CALIFORNIA ENERGY COMMISSION
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October 26, 2009

Mr. Emiliano Garcia Sanz
Abengoa Solar Inc.
11500 W 13th Ave.
Lakewood, CA 80215

DOCKET
09-AFC-5
DATE OCT 26 2009
REC'D OCT 26 2009

RE: ABENGOA MOJAVE SOLAR (09-AFC-5)
DATA REQUEST SET 1B (nos. 1-86)

Dear Mr. Garcia:

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, 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. 1-86) is being made in the areas of Cultural Resources (nos. 1-20), Soils and Water Resources (nos. 21-61), Visual Resources (nos. 62-71), Visual Plume Modeling (nos. 72-77) and Waste Management (nos. 78-86). Written responses to the enclosed data requests are due to the Energy Commission staff on or before November 23, 2009, or at such later date as may be mutually agreeable.

If you are unable to provide the information requested, need additional time, or object to providing the requested information, please 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, and the grounds for any objections (see Title 20, California Code of Regulations, Section 1716 (f)).

If you have any questions, please call me at (916) 654-4781 or email me at choffman@energy.state.ca.us.

Sincerely,

Original signed by:
Craig Hoffman
Project Manager

Enclosure

PROOF OF SERVICE (CREATED 10/21/09) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 10/26/09
AA

Technical Area: Cultural Resources
Authors: Amanda Blosser

Any information that identifies the location of archaeological sites needs to be submitted under confidential cover.

BACKGROUND

The Applicant identified two potentially historic architectural resources within the project area (P-36-006556 and P-36-006557).

Site P-36-006556, known as the Hays farm and located at 16198 Lockhart Road, was originally identified by Greenwood and Associates in 1990 during a cultural resources study for the then proposed Luz Solar Energy Generation System (SEGS) XI and XII power plants, now extant to the north of the proposed project. The site is the location of the first homestead in the Harper Lake community, settled by Henry and Emma Spenkler circa 1911. At the time of the original survey, Greenwood and Associates recommended the complex was significant as the location of the first homestead in the area, but that the structural and archaeological data potential had been exhausted by the survey. The update provided by the applicant's consultant recommended the site is potentially eligible for the California Register of Historical Resources (CRHR) under Criteria 1 ("associated with events that have made a significant contribution to the broad patterns of our history") and 4 ("likely to yield information important to history or prehistory"), although no justification was provided for the recommendation. The proposed project would demolish the Hays farm, which may be a significant impact.

P-36-006557, the site of the community of Lockhart, also was identified by Greenwood and Associates, but has largely been demolished since the 1990s. Only the Lockhart General Merchandise Store is still extant. The update of the original inventory provided by the applicant's consultant recommended the Lockhart General Merchandise Store is potentially eligible for inclusion in the CRHR for its significance under Criterion 1, given its importance within the community of Lockhart. This resource would also be demolished to accommodate the proposed project, which may be a significant impact.

The applicant's consultant did not explain the resources' significance within their historic contexts, nor did they provide a justification for significance under CRHR criteria for either of the two resources. Consequently, at the present time, staff does not have enough information regarding these two resources to determine whether they are significant under CRHR criteria.

DATA REQUESTS

1. Please add the following information to the Hays Farmstead DPR523 form:

A. In Item B10 of the DPR523 BSO form, provide an evaluation of the CRHR eligibility for the Hays Farmstead that clearly defines how the resource is associated with one or more events important in a defined historic context.

B. Provide a justification of the consultant's potential recommendation under CRHR Criterion 1.

C. Please also include in Item B10 a discussion of the integrity of the resource.

2. Please complete a DPR523 form for the Lockhart General Merchandise store, including:

A. In Item B10 of the DPR523 BSO form, provide an evaluation of the CRHR eligibility for the Lockhart General Merchandise store that clearly defines how the resource is associated with one or more events important in a defined historic context.

B. Provide a justification of the consultant's significance recommendation under CRHR Criterion 1.

C. Please also include in Item B10 a discussion of the integrity of the resource.

BACKGROUND

The locales of the two built-environment resources considered in the above data requests may also be the locations of potentially significant historical archaeological deposits associated with the Hays Farmstead and with the community of Lockhart. The applicant has not identified any such resources. To complete its inventory of cultural resources of the proposed project, and because these resources would be subject to significant impacts from the project, staff needs additional information on these possible historical archaeological sites.

DATA REQUESTS

3. Please instruct a historical archaeologist who meets the U.S. Secretary of Interior's Professional Qualifications Standards for historical archaeology to:

A. Conduct site-specific archival research on the Hays Farmstead and the community of Lockhart to identify where historical archaeological deposits could be located.

B. Write a letter report to Energy Commission staff stating that archaeological deposits are likely or unlikely at either or both sites, with a justification for that conclusion. Please include a resume that demonstrates the required qualifications have been met by the author of the report.

4. If the historical archaeologist concludes that historical archaeological deposits are likely at either or both sites, instruct him/her conduct a field survey and write a letter report for staff describing the field methods used and the historical

archaeological deposits present, and making recommendations for the sites as eligible/ineligible for the CRHR.

