

CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET
SACRAMENTO, CA 95814-5512
www.energy.ca.gov

DOCKET**11-AFC-4**

DATE FEB 27 2012

RECD. FEB 27 2012



February 27, 2012

Todd Stewart, Senior Director of Project Development
BrightSource Energy, Inc.
1999 Harrison Street, Ste. 2150
Oakland, CA 94612

**RE: RIO MESA SOLAR ELECTRIC GENERATING FACILITY (11-AFC-4)
DATA REQUESTS, SET 1B (Nos. 85- 154) AND AMENDED DATA REQUEST
SET 1A (No. 44)**

Mr. Stewart:

Pursuant to Title 20, California Code of Regulations, Section 1716, the California Energy Commission staff seeks the information specified in the enclosed data requests. The information requested is necessary to: 1) more fully understand the project and alternatives, 2) assess whether the facility will be constructed and operated in compliance with applicable regulations, 3) assess whether the project will result in significant environmental impacts, 4) assess whether the facilities will be constructed and operated in a safe, efficient and reliable manner, and 5) assess potential mitigation measures.

This set of data requests (Nos. 85 - 154) is being made in the areas of Alternatives (Nos. 85 - 90), Cultural Resources (Nos. 91 - 125), Paleontological Resources (Nos. 126 - 130), Soil and Water Resources (Nos. 131 - 142), Traffic and Transportation (Nos. 143 - 147), and Visual Resources (Nos. 148 - 154). Additionally, this correspondence includes a revision to data request No. 44 related to Biological Resources. Written responses to the enclosed data requests are due to the Energy Commission staff on or before March 28 2012.

If you are unable to provide the information requested, need additional time, or object to providing the requested information, you must send a written notice to both the Committee and me within 20 days of receipt of this notice. The notification must contain the reasons for not providing the information, the need for additional time, or the grounds for any objections (see Title 20, California Code of Regulations, Sec.1716 (f)). If you have any questions, please call me at (916) 651-3765 or email me at pmartine@energy.ca.gov.

Sincerely,

Pierre Martinez, AICP
Project Manager

PROOF OF SERVICE (REVISED 2/13/12) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 2/27/12
EKS

cc: Docket (11-AFC-4)
Proof of Service List

Technical Area: Alternatives
Author: Christina Snow

BACKGROUND:

Subsection 6.5.2, “Central Tower Concentrating Solar Power with Integral Thermal Storage,” in the Application for Certification (AFC), briefly describes an alternative solar power tower project with integral thermal storage. The analysis states that the use of integral thermal storage was not selected due to its higher cost and that it would not meet the applicant’s objective of using their proprietary technology.

Staff notes that several articles published on Web sites since the AFC was filed in October 2011 indicate that BrightSource Energy is proposing the addition of thermal energy storage capability to its solar thermal power plants planned at two California sites in “Siberia and Sonoran West” (see the November Bloomberg and December EarthTechling articles referenced below). A recent press release from BrightSource Energy describes how adding storage to its power tower projects will provide utilities with “cost-competitive, reliable, and dispatchable clean power that meets peak demand”.

According to statements by a representative from Southern California Edison (SCE) in an article recently published by Bloomberg’s online business and financial information Web site, adding molten-salt storage at the BrightSource Energy facilities discussed above may improve energy production by 30 percent and allow the plants to have smaller footprints and use fewer materials.

Online sources, including the BrightSource Energy press release, indicate that adding molten-salt energy storage to these projects will require amending the power purchase agreements with SCE. In addition, information obtained from BrightSource’s website (http://www.brightsourceenergy.com/technology/how_lpt_works) indicates that adding the SolarPLUS storage component to plants provides benefits including:

- Extending the production of electricity into later parts of the day and after the sun sets when it is most valued by utilities.
- Reducing the cost of renewable power for utilities’ customers by increasing a plant’s capacity factor and offering higher efficiencies than competing solar thermal power plants.
- Providing utilities with greater operational flexibility to shape production to meet changing utility customer demand.
- Offering utilities and grid operators additional operational and market value, by providing balancing and shaping capabilities, as well as ancillary services to support a reliable grid.

Applicable information recently published on Web sites and reviewed by staff includes these sources:

- <http://www.earthtechling.com/2011/08/brightsource-adding-molten-salt-solar-storage/>
- http://www.brightsourceenergy.com/images/uploads/press_releases/BSE_SCE_PPA_Storage_112811_FINAL.pdf
- <http://www.forbes.com/sites/toddwoody/2011/11/28/brightsource-strikes-worlds-biggest-solar-energy-storage-deal/>
- <http://www.bloomberg.com/news/2011-11-29/edison-brightsource-power-contracts-changed-to-use-storage.html>
- <http://www.earthtechling.com/2011/12/molten-salt-storage-coming-to-california/>

DATA REQUEST

85. Please provide a more detailed discussion and updated analysis of the feasibility of adding energy storage capabilities to the proposed Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) project. Please include the following:
- a. Information on new and modified equipment and processes to add molten-salt or other energy storage to the project. Discuss known or potential alterations to the project configuration and changes to requisite number of heliostats. Also include a detailed discussion of any increase in cost such alterations might add to the project and whether these costs would be offset by increased availability of electricity resulting from storage.
 - b. Information on the expected benefits of adding storage capabilities to the project. Include potential benefits pertaining to improved efficiency and capacity, reduced energy costs, smaller site footprint, increased flexibility, and other potential benefits. Include information comparing the benefits of the proposed Rio Mesa SEGF project to potential benefits of a project that is altered to include storage.
 - c. Information comparing the environmental effects of the proposed Rio Mesa SEGF project as opposed to a project that includes storage capabilities. Discuss in detail how altering the project configuration, reducing the project footprint, or changing project operations could affect the level of impacts on environmental resources, including potential impacts relating to water use, air quality, sensitive plant and animal species and habitats, cultural resources, and visual resources.
 - d. A detailed discussion of the extent to which a project with storage capabilities would or would not satisfy each of the stated project objectives compared to the proposed Rio Mesa SEGF project.
 - e. A detailed discussion of why adding salt storage to the Rio Mesa SEGF project was eliminated as a viable alternative when it is now being considered in two other BrightSource projects.

BACKGROUND:

Subsection 6.5.1, “Other Solar Thermal Technologies”, briefly describes other solar thermal technologies such as solar trough, Stirling engines and compact linear Fresnel reflectors and concludes that these technologies were eliminated due to cost. Staff has reviewed information regarding various technologies and has found the following with regard to the viability of other alternative technologies.

- Stirling Energy Systems has filed for bankruptcy and therefore would likely preclude this as a potential alternative technology.
- A recent report published by the National Renewable Energy Laboratory indicates that parabolic trough technology is comparable to power tower systems with regard to costs. Additional information was obtained regarding parabolic troughs and their reliability and are identified as follows:
 - “Current and Future Costs for Parabolic Trough and Power Tower Systems in the US Market”. Craig Turchi and Mark Mehos, *National Renewable Energy Laboratory* and Clifford K. Ho and Gregory J. Kolb, *Sandia National Laboratories*, 2010. (<http://www.nrel.gov/docs/fy11osti/49303.pdf>)
 - <http://www.solarthermalmagazine.com/2010/11/04/commercial-solar-thermal-parabolic-trough-collectors-pass-the-20-year-reliability-tests/>
 - “Executive Summary: Assessment of Parabolic Trough and Power Tower Solar Technology Cost and Performance Forecasts”. *Sargent & Lundy LLC Consulting Group, Chicago, Illinois*, 2003. (<http://www.nrel.gov/csp/pdfs/35060.pdf>)
 - “White Paper to California Energy Commission on Assessment of Concentrated Solar Power”. David Barlev, Ruxandra Vidu, Pieter Stroeve. *California Solar Energy Collaborative, University of California Davis*.
 - “Concentrating Solar Power (CSP)” PowerPoint presentation. *Craig Turchi, PhD*, April 22, 2010. (http://www.energy.ca.gov/33by2020/documents/2010-04-22_meeting/presentations/Solar_Technology_Presentation_by_NREL.pdf)

DATA REQUEST

86. Please provide additional information on the technological feasibility of a parabolic trough alternative, including the following:
- a. Information and details documenting the conclusion that a parabolic trough system is less efficient than the proposed Rio Mesa SEGF project. Please expand the discussion of efficiency to address energy conversion, land use, water use, and operating and maintenance costs. Compare the expected efficiencies of the proposed Rio Mesa SEGF project to an alternative using a parabolic trough technology. Include specific data on the net generating capacity, in megawatts, for a parabolic trough alternative at the proposed Rio Mesa SEGF project site (i.e., assuming the same project acreage).
 - b. Information on the feasibility of adding energy storage capabilities to an alternative using a parabolic trough technology.

