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January 26, 2009

Via Electronic Service

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Re: Beacon Solar Energy Project (08-AFC-2)
CURE Data Requests, Set One (Nos. 1-144)

Dear Mr. Stein and Ms. Luckhardt:

California Unions for Reliable Energy (CURE) submits this first set of data requests to Beacon Solar, LLP for the Beacon Solar Energy Project pursuant to Title 20, section 1716(b), of the California Code of Regulations. CURE requests this information to assess issues not addressed in Beacon Solar, LLP's responses to California Energy Commission staff's data requests, and to follow-up on issues raised at the November 6, 2008 Data Response and Issue Resolution Workshop. The requested information is necessary to: (1) more fully understand the project; (2) assess whether the project will be constructed and operated in compliance with all laws, ordinances, regulations and standards; (3) assess whether the project will result in significant environmental impacts; (4) assess whether the project will be constructed and operated in a safe, efficient and reliable manner; and (5) assess potential mitigation measures.

CURE reserves the right to submit additional data requests on any other topic that requires further information. Our reservation is based in part on matters beyond our control; principally, in response to the California Energy Commission

staff's requests, Beacon Solar, LLP continues to file additional information regarding several resource areas.

Pursuant to section 1716(f) of the Energy Commission's regulations, written responses to these requests are due within 30 days. If you are unable to provide or object to providing the requested information by the due date, you must send a written notice of your objection(s) and/or inability to respond, together with a statement of reasons, to Commissioners Douglas and Byron and to CURE within 20 days.

Please contact us if you have any questions. Thank you for your cooperation with these requests.

Sincerely,

/s/

Rachael E. Koss

REK:bh
Enclosure
cc: Docket (08-AFC-2)
Proof of Service List (08-AFC-2)

STATE OF CALIFORNIA
California Energy Commission

In the Matter of: The Application for Certification for the BEACON SOLAR ENERGY PROJECT	Docket No. 08-AFC-2

CALIFORNIA UNIONS FOR RELIABLE ENERGY DATA REQUESTS, SET ONE

January 26, 2009

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Attorneys for the CALIFORNIA UNIONS FOR RELIABLE ENERGY

The following data requests are submitted by California Unions for Reliable Energy. Please provide your responses via email (if available) by February 25, 2009 to each of the following people:

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Please identify the person who prepared your responses to each data request. If you have any questions concerning the meaning of any data requests, please let us know.

BEACON SOLAR ENERGY PROJECT
CURE Data Requests Set One (Nos. 1-144)

AIR QUALITY

Background: MITIGATION MEASURES FOR FUGITIVE DUST AND CONSTRUCTION EQUIPMENT COMBUSTION EXHAUST

Project construction is expected to take 25 months, and will require an average of 477 employees per day with a peak workforce of 836 workers.[1] According to the AFC, construction workers will commute up to two hours to construction sites from their homes.[2] The applicant anticipates drawing its construction workforce from Kern, Los Angeles, and San Bernardino counties.[3]

The AFC states that construction related air emissions include exhaust and fugitive dust from construction worker commute vehicles.[4] Construction-related emissions will contribute to existing violations of the California 24-hour and annual PM10 ambient air quality standards.[5] In addition, because the Project will be a source of ozone precursor pollutant emissions, construction emissions will contribute to existing violations of Federal and California ozone standards.[6]

Under the California Environmental Quality Act ("CEQA"), feasible mitigation measures must be required to minimize the Project's significant environmental impacts.[7] However, the applicant did not propose any mitigation measures to reduce impacts from construction workforce commute vehicles. Feasible mitigation includes providing buses for the construction workforce to reduce air pollutant emissions.

Data Requests

1. Please identify mitigation measures that the Project will employ to reduce air pollutant emissions from construction workforce commute vehicles.

2. Please indicate whether the applicant is willing to accept a Condition of Certification requiring the Project to provide buses for the construction workforce to commute from Kern, Los Angeles, and San Bernardino counties. If not, please justify your answer.

[1] AFC, p. 5.11-14.
[2] *Id.*
[3] *Id.*
[4] *Id.* at p. 5.2-29.
[5] AFC, Table 5.2-27, p. 5.2-40.
[6] AFC, p. 5.2-19.
[7] Cal. Code Regs., tit. 14, § 15126.4, subd. (a)(2).

Background: EMERGENCY FIREWATER PUMP ENGINE

The AFC's emission estimates for the emergency firewater pump engine are based on EPA Tier 3-certified engines as determined by the BACT analysis.[8] However, the text of the AFC specifies the use of a 300-hp John Deere Model 6081HF;[9] Appendix E variously specifies the use of a 300-hp John Deere Model 6081HF and a 300-hp John Deere Model 6125H.[10] According to manufacturer specifications, neither of these engine models is EPA Tier 3-certified.

Data Requests

3. Please confirm that the Project would employ an EPA Tier 3-certified emergency firewater pump engine.

4. Please specify the engine brand, model, and horsepower rating for the Project's emergency firewater pump engine.

WATER RESOURCES

Background: WATER SUPPLY ALTERNATIVES

California's Waste Water Reuse Law[11] precludes the use of potable domestic water for nonpotable uses if suitable recycled water is available to the user. In particular, section 13552.6 of the Water Code finds that the use of potable domestic water in cooling towers is a waste or unreasonable use of water if suitable recycled water is available.

The Water Code defines "recycled water" as "water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur and is therefore considered a valuable resource."[12] Recycled water is "available" if it meets four criteria: (1) the source of recycled water is of adequate quality for the proposed use and is available for the proposed use; (2) recycled water can be furnished at a reasonable cost and the cost of supplying treated recycled water is comparable to, or less than, the cost of supplying potable domestic water; (3) the use will not be detrimental to public health; and (4) the use will not adversely affect downstream water rights, water quality, or plant life, fish and wildlife.[13]

It is important to read these provisions in the context of the Legislature's directive to state agencies to encourage wastewater recycling. The Legislature's directives include Water Code

[8] AFC, p. 5.2-31.
[9] *Id.*
[10] AFC, Appendix E, p. 3-2 and Table 16A.
[11] Water Code, § 13550 et seq.
[12] Water Code, § 13050, subd. (n).
[13] Water Code, § 13550, subd. (a).

section 13512, which states that "[i]t is the intention of the Legislature that the state undertake all possible steps to encourage development of water recycling facilities so that recycled water may be made available to help meet the growing water requirements of the state," and Water Code section 461, which provides that the public policy of the state requires the maximum re-use of wastewater.

In the past, the California Energy Commission has implemented these requirements in siting power plants by looking for sources of wastewater that have already been recycled to a level suitable for cooling tower use, and also for sources of wastewater that could be treated or further treated at a reasonable cost for cooling tower use. The Commission took the latter approach in both the Delta Energy Center and Los Medanos Energy Facility cases, where the Commission required the use of tertiary treated recycled water from the Delta Diablo Sanitation District for cooling the proposed plants, even though the tertiary treatment facility had not yet been built or permitted to provide sufficient amounts of recycled water, and therefore, the tertiary treated water was not currently available.

Further, in 2003, the California Energy Commission established a policy regarding the use of fresh water for power plant cooling. The Energy Commission's 2003 Integrated Energy Policy Report states that the Commission will approve the use of fresh water for power plant cooling "only where alternative water supply sources and alternative cooling technologies are shown to be 'environmentally undesirable' or 'economically unsound.'" The Commission defines "environmentally undesirable" as "having a significant adverse environmental impact," and "economically unsound" as "economically or otherwise infeasible."[14]

Here, the Project proposes the use of potable water for cooling. The AFC's water supply alternatives assessment dismisses numerous sources of nonpotable water for various reasons, including: (1) the water source's distance from the Project; (2) the water source has future plans for tertiary treatment but current tertiary treatment is not available; (3) there are other entities that are interested in the source; and (4) use of the water source poses potential environmental issues.[15]

Data Requests

5. Please identify the water quality requirements for all proposed uses of water.

6. In light of the Legislature's intent discussed above, please address the Project's compliance with the Water Code and the Commission's policy on the use of fresh water for power plant cooling.

7. Please support your conclusion that alternative sources of water are cost prohibitive, by presenting your analysis and all supporting information including the location of each source, quantity of water available, and composition of water available.

[14] 2003 Integrated Energy Policy Report, California Energy Commission, December 2003, Docket No. 02-IEP-1, Pub. No. 100-03-019, available at http://www.energy.ca.gov/reports/100-03-019F.PDF.
[15] AFC, p. 4-16.

8. Please provide a list of the other entities interested in the water supply alternatives referred to on page 4-16 of the AFC, the quantity of water sought by each entity, and the proposed use of the water sought by each entity.

9. Please provide a list of and discussion of the "potential environmental issues" referred to on page 4-16 of the AFC.

BIOLOGICAL RESOURCES

Background: DATA RELIABILITY: RARE PLANT SURVEYS

Sampling was used to provide data on sensitive biological resources that occur in the Project area and associated vicinity. These data serve as the cornerstone from which much of the AFC's biological resources analyses are based, including analyses of direct, indirect, and cumulative impacts, as well as analyses of appropriate measures to mitigate those impacts.

The foundation of any biological resource assessment is the reliability of the data. Data reliability is highly correlated with sampling intensity. The AFC states that the entire survey area (i.e., 100% coverage) was surveyed.[16] It is not clear whether the AFC is suggesting that the entire survey area was sampled, or whether the entire area was in fact surveyed, which would constitute a census. True censuses of biological resources are extremely difficult to conduct, even in relatively small areas. As a result, most scientists rely on carefully conducted samples to obtain the desired information. Therefore, it is likely that surveys conducted for the Project represent a sample from which inferences about target populations were made.

In addition to sampling intensity, the reliability of sampling data is dependent on the ability to control sampling bias. Whereas sampling bias can be nearly impossible to eliminate, it can be minimized by several means, including: (1) implementing an appropriate sampling design; (2) ensuring personnel are appropriately trained; and (3) adhering to strict and carefully constructed sampling protocols.

Survey Effort

Rare plant surveys for the Project were conducted in 2007, and again in 2008, at the request of the agencies due to the lack of adequate rainfall in 2007. The 2008 survey area included the plant site, the two transmission line option corridors, and both sides of the roadway along the 17.6-mile natural gas pipeline route. Surveys of the plant site, potential transmission line corridors, and gas pipeline route were conducted three to four times to account for different blooming times of the target species.[17]

[16] AFC, Appendix F, p. 21.
[17] Response to CEC Data Request 13.

The 2008 survey report indicates that rare plant surveys followed survey guidelines provided by the U.S. Fish and Wildlife Service.[18] Other than the names of the individuals that conducted the surveys, and the dates that surveys were conducted, the AFC and associated 2008 plant survey report do not provide any other specific information about how rare plant surveys were conducted.

Rare plant survey guidelines established by the U.S. Fish and Wildlife Service require biologists to walk parallel transects spaced five to ten meters (16 to 33 feet) apart throughout the entire site, regardless of subjective habitat evaluations.[19] Assuming that this protocol was followed, and assuming that transects were ten meters apart, biologists would have walked at least 942 kilometers of transects:

- 787 kilometers (km) of transect within the Plant Site (two rectangles);[20]
- 50 km of transect within Plant Site (triangle adjacent to railroad tracks);
- 11 km (7 miles) of transect along potential transmission line corridors (assuming centerline only);
- 56 km (17.6 miles of road shoulder x 2 shoulders) of transect along the pipeline corridor (assuming centerline only); and
- 38 km of transect within the 80-acre and 14-acre parcels.