5. If the historical archaeologist cannot reach conclusions on the CRHR eligibility of the sites, instruct him/her to draft and submit for staff approval testing plans for the sites to determine if any subsurface deposits are present at these sites. The plan should be designed with the goal of acquiring sufficient data to enable recommendations of eligibility for the CRHR for these sites. The recovered data should be evaluated according to its applicability to the research questions posed in the confidential cultural resources technical report.

6. After implementation of the testing plans, please provide to staff a letter report on the testing methods and results at these sites, presenting an analysis of the recovered data and recommendations regarding the eligibility of these sites.

7. Please complete DPR 523 “Archaeological Site” detail forms for each of these sites, including dating and significance recommendations, and submit them to staff with the letter report submitted in response to either Data Request 4 or 6.

BACKGROUND

The applicant identified four potentially significant historical archaeological sites within the buffer around the project area (MS-H-026, MS-H-004, MS-H-225, and P-36-006553) which could be subject to impacts from the proposed project. The confidential archaeological survey report included a map (Attachment 4m Map 2 of 3m Archaeological Survey Results) that detailed the location of the sites. Since the boundaries of many of the sites are not well determined and the resolution of the map did not indicate whether there was overlap between the site boundaries and the project boundary, it appears that some sites might extend into areas where they could be impacted by construction.

DATA REQUESTS

8. A. Please provide the distance of the archaeological site boundaries from the project boundary for each of the archaeological sites referenced above.

   B. In addition, if the site is within 50 feet of the boundary of the project site, please provide a discussion of the potential for impacts to these sites by the proposed project.

9. Should the project have impacts on any of these sites, please identify the nature and extent of the impacts and provide a plan to avoid project impacts to these sites.

10. If destroying any of these sites cannot be avoided, please submit for staff approval a plan for using test excavations to determine if any subsurface deposits are present at each of these sites. The objective of the plan should be to acquire sufficient data to make recommendations of eligibility for the CRHR for these sites. The recovered data should be evaluated according to its applicability

to the research questions posed in the confidential cultural resources technical report.

11. After implementation of the testing plans, please provide to staff a letter report on the testing and results at these sites, presenting an analysis of the recovered data and recommendations regarding the eligibility of these sites.

12. Please complete DPR 523 “Archaeological Site” detail forms for each of these sites, including dating and significance recommendations, and submit them to staff with the letter report.

13. This work should be completed by a qualified historical archaeologist. Please include the resume that demonstrates the previously stated qualifications have been met by the author of the report.

BACKGROUND

The confidential cultural resources technical report identifies two potentially significant archaeological sites that are located within the project boundaries and could be destroyed by the construction activities of the proposed Abengoa Mojave Solar project. The two sites are: MS-H-246, a refuse dump and historical occupation site; and MH-250, a lithic scatter and prehistoric occupation site. The applicant recommended these two sites could potentially be significant under CRHR Criterion 4 (“likely to yield information important to history or prehistory”), so the impacts could be significant. Consequently, staff believes that either these sites should be avoided, or they should be tested to better evaluate their potential to yield important data.

DATA REQUESTS

14. Please provide a plan to avoid project impacts to these sites.

15. If destroying these sites cannot be avoided, please submit for staff approval a plan for using test excavations to determine if any subsurface deposits are present. The plan should be designed for acquisition of sufficient data to make recommendations of eligibility for the CRHR for these sites. The recovered data should be evaluated according to its applicability to the research questions posed in the confidential cultural resources technical report.

16. After implementation of the testing plans, please provide to staff a letter report on the testing and results at these sites, presenting an analysis of the recovered data and recommendations regarding the eligibility of these sites.

17. Please complete DPR 523 “Archaeological Site” detail forms for each of these two sites, including dating and significance recommendations, and submit them to staff with the letter report.

BACKGROUND

According to the Cultural Resources Technical Report, the areas subject to impact from the proposed project consist of alluvium and lake deposits, potentially obscuring

archaeological sites. The construction of the Abengoa Mojave Solar project would entail mass grading at the 1,765-acre project site and excavation for the foundations for the large equipment, as well as road improvements and drainage channel construction to accommodate a 100-year rain event. The amount of ground disturbance proposed could inadvertently impact previously unknown subsurface archaeological resources during construction activities. Staff assumes that the previous agricultural use of the project areas makes it likely that no intact buried archaeological deposits would be found in the uppermost 3 feet of sediments in the project areas.

Although the Cultural Resources Report acknowledges that archaeological deposits could be inadvertently exposed during construction activities, the Cultural Resources section of the AFC and the Cultural Resources Technical Report provide no information on the likelihood for the construction of the proposed project to truncate archaeological deposits that may lie buried beneath the surface of the project area. These deposits may be too deep to present surface manifestations, yet may be within reach of construction impacts. Staff needs finer resolution information on the age, the structure, and the character of the geologic units beneath the surface of the project area to be able to evaluate the project's potential to substantially and adversely change the significance of archaeological resources that may lie buried in the project areas.