- c. Details on the potential impacts of a parabolic trough project relating to worker safety, fire protection, and environmental hazards.
- d. In addition to the information requested under 86.c, above, provide information comparing the environmental effects of the proposed Rio Mesa SEGF project to an alternative using a parabolic trough technology. Discuss in detail how operation of a parabolic trough project could change the level of impacts on environmental resources, including potential impacts on birds, bats, and eagles. Address the magnitude of impacts on visual resources, including a discussion of the difference between a parabolic trough project and a solar power tower project. Compare impacts relating to glint and glare. Include discussions of how changing the project configuration and operations could affect the level of impacts on other environmental resources, including potential impacts on other sensitive biological species and habitats, water supply and use, air quality, cultural resources, and soils.
- e. Information on the extent to which a project using a parabolic trough technology, with and without storage, would satisfy the stated project objectives compared to the proposed Rio Mesa SEGF project.

BACKGROUND:

Subsection 6.5.3, “Solar Photovoltaic Technology,” briefly describes the solar photovoltaic (PV) power plant system and concludes that the technology was not selected because of its “inherent technical limitations, chiefly, intermittency, which at the desired scale poses significant challenges to grid system stability.” Staff requires additional information to compare the proposed Rio Mesa SEGF project to an alternative using PV technology.

DATA REQUESTS

- 87. Please provide additional information on the technological feasibility of a PV alternative, including the following:
 - a. Information on how the location of a PV project relative to load centers alters the effect of intermittency on the system.
 - b. Data on the net generating capacity, in megawatts, for a PV alternative at the proposed Rio Mesa SEGF project site (i.e., assuming the same project acreage) and provide information as to the types of PV solar cells used in the calculation (e.g. Monocrystalline or Polycrystalline Silicon, thin film, etc.).
 - c. Information on the costs and benefits of incorporating energy storage into a PV project to improve the project’s dispatchability and address intermittency.
 - d. Information comparing the environmental effects of the proposed Rio Mesa SEGF project to a PV alternative. Provide details on differences in required water usage for the two technologies. Discuss in detail how operation of a PV project could change the level of impacts on other resources, including potential impacts on birds, bats, and eagles. Address the magnitude of impacts on visual resources, including differences between a PV project and

a solar power tower project. Compare impacts relating to glint and glare, including the impacts of heliostats compared to PV panels. Include discussions of how changing the project configuration and operations could affect the level of impacts on other environmental resources, including potential impacts on other sensitive biological species and habitats, air quality, cultural resources, and soils. In addition, please provide the type of PV cells that were used in this comparison (e.g. Monocrystalline or Polycrystalline Silicon, thin film, etc.).

- e. Information on the extent to which a PV project would satisfy the stated project objectives compared to the proposed Rio Mesa SEGF project.

BACKGROUND:

Subsection 6.3.3, “Environmental Impact Analysis of the On-Site Alternatives”, provides information on the three on-site alternatives. These include the preferred alternative and the on-site alternatives 2 and 3 that were eliminated from further consideration. Staff requires additional information with regard to the on-site alternatives in order to adequately analyze the on-site alternatives that were eliminated.

DATA REQUESTS

88. Please provide the additional acreage of washes, wetlands, and jurisdictional waters (Waters of the U.S. and State of California) that would be directly impacted by the on-site alternative 2 in comparison to the preferred alternative direct impacts.
89. Please provide the acreage of wetlands and jurisdictional waters (Waters of the U.S. and State of California) that would be impacted by the on-site alternative 3 given the reduced footprint.
90. For comparison purposes, please provide a table showing the acreages of wetlands and jurisdictional waters that would be directly impacted by each on-site alternative, including the preferred.

Technical Area: Cultural Resources
Author: Amber Grady, Thomas Gates, Elizabeth Bagwell, and Michael D. McGuirt

Where the disclosure of information on the location or the character of cultural resources may create a substantial risk of harm, theft, or destruction, such information must be submitted under cover of an application for confidential designation, pursuant to Title 20, California Code of Regulations, Section 2505. Data requests are based on the Project Area(s) of Analysis (PAAs). The PAAs identified in this document may not be identical to the Area of Potential Effect (APE) proposed or adopted by the Bureau of Land Management (BLM) for this project.

ANALYTICAL FRAMEWORK

BACKGROUND: PROJECT DESCRIPTION

Specific data on the lateral extent, the height above ground, and the subsurface depth of project components is critical to the establishment of the appropriate framework for an environmental analysis. Based on information provided in Application For Certification (AFC) Sections 1 and 2, and Appendices 2A, 2B, and 2G, staff is unable to discern the anticipated depth to which construction of a number of key project components would disturb the ground. Absent this information, staff has no way to delineate the appropriate subsurface extent of the cultural resources analysis for the proposed project. Such information may also facilitate narrowing the scope of any subsurface investigations that may become necessary.

DATA REQUEST

91. Please identify, with as much detail as the present state of the proposed project's design will permit, where ground disturbance (surface or excavation) would occur on the proposed project site during project construction and operation, including both the overall extent of the area(s) to be disturbed and individual locations of all project components, including the facility buildings, linears, ancillary facilities, parking, roads, and temporary construction parking, laydown, and operational areas. Also, please provide the footprint (length, width, and depth) of any excavations, including foundations and test trenches. For the purposes of staff's cultural resources analysis, it is particularly critical to know the portions of the proposed project area where construction excavation would exceed one meter in depth.
92. Please describe the methodology for insertion of the heliostat pedestals as it appears vibratory techniques may be proposed. Provide proposed mitigation measures that would reduce any potentially significant impacts to cultural resources caused by heliostat pedestal installation.

BACKGROUND: ETHNOGRAPHY

The September 2011 *Cultural Resources Technical Report for the Rio Mesa Solar Electric Generating Facility, Riverside County* (Methods page 4-1) indicated that arrangements are currently being made for the completion of a regional study that would provide an ethnographic contextual overview emphasizing the PAA and vicinity. It

also indicated that the data gathered and results of this ethnographic study would be provided as a supplemental report and would serve as a comparative dataset for the results and findings associated with the current *Cultural Resources Technical Report*.

The information that would be expected to be contained in such a supplemental report and dataset is critical to staff verification of the data presented in the ethnographic portion of the *Cultural Resources Technical Report* and the identification and evaluation of ethnographic resources in the PAA and to avoid duplication of effort by staff during their research and ethnographic analysis for the project.

DATA REQUESTS

93. Please provide a time frame for completion and submission of the referenced regional ethnographic study.
94. Please provide the research design, work plan, and scope of work for the ethnographic study to allow staff to understand the specific geographic areas of analysis. Please identify the specific cultural practices/beliefs, and other resource themes that will frame the study and the subsequent ethnographic report; Native Americans who have or will be interviewed for oral history data; and the archives and related data sets to be gathered for analysis.
95. Please provide a rationale for defining an ethnographic study area (from Desert Center to the Colorado River), as identified for the referenced study, that places the project site at the far eastern side of the study boundary. Tribal ancestral territories and related ethnographic areas in the project vicinity do not end at/or rely upon the Colorado River as a natural boundary between tribes. Instead the river flows in the midst of tribal ethnographic boundaries.

NATURAL AND CULTURAL CONTEXTS

BACKGROUND: GEOARCHAEOLOGY

The primary purpose of studying the geoarchaeology of a proposed project area is to understand the group of landforms that are the physical contexts for the cultural resources there. A geoarchaeology study seeks first to identify and delimit individual landforms. The study then gathers evidence to help figure out the different natural forces that acted to create each landform and when in time those forces acted.

Knowledge of the development and the history of local landforms is critical to the understanding of archaeological deposits in a proposed project area. The knowledge enables one to interpret whether the structure of archaeological deposits exposed on the surface of the ground is the result of past human behavior or of natural forces. The knowledge also provides a factual basis to support whether a particular archaeological deposit may be strictly a surface phenomenon or may include buried components. Knowledge of the geoarchaeology of a proposed project area provides the further benefit of helping to discern which landforms may contain buried archaeological deposits that are not presently evident on the surface and how old such buried deposits may be. A reasonably thorough understanding of the geoarchaeology of an area leads

to a better informed analysis of the potential effects that a proposed project may have on cultural resources.