The 2008 plant survey report provides a table of the rare plant survey dates and personnel.[21] Assuming that each listed individual conducted 11 hours[22] of survey time each day, 88 to 275 man-hours (rounds two and one, respectively) were devoted to each round of surveys. To meet survey protocol, surveyors working independently would have each had to walk 10.7 km per hour to cover the areas listed for round two, and 7.1 km per hour during round four. As a rule of thumb, a "swift" walk in which one is breathing noticeably is achieved at a rate of approximately 6.5 km per hour.[23] It is unreasonable to expect a surveyor, who is attempting to identify plant species while walking on sandy soils, to maintain this rate of speed. As a result, it does not appear that rare plant surveys conducted for the Project adhered to survey protocols, and thus they should not be considered sufficient to provide reliable information for the presumed absence of rare plants.

Survey Timing

The AFC identified several special-status annual plant species as having the potential to occur on or near the survey area.[24] The applicant conducted focused rare plant surveys within the site during 2007. However, conditions for performing these surveys were less than satisfactory due to extremely low winter rainfall.[25] As a result, the applicant conducted

[18] Beacon Solar Energy Project - 2008 Spring Survey Report.
[19] Cypher, E.A. 2002. General rare plant survey guidelines. California State University, Stanislaus. Endangered Species Recovery Program. Available online at: http://sacramento.fws.gov/es/documents/rare_plant_protocol. pdf.
[20] See Attachment A.
[21] Beacon Solar Energy Project - 2008 Spring Survey Report, A-1.
[22] Survey hours not provided in report.
[23] http://walking.about.com/od/measure/f/howfastwalking.htm
[24] AFC, Appendix F, p. 11.
[25] AFC, Appendix F, p. vi.

additional focused surveys in 2008. The 2008 surveys resulted in the detection of considerably more native annual species in the survey area than the number detected in 2007. Because nearly three times as many plant species were detected in the survey area during 2008, Project botanists concluded that 2008 was an adequate rainfall year to detect special-status species.[26]

The term "annuals" implies blooming yearly. However, because this is not always the case, desert annuals are more accurately referred to as "ephemerals." The exact phenology of many desert plants is poorly understood; however, in general the flowering of many species is thought to be dependent on the unique combination of sun, wind, precipitation, temperature, and elevation. For many ephemeral species, precipitation is needed in small doses throughout the winter. Too little rain provides a poor climate for seed germination, whereas too much rain may result in seeds being washed away or rotting. Timing of precipitation is also important. Rainfall that occurs too early or too late in the season may inhibit blooming.[27]

Temperature is also critical for ephemerals. If seeds get too hot (e.g., over 85 °F in February or March), seeds may become parched and seedlings scorched. In addition, whereas cool nights can assist flower seedlings by slowing the growth of competitors like grasses and mustards, very cold temperatures can damage blossoms.[28]

The AFC's conclusion that 2008 surveys were sufficient to document the presence of special-status plants is not adequately or scientifically supported. Specifically, the AFC does not provide any quantitative data on rainfall or other environmental factors that may have influenced species richness, abundance, or blooming. Despite an increase in rainfall, some species may flower only after substantial winter rains, or may remain dormant for two or three springs as the result of other factors.[29] Even though site-specific uncertainty in flowering timing and abundance cannot be eliminated, it can be minimized through examination of reference sites known to contain the species of interest.

An increase in species richness is not sufficient evidence to justify the conclusion that target species would have been detected if they were present. In particular, the AFC needs to demonstrate that survey effort was standardized between years and did not bias results (e.g., by dedicating more time to surveying in 2008 than in 2007).

Because there are numerous issues associated with the reliability of the AFC's rare plant survey data, further information is needed to evaluate Project's impact on rare plants.

Data Requests

10. Please clarify whether 2008 surveys were designed to document the actual *presence* of special-status plant species, or simply the *potential* for special-status plant species to occur in the Project area.

[26] Beacon Solar Energy Project - 2008 Spring Survey Report, p. 26.
[27] DesertUSA 2008 (cited 24 Nov 2008). Available at: http://www.desertusa.com/du_plantsurv.html
[28] *Id.*
[29] *Id.*

11. If 2008 surveys were devoted to documenting the actual presence of special-status plants, please provide the specific methods that were used to conduct focused surveys. Please include: (1) the total number of man-hours devoted to each survey day; (2) the role of each individual that participated; (3) spacing of transects; and (4) whether surveyors worked independently or in teams.

12. Please provide precise information on the locations of special-status plant survey transects established by the survey team. Please address any extra level of effort (e.g., closer transect spacing) that was devoted to washes, swales, or other potentially suitable habitats.

13. Please discuss the extent to which established survey protocols were followed, including development of target species at the reference site(s).

14. Please provide information on the floristic field survey experience of the individuals that conducted the surveys, including any past experience identifying the special-status species identified as having the potential to occur within the Project area.

15. Please provide 2007, 2008, and mean rainfall data obtained by the weather station(s) nearest the Project site.

16. Please provide 2007, 2008, and mean temperature data obtained by the weather station(s) nearest the Project site.

17. Please discuss the phenology of the special-status plant species identified as having potential to occur on the Project site.

18. Please provide scientific information to support the conclusion that climatic conditions in 2008 were sufficient to support the flowering of any special-status species with the potential to occur on the Project site.

19. Please discuss any potential sources of survey bias that may have led to the detected increase in species richness during 2008 surveys (i.e., a Type I error).

Background: DATA RELIABILITY: DESERT TORTOISE SURVEYS

The AFC states that desert tortoise (*Gopherus agassizii*) surveys conducted for the Project adhered to the established U.S. Fish and Wildlife Service protocol.[30] Whereas much of the information presented in the AFC suggests that surveyors followed protocol, some of the information necessary to evaluate survey effort is lacking.

[30] Beacon Solar Energy Project – 2008 Spring Survey Report, p. 9.

Data Requests

20. Please discuss transect spacing employed in desert tortoise surveys along the two transmission line routes and along the pipeline corridor.

21. Please provide: (1) the number of man-hours devoted to focused tortoise surveys, by location; (2) the role of each individual that participated; and (3) clarification on whether surveyors worked independently or in teams.

22. Please address any measures that the desert tortoise survey team took to address surveyor accuracy, including whether the survey team conducted the additional intensive survey recommend in the U.S. Fish and Wildlife Service protocol. If the additional intensive survey was conducted, please discuss the results.

Background: DATA RELIABILITY: BURROWING OWL SURVEYS

The AFC indicates that protocol surveys were conducted for the western burrowing owl (*Athene cunicularia*).[31] During Phase II of the protocol, 14 burrows were detected within the survey area, five of which had sign of recent of burrowing owl activity.[32] During Phase III of the protocol, the surveyors "drove established paved and dirt roads, stopping at observation points that provided a wide view."[33] If burrows with sign of owls were not visible from established roads, surveyors approached the burrows on foot to carefully verify the presence or absence of owls.[34] Data obtained from these surveys led the Applicant to assume that two owls (or two pairs) may be directly impacted by the Project. This assumption cannot be deemed accurate until additional information on survey techniques is provided.

Data Requests

23. Please provide more specific information on the techniques used to conduct the Phase III surveys for western burrowing owl, including:

    (1) specific observation dates and times of the 14 burrows identified during the Phase II surveys;
    (2) a map of the roads that were traveled;
    (3) the location(s) of observation points in relation to burrows;
    (4) a distinction of the burrows that were approached by foot versus those observed from a distance;
    (5) whether each potential burrow was visited four times each as specified in the protocol, and
    (6) the amount of time actively devoted to surveying, as opposed to driving.

[31] AFC, p. 5.3-12.
[32] AFC, Appendix F, p. 44.
[33] *Id.* at p. 22.
[34] *Id.*

24. Please provide the resource report called for in Phase IV of the western burrowing owl protocol.

25. If not provided in the resource report called for in Phase IV of the western burrowing owl protocol, please provide data on any additional owl sign that was detected during Phase III surveys and a discussion of the discrepancy between the five apparently active burrows detected during Phase II and the conclusion that only two pairs of owls will be impacted within the survey area.

26. Please discuss any factors that would have led to owls being present within the survey area, but not detected, including, but not limited to, the potential for owls to have been flushed from their burrow(s) due to vehicle disturbance.

Background: IMPACTS TO THE MOJAVE GROUND SQUIRREL

In lieu of conducting focused surveys for the state listed threatened Mohave ground squirrel (*Spermophilus mohavensis*), the Applicant assumed presence of the species within identified suitable habitat.[35] However, the Applicant provided conflicting information regarding the amount of potentially suitable habitat that will be impacted. For example, the AFC concluded that only habitat west of SR-14 (116 acres) is suitable for the species.[36] However, the Applicant's response to CEC Data Request 18 discusses habitat compensation for possible incidental take of "transient" Mohave ground squirrels within the 429.5 acres of degraded Atriplex scrub and desert wash scrub communities that will be impacted by the Project.[37] Therefore, this 429.5 acre scrub community is potentially suitable habitat for "transient" ground squirrels that will be impacted.[38]

Further, the AFC provides no scientific evidence to support the inference that individuals presumed to occupy the Project area are likely transients. In fact, there are no concepts of wildlife-habitat relationships that support this reasoning, particularly for the large ecological scale being examined for the Project.

The AFC's reasoning regarding habitat suitability, quality, and function--and their relationships to animal density--is flawed. The AFC improperly:

(1) Disregards for "niche" factors (behavioral activities) that serve as determinants of where an animal occurs;

(2) Fails to recognize that wildlife-habitat relationships are complex and often require site-specific study before inferences can be made;

[35] AFC, Appendix F, p. 42.
[36] *Id.*
[37] Response to CEC Data Request 18.
[38] AFC, Appendix F.

(3) Fails to understand that the traditional definition of "habitat" incorporates habitat "elements" that may not provide food, water, or cover, but are essential to an organism's persistence; and

(4) Fails to recognize the difference between resource use and habitat, and the temporal (e.g., seasonal) nature of both resources and habitat in supporting an organism.

More information on these and other flaws is readily available in Braun 2005, Morrison et al. 2006, and other sources that discuss concepts of wildlife-habitat relationships.[39]

The AFC proposed mitigation for the Mohave ground squirrel based on a formula that incorporates ground squirrel density and habitat quality.[40] However, several limitations and ecological processes must be considered when density data are used to evaluate habitat quality.[41] For example, higher-quality habitats may be occupied by dominant individuals, forcing subdominants into lower-quality habitat. Thus, higher densities may be present in poorer, rather than better, habitats.[42] Although behavior studies of Mohave ground squirrels have provided mixed results, there is evidence that the species exhibits some form of territoriality.[43] As a result, use of presumed density to calculate appropriate mitigation is not appropriate without additional consideration and study.