DATA REQUESTS

18. Please obtain the services of a professional in geoarchaeology: a person who, at a minimum, meets the U.S. Secretary of Interior's Professional Qualifications Standards for prehistoric archaeology, as published in Title 36, Code of Federal Regulations, part 61, and includes the completion of graduate-level coursework in geoarchaeology, physical geography, geomorphology, or Quaternary science, or education and experience acceptable to cultural resources staff. Please submit the resume of the proposed geoarchaeologist for staff review and approval.

19. Please have the approved geoarchaeologist provide a discussion, based on the available Quaternary science and geoarchaeological literature, of the historical geomorphology of the project areas. The discussion should describe the development of the landforms on which the project components are proposed, with a focus on the character of the depositional regime of each landform since the Late Pleistocene epoch. The discussion should include data on the geomorphology, sedimentology, pedology, hydrology, and stratigraphy of the project areas and the near vicinity. The discussion should relate landform development to the potential in the project areas for buried archaeological deposits. The discussion should include maps overlaying the above data on the project areas.

20. In the absence of sufficient extant Quaternary science and/or geoarchaeological literature pertinent to the reconstruction of the historical geomorphology of the project areas, please have the approved geoarchaeologist design a primary geoarchaeological field study of the project areas, submit a research plan for staff approval, and conduct the approved research. The purpose of the study is to facilitate staff's assessment of the likelihood of the presence of archaeological

deposits buried deeper than 3 feet in the project's areas. The primary study should, at a minimum, include the following elements:

A. A map (or map series) of the present landforms in the project areas at a scale of not less than 1:24,000; the data sources for the map may be any combination of published maps, satellite or aerial imagery that has been subject to field verification, and the result of field mapping efforts;

B. A sampling strategy to document the stratigraphy of the portions of the landforms in the project areas where the construction of the proposed project will involve disturbance at depths greater than 3 feet;

C. Data collection necessary for determinations of the physical character, the ages, and the depositional rates of the various sedimentary deposits and paleosols that may be beneath the surface of the project areas to the proposed maximum depth of ground disturbance. Data collection at each sampling locale should include a measured profile drawing and a profile photograph with a metric scale, and the screening of a small sample (three 5-gallon buckets) of sediment from the major sedimentary deposits in each profile through ¼-inch hardware cloth. Data collection should also include the collection and assaying of enough soil humate samples to reliably radiocarbon date a master stratigraphic column for each sampled landform;

D. An analysis of the collected field data and an assessment, based on those data, of the likelihood of the presence of buried archaeological deposits in the project areas, and, to the extent possible, the likely age and character of such deposits.

E. Please have the approved geoarchaeologist prepare a report of the primary field study and submit it to staff under confidential cover.

Technical Area: Soil and Water Resources
Author: Christopher Dennis, P.G., John L. Fio, Gus Yates, PG, CHG

BACKGROUND

Poor quality groundwater, high in total dissolved solids (TDS), is expected to occur beneath Harper Dry Lake and within the zone of perched groundwater (section 5.17.1.11). Groundwater pumping by the proposed project can cause this low quality groundwater to be drawn towards the project's proposed pumping well(s) and impact expected higher groundwater quality beneath the proposed project site. For example, the Stiff diagrams for the Ryken agricultural well sampling site show a significant increase in the concentration of dissolved constituents in the groundwater between 1990 and 2000 (compare graph 2-21 and 2-23).

Water Resources (p. 5.17-29) and *Appendix A* (p. 86) assert that "because of the high transmissivity of the uQal aquifer, prolonged extraction for Abengoa Mojave Solar supply water should not cause an increase in TDS concentration and deterioration in quality by drawing in water of higher TDS from an expanded pumping depression reaching below Harper Dry Lake." High transmissivity tends to increase the radius of the cone of depression and capture zone, and unless there is anisotropy or nonhomogeneity between the project wells and Harper Dry Lake, then one would expect radially symmetrical flow toward the wells, including those from beneath the lake bed.

DATA REQUESTS

21. A. Using available data, please provide a graphical analysis of the historical relationship of groundwater pumping to TDS concentrations at the proposed project site over time.

    B. Similarly, please provide historical groundwater TDS (or electrical conductivity [EC]) data for wells within the Harper Valley Groundwater Basin (HVGB) during the peak decades of pumping for alfalfa irrigation (1950s to 1980s).

    C. Evaluate the data for pumping-induced trends.

22. A. Please evaluate the potential for high TDS groundwater beneath the dry lake to be drawn towards the project's proposed pumping wells. Please use the maximum expected groundwater pumping rate for this evaluation.

    B. Similarly, please assess potential changes in the leakage rate from the perched groundwater table to the deeper water table resulting from the maximum expected groundwater pumping rate.

23. Please provide results of a MODPATH or similar particle tracking analysis to show the capture zones of the project wells (with simultaneous operation of wells at Luz Solar Energy Generation System (SEGS) XI and XII power plants) with

continuous pumping at the maximum annual production rate for periods of 10, 20, and 30 years.

BACKGROUND

The groundwater model developed for the proposed project assumes groundwater would be consumed at an estimated average annual rate during construction and project operations. For the purposes of environmental and human health protection, the Energy Commission requires evaluation of the project at the maximum expected groundwater pumping rate.