The *Geoarchaeological Assessment* (Assessment) in the September 2011 *Cultural Resources Technical Report for the Rio Mesa Electric Generating Facility, Riverside County, California* provides useful preliminary research into the physical contexts that bear the archaeological deposits in the proposed project area. The Assessment provides a relatively coarse resolution perspective on project area landforms derived from extant literature on the geology, geomorphology, and hydrology of the region. It largely uses three sources to construct the basic geologic and geomorphic frameworks for the proposed project area (Bull 1991, Metzger et al. 1973, and Stone 2006). The primary source that the applicant uses to inform the development of a landform map for the area is a relatively recent geologic study of the northern portion of it (Stone 2006). The applicant extrapolates this information to the south across the proposed project area and supports the extrapolation with what appears to have been a field reconnaissance. The field reconnaissance had multiple functions. It sought to:

- a. verify and refine the basic geologic units mapped by Stone, and the applicant's own extrapolation of those units to the south;
- b. refine the approximate ages of the landforms that had been correlated in the Assessment with landforms that other researchers had observed in the region (Bull 1991 and Metzger et al. 1973);
- c. establish a framework of relative ages among the landforms in the proposed project area; and
- d. assess the relative sensitivity of the different geologic units for buried archaeological deposits on the basis of soil profiles and other physical indicators of landform age and processual development.

The resultant assessment reflects this field effort and serves as a useful initial sketch of the geoarchaeology of the proposed project area.

Energy Commission staff requests that the applicant use the assessment as the point of departure to develop a higher resolution perspective on the group of landforms that are the subject of that document. The primary focus of the new phase of geoarchaeological research should be the excavation and exposure of representative landform profiles for those portions of the project area where the sedimentary deposits are of an age, and are the result of depositional regimes, where the potential presence of buried archaeological deposits could not be ruled out, and where the construction and operation of the proposed project would disturb native ground to a depth of greater than one meter. These excavations would provide the type of data that the applicant acknowledges is presently in short supply due to the very limited number of natural exposures in the proposed project area (pp. 2-8 and 2-9, *Geoarchaeological Assessment*). First-hand observational data on the stratigraphy of pertinent landforms would help to:

- a. verify the geologic correlations that have been made in the Assessment;

- b. assess whether those units are relatively synchronous or time-transgressive;
- c. establish and refine the age of the lithostratigraphic and pedostratigraphic units that compose the landforms; and
- d. establish the lateral variation in the depositional energy responsible for the development of each landform.

The applicant's research design for this work, and the report of its results, should, minimally:

- a. relay the physical descriptions of the geologic units from the literature sources with which the proposed project area's geologic units have been and would be correlated, so that staff would have an objective basis to assess the veracity of those correlations;
- b. describe and provide the rationale for any field methodology that the applicant uses to generate new datasets; and
- c. provide robust physical descriptions of the lithostratigraphic and pedostratigraphic units which the applicant finds to compose the excavated landforms.

Staff needs the applicant to develop the additional data that would be the result of this new field effort, data that the assessment does not and was not meant to provide, in order to more securely establish the physical contexts of the surface archaeological sites in the proposed project area, and to reliably assess both the likelihood that project area landforms may contain buried archaeological deposits and the likely character of any such deposits.

DATA REQUESTS

- 96. Staff could not find the figures for the Geoarchaeological Assessment (Assessment) section in the electronic copy of the September 2011 Cultural Resources Technical Report for the Rio Mesa Solar Electric Generating Facility, Riverside County, California submitted to the Energy Commission. Please provide four hard copies of the referenced technical report, including all referenced figures.
- 97. Please prepare, for staff review and approval, a research design for the subsurface investigation of landforms in the PAA, any portions of which may date from the terminal Pleistocene through the Holocene epochs (ca. 16,000 years ago to the present). The multiple research objectives of the investigation should include the refinement of the geographic definitions of the landforms that compose the proposed project area, and reconstructions of the processual and historical geomorphology of each constituent landform. The reconstructions would facilitate both the definition of the lateral variation in the depositional energy responsible for the development of each pertinent landform, and determinations of lateral and vertical variations in the age of the stratigraphic units that compose each landform. The investigation should be broadened beyond the heavy emphasis in the Assessment on the search for paleosols.

Paleosols are convenient stratigraphic markers of past land surfaces, but staff would argue that the quality of archaeological preservation is higher in relatively low energy depositional environments that have high depositional rates, such as mid- to distal fan reaches, than it is at or near the surface of paleosols where archaeological deposits are intrinsically subject to hundreds or thousands of years of mechanical weathering.

The research design must include, among other elements:

- a. detailed descriptions for the landforms and geologic units that the Assessment cites as correlates of the landforms and geologic units in the proposed project area; and
- b. detailed descriptions of the latter landforms and geologic units that also did not appear in the Assessment.

This information will assist staff in assessing the veracity of these tentative correlations and the ascriptions of equivalent age between the correlated landforms and units. The research design must also include:

- c. explicit discussions of the choices of field methodology and the suite of techniques that the project owner would intend to use in the service of any particular methodology;
- d. the size and structure of the subsurface sample that the investigation would employ; and
- e. the proposed suite of attributes for each stratigraphic unit that would be observed and documented.

The scope of the sample should be limited to those areas where the construction and operation of the proposed project would entail the disturbance of natural ground deeper than one meter below the present surface.

98. Implement the approved research design and prepare, for staff review and approval, a report of the research results that includes, at a minimum:
 - a. complete graphic, photographic, and prose presentations of the new data;
 - b. refinements of the processual and historical geomorphology of the portions of each constituent landform sampled by the new investigation; and
 - c. the refinement of the preliminary analysis in the Assessment of the portions of landforms that may contain buried archaeological deposits, and the potential age, type, and relative density of such deposits.

BACKGROUND: HISTORICAL CONTEXT

The sparse distribution of resources critical to human life in the Mojave Desert has had a major role in shaping the patterns of the historic use of the desert from the Spanish Colonial through the American eras. Historic-era resources in the project area are associated with mining, irrigation/agriculture, transportation, and energy infrastructure.

The portion of the desert that encompasses the proposed project area is adjacent to the Mule Mountains, an important mining area. The Historic Bradshaw Trail, a National Register Eligible property, runs through the project area. The distribution of both historical archaeological deposits and built-environment resources in and around the proposed project area reflect the influence of these and other similar resources. To properly interpret the cultural resources in the PAA, staff needs to be able to document and establish a relatively complete local context for any historical archaeological deposits and built-environment resources. A map of the known roads, trails, springs, seeps, ranches, way-stations, and other notable foci of historic activity in the vicinity of the proposed project area is essential for staff to contextualize the historic cultural resources in the PAA and provide a detailed discussion of those historical events/activities. This information is critical for the cumulative analysis as well.

DATA REQUESTS

99. Please provide a map at a scale of at least 1:24,000 and sufficient to show the project area and the adjacent vicinity. Label places and historic features including, but not limited to, the Bradshaw Trail; the Mule Mountains Mining District; Hodges Mine; Opal Hill Mine; the powerplant(s), substation(s) and transmission lines associated with the Parker and Davis Dams; and any other places or historic features that are important in the history of the project area and vicinity. For the Hodges and Opal Hill mines, please include any associate features, such as access roads and structures.
100. Please provide a more detailed discussion of the history of the area as it relates to the types of resources (e.g., mining, irrigation/agriculture, transportation, and energy infrastructure) found on and in the vicinity of the project site. Include a discussion of types and locations of features associated with these activities, as well as a more comprehensive list and discussion of resources beyond the project site that are associated with these activities to allow a better understanding of the context and interrelationship of these resources. Please provide any photos or figures that would help to illustrate how the resources on the project site relate to those outside of the project site.
101. There are mining roads on or adjacent to the project site, but no clear picture has been provided concerning their relationship, if any, to the larger Mule Mountains Mining District (District). The District is only mentioned in passing in the Department of Parks and Recreation (DPR) 523 forms provided with the AFC and is not addressed at all in the September 2011 Cultural Resources Technical Report. Please provide a discussion of the Mule Mountains Mining District, along with a map or maps showing the locations of the mines and major roads and other associated features.

BACKGROUND: ETHNOGRAPHIC CONTEXT

AFC page 2-25, Section 2.6.4 states “consultations with Native American tribal members were used to reconstruct the ethnogeography of each group’s territory...”. On page 5.3-103, Section 5.3.3.9, Native American Contacts and Coordination, it is stated that 7 responses were provided, three were written and four were telephone messages. A summary of those communications is provided in Appendix 5.3A.

However, that summary does not substantiate the previous referenced assertion that consultations with tribal members were held to determine ethnogeographic parameters. Staff is conducting outreach activities with tribes or individuals who have been identified by the Native American Heritage Commission (NAHC) as representatives of local Native American communities who may have knowledge and/or concerns about cultural resources in the proposed project area and vicinity, and would like to avoid duplicating information requests placed upon the tribes.

DATA REQUEST

102. Please provide specific information that characterizes the nature and substance of consultation with tribal representatives as it related to the ethnogeographic parameters of the project area.