Data Requests

27. Please clarify and quantify the potential for the Project to impact the Mohave ground squirrel.

28. Please describe and quantify the Project's "take," as defined by the California Endangered Species Act, of Mohave ground squirrel.

29. Please clarify how the Project will avoid incidental take of any Mohave ground squirrels within impact areas.

30. Please provide citations for the density studies that were used to calculate compensation land for Mohave ground squirrel and that were referenced in the applicant's response to CEC Data Request 18.

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[39] McDonald, L.L., J.R. Alldredge, M.S. Boyce, and W.P. Erickson. 2005. Measuring Availability and Vertebrate Use of Terrestrial Habitats and Foods. Pages 465-488 in C.E. Braun, editor. Techniques for Wildlife Investigations and Management. The Wildlife Society, Bethesda (MD); Morrison M.L., B.G. Marcot, and R.W. Mannan. 2006. Wildlife-Habitat Relationships: Concepts and Applications. 3rd ed. Washington (DC): Island Press.

[40] Response to CEC Data Request 18.

[41] Anderson, S.H. 1981. Correlating habitat variables and birds. Pages 538-542 in CJ Ralph and JM Scott, editors. Estimating numbers of terrestrial birds. Studies in Avian Biology 6.

[42] McDonald, L.L., J.R. Alldredge, M.S. Boyce, and W.P. Erickson. 2005. Measuring Availability and Vertebrate Use of Terrestrial Habitats and Foods. Pages 465-488 in C.E. Braun, editor. Techniques for Wildlife Investigations and Management. The Wildlife Society, Bethesda (MD).

[43] Stewart, G.R. 2005. Petition to list the Mohave ground squirrel (Spermophilus mohavensis). Defenders of Wildlife.

31. Please discuss the appropriateness of using Mohave ground squirrel density estimates to determine acreage of compensation land.

32. Please provide studies supporting the inference that density estimates can be used to calculate compensation acreage for Mohave ground squirrel and successfully mitigate impacts to below a level of significance.

33. Please clarify the definition of a "transient" individual and provide credible citations that discuss habitat use and value to transients.

34. Please provide the following additional information on the mitigation habitat being proposed for Mohave ground squirrel:
    (a) please discuss how land purchased for conservation will be "managed by fencing to improve habitat quality" given that the proposed mitigation land has been subject to off-highway vehicle use and livestock grazing, which may have permanently degraded or damaged existing habitat;[44] and
    (b) please clarify any other habitat improvement techniques that will be implemented in addition to fencing.

35. Please specify the intended use of the estimated $13,625 (or $13,225 if Transmission Line Option 2 is adopted) being proposed for enhancement of compensation lands.[45]

36. Please discuss how the proposed $13,625 (or $13,225 if Transmission Line Option 2 is adopted) for enhancement of compensation lands[46] will be used to enhance habitat for the Mohave ground squirrel, desert tortoise, and burrowing owl. Please quantify examples provided to illustrate what could be accomplished with the proposed funding.

37. Since off-highway vehicle routes may serve as a barrier to Mohave ground squirrel dispersal,[47] please discuss the ability for ground squirrels to disperse into and out of the proposed compensation area that has been subject to off-highway vehicle use.

38. Please discuss the timing of anticipated Mohave ground squirrel habitat improvement measures within the habitat compensation area.

39. Assuming that the availability of resources is a limiting factor in population size, and that the proposed conservation area is considerably smaller than the Project site, discuss how potentially occurring stochastic events will be mitigated and monitored to ensure sustainability of the Mohave ground squirrel population. Please include a discussion of any adaptive management that will be implemented if stochastic events occur.

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[44] Response to CEC Data Request 18.
[45] *Id.*
[46] *Id.*
[47] Stewart, G.R. 2005. Petition to list the Mohave ground squirrel (Spermophilus mohavensis). Defenders of Wildlife.

40. Please provide scientific support for the claim that compensation land that has at least ten individuals would support an "increased permanent reproductive population."[48]

Background: IMPACTS TO THE BURROWING OWL

To avoid potential impacts to the burrowing owl, the applicant proposes passively relocating owls and habitat compensation in the form of 6.5 acres per pair.[49] The AFC states that passive relocation of burrowing owls has been shown to be effective and suggests that it will adequately mitigate any potential adverse effects resulting from burrow eviction.[50] To support this statement, the applicant cites a two-year monitoring report conducted for another project in a non-desert ecosystem.[51]

Translocation of wildlife can have both positive and negative implications to the individuals released and the ecological community into which they are introduced.[52] With respect to burrowing owls, few studies have quantitatively studied the long-term effects of translocation, and those that have provide mixed results. Consequently, the rates of survival and reproduction of burrowing owls relocated to artificial burrows, as well as the long-term use of artificial burrows and the ability to maintain populations, are unknown.[53]

Data Requests

41. Please cite any long-term studies that have been conducted to document the survival and reproduction rates of burrowing owls relocated to artificial burrows.

42. Please discuss any additional monitoring results from the study cited in response to CEC Data Request number 20. If more comprehensive (i.e., longer term) monitoring results are not available, please cite any studies that have examined the ability of relocated owls to maintain populations through the long-term use of artificial burrows.

Background: IMPACTS TO BURROWING OWL HABITAT

Data obtained from burrowing owl surveys were used in conjunction with vegetation mapping efforts to subjectively evaluate burrowing owl habitat quality within the Project site. The applicant's response to CEC Data Request number 20 suggests that the Project site provides

[48] Response to CEC Data Request 18.
[49] Response to CEC Data Request 78.
[50] Response to CEC Data Request 20.
[51] *Id.*
[52] Mills L.S., J.M Scott, K.M. Strickler, and S.A. Temple. Ecology and Management of Small Populations in Bookhout T.A., ed. Research and Management Techniques for Wildlife and Habitats. Fifth ed., rev. Bethesda (MD): The Wildlife Society.
[53] Klute D.S., L.W. Ayers, M.T. Green, W.H. Howe, S.L. Jones, J.A. Shaffer, S.R. Sheffield, T.S. Zimmerman. 2003. Status assessment and conservation plan for the western Burrowing Owl in the United States. Bio Tech Pub FWS/BTP-R6001-2003. Washington: US Fish and Wildlife Service. Available at: http://mountain-prairie.fws.gov/birds.

sub-optimal burrowing owl habitat.[54] The AFC's conclusion that the Project site provides sub-optimal habitat for the burrowing owl is based on the belief that without continued disturbance, the site will become a dense scrub community inhospitable to burrowing owls.[55] Consequently, the AFC proposes mitigation based solely on two burrowing owls believed to be within the Project site boundary.

The AFC's conclusion that the Project site provides sub-optimal habitat for the burrowing owl is highly speculative for several reasons. First, it ignores naturally occurring sources of disturbance, like wildfire, that are effective in retarding plant succession.

Second, the conclusion conflicts with the AFC's description of the 1,785 acres of fallow agricultural-ruderal vegetation community present within the survey area. Specifically, the AFC states that the fallow agricultural-ruderal vegetation community "occurs in areas that are now unable to effectively retard soil loss through wind and water erosion."[56] Recovery following severe disturbance in alkali scrub communities, like other desert scrub communities, requires decades and perhaps centuries.[57] Vegetation cover in this portion of the Project site currently ranges from 0% to 2%.[58] Presumably, shrub colonization of the barren and degraded soils within the fallow agricultural-ruderal vegetation community would take an extremely long time, if ever, to shift to a community providing unsuitable vegetative conditions for burrowing owls.

As currently proposed, the Project will result in the elimination of approximately 2,012 acres of suitable, or potentially suitable, burrowing owl habitat. The applicant's proposal to conserve and enhance approximately 20 acres of burrowing owl habitat does not adequately mitigate potential impacts to the species.[59]

Data Requests

43. Please provide support for your conclusion that the Project site provides sub-optimal habitat for burrowing owl.

44. Please provide scientific information that supports the assumption that continued human disturbance is required to maintain burrowing owl habitat within the Project site.

Background: CUMULATIVE IMPACTS TO BURROWING OWL

The applicant stated that cumulative impacts to the burrowing owl will be avoided, because impacts associated with the Pine Tree Wind Development Project and the LADWP

[54] Response to CEC Data Request 20.
[55] *Id.*
[56] AFC, Appendix F, p. 29.
[57] Webb, R.H., H.G. Wilshire, and M.A. Henry. 1982. Natural recovery of soils and vegetation following human disturbance. Pages 279-302 In R.H. Webb and H.G Wilshire, editors. Environmental effects of off-road vehicles impacts and management in arid regions. Springer-Verlag New York.
[58] *Id.*
[59] Response to CEC Data Request 20.

Barren Ridge-Castaic Transmission Project will be mitigated.[60] However, the potential existence of project-level mitigation for other projects does not negate significant cumulative impacts. By definition, cumulative impacts are the result of additive or synergistic effects of a number of variables, often originating in separate locations.[61] Due to the nature of cumulative impacts, it is impossible to address them without a landscape or regional perspective.[62] Thus, the AFC failed to properly assess cumulative impacts, because it performed individual impact analyses for each of the three projects, rather than analyzing their combined effects.

Data Requests

45. Please provide support for the claim that the Project site lacks a suitable prey base.

46. Please discuss the potential cumulative impacts from the three projects on potentially suitable burrowing owl habitat and include, among other relevant factors, the following information:
    (a) The net gain or loss of habitat resulting from the three projects; and
    (b) a discussion of how the proposal to conserve habitat that is not adjacent to the Project site affects the regional availability of burrowing owl habitat.

47. Please discuss potential cumulative impacts from the three projects on the regional burrowing owl population and include a discussion of metapopulation dynamics that will be sustained despite habitat fragmentation.

Background: IMPACTS TO THE DESERT TORTOISE

The AFC identifies the potential for the Project to directly and indirectly impact the desert tortoise, a federal and state listed threatened species.[63] Two live desert tortoises and tortoise sign were detected in the survey area. Additional live tortoises and sign of tortoise activity were detected within the zone of influence and along or adjacent to the two potential transmission line routes and the pipeline corridor.[64] Despite these documented occurrences, the AFC concluded that:

(1) The survey area east of SR-14 has no value for desert tortoise conservation;[65]

(2) While there is potential that a desert tortoise would be observed in shrub patches or in the wash that cross the survey area, the use of these areas would be attributable to the proximity of the adjoining native habitat outside of the plant site, and is likely to be temporary due to the poor habitat quality within the plant site;[66]

[60] *Id.*
[61] Forman, R.T. 1995. Land Mosaics: The Ecology of Landscapes and Regions. Cambridge University Press, Cambridge. 632 pages.
[62] *Id.*
[63] AFC, Appendix F, pp. 60, 62.
[64] AFC, Appendix F, p. 39; AFC, 2008 Spring Survey Report, Figures 5a,b.
[65] AFC, Appendix F, p. 39.
[66] *Id.* at p. 40.