DATA REQUESTS

24. Please adjust the groundwater model so that the maximum expected groundwater pumping rate is used rather than the average expected groundwater pumping rate.

25. At the maximum expected pumping rate, please evaluate the potential impact to water levels in the Harper Valley Groundwater Basin (HVGB) and to other groundwater wells in the vicinity of the proposed project.

BACKGROUND

A number of specific modeling questions are most effectively answered if the model input and output files are provided for review. The applicant's consultant employed two different software packages. The "domain" groundwater-flow model was constructed using the proprietary Groundwater Vistas software, which utilized the U.S. Geological Survey's source code MODFLOW-96. The MODFLOW model is employed to simulate the HVGB volumetric water budget and drawdown due to proposed project pumping. Well interferences (drawdown) from project pumping were also simulated using the proprietary software WinFlow.

DATA REQUESTS

26. Please provide the MODFLOW input and output files for the steady-state and transient calibrations and the project pumping scenarios. Please also include the MODFLOW listing files from these simulations. Note: In order to keep the file size manageable, the binary heads and cell-by-cell flow files are not needed for review at this time.

27. Please provide the Groundwater Vistas file(s) used to create and run the MODFLOW models for the steady-state and transient simulations identified above.

28. Please provide the real-world coordinates for the MODFLOW model grid origin (i.e., UTM, California State Plane, etc.).

29. Please provide the WinFlow model project files.

BACKGROUND

The boundaries of the "domain" simulated in the groundwater models and used for water budget assessments do not coincide with published HVGB boundaries. Only 411 of the 640 square miles of the basin are included in the domain (*App. A, Basin Conceptual Model, p. 21*). The domain boundaries were reportedly selected to coincide with water-level (potentiometric surface) contour maps from a previous study. Groundwater in storage and recharge from the excluded basin areas can conceivably effect drawdown and water budgets in the domain and near the project site.

Water level (potentiometric surface) contour maps are sensitive to the number and distribution of data points on which the contours are based. Furthermore, the contour shapes and extents are influenced by geologic boundaries and permeability contrasts. For example, the contours in Figures 1-8 through 1-9 appear to pass through bedrock (i.e., the Iron and Lynx Cat Mountains) and pass smoothly through materials with substantially different permeability (i.e., fault zones)

DATA REQUESTS

30. Please estimate the potential omissions introduced in the drawdown and water budget analyses due to excluding HVGB areas from the domain.

31. Please provide a revised drawdown and water budget analysis derived from a 640 sq mile basin

32. Please show the data values and locations utilized to construct the contours.

33. Please modify the contours to reflect uncertainty (i.e., query and dash the contours where the lack of data contributes to uncertainty in groundwater level contours).

BACKGROUND

The two aquifer properties specified in the model are transmissivity (the product of hydraulic conductivity and saturated aquifer thickness) and storage coefficient. Hydraulic conductivity is a measure of the aquifer's ability to transmit water, and the storage coefficient and related sorativity is the volume of water an aquifer releases or takes into storage per unit surface area per unit change in groundwater level. *Appendix A* implies initial estimates for model layer 1 aquifer parameters were derived from the aquifer testing program, and the report text states that parameter values for layers 2 and 3 were derived from "previous studies or the literature".

There is almost always uncertainty in the magnitude and distribution of hydraulic conductivity owing to the inherent uncertainty of natural heterogeneous systems. For example, the recommended transmissivity for sediments beneath the proposed project site was 225,000 gpd/ft (about 30,000 ft2/day). In contrast, the USGS model of the Mojave River Groundwater Basin (*Stamos et. al., 2001*) employs transmissivity values for the general domain area ranging from less than 250 to 3,500 ft2/day.

DATA REQUEST

34. Please compile information from previous studies and the literature and provide a table with reference citations that summarizes the ranges in Transmissivity and Storativity values by layer for the HVGB.

BACKGROUND

The water budget analysis in the *Conceptual Basin Model* report (*Appendix A, p. 55*) includes recharge from precipitation on the valley floor, recharge from ephemeral streams that flow from mountains around the periphery of the basin onto the valley floor ("mountain front recharge") and recharge via flow through bedrock fractures from peripheral bedrock uplands into the alluvial basin ("mountain block recharge"). The assumed rainfall recharge on the valley floor seems to be based on a single New Mexico study from the 1980s (Stone 1986).

A comprehensive review of more recent studies of groundwater recharge in the southwestern United States (Hogan, J.F., F.M. Phillips and B.R. Scanlon. 2004. Groundwater recharge in a desert environment: the southwestern United States. American Geophysical Union, Washington, D.C.) cites several studies demonstrating, on the basis of isotopes and chloride profiles in the soil horizon, that rainfall recharge on the desert floor is essentially zero. The USGS Mojave River Valley Model (Stamos, 2001) also assumes recharge from direct precipitation on the valley floor is negligible. The MODFLOW numerical groundwater model assumed no valley floor, mountain front or mountain block recharge (Appendix I, p. 10). Previous estimates of these inflows were manually subtracted from the simulated general-head boundary flux to create the water budget table (compare Appendix A, Table 4.3a with the MODFLOW mass balance table at the end of Appendix I). The former assumed recharge sources occur at different times and locations than the general head boundary flow simulated by the model, and their implications for Mojave River alluvial aquifer groundwater flow are therefore also different.