BACKGROUND: ARCHIVAL RESEARCH

The Cultural Resources Technical Report (page 2-51) indicates that 46 investigations were previously conducted within the study area and these were reviewed to identify known resources on the project site and vicinity and provide background information for the overall setting/context of the area. Some of these reports were not included in the Appendices. Staff needs these reports to properly interpret the cultural resources in the PAA, verify information provided from those documents, and to have a complete Administrative Record under CEQA.

DATA REQUESTS

103. Please explain the absence of or provide the following reports missing from Appendix F:

- RI-00160 – Archaeological Resources Survey – West Coast – Mid-Continent Pipeline Project, Long Beach to Colorado River prepared by Greenwood and Associates (1977).
- RI-01022 - Archaeological Examination of the Sundesert Nuclear Plant Site, Final Report prepared by Imperial Valley College Museum (1975)
- RI-02481 – An Archaeological Inventory and Evaluation of the Pebble Terraces in Riverside County, California prepared by the BLM (1989)
- RI-06999 – A Class III Cultural Resource Inventory, and Evaluation for the Coachella Canal, Lining Project: Prehistoric and Historic, Sites Along the Northeastern Shore of, Ancient Lake Cahuilla, Imperial and Riverside Counties, California prepared by ASM Affiliates, Inc. (2003)
- RI-07204 – Overview and Cultural Resources Survey for the De Anza Natural Gas Pipeline prepared by KEA Environmental, Inc.
- RI-07348 – Overview and Cultural Resources Survey for the De Anza Natural Gas Pipeline prepared by KEA Environmental, Inc.
- RI-07349 – Chocolate Mountains Aerial Gunnery Range: Cultural Resources Survey of 12 Targets and Monitoring of 14 Archaeological Sites prepared by EDAW, Inc. (2005)

- 103(a) Since a number of these reports indicate that "[L]ocational data was not available from EIC" (Table 2.8-1, page 2-54), please explain how they were included in the records search or reviewed by the applicant.
104. Please provide report RI-05520 (Draft Southern California Gas Company Natural Gas Transmission Line 6902 Project, Riverside and Imperial Counties, CA, The Bradshaw Trail: Recommendation for National Register Eligibility prepared by LSA Associates, Inc. in 1993). It is directly relevant as it includes the evaluation of Bradshaw Trail which traverses the project site.
105. Please provide Survey Report RI-06707 (Cultural Resources Survey of Alternative Routes within California for the proposed Devers-Palo Verde 2 Transmission Project prepared by ICF Jones & Stokes in 2008). Only the DPR forms were provided.
106. Regarding Table 2.8-1, Report RI-08410 – Please provide the correct report or correct Table 2.8-1 to reflect the report actually provided in Appendix F under that number.
107. Regarding Table 2.8-1, Report RI-08411 – The date in Table 2.8-1 does not match the report in Appendix F. Please provide the correct report or correct Table 2.8-1 to reflect the report actually provided in Appendix F under that number.
108. Regarding Appendix F, Volume 5 – The coversheet for RI-06186 says "RI-06168." Please provide the correct report or correct the cover sheet to reflect the report actually provided in Appendix F under that number.
109. Appendix F includes multiple copies of some of the DPRs contained in the records search (e.g., CA-RIV-1095). Please provide a revised Appendix F. Remove any duplicate DPRs and confirm all DPRs obtained during the records search were included in Appendix F of the Cultural Resources Technical Report.
110. The bibliography is incomplete; many parenthetical citations referenced throughout the report are not contained in the bibliography. Please review the completeness and accuracy of the bibliography and provide a revised bibliography.
111. Please provide the National Register Evaluation of the Blythe-Knob 161kV Transmission Line that was prepared by Kurt Schweigert of Associated Cultural Resource Experts under contract with Western Area Power Administration. Several DPRs from the early 2000s note that it is being prepared.
112. Please provide the following reports. Staff has determined that they are necessary in preparing the Ethnographic portion of our analysis.
- a. Report RI-00991 - Persistence and Power: A Study of Native American Peoples in the Sonoran Desert and the Devers-Palo Verde High Voltage Transmission Line prepared by Cultural Systems Research, Inc. in 1978).

- b. RI-01038 – An Aboriginal Trail Complex in the Big Maria, McCoy and Mule Mountains of the Central Colorado Desert prepared by William D. Alderson (1977).
- c. RI-01300 – Mule Mountains – Area of Critical Environmental Concern – Management Plan prepared by the BLM (1981).
- d. Riverside County Integrated Project: Existing Setting Report prepared by LSA Associates, Inc. in 2000.

EFFORTS TO IDENTIFY CULTURAL RESOURCES

BACKGROUND: EFFORTS TO IDENTIFY ARCHAEOLOGICAL AND BUILT-ENVIRONMENT RESOURCES

The information contained in the AFC; the Cultural Resources Assessment Report for the Rio Mesa Solar Electric Generating Facility, Riverside County, California; and the DPR 523 series forms is inadequate for staff to adequately analyze cultural resources in the PAA, determine their historical significance, and identify any project-related impacts to those resources. It contains multiple cases of absent, incomplete, and contradictory information, and inconsistent information on the eligibility of the resource. For archaeological resources, the information provided is not sufficient for staff to clearly identify and analyze the archaeological deposits and resources in the study area, understand the prehistoric and historic land use behaviors that the deposits represent, or identify the geomorphic contexts for the resources so as to evaluate the probability of buried site components. For built environment resources, the information provided is not sufficient for staff to clearly identify and analyze the archaeological deposits and resources in the study area, understand the prehistoric and historic land use behaviors that the deposits represent, or identify the geomorphic contexts for the resources so as to evaluate the probability of buried site components.

This information is necessary for staff to assess the adequacy of the pedestrian survey of the proposed project area; determine whether a determination of historical significance can be made based on the information provided, and whether evaluation phase fieldwork may be warranted. This information will become the basis, at least in part, for staff's determinations as to whether additional pedestrian survey work and fieldwork to better document resource-specific geomorphic contexts may be needed to determine the historical significance, and for staff to develop the exact roster of archaeological resources on which evaluation phase excavation may be required.

DATA REQUESTS

- 113. Please provide a U.S. Geological Survey quadrangle map at a scale of 1:24,000, depicting the locations of all previously known and newly identified cultural resources, with separate overlays of prehistoric and historic resources, compiled during the course of the applicant's efforts to construct a cultural resources inventory for the proposed project area. For historic resources, please distinguish WWII era resources from other historic resources. The historic components of multi-component sites should be included.

114. Please review the completeness and accuracy of all URS prepared DPR 523 forms in the PAA, correct any absent data or incorrect data, and correct all discrepancies for each resource identified in the cultural resources section of the AFC, the technical report, and the DPR 523 forms applicable to this project. Staff found that basic information was frequently missing from the forms, such as location, owner, a photo of the site or feature, date ranges for each site, and a sketch map or equivalent GIS map. In addition, citations in the text were often not included in the bibliography. In particular, the significance recommendations were unclear and unsupported, and in some cases inconsistent between the AFC and the Technical Report. Please provide corrected versions of all DPR forms requiring clarification or further information and a brief summary of the corrections made.
115. Table 5-1 – many of the site designations and descriptions are incorrect. For example, many multi-component sites with both prehistoric and historic components lack the “/H” notation. Please review the completeness and accuracy of all of the information provided in Table 5-1, make any necessary corrections, and provide a revised table that includes a column that notes the NRHP/CRHR criteria for recommended eligibility of the resource.
116. Please provide a list of all of the NRHP, CRHR, Arizona Register of Historical Places (ARHP), and locally-listed historic resources for a 10-mile radius around the project boundary. Also provide a map depicting the location of these resources in relation to the project site and major project elements, such as the power towers.

BACKGROUND

Many of the plants and animals that exist within the project site and the broader PAA have ethnobotanical and ethnozoological uses and significance to Native American tribes, beyond the normal consideration of population viability and biological perspective.

DATA REQUESTS

117. Please provide an ethnobotanical and ethnozoological analysis of the plants and animals within the PAA.
118. Assess project impacts to traditional and current access to and use of plants and animals located within the PAA and identified as central to Native American cultural and spiritual practices, including project impacts that would substantially minimize tribal members' abilities to maintain their cultural practices (including intergenerational knowledge transmission) as they relate to the identified plant and animal populations.

BACKGROUND: INDIGENOUS TRAILS

Indigenous trails, systematically understood, are a key resource type that underpins the broad context for understanding the relationship of various identified Native American cultural resources and provides a strong predictive tool for where additional cultural

resources may be discovered. Some general trail information is provided in the AFC ethnographic section. In addition, numerous site records (11) indicate various segments of trails, with many of the trails defined with associated features. However, there is a lack of connection/analysis of how the general ethnographic trail information links with the archaeological data. In addition, the Quechan Dream Trail, a physical trail, otherwise named the Xam Kwatcan trail, runs through the project area in several locations and is not addressed at all in the AFC, Cultural Resources Technical Report, or other supporting documents provided by the applicant.