(3) While good tortoise habitat occurs south of the plant site, little habitat occurs within the plant site to define a corridor that would connect with this [good habitat];[67]

(4) The entire area within the plant site has been inappropriate desert tortoise habitat for decades as a consequence of agriculture-related disturbance. Therefore the area has had no value for desert tortoise population persistence or recovery for many years;[68]

(5) No fresh sign and only one Class 5 (deteriorated) adult tortoise burrow were seen within the plant site, east of SR-14, during desert tortoise surveys;[69] and

(6) A low possibility exists that one or few transient tortoises may be found in re-growth habitats that connect to native habitat off-site (e.g., in the wash or saltbrush scrub).[70]

Most of these statements are highly speculative, contradictory, or both. With respect to tortoise occurrence, the AFC cites no scientific literature to support the conclusion that a desert tortoise can occur in a location, but that the location does not provide habitat or serve as a corridor. By definition, all features of the environment surrounding an individual animal at any given point in time can be used to describe its habitat.[71] Even if transiency occurred in desert tortoise populations, adequate data from which to base an inference of transiency would require detailed study. The AFC cites no such study.

With respect to habitat, the AFC states that the entire Project site has been unsuitable desert tortoise habitat for decades. Yet, the Project site contains a Class 5 burrow, which was defined by the applicant's desert tortoise expert as "definitely tortoise - deteriorated such that it would require substantial remodeling to be usable."[72]

A research study on habitat use and food preferences of the desert tortoise in the western Mojave Desert recorded 35,356 foraging bites of 18 wild desert tortoises. The study involved observing both females and males, and immature and adult tortoises during three phenological periods.[73] From these observations the researcher calculated the ten most-preferred food plants consumed. These included Astragalus laynae, Lotus humistratus, and Mirabilis bigelovii. Some of the preferred plant species were uncommon or rare in the environment. For example, M. bigelovii constituted 29.7% of the bites taken even though it represented less than 1% of the perennial plants in the environment and far less of the total biomass of both ephemeral and perennial plants. All three of the preferred food sources listed above were documented as

[67] *Id.*
[68] *Id.*
[69] *Id.*
[70] AFC, Appendix F, p. 60.
[71] Morrison M.L., B.G. Marcot, and R.W. Mannan. 2006. Wildlife-Habitat Relationships: Concepts and Applications. 3rd ed. Washington (DC): Island Press.
[72] AFC, Appendix F, Attachment D.
[73] Jennings, W.B. 1997. Habitat Use and Food Preferences of the Desert Tortoise, Gopherus agassizii, in the Western Mojave Desert and Impacts of Off-Road Vehicles. Proceedings of the international conference on conservation, restoration, and management of tortoises and turtles; 1997; New York (NY): New York Turtle and Tortoise Society. pp. 42-45.

occurring within the Project survey area.[74] Given this information, it's nearly impossible to conclude that the site has "no value for desert tortoise conservation."

Data Requests

48. Please provide all studies of desert tortoise transiency that were prepared for the AFC.

49. Please provide scientifically defensible information that supports the AFC's conclusions regarding desert tortoise habitat, and the presence of tortoises in relation to that habitat. Alternatively, please provide a revised assessment of potential impacts to the desert tortoise.

50. If the applicant revised the assessment of impacts to desert tortoise since the filing of the AFC, please provide revised mitigation for impacts to desert tortoise.

Background: EFFECTIVENESS OF COMPENSATORY MITIGATION

The applicant intends to purchase compensation lands to mitigate impacts to wildlife species and special-status plants.[75] According to the AFC, "the ultimate goal is to acquire compensatory lands that would offset the loss of biological values associated with construction and operation of the BESP that cannot be completely addressed onsite."[76] The applicant proposed 30 to 31.6 acres of off-site compensatory mitigation for impacts to the desert tortoise, Mohave ground squirrel, and burrowing owl.[77] Because compensation habitat is expected to support all three species, its proposed size was based on impacts to the species requiring the maximum amount of compensatory habitat (i.e., two Mohave ground squirrels).[78]

The AFC makes three significant assumptions in concluding that compensatory mitigation will offset Project impacts to the desert tortoise, Mohave ground squirrel, and burrowing owl. The assumptions are:

(1) The Project site provides disturbed and degraded lands that are of low habitat and conservation value to the three target species;

(2) Target species density on-site is low due to poor-quality habitat; and

(3) Acquisition and conservation of high-quality habitat for the target species would provide for the long-term maintenance of a greater number of individuals despite its considerably smaller size.

Each of these assumptions relies on the ability to effectively evaluate habitat quality. In general, the AFC relies on vegetation community characteristics as indices of habitat quality

[74] AFC, 2008 Spring Survey Report, Appendix C.
[75] AFC, Appendix F, p. 79.
[76] Revised response to CEC Data Request 18.
[77] *Id.*
[78] *Id.*

(although some other factors are briefly mentioned).[79] However, wildlife habitat analysis typically requires much more than a reconnaissance-level evaluation of vegetation. In particular, many non-vegetative factors may influence habitat quality. These include population demography, population genetics, metapopulation dynamics, environmental stochasticity, species biogeography, evolutionary adaptations and selection measures, reproductive ecology and behavior, effects of other species, and effects of human activities.

Habitat per se can only provide part of the explanation of the distribution and abundance of an animal, because habitat by itself does not guarantee long-term fitness of individuals or viability of populations.[80] Habitat often fails as a predictor of performance because constraints on exploitation of critical resources and consideration of critical limiting factors have not been examined.[81] As a result, the key focus of habitat evaluation should be the determination of limiting agents in species abundance.

Non-vegetative factors, especially potentially limiting factors, need to be assessed before assumptions on habitat quality can accurately be made. Assessment of potentially limiting factors to the target species is particularly critical to the assumption that impacts to extensive "low-quality" habitat can be offset through provision of a small parcel of "high-quality" habitat. In particular, population viability in small reserves is known to be much more susceptible to environmental stochasticity than population viability in larger reserves.[82] Before a conclusion can be reached that compensatory mitigation will provide for the long-term maintenance of a greater number of individuals, information is required on how environmental stochasticity or other potentially limiting factors will be evaluated, monitored, and managed to provide for species conservation.

Data Requests

51. For each target species (i.e., desert tortoise, Mohave ground squirrel, burrowing owl), please provide scientific support for the assumption that the Project site provides low-quality habitat. In your answer, please include species-specific discussions of habitat parameters, including cites to studies supporting the use of such parameters, that were assessed, assessment techniques, and the effect of these parameters on habitat quality.

52. Please cite any species-specific studies that have examined the relationship between habitat quality parameters and species density.

53. For each target species, please provide a discussion of how habitat quality at potential mitigation sites will be evaluated.

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[79] *Id.*

[80] Morrison M.L., B.G. Marcot, and R.W. Mannan. 2006. Wildlife-Habitat Relationships: Concepts and Applications. 3rd ed. Washington (DC): Island Press.

[81] Morrison M.L., B.G. Marcot, and R.W. Mannan. 2006. Wildlife-Habitat Relationships: Concepts and Applications. 3rd ed. Washington (DC): Island Press.

[82] Meffe, G.K. and C.R. Carroll. 1997. Principles of Conservation Biology, 2nd edition. Sinauer Associates, Inc., Sunderland, MA.

54. Please provide a discussion of how the mitigation site(s) will offset the loss of biological values associated with construction and operation of the Project. In particular, please identify the biological values of interest, and how these values will be measured and monitored.

55. Please discuss studies of Mohave ground squirrel home-range size that support the habitat-productivity hypothesis, which suggests that home-range size and use of space vary in response to resource availability,[83] clarify potential Project impacts to Mohave ground squirrel resources, and discuss how resources at potential mitigation sites will be measured to ensure appropriate resource compensation.

56. Since roads, including off-highway vehicle routes, may serve as barriers and, hence, limiting factors to desert tortoise and Mohave ground squirrel movement,[84] and roads are unlikely to serve as the limiting factor for burrowing owls or special-status plants, please discuss how a single small mitigation area can be used to compensate for impacts to several species likely subject to unique limiting agents.

Background: IMPACTS TO THE NORTHERN HARRIER

CEC Data Request 22 requested a thorough analysis of direct, indirect, and cumulative impacts of the Project on several special-status species not addressed in the AFC. These included the loggerhead shrike, northern harrier, snowy plover, desert kit fox, and American badger. With respect to the northern harrier, the applicant responded by stating "the lack of detection within the Plant Site boundary…suggests that the project area provides only low-quality foraging habitat for the species."[85] However, the AFC states that "suitable habitat for northern harrier…occurs throughout the survey area."[86]

Failure to opportunistically detect an animal within an area does not suggest a value (either good or poor) on habitat quality of that area. There are many reasons why animals are not visually detected, including that the survey was conducted during the wrong time of day, season, or year. Further, absence of visual detection does not mean that an animal does not use the area. At best, it means that the animal did not use the area at the time the observer looked.

Inference of habitat quality requires intense study. On a continuum, the first inference is habitat use. Typically, this is assessed through animal-specific methods (e.g., following a single animal over time and quantifying habitat types used by the animal). Another method used to determine habitat use is habitat type specific, in which all habitat types of an area are delineated

[83] Harris, J.H., and P. Leitner. 2004. Home-Range Size and Use of Space by Adult Mohave Ground Squirrels, *Spermophilus Mohavensis*. Journal of Mammalogy. 85(3): 517-523.
[84] Boarman, W. I., M. Sazaki, and W. B. Jennings. 1997. The effect of roads, barrier fences, and culverts on desert tortoise populations in California, USA. In: J. Van Abbema (ed.), Proceedings: Conservation, Restoration, and Management of Tortoises and Turtles—An International Conference, pp. 54–58. July 1993, State University of New York, Purchase. New York Turtle and Tortoise Society, New York; [84] Stewart, G.R. 2005. Petition to list the Mohave ground squirrel (*Spermophilus mohavensis*). Defenders of Wildlife.
[85] Response to CEC Data Request 22.
[86] AFC, p. 5.3-22.

and observed, and any animals detected within each of the types are tallied and habitat use is inferred. The next inference is habitat preference, in which statistical procedures are employed to determine if animals use certain habitats at greater proportions than are available. Inference of habitat quality is the most difficult to ascertain. This requires specific information on limiting factors within the habitat type. For example, inferences on northern harrier foraging habitat quality would, at a minimum, require information regarding prey abundance and availability.

With respect to breeding habitat, the applicant stated "the lack of wetland habitats within the Project area indicates that nesting activity would not occur onsite."[87] However, lack of wetlands does not infer nesting did not occur. Additionally, this inference is contradicted by the applicant's statement that "northern harriers breed in open wetlands…old fields…and dry uplands, including upland prairies, mesic grasslands, drained marshlands, croplands, cold desert shrub steppe, and riparian woodland."[88]

To date, the applicant has based the northern harrier impact assessment simply on inferences of onsite foraging and breeding habitat. These inferences are supported only by reconnaissance-level observation data (of species occurrence), and not on any actual data of habitat quality. Furthermore, the applicant has selectively made assumptions about the ability of compensation lands to offset impacts to the harrier without any substantive information to support the assumptions. Consequently, the applicant has yet to provide an accurate assessment of potential direct, indirect, and cumulative impacts on the northern harrier.

Data Requests

57. Please provide a revised discussion of the Project's potential direct, indirect, and cumulative impacts on the northern harrier that includes a revised assessment of potential impacts on breeding and foraging habitat, or provide scientifically based data to support your conclusion that the site provides low-quality habitat.