DATA REQUEST

35. Please provide the justification and rationale for excluding valley floor, mountain front, and mountain block recharge from the MODFLOW model.

BACKGROUND

36. The MODFLOW model indicated total water inflow of 6,530 AFY (*App. A Table 4-3a* and the MODFLOW mass balance table at the end of *App. I*). The simulated inflow is derived entirely from the Mojave River general-head boundary, and all of this flow passes through the Hinkley Gap. Four previous estimates of groundwater flow through the Hinkley Gap range from 22 to 3,071 AFY (*App. A*, *page 27*). The MODFLOW simulated inflow is approximately two times greater than the sum of the recharge terms for which independent estimates are available (valley floor, mountain front, mountain block, and Hinkley Gap). The excess is considered "recharge of indeterminate origin" (*App. A, Tables 4-3a and 4-3b*). The text states that this excess recharge probably occurs as underflow

through “perimeter gaps” connecting the HVGB with adjacent basins (*App. A, p. 82*), but the MODFLOW model represents all gaps except the Hinkley Gap as no-flow boundaries. The calibrated hydraulic conductivity in the gap west of Iron Mountain was four orders of magnitude smaller than through the Hinkley Gap (0.001 ft/d versus 70 ft/d; *App. I, p. 15*), so in practical terms it also effectively acts as a no-flow boundary.

DATA REQUEST

37. Please explain how “indeterminate recharge” can be derived from other basins if the boundaries between the Harper Valley Basin and these other basins are represented in the MODFLOW model as no-flow boundaries.

BACKGROUND

The MODFLOW model is a simplification of the real world system. In effect, the model of the domain has been simplified to the point that it functions as a “pipeline” between the Mojave River general-head boundary (GHB) to the Harper Dry Lake drain (DRN) boundary. The range of non-unique combinations of model parameters (specifically, the conductances of those two head-dependent boundaries and the effective horizontal hydraulic conductivity between them through the Hinkley Gap) is nearly infinite. However, each different combination that produces an acceptable comparison of water levels would be associated with a significantly different overall water budget. Given that the model was calibrated to an assumed budget (*App. I, page 13*), the model calibration appears to provide no new information regarding the water budget. Furthermore, the calibrated budget was at least twice as large as prior estimates, and the excess or additional water attributed to an unknown water source.

The text asserts that the final calibration is the best one because the sensitivity analysis revealed that adjusting any single parameter from the calibrated value increased the residual error. This is questionable because alternative non-unique calibrations require simultaneous, compensating adjustments to two or more parameters.

DATA REQUEST

38. A. Please assess the sensitivity of the MODFLOW calibration and simulated water budget by assuming a flow of 1,468 AFY through the Hinkley Gap, which is the most recent estimate of inflow from the Mojave River area (AST 2007).

    B. Continue to omit rainfall recharge from direct precipitation on the valley floor but add the 850 AFY of mountain front and mountain block recharge. The model should be recalibrated as appropriate to minimize the residual errors (consider a reduction in the layer 1 zone 5 hydraulic conductivity and adjust the GHB and DRN conductances accordingly).

BACKGROUND

Appendix A utilizes results from two models (models constructed with the WinFlow and MODFLOW software) and concludes that pumping for project construction and operations is not expected to "significantly impact water levels at neighboring wells."

The only transient MODFLOW calibration is to a multi-day aquifer test conducted near the project site. However, the basin is undergoing dynamic changes in water levels and groundwater storage due to historical groundwater use and recovery over a period of decades. The spatial and temporal scales of drawdown during the multi-day aquifer test are likely inappropriate for calibrating a groundwater model intended to address long-term water balance issues at a basin-wide scale. The historical period most useful for model calibration is the period of widespread alfalfa farming and the subsequent recovery period (approximately 1950-present). Annual groundwater pumping during the alfalfa farming years exceeded both the planned pumping for the project and the basin yield. This major historical stress and associated decline in water levels constitute the most appropriate period for model calibration.

Transient calibration is generally more informative than steady-state calibration—and essential to obtain calibrated values of the storage coefficient. Furthermore, the predictive scenarios use initial heads from the "calibrated non-pumping simulation" which presumably is the steady-state calibration. Hence, initial heads ignore water level transients that exist in the system due to historical pumping and recovery.

DATA REQUESTS

39. Please explain the rationale or need for using two models (ie., Winflow and MODFLOW) to evaluate pumping drawdown.

40. Please test the model calibration using longer-term pumping and water level transients (i.e., the 1950-2009 period). Include simulated and observed water level hydrographs for well locations throughout the domain (a number of potentially useful hydrographs are shown in Figure 1-14).

41. A. Please conduct a cumulative impact simulation that includes pumping from SEGS VIII and IX supply wells and irrigation, and municipal and domestic wells in the modeled area.