The project is in or very near to one of the major crossroads of a regional trail system. Until trail connectivity in the PAA is robustly understood, staff will be unable to determine the potential any segment may have, no matter how damaged or segmented, for contributing information to understanding the local indigenous trail network and how that network is associated with a regional trail system. This information is also critical to staff's analysis of the cumulative impacts of the project on the area's prehistoric trails system.

DATA REQUESTS

119. Please provide a map that only shows trail segments documented in and near the project area with an overlay of the other trails that are shown in various ethnographic sources for the area.
120. Please evaluate all trail segments documented in or near the PAA for Criteria A and D of the California Register of Historical Resources, and revise DPR trail site forms accordingly.
121. Please conduct an aerial photography/remote sensing study as necessary to locate trail segments in the PAA not otherwise evident in pedestrian surveys, using aerial images and historic maps of the area in rectified GIS layers to determine which trails segments are connected to one another. Provide strategic dating of associated trail features along trail segments within the PAA to identify use dates. Trail segments should be identified and mapped by prehistoric, historic, and modern era formation and use. Provide maps and overlays as an element of the resulting report identifying findings and discussion of trail connectivity and significance.
122. Please conduct and provide an expanded record search of trail segments, associated trail features, and petroglyph sites (regardless of proximity to a trail) in a five mile radius of the project boundaries. This data will establish trail trends that will assist staff in determining connectivity to trail segments within the project area.
123. Please provide a clear, consistent, and substantiated discussion of the entire Xam Kwatcan (Quechan Dream) Trail, including a general discussion of setting and integrity, as well as a detailed discussion of integrity for the segments within and adjacent to the PAA or that may be in view of the project infrastructure. In terms of NRHP or CRHR eligibility, integrity is a measure of the degree to which a property retains or is able to convey the significance defined under one of the four eligibility criteria. There is specific guidance in *National Register Bulletin VIII*

– *How to Evaluate the Integrity of a Property*, which outlines the seven aspects of integrity that should be used when assessing the integrity of a resource. As this is a joint document, both NRHP and CRHR evaluations must be completed; therefore, the integrity assessment of resources should discuss all seven aspects as directed by the National Park Service. Specific detailed research should be presented for the length of the trail that parallels the project area and should identify any encroachment onto or immediately adjacent to the trail and any light/glow that may result from the project activities and be visible from the trail. Include any previous documentation or evaluations of the resource. Please complete any evaluations, provide copies of completed DPR 523 forms for the resource, and ensure that it contains a discussion of the significance of the resource under CEQA Section 15064.5(a)(3), (A)(B)(C) & (D). Please evaluate whether the integrity will be significantly impacted by construction of the proposed project such that the significance of the resource will be materially impaired. In addition, please assess impacts to the trail segments that cross the project area and other impacts to Native Americans that utilize the trail, including aesthetic considerations such as, but not solely limited to, visual impacts. All trail research should be closely coordinated with affiliated tribes.

BACKGROUND: EVALUATION OF HISTORICAL SIGNIFICANCE OF BUILT-ENVIRONMENTAL RESOURCES

The historical significance of all of the cultural resources in the proposed PAA needs to be determined or justified before staff can identify the extent of any potential impacts. Based on the AFC and the associated technical report, it is clear that the historical significance of many of the cultural resources, including built-environment resources, identified in the proposed project area is unknown or inadequately substantiated. As previously discussed, many of the potential resources on the project site belong to larger systems or networks with features outside of the proposed project area (e.g., Mule Mountains Mining District). A better understanding of these systems or networks as a whole is needed to adequately evaluate the significance of the segments or portions of these resources that occur on the project site. This information has been requested above in “Historic Context”. Additionally, staff found that some basic information was missing from the DPR forms. Maps and photos were inadequate (e.g., too small, blurry, etc.) to depict the necessary information. Information among the various components (AFC, Technical Report, and DPRs) was contradictory. Basic information, such as location (P2 on DPR523 A), owner and address (P7 on DPR523A), a clear photo of the site or feature, or a sketch map or equivalent GIS map, was frequently missing from the forms. The same map is used on every DPR and the locations of the resources are not legible. In some cases, a larger photo on a Continuation Sheet would be appropriate. In addition, citations in the text were often not included in the bibliography and the technical reports associated with the DPRs were not included. In particular, the significance recommendations were unclear and unsupported and in some cases contradicting between the AFC and the Technical Report. The discussions concerning integrity were incomplete with only two or three aspects being discussed. As stated above, in terms of HRHP or CRHR eligibility, integrity is a measure of the degree to which a property retains or is able to convey the significance defined under one of the four eligibility criteria. As this is a joint document, the integrity assessment of resources should discuss all seven aspects as directed by the

NPS. Any eligibility recommendations must be clear and supported by evidence. Some of the information requested above will trickle down into the evaluations and DPRs as supporting evidence. Additional survey and research may be needed to address the data requests.

DATA REQUESTS

124. Please review the completeness and accuracy of all DPR 523 forms for the built environment sites in the PAA, correct any absent data or incorrect data, correct all discrepancies for each resource identified in the cultural resources section of the AFC and the technical report and provide the revised documents. Also, please provide corrected versions of all the DPR 523 forms and a brief summary of the corrections made.
125. Please provide a clear, consistent, and substantiated recommendation of eligibility for the following resources:
- The entire Bradshaw Trail (RMS-ML-003/CA-RIV-5191), including a general discussion of setting and integrity of the 100+ mile trail, as well as a detailed discussion of integrity for the segment in the PAA.
 - The Pilot Knob to Blythe 161 kV Transmission Line (RMS-ML-001/P-33-011110) as it relates to the system of powerplant(s), substation(s) and transmission lines associated with the Parker and Davis Dams.
 - The Niland to Blythe 161 kV Transmission Line (RMS-ML-002) as it relates to the system of powerplant(s), substation(s) and transmission lines associated with the Parker and Davis Dams.
 - The Open Pit Mines 1 and 2 (RMS-ML-004), Hodges Mine Access Road (RMS-ML-005), and Opal Hill Mine Access Road (RMS-ML-006) as they relate to the Mule Mountain Mining District.
 - SR 78 (RMS-ML-007) as it relates to “larger network of roads and highways throughout the Pal Verde Valley and southeastern California,” as stated in the Technical Report. Include a general discussion of the larger network of roads and highways it is a part of to provide context and a detailed discussion of the history and significance within the context of that larger network. Also provide a detailed discussion of the integrity for the segment of SR 78 in the PAA.
 - The Bradshaw Trail Borrow Pit (RMS-ML-008) as it relates to the mining operations in the Palo Verde Mesa. Include a general discussion of the mining operations in the Palo Verde Mesa to provide context and a detailed discussion of the history and significance of the Bradshaw Trail Borrow Pit within the context of the mining operations in the Palo Verde Mesa.
 - The Hodges Drain (RMS-ML-009) as it relates to the “larger network of drains, canals, pumping stations and gates” in the Palo Verde Irrigation District. Include a general discussion of the history of the Palo Verde Irrigation District and its components to provide context and a detailed discussion of the history and significance of the Hodges Drain within the context of the irrigation district.

- The C-03 Canal (RMS-ML-010), Palo Verde Drain (RMS-ML-011), Estes Drain (RMS-ML-012), and Private Drain #1 (RMS-ML-013) as they relate to the larger Palo Verde Irrigation District. Include a general discussion of the history of the Palo Verde Irrigation District and its components to provide context and a detailed discussion of the history and significance of these resources within the context of the irrigation district.

The discussions of integrity should discuss all seven aspects as outlined in *National Register Bulletin VIII – How to Evaluate the Integrity of a Property*. Include any previous documentation or evaluations of the resources. Please have an architectural historian complete any evaluations, provide copies of completed DPR 523 forms for the resources, and ensure that they contain a discussion of the significance of the resource under CEQA Section 15064.5(a)(3), (A)(B)(C) & (D). Please have the architectural historian evaluate whether the integrity of setting will be significantly impacted by construction of the proposed project such that the significance of the resource(s) will be materially impaired.

REFERENCES

Bull, W.B

1991 Geomorphic Responses to Climate Change. Oxford University Press, New York.

Metzger, D.G., O.J. Loeltz, and Burdge Irelna

1973 Geohydrology of the Parker-Blythe-Cibola Area, Arizona and California. Water Resources of Lower Colorado River-Salton Sea Area. Geological Survey Professional Paper 486-G. U.S. Geological Survey, Menlo Park, California.