58. Please discuss factors limiting abundance of northern harriers in the region.

59. Assuming abundance and population viability are resource dependant, discuss how resources will be quantified at compensation lands to ensure they offset resources that will be lost through Project implementation.

Background: IMPACTS TO THE DESERT KIT FOX

The applicant responded to CEC Data Request 22 by stating that "the Plant Site and natural gas pipeline buffer are relatively low-quality kit fox habitat, and if currently present within these areas, the species would occur at very low numbers."[89] The applicant has not provided any data to support the conclusion that the site provides low-quality kit fox habitat, or that, if the species were to occur, it would be at very low numbers.

[87] Response to CEC Data Request 22.
[88] *Id.*
[89] *Id.*

Data Requests

60. Please provide a revised discussion of the Project's potential direct, indirect, and cumulative impacts on the desert kit fox that includes a revised assessment of potential Project impacts on breeding and foraging habitat, or provide scientifically based data to support the conclusion that the site provides low-quality habitat.

Background: IMPACTS TO THE AMERICAN BADGER

The applicant responded to CEC Data Request 22 by stating that "the American badger was not detected during the project surveys."[90] This statement is misleading because badger surveys are typically conducted using spotlight techniques, track plates, and systematic searches for hair, tracks, and scat; not by retroactively assuming that badger burrows would have been identified during the course of transect surveys for the desert tortoise and burrowing owl.[91] Of the burrows that were detected, the applicant stated that "none were specifically deemed appropriate for the American badger."[92] However, the applicant does not provide any scientific data or discussion to support this conclusion.

The applicant provided additional information on the badger that is contradicted by published scientific literature. For example, the applicant stated "although the species is not expected to inhabit the plant site or any linear corridors, it has an extremely low potential to occasionally transit the site while foraging or traveling through its home range."[93] The applicant also stated that "the Plant Site consists of low-quality wildlife movement corridor resources (e.g., relatively sparse protective vegetative cover, and disturbance from off-highway activity and unauthorized dumping of trash)."[94] It should be clear that foraging and traveling within a home range constitutes habitat (or habitation), and that traveling through a site is potentially a sign of corridor use. In fact, badgers are commonly associated with open habitats, and therefore the suggestion that "sparse protective vegetative cover" would limit site use as a corridor is incorrect.[95]

Data Requests

61. Please clarify how American badger surveys were conducted. Specifically, please clarify whether surveyors were aware of the potential for the species to occur at the site during the time of surveys, and describe the specific techniques that were used to identify potential badger burrows.

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[90] Response to CEC Data Request 22.
[91] *Id.*
[92] *Id.*
[93] *Id.*
[94] *Id.*
[95] California Wildlife Habitat Relationships System. 2005. California Department of Fish and Game. California Interagency Wildlife Task Group. CWHR version 8.1 personal computer program. Sacramento (CA).

62. Please provide the field data that the AFC states were collected on burrow height, width, and depth,[96] and the following information on such data:

    a. Please annotate the data with information on the species using, or potentially using, each burrow;

    b. For burrows presumed to be vacant, please list the species presumed to have excavated the burrow; and

    c. Please specify how burrows were "deemed" not appropriate.

63. The applicant responded to the CEC data request 22 by stating that "badgers are primarily active during the day" and "the American badger is primarily nocturnal."[97] Please clarify the activity pattern of the American badger, and whether survey times corresponded with this pattern.

64. Please provide scientifically based data to support your statements that the site provides low-quality habitat and movement corridor resources.

Background: IMPACTS TO THE SAN EMIGDIO BLUE BUTTERFLY

The San Emigdio blue butterfly (*Plebulina emigdionis*) is a State listed special-status species endemic to the Mojave Desert region of California.[98] The San Emigdio blue butterfly is known to occur in shadscale scrub in desert canyons and near washes.[99] Fourwing saltbush (*Atriplex canescens*) is the host plant for the San Emigdio blue butterfly.[100] According to the AFC, fourwing saltbush was detected on the Project site.[101] No other information about the presence of fourwing saltbush is provided. If fourwing saltbush plants will be impacted by the Project, it may have an adverse effect on the San Emigdio blue butterfly.

Data Requests

65. Please provide additional information on the presence of fourwing saltbush plants within the Project site, including their abundance, geographic location(s), and physical characteristics.

66. Please discuss the potential for the Project to directly and indirectly impact the San Emigdio blue butterfly.

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[96] AFC, Appendix F: p. 21.
[97] Response to CEC Data Request 22.
[98] California Dept. of Fish and Game, UC Davis Wildlife Health Center. 2007. Chapter 7: Mojave Desert Region *in* California Wildlife: Conservation Challenges. California Dept. of Fish and Game Sacramento (CA).
[99] Opler, P.A., H. Pavulaan, R.E. Stanford, M. Pogue, coordinators. 2006. Butterflies and Moths of North America. Bozeman (MT): NBII Mountain Prairie Information Node. http://www.butterfliesandmoths.org/ (Accessed 26 Nov. 2008).
[100] California Department of Fish and Game, California Interagency Wildlife Task Group. 2005. California Wildlife Habitat Relationships version 8.1 personal computer program. Sacramento, California.
[101] AFC, 2008 Spring Survey Report, Appendix C.

Background: IMPACTS TO NESTING BIRD SPECIES

Migratory birds have the potential to nest within the Project site. The Migratory Bird Treaty Act ("MBTA") prohibits the "take" of migratory birds and their active nests containing eggs or young. To comply with the MBTA, the AFC indicates that if construction is scheduled to occur during the nesting season, a nesting bird survey will be conducted within permanent and temporary impact areas. If nesting birds, including but not limited to special status species, are detected in these areas, the nest will be flagged and no construction activity will take place near the nest until nesting is complete (i.e. nestlings have fledged or the nest has failed).[102]

Locating bird nests can be extremely difficult due to the tendency of many species to construct well-concealed or camouflaged nests. As a result, most studies that involve locating bird nests employ a variety of techniques beyond simply searching for nests. These include efforts focused on observing bird behavior. Often, the results of these observations are sufficient to infer nesting, or not, without having to locate the actual nest. For example, a bird carrying food or nesting material can be a strong cue that a nest is located nearby or under construction.

In addition to their varied efficacy, some nest searching techniques have the potential to reduce nest success if not conducted appropriately.[103] Specifically, studies indicate that humans can alert predators to a nest's location, or cause disturbance that results in nest abandonment.[104] The AFC does not provide information on the specific methods that will be used to conduct the pre-construction nesting bird survey. Information on these methods is needed to ensure that the Project complies with the MBTA.

Data Requests

67. In order to ensure that the Project complies with the Migratory Bird Treaty Act, please provide the specific methods that will be used to conduct pre-construction nesting bird surveys. In your answer, please do the following:

    a) Discuss whether additional survey effort will be devoted to instances in which nesting cues (e.g., carrying food, territorial behavior) are observed but a nest cannot be located.

    b) Discuss how the applicant will ensure that well-concealed or camouflaged nests are located and not adversely affected by Project activities.

68. Please discuss the methods that the applicant will use to minimize surveyor-induced predation, nest disturbance, or abandonment.

[102] AFC, Appendix F, p.81.
[103] Gotmark F. 1992. The effects of investigator disturbance on nesting birds. Current Ornithology 9: 63-104.
[104] Martin T.E., and G.R. Geupel. 1993. Nest-Monitoring Plots: Methods for Locating Nests and Monitoring Success. J. Field Ornithol. 64(4):507-519.

Background: IMPACTS TO BIRDS FROM COLLISION HAZARDS

Fish and Game Code sections 3503.5 and 3513 prohibit "take" of migratory nongame birds and birds-of-prey. Mortality resulting from birds striking windmills, buildings, towers, and other man-made, elevated structures has been well-documented in the scientific literature.[105] A 1986 study of avian mortality at a solar energy plant in the Mojave Desert concluded that 81% of dead birds found on site died from collision with physical structures of the solar field.[106] In addition, collisions with transmission lines have also been documented as a source of bird mortality. Commonly associated with migratory birds, collisions are likely to occur during periods of darkness or inclement weather, and usually occur when birds impact overhead ground wires.

The Project's solar field will encompass 1,244 acres of mirrors and heat collection elements, among other equipment.[107] In addition, the Project proposes the construction of a 3.5 mile transmission line, 1.6 miles of which will exist within the plant site.[108]

According to the AFC, the Project site lies along an inland shorebird migration route, connecting the Central Valley with the Gulf of California.[109] Several species of migratory birds and raptors are known to occur on the project site and within the project vicinity.[110] However, the AFC failed to provide an analysis of impacts to birds from collisions with project structures.

Data Requests

69. Please provide a discussion of collision hazards to birds from the Project's proposed transmission line, mirrors, and other structures on-site. Please include any studies that support the applicant's conclusions.

70. Please describe mitigation measures that the Project will employ to avoid impacts to birds from collisions.

Background: IMPACTS TO BIRDS FROM HEAT ENCOUNTERED

Fish and Game Code sections 3503.5 and 3513 do not allow "take" of birds-of-prey or migratory nongame birds. A 1986 study of avian mortality at a solar energy plant in the Mojave

[105] US Fish and Wildlife Service, Office of Migratory Bird Management. 1998. Bird kills at towers and other human-made structures: An annotated partial bibliography (1960-1998) [internet; cited 2008 Jun 12]. Available at: http://www.fws.gov/migratorybirds/issues/tower.html.
[106] McCrary, M. D., R. L. McKernan, R. W. Schreiber, W. D. Wagner, and T. C. Sciarrotta. 1986. Avian mortality at a solar energy power plant. J. Field Ornithol. 135-141.
[107] AFC, p. 2-8.
[108] *Id.* at p. 5.3-24.
[109] *Id.* at p. 5.3-17.
[110] *Id*.

Desert concluded that the heat generated from the reflective surface of mirrors was high enough to kill birds.[111]

The Project consists of a 1,244-acre solar collector field made up a large field of many rows of solar collectors.[112] Each solar collector focuses the sun's radiation on a receiver.[113] The solar collectors track the sun to ensure that the sun is continuously focused on the receivers.[114]

According to the AFC, several species of birds were observed within the project site study area.[115] However, the AFC failed to analyze potential impacts to birds from the heat that birds would encounter when flying between the collectors and receivers.

Data Requests

71. Please provide a discussion of potential bird mortality from the heat generated by the Project's collectors.

72. Please provide monitoring data from similar solar facilities.

73. If monitoring data is not available from similar facilities, please develop and describe a monitoring plan to analyze whether the heat will cause significant impacts to birds.

74. Please describe mitigation measures that the Project will employ to avoid impacts to birds from heat encountered while flying between the collectors and receivers.

Background: RAVEN MANAGEMENT PLAN

The applicant submitted a Raven Monitoring, Management, and Control Plan on October 21, 2008. The plan discusses monitoring, management, and control measures that will be implemented to minimize the potential for the Project to attract ravens. The intent of the monitoring portion of the plan is to identify any substantial and sustained increase in raven activity. If increased raven activity is detected, the plan states that the applicant may need to implement adaptive management. Thus, the need to implement adaptive management hinges on adequate monitoring data.