    B. Provide a tabulation of the simulated construction period and 30-year project pumping drawdown at key existing wells shown in *Figure 1-2*.

42. Please quantify the potential water use by all existing and reasonably foreseeable projects within the HVGB and provide the rationale for why particular projects may not be included in this listing.

43. Please discuss the potential incremental and cumulative impact to the HVGB water quality and water supply by the projects within the listing.

44. Please identify and explain the thresholds employed to conclude impact significance (or lack thereof).

45. Please provide a table that summarizes the range in simulated impacts at the existing wells tabulated above to represent a plausible range in aquifer property values from previous studies, the literature, and model calibration.

BACKGROUND

Numerous assumptions or conclusions regarding basin hydrogeology and water budgets were based on a few key previous studies, some of which may be difficult to obtain. Please provide copies of the following background reports or report sections.

DATA REQUESTS

46. Please provide a copy of: California Department of Water Resources. 1967. Mojave River ground water basins investigation. Bulletin 84.

47. Please provide a copy of: California State University Fullerton, Department of Geological Sciences (CSU) and Mojave Water Agency. September 2007. Harper Dry Lake basin, San Bernardino County, California, hydrogeologic report.

48. Please provide a copy of: The Mark Group. April 1989. Hydrogeologic assessment report, Harper Dry Lake, California. Final. Report No. 88-03219.18. Prepared for LUZ Development and Finance Corporation.

49. Please provide a copy of: The Mark Group. December 1989. Aquifer analysis, LUZ solar energy generating station, Harper Valley, California. Preliminary report. Report No. 89-03409.18. Prepared for LUZ Development and Finance Corporation.

BACKGROUND

The AFC made an economic and performance comparison of using an alternative air-cooled system to the wet-cooling tower system proposed in the AFC. The proposed wet-cooling towers would use at least 2,163 acre-feet per year of impaired groundwater. The AFC analysis concluded that wet cooling using impaired groundwater was more economically sound and was preferable when compared on a performance basis to air cooling. No analysis of the environmental desirability of one cooling system over the other was made. No analysis of other alternative water supplies, including recycled water was provided.

DATA REQUESTS

50. Please quantify and discuss the economic soundness and environmental desirability of a wet-dry hybrid system.

51. Please discuss the environmental benefits of a wet-dry hybrid system.

52. Please quantify and discuss the environmental desirability of the air cooled system in comparison with the wet cooled system.

53. Please quantify and discuss the economic soundness and environmental desirability of using recycled water instead of groundwater for wet cooling.

BACKGROUND

The solar mirrors would require routine cleaning and roads between the mirrors would require maintenance for vehicle access. Excess water from mirror washing would likely promote vegetation growth, particularly noxious and invasive species. It appears there would also be a need for surfactants to wash the mirrors, herbicides to control noxious and invasive plants, and dust suppression and stabilization along the vehicle maintenance routes. Information related to potential impacts from the proposed routine mirror washing was not provided in the AFC. Staff needs this information for a complete Soil and Water Resources analysis.

DATA REQUESTS

54. Please provide the following:

    A. Long-term maintenance requirements for access roads;

    B. Reapplication requirements of herbicides, dust suppressants, and soil stabilizers; and

    C. The expected number and a description of the maintenance equipment that would be used for all maintenance activities in the facility.

55. A. Please provide a schedule for the proposed mirror washing, including the frequency and duration of the washing.

    B. Provide the quantity of water that would be used daily. As this information may be provided in air quality data requests, a cross reference may be used.

56. A. Please describe in detail the method by which the mirrors would be washed.

    B. Please provide the volume of water that would run off the mirrors and in to the soil below the mirrors.

57. Please describe how vegetation beneath the mirrors would be managed, including treatment of noxious and invasive species.

58. A. Please discuss how wastewater from the mirror washing would be managed.

    B. Provide the locations and dimensions of wastewater disposal sites. As this information may be provided in a response to Biological Resources data requests, a cross reference may be used.

59. Please provide an evaluation of alternatives to allowing the mirror wash water to run off to the soil below the mirrors.

60. A. Please identify the chemical composition of any surfactants for mirror washing and any herbicides, dust suppressors, or soil stabilizers that would be used by the project.

    B. Provide a copy of the Material Safety Data Sheet (MSDS) for each surfactant, herbicide, dust suppressor, and soil stabilizer.

61. Please discuss and quantify the buildup of mirror wash water surfactant, herbicide, dust suppressor, and soil stabilizer chemicals in the soil over the life of the project.

Technical Area: Visual Resources
Author: William Kanemoto

BACKGROUND

To independently evaluate visual effects of the solar collector arrays (SCAs), staff requires a better understanding of the physical components.

DATA REQUESTS

62. Please provide scaled architectural elevations of the SCAs (both front and side elevations), and indicate the point of mirror rotation. Please describe the maximum and minimum heights of the SCAs in the course of the day.

63. Please provide close-up photographs of SCAs of the type proposed for the Abengoa Mojave Solar project. Please include photographs of fronts, backs and mounting structures for the SCAs. If SCAs in the photographs differ from those proposed for the Abengoa Mojave Solar project, please describe the differences.

