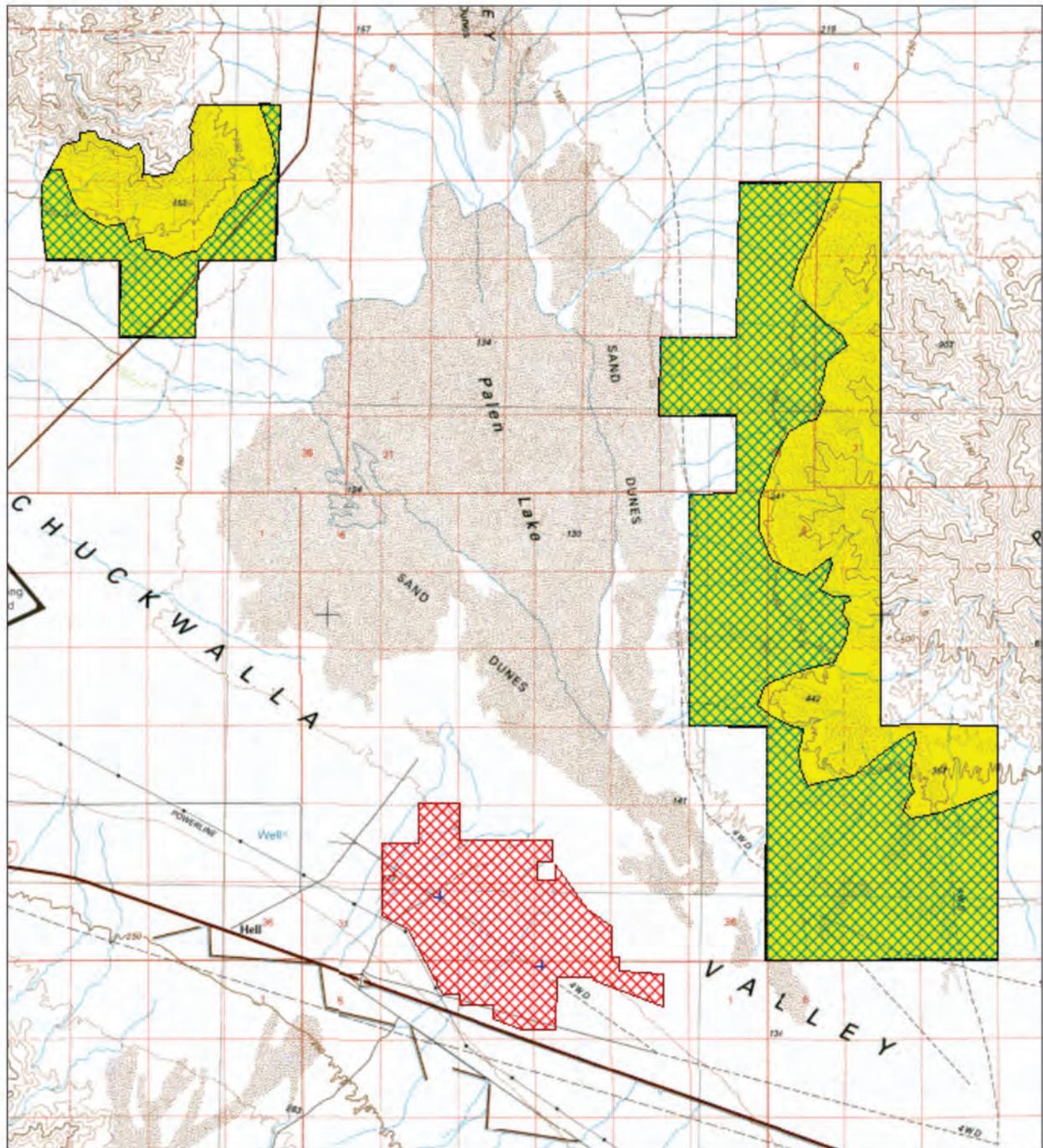


Figure 4. Map showing PSEGS footprint (red pattern) and requested additional reconnaissance archaeological survey areas (yellow) in the Palen Mountains and Coxcomb Mountains. Green pattern in reconnaissance survey areas depict those portions of alluvial fans and bajadas that are visible from one or both power towers in the footprint. Total area in the Palen Mountains is approximately 16,035 acres, visible fan and bajada area is about 10,325 acres. Total area for reconnaissance survey in the Coxcomb Mountains is approximately 3,770 acres and visible fan and bajada areas encompass about 1,740 acres.