Stone, Paul

2006 Geologic Map of the West Half of the Blythe 30' by 60' Quadrangle, Riverside County, California and La Paz County, Arizona. Scientific Investigations Map 2922. U.S. Geological Survey, Menlo Park, California.

Technical Area: Paleontological Resources
Author: Casey Weaver, CEG

BACKGROUND

During the initial study of the site, the project owner's paleontological consultant discovered a previously unknown paleontological resource that, since discovery, has yielded hundreds of vertebrate fossils. The areal extent and thickness of this deposit is unknown. The average density of fossils within this unit is also unknown. In order to address project impacts to this recently discovered resource, its location within and around the project must be determined. It is likely that subsurface excavation will be required to determine the thickness and lateral extent of this deposit. Land surveying may be required to accurately map the extent of the deposit.

DATA REQUESTS

126. Please provide a plan for review and approval that will be used to adequately delineate the recently discovered paleontological resource.
127. Please provide a map at a scale of 1:24,000 that delineates the areal extent of the recently discovered paleontological resource within the project perimeter.
128. Please provide a map at a scale of 1:24,000 that shows the thickness of the recently discovered paleontological resource within the project perimeter.
129. Please describe the density of the fossils throughout the paleontological resource using both the areal extent and thickness of the deposit.

BACKGROUND

The Application for Certification (AFC) indicated the proposed project will consist of several buildings, three large solar collection towers and approximately 255,000 heliostats. The structures and towers will be supported by conventional foundations constructed within earth excavations. The heliostats will be supported by individual cylindrical pedestals inserted into the ground using vibratory techniques.

The AFC indicates that the fossils recently discovered on the project site are classified using the Bureau of Land Management's Potential Fossil Yield Classification system as Class 4a, which is considered to be a high value paleontological resource. This resource has yielded numerous species of Pleistocene age vertebrate fossils.

While the AFC provided proposed mitigation measures related to the discovery of fossils during construction excavations, there was no discussion regarding the potential significant impact to existing paleontological resources caused by heliostat pedestal installation. The insertion of heliostat pedestals using vibratory techniques will not allow the discovery and recovery of in-place fossils. Where encountered by this construction method, the fossils will be destroyed and no scientific value of these resources realized.

DATA REQUEST

130. Please provide an assessment of the potential impacts to paleontological resources caused by heliostat pedestal installation.

Technical Area: Soil and Water Resources
Author: Abdel-Karim Abulaban, P.E., Christopher Dennis, CHG

BACKGROUND

The applicant has entered into an “Agreement for Environmental Review and Option to Lease” agreement with the Metropolitan Water District (MWD) over approximately 6,640 acres owned by MWD. The referenced agreement includes an option to lease a minimum of 4,000 acres of land from MWD for project development, but that lease option cannot be entered into until the California Energy Commission has certified the final environmental document and issued its final decision approving certification of the project (to construct and operate a solar thermal generating facility). The lease terms allow the applicant to extract up to 600 acre-feet per year (AF/y) of groundwater. The terms of the lease also require participation in MWD’s mitigation program for any groundwater extracted which is determined by a jurisdictional agency to be a reduction in the volumetric flow to the Colorado River. The project proposes using onsite wells to extract up to 400 AF/y of groundwater for construction and up to 260 AF/y for plant operation. This groundwater has hydraulic connection to the Colorado River. The Bureau of Reclamation has jurisdiction over water rights and use of water in the Colorado River including underground water that has hydraulic connection to the river. Due to the hydraulic connection of the groundwater to the Colorado River, staff needs to understand if, how, and when another agency with jurisdiction such as the Bureau of Reclamation would exercise its authority and how that would affect the environmental analysis of the proposed project. Staff also needs to know whether the applicant would be required to participate in MWD’s mitigation program and what that would entail so an adequate assessment of project impacts can be completed.

DATA REQUESTS

131. Please identify what other agencies would have jurisdiction over the proposed project water supply other than the Bureau of Reclamation.
132. Please discuss whether any determinations have been made that the proposed water use will or will not result in the need for the applicant to participate in MWD’s Mitigation Program, or whether any are anticipated.
133. Should the project be required to participate in the MWD mitigation program, please provide a detailed description of the MWD mitigation program. The description should include but not be limited to the following:
 - a. How the ‘accounting surface rule’ would be used as the threshold for application of MWD’s mitigation requirements.
 - b. How water pumped from above the ‘accounting surface’ but nonetheless in hydraulic connection to the Colorado River will be mitigated.
 - c. Identification of the source of water that would be used as an exchange for an equal volume of MWD non-Colorado River water.
 - d. A copy of the environmental impact analysis for the non-Colorado River exchange water.

- e. Demonstration that the exchange water benefits the Colorado River in equal volume to the Colorado River water used by the project.

BACKGROUND

The Metropolitan Water District (MWD) appears to be acting as a water supplier for the project's water supply. Under California Water Code section 10910, water suppliers are required to provide a water supply assessment for a project's water use during normal, single-dry, and multiple-dry water years where they exceed certain thresholds for water use. Staff must ensure the applicant's water use complies with applicable statutes and a reliable supply can be delivered to a proposed project.

DATA REQUESTS

134. If MWD would be a water supplier to the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF) project for the purposes of Water Code section 10910, please provide a copy of the MWD's water supply assessment for the proposed project.
135. If MWD is not a water supplier for the purposes of Water Code section 10910, please provide documentation from MWD that explains why MWD would not be a water supplier for the Rio Mesa SEGF project.

BACKGROUND

The applicant used a groundwater model for analysis of impacts to flow in the Colorado River. The model appears to be similar to the robust model used for impact analysis in the recent Blythe Solar Power Project. Staff believes use of the proposed model may be appropriate for the proposed project, but needs to evaluate how the project site has been characterized using the model and whether staff is in agreement with the findings that there are no impacts to the Colorado River.

DATA REQUESTS

136. Please provide an electronic copy of the groundwater model used for the project.
137. Please provide an electronic copy of the groundwater model input and output files for each model run presented in the AFC.

BACKGROUND

The applicant has used Flo-2d computer modeling to evaluate storm water runoff through the drainages across the proposed Rio Mesa SEGF project. Results of the Flo-2d modeling are largely dependent on the precipitation data input into the model. Staff needs to review the precipitation data used in the Flo-2d modeling and evaluate what effect it has on the predicted model runs.

DATA REQUEST

138. Please provide an electronic copy of the precipitation data used in the Flo-2d modeling and the references for the source of the precipitation data used.

BACKGROUND

The applicant proposes to utilize Reverse Osmosis (RO) to treat the groundwater produced for water needs. The RO system will create reject water or concentrate with very high concentrations of total dissolved solids. The amount of reject water was not provided. The RO reject water is directed to on-site wastewater treatment plants. The RO system produces salts that have to be stored on-site in evaporation ponds and then later disposed of off-site. Staff needs to verify the handling of salts produced by the RO system to complete the Report of Waste Discharge.

Staff needs to verify that the applicant has done the following:

- Conducted an analysis of the quantity of salts that would be generated by the RO system;
- Performed an analysis to determine the longest period that could occur where salts would accumulate on site;
- Addressed all potential constituents that may be present and could be detrimental to flora and fauna; and,
- Provided adequate design details for evaporation ponds where salts will be stored for offsite disposal.

DATA REQUEST

139. Please conduct an analysis of the RO system to determine the average and maximum salt production rates on a monthly basis.
140. Please provide a discussion of potential salt accumulation using the longest period the salt may have to be stored on site.
141. Please provide an analysis showing all the constituents potentially detrimental to flora and fauna that may be present in the reject of the RO system and plans to mitigate such constituents.
142. Please provide all information necessary to file a Report of Waste Discharge to the Regional Water Quality Control Board (RWQCB) and Energy Commission staff, and include the appropriate application fee to the RWQCB. This should include design details for evaporation ponds where generated salts will be stored.

Technical Area: Traffic and Transportation – Glint and Glare
Author: Gregg Irvin, Ph.D.

BACKGROUND

In Section 5.13 “Visual Resources” of the Application for Certification, the applicant states: “A study prepared for the Ivanpah Solar Electric Generating System (a project similar to the Rio Mesa SEGF) revealed that at 1.5 miles from the project, the brightness of the solar boiler will be only 38 candelas per square meter, which is similar to the brightness experienced by a 100-watt light bulb viewed from a distance of 35 meters, or 115 feet”. Staff recognizes that this is significantly below the MPE (Maximum Permissible Energy) for retinal damage. However, it is well known that: a) perceived brightness and MPE are not systematically related, and b) that perceived brightness and luminous intensity (e.g., candelas) are context dependent (e.g., observer state of light adaptation, source spatial extent, source background luminance). For example, the impact of glare should be considered within the context of an emissive light source which is large in size. The solar collector is visually larger than the sun at a considerable range of viewing distances. For example, at 12 meters in width, the solar collector has a visual extent (angular subtense) exceeding that of the sun (32 min arc) for a viewing distance of approximately 1,288 meters (0.8 mile).