The plan proposes conducting biweekly surveys for raven activity at pre-designated locations throughout the Project site.[116] Surveys will begin when the plant is operational, and will continue for the life of the Project.[117] Surveys will consist of five-minute sampling sessions

[111] McCrary, M. D., R. L. McKernan, R. W. Schreiber, W. D. Wagner, and T. C. Sciarrotta. 1986. Avian mortality at a solar energy power plant. J. Field Ornithol. 135-141.
[112] AFC, p. 2-7.
[113] *Id.*
[114] *Id.*
[115] *Id.* at p. 5.3-17.
[116] Beacon Solar Energy Project Raven Monitoring, Management, and Control Plan, October 2008, pp. 6-7.
[117] *Id.*

at each pre-designated location, during which time the surveyor will observe and listen for ravens. It is unclear how data from the surveys will be analyzed, and whether data from five-minute sampling sessions will be adequate enough to provide reliable inferences for raven population trends. Given the potentially significant impacts ravens can have on desert tortoises and other special-status species, adequate data is essential to adaptive management.

Further, the plan states that the applicant will agree to pay in-lieu fees to USFWS in place of quantitative raven monitoring.[118] According to the plan, the in-lieu fees will be contributed to a future quantitative regional monitoring program aimed at understanding the relationship between development in the region, raven population growth, and raven impacts on desert tortoise populations.[119]

Data Requests

75. Please discuss the baseline data that will be used to assess raven population growth and expansion.

76. Please quantify the thresholds for a "substantial" and "sustained" increase in raven activity and explain the basis for your answer.

77. Please provide the estimated number of pre-designated observation locations.

78. Considering known behavior patterns of the species and the potential for observer-induced bias (e.g., raven activity resulting from observer presence), please discuss the adequacy of five-minute surveys in providing sufficient data from which to infer correlations between Project features, raven activity, and the need for adaptive management.

79. Although ponds will be designed to prevent ravens from walking down the sides or accessing water from the pond's perimeter,[120] please discuss the ability of ravens to access water by landing on the pond's bank when water level is below maximum capacity.

80. Please provide all correspondence between the applicant and the wildlife agencies regarding the quantitative regional monitoring program.

81. Please provide all portions of the regional monitoring program that have been developed.

82. Please explain how the regional monitoring program will mitigate project-level impacts.

83. Please provide the amount of the in-lieu fee, and explain how the amount of the in-lieu fee was determined.

[118] *Id.* at p. 4.
[119] *Id.*
[120] *Id.*

Background: DESIGN OF EVAPORATION PONDS

According to data response number 74, submitted October 13, 2008, the Project pond system was designed based on a calculated monthly water balance between plant wastewater discharge and evaporation. In its supplemental response to CEC data request number 14, submitted November 26, 2008, the applicant committed to modifying the baseline minimum water level in the ponds to two feet, as opposed to a one-foot minimum water depth as originally proposed.

Project pond management will include outfitting each pond with a level gauge for daily water level measurements, a hydrometer for daily salinity measurements, and a direct reading thermometer.[121] To minimize the potential for waterfowl deaths by salt toxicosis and salt encrustation following very low water levels, the Project should consider use of water level and water quality loggers with alarms that enable management response in a more-timely manner.

Further, at the November 6, 2008 workshop, Julie Vance, of the CDFG, recommended that the applicant consider the use of netting as a fall-back measure if monitoring shows that the ponds are impacting birds.

Data Requests

84. Please explain how the increased water level in the ponds will change the design of the ponds, and whether such changes will impact pond access to birds, taking into consideration that the proposed minimum pond freeboard requirement is two feet.

85. Please indicate whether the applicant is willing to accept a Condition of Certification that the Project will implement water level and water quality loggers with alarms.

86. Please indicate whether the applicant is willing to accept a Condition of Certification that the Project will employ netting in the event that birds continue to use the ponds/

Background: IMPACTS TO BIRDS FROM EVAPORATION POND HYPER-SALINITY

The evaporation ponds will receive process water that will contain an estimated total dissolved solids ("TDS") concentration of 5579 mg/L.[122] The applicant stated that the evaporation pond discharge would include concentrations of TDS that could lead to hyper-saline conditions.[123] Hyper-salinity is known to have toxic impacts on waterfowl. The Bureau of Land Management has described effects of salinity conditions on waterfowl as follows:

[121] Response to CEC Data Request 14.
[122] Supplemental Response to CEC Data Request 14.
[123] Response to CEC Data Request 14.

(1) Sodium levels as low as 821 ppm reduced growth in 1-day-old mallard ducklings exposed for 28 days;

(2) Mallard ducklings that drank water with 3,000 ppm of sodium had reduced thymus size and bone strength;

(3) Concentrations between 8,800 and 12,000 ppm caused 100 percent mortality in mallard ducklings; and

(4) In adult waterfowl, sodium concentrations of 17,000 ppm caused a die-off when fresh water was unavailable.[124]

Hyper-saline conditions have been noted elsewhere in the area of the Mojave Desert which can lead to salt encrustation on birds, impeding their ability to fly. In Trona, California, approximately 50 miles from the Project site, hyper-salinity has led to the death of over 3,000 birds from 2002 to 2007.[125] Over 60 species have been impacted, including various waterfowl, wading birds, raptors, and songbirds.

The applicant stated that "studies have shown that the formation of salt crystals on hyper-saline ponds requires water temperatures at or below 4 degrees Celsius (39 degrees Fahrenheit)…It is not anticipated that water temperatures will consistently drop to this level of concern."[126] However, the average minimum temperature, as reported for California City, 17 miles southeast of the Project site, is 33 degrees Fahrenheit in December,[127] well below the temperature that was cited as necessary for the formation of salt crystals.

The revised response to data request number 14, submitted October 13, 2008, stated that the risk to birds from the evaporation ponds is related to the concentration of constituents in the evaporation pond water, and therefore analysis of the risks focuses on pond water quality. At the November 6, 2008 workshop, the applicant stated that the applicant anticipates that the concentration of TDS in the evaporation ponds will remain the same over time. However, when describing the Harper Lake Solar Electric Generating System ("SEGS") site, the revised response to data request number 14 states that "TDS concentrations appear to increase over time." In fact, the TDS concentrations tripled over a ten year period.

The applicant proposed mitigation measures to minimize impacts to waterfowl from hyper-saline conditions in the evaporation ponds, including dilution of pond water, temperature monitoring, and visual inspection for the formation of salt crystals. However, none of the measures occur at night when waterfowl typically migrate and when researchers have estimated that 80 percent of bird deaths occur.[128]

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[124] http://www.blm.gov/pgdata/etc/medialib/blm/nv/field_offices/ely_field_office/energy_projects/toquop_energy/toquop_2003_feis.Par.99472.File.dat/17%20

[125] http://www.dfg.ca.gov/ospr/spill/nrda/nrda_searles.html

[126] Response to CEC Data Request 14.

[127] http://www.idcide.com/weather/ca/california-city.htm

[128] http://www.dfg.ca.gov/ospr/spill/nrda/serles_injury.pdf

The revised response to data request number 14 states that bird mortalities at the SEGS site have been minimized by raising water levels (and thus lowering the concentrations of TDS). Thus, the applicant proposes that by maintaining a minimum water level in the Project's evaporations ponds, risks to birds will be minimized. In efforts to avoid using additional groundwater, the applicant proposes to maintain a minimum water level by pumping water from one or two ponds to the third pond. The applicant assumes that because the Project's ponds will be operated in a manner similar to the SEGS site, it is anticipated that impacts to birds will be avoided.

Data Requests

87. Please provide TDS concentrations, as well as major anion and cation concentrations, in the evaporation ponds under a range of conditions and compare to ecologic screening levels to determine if concentrations may pose a risk to waterfowl.

88. Please provide a detailed plan, which specifically considers the physical conditions at the Project site that are favorable to the formation of salt, to prevent formation of salt crystals.

89. Please provide an explanation for the discrepancy between the applicant's statement that TDS concentrations will remain the same over time, and the data showing that TDS concentrations tripled over a ten year period at the SEGS facility.

90. Please provide scientific support for the statement that TDS concentrations will remain the same over time.

91. Please propose mitigation to protect birds from encrustation that specifically considers bird species that are expected at the evaporation ponds, including duration of seasonal and daily exposure.

92. Please identify any differences in pond management between the SEGS site and the Project.

93. Please explain how the SEGS site maintains minimum water levels (e.g., adding groundwater or pumping from one or two ponds to a third pond).

94. If the SEGS site does not maintain minimum water levels by pumping from one or two ponds to a third pond, and given that TDS concentrations will increase over time, please provide support for the assumption that by pumping from one or two ponds to the third pond impacts to birds will be minimized.

Background: IMPACTS TO BIRDS FROM EVAPORATION POND SELENIUM

The applicant has estimated the selenium concentration in surface water to be discharged into the evaporation ponds at 2.8 ppb.[129] The applicant stated that the cited concentration is "approximately 40 times lower than the most sensitive ecological risk benchmark [110 ppb] that observable adverse effects have been documented for waterfowl, and ranging to more than 3,000 times lower than concentrations at which an adverse effect has been documented."[130] The applicant estimated selenium concentrations to be discharged to the evaporation ponds from the following individual source terms at the following concentrations:

(1) Mean well water concentration: 0.39 ppb;

(2) Cooling tower blowdown: 0.6 ppb; and

(3) Ion exchange regeneration: 4.5 ppb.

Discharge of selenium is subject to the California Toxics Rule which establishes a water quality criterion for selenium of 5 ppb. Selenium concentrations in wastewater have been limited by California regulatory agencies to concentrations as low as 4 ppb, as demonstrated by the following examples:

(1) The California Regional Water Quality Control Board ("RWQCB"), Central Valley Region, required the City of Davis to limit selenium discharge in effluent to a weekly average of 5 ppb;[131]

(2) The RWQCB, Colorado River Basin Region, required the City of El Centro to limit selenium discharge in effluent to a monthly average of 4 ppb;[132] and

(3) The City of Davis 2001 National Pollutant Dishcarge Elimination System ("NPDES") permit limits selenium discharge in effluent to a four-day average of 5 ppb and to a one-hour maximum of 20 ppb.[133]

Selenium is generally thought to exhibit moderate toxicity to aquatic organisms at concentrations of 2 ppb to 5 ppb and high toxicity at concentrations of greater than 5 ppb.[134,135] The cited examples and ecologic screening levels are well below the 110 ppb value cited by the applicant as the "most sensitive ecological risk benchmark."