**ATTACHMENT DR 37-1**  
**PREVIOUS VISUAL SIMULATION DATA**





















NOTE  
VILLAGE  
435512



NOTE  
VILLAGE  
435512













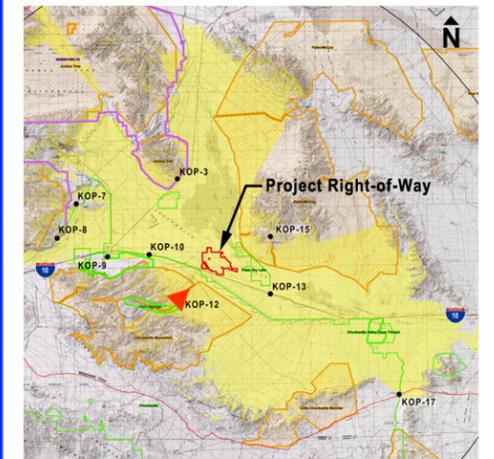


**ATTACHMENT DR 39-1**  
**ADDITIONAL VISUAL SIMULATIONS**



**KOP-12: Chuckwalla Mtn**  
(WA; BLM Land)  
**Existing Condition**

**KOP Location Map:**



**Legend:**

-  Key Observation Point
-  All Key Observation Points
-  Project Right-of-Way

**Photography Data:**

Time of photograph: 6:28 PM  
Date of Photograph: 4/11/2013  
Camera Lens: 50 mm  
Weather Condition: Clear  
Viewing Direction: 45° N.E.  
Viewing Elevation: 1140 ft

**GPS Coordinates:**

33°38'29.492"N 115°16'30.076"W

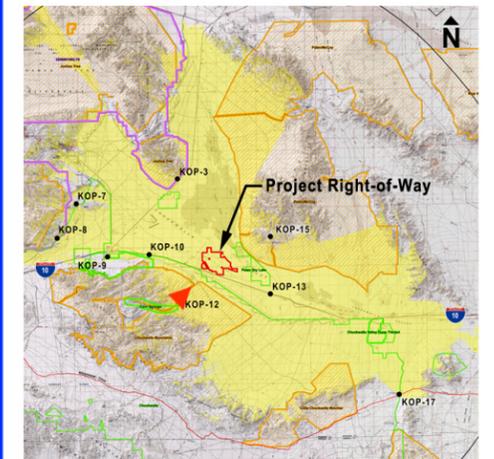
May: 2013 Palen Solar  
Electric Generating System

**3DSCAPE**



**KOP-12: Chuckwalla Mtn**  
(WA; BLM Land)  
**Proposed Condition**

**KOP Location Map:**



**Legend:**

-  Key Observation Point
-  All Key Observation Points
-  Project Right-of-Way

**Photography Data:**

Time of photograph: 6:28 PM  
Date of Photograph: 4/11/2013  
Camera Lens: 50 mm  
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Viewing Direction: 45° N.E.  
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**GPS Coordinates:**

33°38'29.492"N 115°16'30.076"W

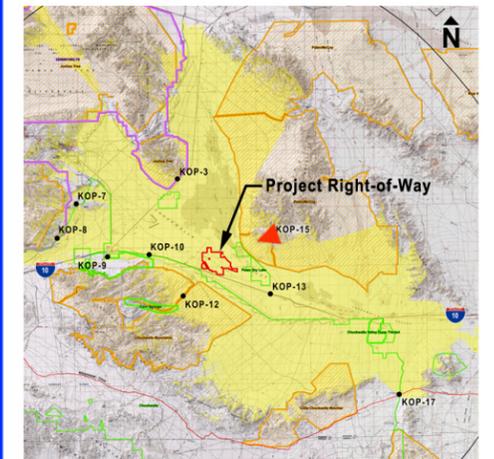
May: 2013 Palen Solar  
Electric Generating System