DATA REQUEST

143. Please provide observer incident luminous energies that would be experienced by workers, civilians, and motorists at representative viewing distances (e.g. for workers – distances from within heliostat fields, for civilians – distances from nearest residential areas, and for motorists – distances from State Route 10 and other nearby public roads).
144. Given the predicted observer incident luminous energies experienced by workers, civilians, and motorists at representative viewing distances, please address the impacts of apparent brightness, glare and visual disruption to these parties.

BACKGROUND

The ability of light to cause injury to the retina has been shown both clinically and experimentally. Light can result in retinal damage through photothermal, photomechanical, and photochemical mechanisms. Photochemical damage is associated with long-duration exposure times as well as lower-wavelength (higher-energy) light exposure. While retina pigment epithelium (RPE) and the neurosensory retina are protected from light-induced exposure by the absorption profile of the surrounding ocular structures (e.g., cornea, crystalline lens, macular pigments) and through retinal photoreceptor outer segment regeneration, photic injury is still possible due to photochemical retinal light toxicity mechanisms.

Photochemical injury is both dose-dependent and cumulative in nature. The cumulative time-dependent nature is that daily exposures can build up and can last many weeks. For example, it has been estimated that the half-life (1/e, when an exposure effect has decayed to approximately 37%) of the cumulative dose exposure effect is on the order of 30 days. This has significant implications for observers (e.g., workers over many

weeks) that spend a significant amount of time in proximity to the high luminance environment of a solar field in the presence of the additional high terrestrial ambient of the desert environment.

As retinal injury can be caused by exposure to otherwise innocuous visible light, there appears to be some critical dose or threshold at which exposure becomes injurious. The safe exposure times for common ophthalmic instruments (e.g., fundal photography) has been reported in the literature and supports the concept of a critical threshold dose necessary for injury.

DATA REQUEST

145. Please address the potential for photochemical retinal damage to the public (both resident and non-resident) and project workers given the cumulative exposure effects of the combined terrestrial ambient and solar field/ tower exposure levels. Additionally, if found to be significant, please address any potential mitigating methodologies for both the general public and workers(e.g., worker sunglasses).

BACKGROUND

The appearance of the heliostats will depend on the angle of the sun and the heliostats in relation to the position of the viewer. Staff recognizes that the applicant will develop and apply heliostat positioning and transition strategies, using positioning algorithms to optimize path selection for minimizing reflected sunrays on all unintended areas and forbidden areas. An aviation concern with respect to glint and glare is unwanted aircraft exposure during heliostat transition. Further, since the heliostat field circumscribes a 360° field around the solar tower, any spillage or leakage past the tower margins of reflected energy could potentially intercept aircraft and produce harmful glint and/or glare visual impacts on pilots.

DATA REQUEST

146. Please describe any strategy in the heliostat positioning algorithms to address the intermittent presence of aircraft for either known or unknown flight paths. Also, please address the amount of energy from the heliostats which spills beyond the tower and its potential for negative impacts on aviation safety.

BACKGROUND

The heliostat mirror control algorithms include sets of mirror standby positions in which mirrors are in a static position reflecting upward at angular positions too steep to intercept the tower. This is considered a readiness position to focus at the tower receiver. The applicant has stated that rather than having two focal points, the project will have thousands of standby points in a ring around the receiver. In this standby position, no heliostats are actually aimed directly at the tower, and all solar energy is reflected upward into the sky in a 360° annulus around the tower. This produces a large 70-90° cone of directly reflected sunlight consisting of the entire solar reflective capacity of the solar field above the tower. Any aircraft flying in this extensive dome over the tower will experience direct heliostat solar reflections.

DATA REQUEST

147. Please address the frequency that the heliostats are in such standby positions, the amount of luminous energy that pilots could experience, and the potential for negative impacts on aviation safety from a glint and glare perspective.

REFERENCES

- Wu J, Seregard S, Algvere PV. Photochemical damage of the retina. *Surv Ophthalmol* 2006; 51(5): 461–481.
- Irvin, GE, Ramer, D.P. Laser Safety Procedures: A Review of the Potential for Retinal Damage through Photothermal, Photomechanical, and Photochemical Mechanisms. Armstrong Aerospace Medical Research Laboratory, Human Engineering Division. Air Force Systems Command. March, 1988.
- Kremers JJM, van Norren D. Two classes of photochemical damage to the retina. *Lasers Light Ophthalmol* 1988; 2: 41–52.
- Ham Jr WT, Ruffolo Jr JJ, Mueller HA, Clarke AM, Moon ME. Histologic analysis of photochemical lesions produced in rhesus retina by short-wave-length light. *Invest Ophthalmol Vis Sci* 1978; 17(10): 1029–1035.

Technical Area: Visual Resources
Author: William Kanemoto and Gregg Irvin, Ph.D.

BACKGROUND

Staff requires a better understanding of proposed operational night lighting, particularly in relation to the vicinity of the mirror field, and in general.

DATA REQUEST

148. Please provide additional description of required night lighting. For example, would night lighting be restricted to the power block area? Would night lighting be required at the common area or any other locations? What specific night lighting requirements are needed for the mirror washing? Would night lighting be installed around perimeter fencing? What operations would require lighting, and could some of these be restricted to lighting during use only? Where would roadway lighting be introduced and of what type?

BACKGROUND

The AFC states that required FAA lighting would be determined after further study.

DATA REQUEST

149. Please provide a description of anticipated FAA-required lighting and marking.

BACKGROUND

To facilitate preparation of the Preliminary Staff Assessment/Draft Environmental Impact Statement, and to conduct its analysis, staff requires high-resolution image files of simulation photographs in the AFC visual analysis.

DATA REQUEST

150. Please provide high-resolution image files of individual photos in the AFC visual discussion, including simulations and character photos, in jpg or tif format. Please do not provide "paired" before and after page layouts, but rather the individual photo image files at a resolution suitable from printing in ledger-size (11"x 17") format.

BACKGROUND

The optical path from the heliostats to the solar collector is assumed to be generally free of aerosols, particulate and other airborne obscurants. However, under various meteorological conditions, airborne dust and particulates can be of sufficient density and reflectivity to produce a substantial scattering field and a pronounced 'haloing' effect. Such 'haloing' can be relatively bright and visually prominent producing a 'Tee Pee' shaped dome over the entire solar field. This effect can produce an extremely large and prominent visual stimulus.

Additionally, the mirror control algorithms include sets of mirror standby positions in which the mirrors are in a static position reflecting upward at angular positions too steep to intercept the tower, yet in proximity to the tower. This is considered a readiness

position to focus at the tower receiver. The applicant has stated that the Rio Mesa Solar Electric Generating Facility project will have thousands of standby points in a ring around the receiver. In this standby position no heliostats are actually aimed directly at the tower, and all solar energy is reflected upward into the sky in an annulus around the tower. This set of heliostat positions can also produce an exceptionally large and prominent visual stimulus much greater in spatial extent than the actual tower.

DATA REQUEST

151. Please discuss the expected frequency, extent, brightness and appearance of visual scattering effects to the public during power generating operations.
152. Please discuss the expected frequency and deleterious visual impact of visual scattering effects to the public during power generation operations in terms of any direct or cumulative adverse visual resource impact on the desert visual landscape.
153. Please discuss the expected frequency, extent, brightness and appearance of visual scattering effects to the public during heliostat standby operations.
154. Please discuss the expected frequency and deleterious visual impact of visual scattering effects to the public during heliostat standby operations in terms of any direct or cumulative adverse visual resource impact on the desert visual landscape.

Technical Area: Biological Resources
Authors: Heather Blair, Scott White

BACKGROUND: MIGRATORY BIRD SURVEYS

Staff's Revised Data Request 44, below, revises the dates of migratory bird surveys as requested in staff's original Data Request 44, included in staff's RIO MESA SOLAR ELECTRIC GENERATING FACILITY (11-AFC-4) DATA REQUESTS, SET 1A (Nos. 1-84), docketed February 7, 2012.