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[129] Supplemental Response to CEC Data Request 14.
[130] Response to CEC Data Request 14.
[131] R5-2008-0601 City of Davis http://www.swrcb.ca.gov/rwqcb5/board_decisions/adopted_orders/yolo/r5-2008-0601_enf.pdf
[132] R7-2006-0075 City of El Centro http://www.swrcb.ca.gov/rwqcb7/board_decisions/adopted_orders/orders/2006/06_0075.pdf
[133] City of Davis DPDES http://cityofdavis.org/pw/water/pdfs/WWExecSumm_Website.pdf
[134] http://www.owue.water.ca.gov/docs/06-EvapPonds.pdf
[135] http://www.saltonsea.water.ca.gov/calendar/ac/06.02.2006/ImpactAssessment_EcologicalRisk.pdf

The applicant has proposed to take action to reduce selenium concentrations if the ponds "become a hazard for wildlife."[136] The applicant has proposed that when selenium concentrations reach 110 ppb, or more than 20 times the maximum concentrations imposed by regulatory agencies for selenium discharge in wastewater, the ponds will be emptied, cleaned of precipitate, and refilled.[137] Other actions proposed by the applicant include avian monitoring at least twice a month to document any mortalities, birth defects or reduced growth. The applicant's proposed trigger for remedial action would be the documented mortality of birds from selenium poisoning and water quality testing showing selenium concentrations above the cited ecological risk assessment benchmark of 110 ppb. Only when there is documented selenium-related mortality of birds and when evaporation pond water quality exceeds selenium concentrations of 110 ppb, will the evaporation ponds will be emptied of precipitate and sludge to reduce concentrations to the 110 ppb benchmark that is cited by the applicant as protective of waterfowl.[138]

In its response to CEC Data Request 14, the applicant stated that "ducks and coots appear to be most sensitive to selenium contamination, with black-necked stilts being moderately sensitive, and American avocets being more tolerant…Similar projects have used toxicity levels as the standard for monitoring selenium levels."[139] If waterfowl are more sensitive to selenium than are avocets, the effects on waterfowl would occur before management actions are enforced. Mortality data from the Harper Lake SEGS site reveal that waterfowl were the most affected.[140]

Data Requests

95. Since selenium is generally thought to exhibit moderate toxicity to aquatic organisms at concentrations of 2 ppb to 5 ppb and high toxicity at concentrations of greater than 5 ppb,[141,142] please provide the source of the cited "most sensitive ecological risk benchmark" of 110 ppb.

96. Please describe NPDES discharge requirements for selenium that would likely be imposed by the RWQCB and how the discharge requirements will be met in wastewater discharged to the ponds upon evaporation as selenium concentrations increase.

97. Please provide data and detailed calculations for deriving the estimated selenium concentration of 2.8 ppb for discharge water to the evaporation ponds.

98. Please provide data and included detailed calculations for deriving the estimated concentrations for selenium to be discharged to the ponds from water wells (0.39 ppb), the cooling tower (0.6 ppb), and the ion exchange regeneration (4.5 ppb).

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[136] Supplemental Response to CEC Data Request 14.
[137] *Id.*
[138] *Id.*
[138] *Id.*
[139] Response to CEC Data Request 14.
[140] Response to CEC Data Request 75.
[141] http://www.owue.water.ca.gov/docs/06-EvapPonds.pdf
[142] http://www.saltonsea.water.ca.gov/calendar/ac/06.02.2006/ImpactAssessment_EcologicalRisk.pdf

99. Please explain why selenium tolerance levels are based on avocets, which have an intermediate sensitivity level, rather than on waterfowl, which are more sensitive to selenium.

Background: IMPACTS TO SPECIAL STATUS BAT SPECIES

Special-status bat species have been documented as occurring in the vicinity of the Project site.[143] These include the pallid bat (*Antrozous pallidus*) and spotted bat (*Euderma maculatum*). Both species may use buildings for roosting.[144] According to the AFC, abandoned buildings occur at the northwestern portion of the site that abuts the east side of SR-14, immediately south of the proposed access road to the plant site.[145] Although special-status bat species have the potential to use the Project site for roosting or foraging, the AFC does not provide an analysis of potential Project-related impacts on special-status bat species.

Data Requests

100. Please discuss the potential for special-status bat species to be directly or indirectly impacted by the Project.

101. Please provide a mitigation strategy for potential Project impacts to special-status bat species.

Background: IMPACTS TO NATIVE DESERT VEGETATION

The Project area contains silver cholla (*Cylindropuntia echinocarpa* ssp. *echinocarpa*) and the Joshua tree (*Yucca brevifolia*), which are protected under the California Desert Native Plants Act ("Native Plants Act").[146]

The Native Plants Act requires the following for issuance of a permit:

- The name, address, and telephone number of the applicant;
- The amount and species of native plants to be transported;
- The name of the county from which the native plants are to be removed;
- A description sufficient to identify the real property from which the native plants are to be removed;
- The name, address, and telephone number of each landowner from whose property the native plants are to be removed;

[143] AFC, Appendix F, Figure 4.
[144] California Wildlife Habitat Relationships System. 2005. California Department of Fish and Game. California Interagency Wildlife Task Group. CWHR version 8.1 personal computer program. Sacramento (CA).
[145] AFC, Appendix F, p.2.
[146] California Food and Agriculture Code division 23, chapter 7, section 80073.

- The applicant's timber operator permit number, if the harvesting is subject to the Z'berg-Nejedly Forest Practice Act of 1973;
- The proposed date or dates of the transportation;
- The location of the office of the peace officer who will validate the tag or tags;
- The destination of the native plants;
- The ultimate use of the native plants; and
- Make, model, and license number of the transportation vehicle.[147]

Data Requests

102. Since the Project area contains protected silver cholla and the Joshua tree, please address the Project's compliance with the California Desert Native Plants Act.

103. Please provide information regarding the significance of the impact from removing, displacing or disturbing the silver cholla and Joshua trees within the Project area.

104. Please provide the number of silver cholla found in the Project area.

105. Please provide the number of Joshua trees found in the Project area.

106. Please explain how the applicant will mitigate the loss of silver cholla and Joshua trees.

Background: IMPACTS TO MOJAVE TARPLANT

The AFC states that Mojave tarplant (Deinandra mojavensis) has the potential to occur on or in the vicinity of the Project site. Mojave tarplant has been listed as endangered by the State of California and as a "1B" species by the California Native Plant Society. This species is separable from other members of the section Madiomeris by the combination of yellow anthers, a disk pappus of short scales, five ray flowers (and phyllaries), entire basal leaves, and a densely flowered inflorescence.[148] These features are evident during the plant's flowering period, which is typically July through October.[149]

Four Project biologists conducted focused surveys for Mojave tarplant from July 1 through July 3, 2008. The survey area included the Project site, transmission line options, and the 17.6-mile gas pipeline corridor.[150] The AFC states that no Mojave tarplants were detected during the surveys, and that the species is not expected to occur in the survey area.[151] However, the information presented in the AFC suggests that focused surveys for Mojave tarplant were not conducted according to established protocols, particularly the amount of survey effort necessary

[147] California Food and Agriculture Code, division 23, chapter 7, section 80114.
[148] Hickman, J.C., editor. 1993. The Jepson Manual: Higher Plants of California. Berkeley, CA: University of California Press. 1400 pp.
[149] California Native Plant Society. 2008. Inventory of Rare and Endangered Plants (online edition, v7-06b). <http://www.cnps.org/inventory>. Accessed on Apr. 24, 2006.
[150] Beacon Solar Energy Project - 2008 Spring Survey Report, A-1.
[151] Beacon Solar Energy Project - 2008 Spring Survey Report, p. 36.

to provide thorough coverage of potential impact areas.[152] Consequently, the AFC failed to adequately demonstrate that the Project will not result in significant impacts to this state-listed endangered species.

Data Requests

107. Please provide the specific methods that were used to conduct focused surveys for Mojave tarplant. In your answer, please include: (1) the total number of man-hours devoted to each survey day; (2) the role of each individual that participated; (3) spacing of transects; and (4) whether surveyors worked independently or in teams.

108. Please provide precise information on the locations of Mojave tarplant survey transects established by the survey team. Please address any extra level of effort (e.g., closer transect spacing) that was devoted to washes, swales, or other potentially suitable habitats.

109. Please discuss the extent to which established survey protocols were followed, including a description of any reference site(s) visited and the phenological development of Mojave tarplant at the reference site(s).

110. Please provide information on the floristic field survey experience of the individuals that conducted the surveys, including any past experience identifying Mojave tarplant.

Background: IMPACTS FROM REROUTING DESERT WASHES

The Project proposed to reroute two desert washes that cross the Project site. CEC Data Request 17 asked for a discussion on how a newly-created channel would replicate the functions and values of the natural desert washes that would be impacted. The applicant responded by stating that the newly-created channel will replicate the functions and wildlife values of a natural desert wash because the soils, morphology, hydrology, and resulting biota of the rerouted wash will interact in a similar manner as a natural desert wash.[153] Although the supplemental information provided by the applicant is helpful in evaluating the wash mitigation strategy, it does not adequately address the challenges associated with establishing a natural ecological community in a created environment.

[152] Assuming 4 individuals conducting surveys for 4 days would provide approximately 176 man-hours of survey effort.
[153] Response to CEC Data Request 17.

PLANTING PLAN

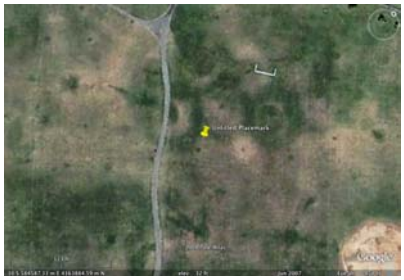
The applicant intends to establish at least 4.8 acres of native desert wash vegetation within the rerouted channels. In addition to providing habitat, establishing vegetation is intended to control erosion and provide bank stabilization.[154] The AFC suggests that mitigation would be achieved by "onsite and in-kind planting of desert wash scrub vegetation."[155] However, the conceptual mitigation plan proposes hand-seeding only and does not discuss any planting that will occur.[156] Clarification of the implementation portion of the mitigation plan is needed before its likelihood of success can be evaluated.

EXTENT OF PROPOSED MITIGATION

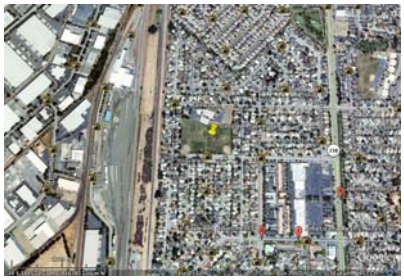
The Project's proposal to reroute two desert washes will result in permanent impacts to approximately 16.0 acres of state waters. This includes 13.6 acres of unvegetated state waters and 2.4 acres of vegetated wetlands.[157] The AFC proposes a 1:1 mitigation ratio for impacts to unvegetated state waters, and a 2:1 mitigation ratio for impacts to vegetated wetlands.[158] The applicant's intent to mitigate impacts to state waters by rerouting desert washes and re-establishing lost functions and values is clear. However, the AFC does not clearly articulate how these functions and values will be measured, or the remedial actions that will be taken if these functions and values are not achieved.

Success standards established in the conceptual mitigation plan relate to cover values for both non-native species and native plants.[159] For example, the plan proposes success standards of less than2% non-native species cover and at least 26% native plant cover by year five.[160] Cover is defined as the vertical projection of the crown or stem of a plant onto the ground surface.[161] Cover measurement occurs at a user-defined scale, and the scale considered may greatly alter the outcome. For example, suppose one was interested in determining the amount of cover provided by grass in an urban environment. If the scale under consideration relates only to the lawn area itself, a healthy lawn may provide nearly 100% cover. However, if the scale of interest is larger, and relates to the entire neighborhood, grass cover would be considerably less. The figures depicted below illustrate this example. The grass shown is from the same location.