BACKGROUND

Staff would like to have a more thorough understanding of potential glare receptors in the vicinity of the project site.

DATA REQUESTS

64. Please identify all occupied residences within 5 miles of the project vicinity on a map or aerial photo. Reference is made in the AFC to residences south, north and west of the project site (AFC 5.15-36). Please indicate these on the map or photo.

65. In order to convey the wider project context, please provide a map of surrounding BLM lands, including Wilderness Areas, Areas of Critical Environmental Concern, and the Watchable Wildlife Area boundaries, at 1:24,000 scale encompassing a radius of at least 5 miles from the project.

BACKGROUND

Staff is concerned about two types of reflective mirror glare that could be visible to off-site viewers: non-directional, diffuse glare; and spread reflection visible to viewers on axis with the position of the sun at a particular time. According to the AFC, the mirrors of solar troughs direct 95 percent of the solar radiation to the heat collection elements (HCEs). A portion of the remaining solar radiation in the visible spectrum will be diffuse or spread reflection with the potential to be excessively bright to off-site observers. Because there are residences located within 5 miles of the project boundaries, there appears to be the potential for substantial discomfort or disability glare from nearby viewpoints, particularly in early morning or late afternoon hours when the mirrors are targeted at their lowest angles.

DATA REQUESTS

66. Please characterize the maximum potential brightness (luminance) of diffuse and spread reflection from mirrors in candela per square meter.

67. Please describe the hours in which the mirror surface of a trough could be visible to an off-site viewer on the ground, and the proportion of surface visible in the course of the day.

68. Please provide all available anecdotal information on glare effects of the Kramer Junction and existing Luz Solar Energy Generation System (SEGS) XI and XII power plants to the west and north of the project site, including photographs of off-site diffuse or spread glare, and images of the heated HCEs, as seen from public roads/viewpoints.

BACKGROUND

Staff is concerned about the potential for heated HCEs (annulus/receivers) to be visible to off-site viewers. Staff is also concerned with the potential for direct reflection from the mirrors by-passing the HCEs due to imperfections in the reflective surfaces.

DATA REQUESTS

69. Please describe whether any portion of the HCEs would be visible to viewers on the ground, either on- or off-site.

70. If so, please characterize the maximum potential brightness (luminance) of the HCEs in candela per square meter.

71. Please explain whether any portion of the directly reflected solar radiation could pass by the HCEs (the steel tube annulus) due to the total divergence factor of the reflectors.

    A. If so, how much?

    B. Is this amount sufficient to cause any potential retinal damage or flash blindness?

    C. Are there measures that would prevent such inadvertent off-site reflection (such as shielding of the HCEs, etc.)?

Technical Area: Visual Resources – Visible Plume
Author: William Walters

APPLICANT'S COOLING TOWER VISIBLE PLUME MODELING

BACKGROUND

Staff plans to review the applicant's visible plume modeling analysis. Staff requires the applicant to provide the plume modeling files for this analysis to complete this review.

DATA REQUEST

72. Please provide an electronic copy of the SACTI modeling input and output files including the meteorological data file(s) and any raw meteorological data files (in a ready to use spreadsheet format) used to create the SACTI meteorological data input file(s).

COOLING TOWER OPERATING AND DESIGN DATA

BACKGROUND

Staff plans to perform a separate plume modeling analysis for the cooling tower and review the applicant's visible plume modeling analysis. Staff requires additional cooling tower operating information to complete this analysis.

DATA REQUEST

73. Please summarize for the cooling towers the conditions that affect vapor plume formation including cooling tower heat rejection, exhaust temperature, and exhaust mass flow rate. Please provide values to complete the table.

Parameter	Cooling Towers Exhausts		
Number of Cells	6 cells (1 by 6)		
Cell Height*	15.55 meters (51 feet)		
Cell Diameter*	9.14 meters (30 feet)		
Tower Housing Length*	98.75 meters (324 feet)		
Tower Housing Width*	16.46 meters (54 feet)		
Ambient Temperature*	30°F	65°F	100°F
Ambient Relative Humidity	90%	40%	15%
Number of Cells in Operation			
Heat Rejection (MW/hr)			
Exhaust Temperature (°F)			
Exhaust Flow Rate (lb/hr)			

* Cell height and diameter and tower length and width are from air quality modeling files.

Additional combinations of temperature and relative humidity, if provided by the applicant, will be used to more accurately represent the cooling tower exhaust conditions. Please include appropriate design safety margins for the heat rejection, exhaust flow rate and exhaust temperature in consideration that the air flow per heat rejection ratio may be used in a Condition of Certification confirmation of design limit.

74. Please provide the variation in average cooling tower heat load per hour (military time) for each month.

75. Please provide heat rejection reduction assumptions, with or without corresponding ambient condition assumptions, that staff can use to determine when cooling tower cells would be shut off when operating at reduced cooling loads and/or when under favorable ambient conditions.

76. Please provide the cooling tower manufacturer and model number information and a fogging frequency curve from the cooling tower vendor for the two cooling towers, if available.