The prior version of Data Request 44 specified that field surveys for migrating passerine birds should be conducted from "late July to April," and that surveys for migratory raptors should be conducted from "August to April." This Revised Data Request updates the survey season for passerine species to "late July to the end of May," but makes no change to the survey season for raptors. This revision is based on a review of ornithological literature by Energy Commission staff in cooperation with staff of the other Renewable Energy Action Team agencies (California Department of Fish and Game, US Fish and Wildlife Service, and Bureau of Land Management). Most migratory birds in the region generally arrive in their breeding grounds by the end of May. Thus, many birds are still in migration during May. May is a critical month in which to observe bird migration through the project area and it is considered the height of the bird migration season in the region encompassing the project. Therefore, staff makes the following revision to Data Request 44 in ~~strike through~~ for deleted text and underline **bold for new text**.

REVISED DATA REQUEST

44. Please provide quarterly results of the migratory bird surveys to the Energy Commission, BLM, USFWS, and CDFG within two weeks of their completion. The survey report should include a detailed description of the methodology; list of surveyors and their qualifications (pre-approval of surveyors by the agencies is recommended); time, date, and weather conditions during surveys; and species observed, including abundance, locations of flying birds relative to proposed project area, flight direction, and estimates of flight altitude. Submittals of interim survey results to Energy Commission staff, BLM, USFWS, and CDFG and will be evaluated by the agencies as received.

For passerine bird species, we request qualified biologists monitor migration trends during the fall/winter/spring migration period using the following methodology:

- From late July to April **the end of May**, weekly surveys should be conducted within the project area and four miles of the project footprint, emphasizing the area between the project site and agricultural lands to the east (between the site and the Colorado River). If there are access restrictions preventing establishment of surveys points in the agricultural lands within four miles east of the proposed project area, please document the efforts taken to gain access and landowner responses. If access is not granted, please conduct surveys within the project area and at least one mile of the project area.
- Qualified biologists should be stationed at 5 to 10 migration count locations

throughout the site and scan the sky and record bird use and movement data (species, number, direction traveled, height traveled, etc.). The REAT agencies agree with the locations of the seven proposed bird observation points illustrated on Figure 1 of the applicant's January counterproposal, so long as they provide a wide expanse of observation area from a single point and were identified by qualified biologists. Observations should occur for at least 8 hours per day under good weather conditions (i.e., no sustained precipitation or fog and incorporate both dawn and dusk hours), encompassing midday hours (i.e., at least dawn to late afternoon for passerine), for 3 consecutive days per week. A fourth day of survey each week, where qualified biologists collect avian point count data using a Breeding Bird Survey route developed by the project proponent, line transect, or comparable technique (see Bibby et al. 2000) is also recommended unless otherwise stated by the REAT agencies pending review of 2011 BLM point count methods and results, as requested in data request No. 50, below. Energy Commission staff have no recommended changes to the applicant's proposal to use the same 16 line transects that were used in 2011; staff assumes these were selected by a qualified biologist.

- Spring and fall nocturnal migration pulses of avifauna (and bats) should be characterized for the project area. Radar ornithology data, using methods such as those described by Gauthreaux and Belser (2005), adapted as appropriate to the project area, should be used to obtain these data. Staff recommends that the applicant work with a recognized expert to develop site-specific methods.

For raptor species, we recommend qualified biologists monitor migration trends during the fall/winter/spring migration using the following methodology based on Hawk Migration Association of North America (HMANA) standard field survey techniques which were modeled after Cape May Raptor observation methods, now standard for hawk migration counts (Bildstein 2006, Bildstein et al. 2007, HMANA 2010a, HMANA 2010b):

- From August to April, weekly surveys should be conducted using unlimited-distance bird migration survey methods. Qualified biologists should be stationed at a minimum of three observation points, at least 2 miles apart, within four miles of the project footprint. If there are access restrictions preventing establishment of surveys points within 4 miles east of the proposed project area, please document the efforts taken to gain access and landowner responses. If access is not granted, please conduct surveys within the project area and at least one mile of the project area.
- Raptor observation points must fit the following criteria: (1) allow wide expanse of observation area from a single point, (2) be away from public view, and (3) afford a location where topographic and biological features are likely to be used by raptors during migration. At least one qualified biologist should lead observations at each observation points for at least four consecutive days per week. Observations should be conducted under good weather conditions (i.e., no sustained precipitation or fog) for a period of at

least 8 hours, encompassing midday hours (i.e., at least 9 a.m. through at least 5 p.m. for raptors) when most species are likely to be migrating or conducting daily movements.



**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV**

**APPLICATION FOR CERTIFICATION
FOR THE *RIO MESA SOLAR*
*ELECTRIC GENERATING FACILITY***

DOCKET NO. 11-AFC-04
PROOF OF SERVICE
(Revised 2/13/12)

APPLICANTS' AGENTS

BrightSource Energy, Inc.
Todd Stewart, Senior Director
Project Development
1999 Harrison Street, Suite 2150
Oakland, CA 94612
tstewart@brightsourceenergy.com

BrightSource Energy, Inc.
Michelle Farley
1999 Harrison Street, Suite 2150
Oakland, CA 94612
mfarley@brightsourceenergy.com

BrightSource Energy, Inc.
Brad DeJean
1999 Harrison Street, Suite 2150
Oakland, CA 94612
e-mail service preferred
bdejean@brightsourceenergy.com

APPLICANTS' CONSULTANTS

Grenier and Associates, Inc.
Andrea Grenier
1420 E. Roseville Parkway,
Suite 140-377
Roseville, CA 95661
**e-mail service preferred*
andrea@agrenier.com

URS Corporation
Angela Leiba
4225 Executive Square, Suite 1600
La Jolla, CA 92037
Angela_leiba@urscorp.com

COUNSEL FOR APPLICANTS

Ellison, Schneider, & Harris
Christopher T. Ellison
Brian S. Biering
2600 Capitol Avenue, Suite 400
Sacramento, CA 95816-5905
cte@eslawfirm.com
bsb@eslawfirm.com

INTERESTED AGENCIES

Mojave Desert Air Quality Management
District
Chris Anderson, Air Quality Engineer
14306 Park Avenue, CA 92392
canderson@mdaqmd.ca.gov

California ISO
e-mail service preferred
e-recipient@caiso.com

Bureau of Land Management
Cedric Perry
Lynnette Elser
22835 Calle San Juan De Los Lagos
Moreno Valley, CA 92553
cperry@blm.gov
elser@blm.gov

INTERVENORS

Center for Biological Diversity
Lisa T. Belenky, Senior Attorney
351 California Street, Suite 600
San Francisco, CA 94104
e-mail service preferred
lbelenky@biologicaldiversity.org

Center for Biological Diversity
Ileene Anderson
Public Lands Desert Director
PMB 447, 8033 Sunset Boulevard
Los Angeles, CA 90046
e-mail service preferred
ianderson@biologicaldiversity.org

**ENERGY COMMISSION –
DECISIONMAKERS**

CARLA PETERMAN
Commissioner and Presiding Member
CPeterma@energy.state.ca.us

KAREN DOUGLAS
Commissioner and Associate Member
e-mail service preferred
kldougl@energy.state.ca.us

**ENERGY COMMISSION –
DECISIONMAKERS (cont.)**

Kourtney Vaccaro
Hearing Adviser
e-mail service preferred
kvaccaro@energy.state.ca.us

Galen Lemei
Advisor to Commissioner Douglas
e-mail service preferred
glemei@energy.state.ca.us

Jennifer Nelson
Advisor to Commissioner Douglas
e-mail service preferred
jnelson@energy.state.ca.us

Jim Bartridge
Advisor to Commissioner Peterman
jbartrid@energy.state.ca.us

ENERGY COMMISSION STAFF

Pierre Martinez
Project Manager
pmartine@energy.state.ca.us

Lisa DeCarlo
Staff Counsel
e-mail service preferred
ldecarlo@energy.state.ca.us

Eileen Allen
Commissioners' Technical
Advisor for Facility Siting
e-mail service preferred
eallen@energy.state.ca.us

**ENERGY COMMISSION –
PUBLIC ADVISER**

Jennifer Jennings
Public Adviser's Office
e-mail service preferred
publicadviser@energy.state.ca.us

DECLARATION OF SERVICE

I, Elizabeth Stewart, declare that on February 27, 2012, I served and filed copies of the attached (11-AFC-4) RIO MESA SOLAR ELECTRIC GENERATING FACILITY DATA REQUESTS, SET 1B (NOS. 85 – 154) AND AMENDED DATA REQUEST SET 1A (NO. 44), dated February 27, 2012. This document is accompanied by the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/riomesa/index.html].

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(Check all that Apply)

For service to all other parties:

- Served electronically to all e-mail addresses on the Proof of Service list;
- Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "e-mail preferred."

AND

For filing with the Docket Unit at the Energy Commission:

- by sending electronic copies to the e-mail address below (preferred method); **OR**
- by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 11-AFC-4
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

- Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Originally signed by
Elizabeth Stewart
Project Assistant