**3DSCAPE**



**KOP-15: Palen/McCoy WA**  
(BLM Land)  
**Existing Condition**

**KOP Location Map:**



**Legend:**

-  Key Observation Point
-  All Key Observation Points
-  Project Right-of-Way

**Photography Data:**

Time of photograph: 12:35 PM  
Date of Photograph: 12/15/2009  
Camera Lens: 35 mm  
Weather Condition: Partly Cloudy  
Viewing Direction: 251° S.W.  
Viewing Elevation: 1,502 ft

**GPS Coordinates:**

33°43'38.6"N 115°07'53.1"W

*(Photo data provided by AECOM)*

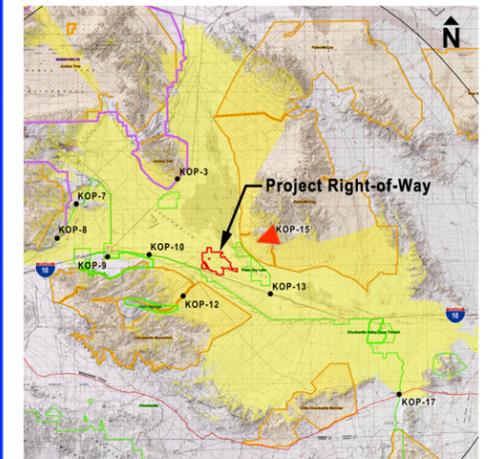
May: 2013 Palen Solar  
Electric Generating System

**3DSCAPE**



**KOP-15: Palen/McCoy WA**  
(BLM Land)  
**Proposed Condition**

**KOP Location Map:**



**Legend:**

-  Key Observation Point
-  All Key Observation Points
-  Project Right-of-Way

**Photography Data:**

Time of photograph: 12:35 PM  
Date of Photograph: 12/15/2009  
Camera Lens: 35 mm  
Weather Condition: Partly Cloudy  
Viewing Direction: 251° S.W.  
Viewing Elevation: 1,502 ft

**GPS Coordinates:**

33°43'38.6"N 115°07'53.1"W

*(Photo data provided by AECOM)*

May: 2013 Palen Solar  
Electric Generating System

**3DSCAPE**



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT  
COMMISSION OF THE STATE OF CALIFORNIA  
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**PALEN SOLAR ELECTRIC  
GENERATING SYSTEM AMENDMENT**

**Docket No. 09-AFC-7C  
PROOF OF SERVICE  
(Revised 05/16/2013)**

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1516 Ninth Street, MS-4  
Sacramento, CA 95814-5512  
docket@energy.ca.gov

\*Indicates change

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Member

Kenneth Celli  
Hearing Adviser

Galen Lemei  
Adviser to Presiding Member

Jennifer Nelson  
Adviser to Presiding Member

\*Gabe Taylor  
Adviser to Associate Member

Eileen Allen  
Commissioners' Technical  
Adviser for Facility Siting

**DECLARATION OF SERVICE**

I, Marie Fleming, declare that on May 20, 2013, I served and filed copies of the attached **PALEN SOLAR HOLDINGS, LLC'S RESPONSE TO CEC STAFF DATA REQUEST SET 2 (19-39)**, dated May 20, 2013. This document is accompanied by the most recent Proof of Service, which I copied from the web page for this project at: <http://www.energy.ca.gov/sitingcases/palen/compliance/>.

The document has been sent to the other persons on the Service List above in the following manner:

**(Check one)**

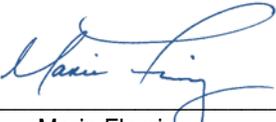
**For service to all other parties and filing with the Docket Unit at the Energy Commission:**

I e-mailed the document to all e-mail addresses on the Service List above and personally delivered it or deposited it in the U.S. mail with first class postage to those parties noted above as "hard copy required";  
**OR**

Instead of e-mailing the document, I personally delivered it or deposited it in the U.S. mail with first class postage to all of the persons on the Service List for whom a mailing address is given.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am over the age of 18 years.

Dated: May 20, 2013

  
\_\_\_\_\_  
Marie Fleming