77. Please identify if the cooling tower fan motors will be dual speed or have variable speed/flow controllers.

Technical Area: Waste Management
Author: Ellie Townsend-Hough

BACKGROUND

The Integrated Waste Management Act of 1989 (AB 939) established landfill waste diversion goals of 50 percent by the year 2000 for state and local jurisdictions. To meet the solid waste diversion goals, many local jurisdictions have implemented Construction and Demolition Waste Diversion Programs.

DATA REQUESTS

78. Please indicate whether the county of San Bernardino operates a Construction and Demolition Waste Diversion Program.

79. Please provide information on how the Abengoa Mojave Solar project will meet each of the requirements of the program cited in the previous data request.

BACKGROUND

The historical use of the proposed project site was for agricultural activities including cattle ranching. The Phase I Environmental Site Assessment (ESA) also indicates that a tanker trailer, fuel dispensing equipment, transformers, and abandoned buildings and structures are located onsite. The presence of this equipment and past land use suggests that pesticides, herbicides, and petroleum may have been used on the site. The Phase I ESA did not identify any recognized environmental conditions, thereby eliminating the need for a Phase II ESA. Although a Phase II ESA was not completed, staff believes that given these past land uses and proposed construction the project owner should verify that no harmful concentrations of any contaminants will be encountered at the proposed project site.

Common agricultural practices can result in residual concentrations of fertilizers, pesticides or herbicides in near-surface soil. To ensure that the concentrations of various chemicals do not pose a potential health risk or hazard, the project owners should provide soil sampling of the parcel/project site. The California Department of Toxic Substances Control (DTSC) has prepared the “Interim Guidance for Sampling Agricultural Fields for School Sites (Third Revision August 7, 2008)”. Staff believes this guidance or equivalent may be appropriate for further site analysis.

DATA REQUEST

80. Please provide results of field sampling and analysis which adequately characterize the presence of harmful chemicals or conditions and whether there will be any risk to construction or plant personnel due to the presence of these chemicals. Sampling and analysis should be consistent with DTSC’s “Interim Guidance for Sampling Agricultural Fields for School Sites”. Samples should be

assessed for persistent agricultural chemicals, such as organochlorine pesticides that were applied to the project property.

81. Please provide information on when, and how the oil tanks, excess aboveground piping, and waste oil was or will be cleaned up and disposed of prior to construction at the project site.

82. Please provide aerial photographs of the proposed project site for the last 20 years at a map scale of 1-inch is equal to 500 to 1,000 feet. These aerials may not have been flown every year. Please provide whatever is available for this time period.

BACKGROUND

The Abengoa Mojave Solar project will use solar thermal technology to power a steam-turbine generator. The solar collectors consist of parabolic trough mirrors which heats Heat Transfer Fluid (HTF). The proposed HTF is Therminol VP-1, which is an oil that generally consists of 26.5 percent biphenyl and 73.5 percent diphenyl oxide. The oil is regulated as a hazardous material by the State of California due to the constituent biphenyl. Biphenyl, is listed in Title 22, California Code of Regulations (CCR), Chapter 11 Appendix X (list #299), as an extremely hazardous waste. The listing of a chemical in Appendix X creates the regulatory presumption that a waste containing that chemical (i.e. HTF contaminated soil) is hazardous unless determined otherwise, pursuant to specified procedures.

Occasional spills of HTF from either equipment failure or human error can result in the generation of contaminated soil. The HTF-impacted soil must be removed from the spill site and properly managed. The applicant proposes to store and treat impacted soil in a bioremediation/land farm. In order to dispose of HTF-impacted soil in a bioremediation/land farm unit the project owner will need a determination from the Department of Toxic Substances Control whether HTF-impacted soil is hazardous or non-hazardous. Their determination will be based on criteria and lists in Title 22, CCR section 66261.1 et seq. which identify hazardous wastes subject to regulation.

DATA REQUESTS

83. Please explain what procedures will be used for handling and remediating HTF spills.

84. Please explain what happens to the HTF-impacted soils once the soil has been bioremediated or land farmed.

85. Please explain how HTF-contaminated soil will be handled and disposed of if it is determined to be present in concentrations that constitute a hazardous waste.

86. Please explain what the difference is between bioremediation and land farming for the Abengoa Mojave Solar project.

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 *ABENGOA MOJAVE*
SOLAR POWER PLANT

Docket No. 09-AFC-5

PROOF OF SERVICE
(Established 10/21/09)

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*indicates change

DECLARATION OF SERVICE

I, April Albright, declare that on October 26, 2009, 2009, I served and filed copies of the attached Abengoa Mojave Solar (09-AFC-5) Data Request Set 1B (nos. 1-86), dated October 26, 2009. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/mariposa/index.html].**

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

(*Check all that Apply*)

For service to all other parties:

__✓__ sent electronically to all email addresses on the Proof of Service list;

__✓__ by personal delivery or by depositing in the United States mail at Sacramento, CA, with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses **NOT** marked "email preferred."

AND

For filing with the Energy Commission:

__✓__ **sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (preferred method);**

OR

_____depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-5
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct.

Original signed by: _____
April Albright