[154] AFC, Appendix F, p. 73.
[155] *Id.*
[156] AFC, Conceptual Mitigation Plan, p. 8.
[157] *Id.* at p.6.
[158] *Id.*
[159] *Id.* at p. 15.
[160] *Id.*
[161] Higgins, K.F., K.J. Jenkins, G.K. Clambey, D.W. Uresk, D.E. Naugle, J.E. Norland, and W.T. Barker. Vegetation Sampling and Measurement in Bookhout T.A., ed. Research and Management Techniques for Wildlife and Habitats. Fifth ed., rev. Bethesda (MD): The Wildlife Society.



Grass cover measured at fine scale (approximately 95% cover).



Grass cover measured at coarse scale (approximately 5% cover).

The AFC provides unclear information regarding how cover was measured for determining impacts to vegetated versus unvegetated washes, and how cover will be measured to determine if success criteria are met. Considering the importance of scale when discussing cover values, specification of measurement techniques is vital to evaluating the expected replacement values that will be provided by the proposed mitigation area.

INVASIVE WEED CONTROL

The AFC discusses the intent to mitigate the adverse effects of non-native invasive plant species whose establishment may be facilitated by ground disturbance and other Project activities. This includes control of exotic plants within the rerouted washes and "wherever possible."[162] Tamarisk (Tamarix ramosissima) and several invasive species have been documented in the Project vicinity.[163] Newly engineered desert washes will be highly susceptible to tamarisk invasion. Tamarisk spreads easily but is very difficult to eliminate. Individual plants can produce 500,000 seeds per year, and shoots can grow three to four meters per season.[164] For this species in particular, long-term monitoring and sustained control are essential, as some tamarisk is capable of re-sprouting following treatment (kill rates average less than or equal to 90%).[165]

The AFC appears to propose non-native species control for five years, after which time control methods will be deemed successful if non-native species cover is less than 2%.[166] In aquatic environments, including washes, non-water soluble herbicide may be used as a control measure. This includes use of Rodeo ® or Aquamaster ®. Both of these herbicides are non-selective and will require careful application to be successful at controlling target species without killing seedlings established by hand-seeding efforts.

[162] AFC, Appendix F, p. 72.
[163] AFC, Conceptual Mitigation Plan, p. 14.
[164] Bossard, C.C., J.M. Randall, and M.C. Hoshovsky, eds. 2000. Invasive Plants of California Wildlands. University of California Press, Berkeley (CA).
[165] *Id.*
[166] AFC, Conceptual Mitigation Plan, p. 15.

It is unclear whether invasive species can be controlled within the five-year period proposed in the mitigation plan. This is especially true for extremely invasive species such as tamarisk, which has a relatively low kill rate. In addition, it is unclear whether the success criteria established in the mitigation plan account for tamarisk's ability to persist and spread as long as there is a seed source in the area.

Data Requests

111. Please provide a map depicting the proposed locations of rerouted desert washes, the location of proposed fencing in relation to the washes, and location of the proposed vegetation establishment zone(s).[167]

112. Please clarify whether and how wildlife will access portions of the washes enclosed by fencing.

113. Please clarify whether implementing the mitigation plan will involve planting, or only hand-seeding. If only hand-seeding is proposed, please discuss the ability of seedlings to effectively control erosion and provide bank stability.

114. Please discuss how erosion and bank stability will be monitored, including any quantitative data that will be collected. In your answer, please discuss how naturally occurring erosion and sedimentation will be distinguished from that resulting from the Project (and thus the need to implement adaptive management). Include a discussion of any acceptable levels of erosion and the corresponding threshold beyond which adaptive management will be necessary.

115. Please provide additional discussion about the abundance and cover of any vegetation present within portions of the "mostly unvegetated" wash that will be impacted by the Project. In your answer, please include a discussion of the scale used in making the determination.[168]

116. Please provide the techniques that will be used to estimate cover in the mitigation area.

117. Considering the Applicant's proposal that the Project biologist make a determination on whether further action is warranted should the cover goal not be met,[169] please discuss the data that will be collected to determine that the site is a "healthy" ecosystem overall, and that vegetative and ecological regeneration are sufficient to deem the mitigation area a success.[170] In your answer, please describe a scenario for which it would be acceptable for the Project biologist to conclude that further action (including monitoring) was not warranted, even though success standards had not been met.

[167] The AFC references Figure 2 as showing the locations of rerouted washes; however, washes are not depicted in the figure.
[168] AFC, Appendix F, p. 73.
[169] AFC, Conceptual Mitigation Plan, p. 16.
[170] *Id.*

118. Please list the areas that will be subject to non-native weed control and clarify what the applicant means by "wherever possible."[171]

119. In light of the fact that invasive species control can be extremely difficult and often unsuccessful, please explain the AFC's conclusion that "efforts to avoid the increase in exotic vegetation" will reduce impacts to surrounding vegetation communities to a "level of insignificance."[172]

120. Please justify the relatively short five-year control period and provide documentation that the timeframe and methods proposed in the mitigation plan have been successful in preventing long-term establishment of invasive species following similar types of anthropogenic disturbance.

121. Please justify using less than 2% cover of non-native species as a viable threshold below which non-native species populations will not exponentially expand.

Background: IMPACTS FROM WEED MANAGEMENT

The applicant's response to CEC Staff's data request 78, filed on October 13, 2008, states that "Beacon will conduct ongoing maintenance and monitoring of the [western burrowing owl] conservation area for exotic weed control for a 5-year period following construction of the burrows." However, the applicant did not specify what method of weed management would be used in the conservation area.

In addition, the AFC states that herbicides "will be used in the solar field to kill weeds…"[173] However, the applicant did not provide an analysis of the impacts from herbicide use on biological resources.

Data Requests

122. Please clarify what method(s) of weed management will be used in the western burrowing owl conservation area.

123. Please provide an impact analysis of the weed management method(s) used in the conservation area on biological resources.

124. Please provide an impact analysis of the anticipated use of herbicides on the Project site on native plant species and wildlife. In your answer, please include an assessment of the potential for herbicides to migrate off-site via runoff, wind, and animal dispersal.

125. Please describe mitigation measures that the Project will employ to avoid impacts to biological resources.

[171] AFC, Appendix F, p. 72.
[172] *Id.* at p. 57.
[173] AFC, p. 5.6-21.

Background: CUMULATIVE IMPACTS

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."[174] CEQA requires a finding that a project may have a significant effect on the environment if "the possible effects of a project are individually limited but cumulatively considerable…'Cumulatively considerable' means that the incremental effects of an individual project are considerable when viewed in connection with effects of past projects, the effects of other current projects, and the effects of probable future projects."[175]

The AFC's cumulative impacts section for biological resources includes a discussion of two projects, the Pine Tree Wind Development Project ("Pine Tree"), a project that is currently under construction, and the LADWP Barren Ridge-Castaic Transmission Project ("LADWP Barren Ridge"), a project that is undergoing environmental review.[176] The AFC concludes that the Project will not contribute to a significant cumulative effect when added to the effects of the Pine Tree project because: (1) the Pine Tree project will primarily impact different habitats than the Project; and (2) the Pine Tree project obtained take authorization and has fully mitigated impacts to desert tortoise, Mohave ground squirrel, and western burrowing owl.[177] The AFC also concludes that the LADWP Barren Ridge project will not contribute to a significant cumulative effect when added to the effects of the Project because it is assumed that the LADWP Barren Ridge project will obtain take authorization and fully mitigate impacts to desert tortoise, Mojave ground squirrel, and western burrowing owl.[178] Finally, the AFC concludes that the Project's proposed mitigation measures will reduce the Project's cumulative biological impacts to a level that is less than significant.[179]

The AFC's cumulative impacts analysis is flawed for four reasons:

First, the AFC's analysis is conclusory. The AFC improperly assumes that impacts from the Pine Tree and LADWP Barren Ridge projects will be fully mitigated. This assumption is totally unsupported. In addition, there is no basis for the applicant's conclusion that the Project's proposed mitigation measures will reduce adverse impacts to biological resources. To the contrary, the applicant has proposed inadequate mitigation measures for impacts to biological resources.

Second, the analysis improperly considers whether the Project will have significant cumulative impacts when combined with, on one hand, the Pine Tree project, and on the other hand, the LADWP Barren Ridge project. Instead, the analysis must consider the combined impacts of all three projects.

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[174] CEQA Guidelines, § 15355, subd. (a).
[175] Pub. Resources Code, § 21083.
[176] AFC, p. 5.3-35.
[177] *Id.*
[178] *Id.*
[179] *Id.* at p. 5.3-36.

Third, the proper approach to a cumulative impacts analysis is whether the additional impact associated with the Project (which may be insignificant at a project-level) should be considered significant in light of the serious nature of existing problems.[180] The AFC acknowledges that "[d]ue to the high levels of human activity in the area, habitat loss, degradation and fragmentation are considered significant issues in the western Mojave Desert."[181] However, the AFC's analysis of cumulative impacts disregards the serious nature of existing problems.

Finally, the analysis fails to include additional probable future projects. In the water supply alternatives analysis, the AFC dismisses the possible use of several wastewater treatment plants in the area because other entities, including solar and other power projects, are interested in using the water sources.[182] Yet, the AFC fails to include these entities in the cumulative effects analysis. In addition, the AFC fails to include the Ecosystem Solar Electric Corp. ("ESE") solar plant in the cumulative effects analysis. The ESE project site is just east of Boron and south of Highway 58 in Kern County. Nick Panchev, CEO of ESE, submitted a letter to the CEC regarding the Project, dated April 28, 2008. In his letter, Mr. Panchev stated that ESE will file an application with the CEC for its Boron facility "as soon as practical." Thus, the applicant is well aware that the ESE project is real and progressing, and the ESE project should be included in the cumulative effects analysis.

Data Requests

126. Please provide the names of the entities interested in using water sources that are referenced in the water supply alternatives analysis.

127. Please provide a description of the projects proposed by the referenced entities in response to data request number 127.

128. Please provide a revised cumulative impact analysis that includes the combined effect of the following: (1) Pine Tree project; (2) LADWP Barren Ridge project; (3) entities referenced in the water supply alternatives analysis; (4) ESE project; and (5) the Project. In your answer, please take into account the severity of the existing problems in the area and provide evidence for your conclusions.

129. Please describe mitigation measures that the Project will employ to avoid cumulative impacts to biological resources.

[180] Los Angeles Unified School District v. City of Los Angeles (1997) 58 Cal.App.4th 1019, 1025.
[181] AFC, p. 5.3-35.
[182] AFC, p. 4-16.

Background: COOLING TOWER

The Project proposes a mechanical drift wet cooling tower for power plant cooling.[183] Plant process water, including cooling tower makeup water, would be supplied from onsite groundwater wells. Raw water would be processed via ion exchange and stored in a treated water storage tank prior to feeding to the circulating water system. Ten percent of the cooling tower raw water makeup would be untreated raw groundwater.[184]

The AFC further indicates that other water streams, including plant drains and other miscellaneous water waste streams, would be collected and recycled back into the cooling towers.[185] The AFC explains:

> The Project's power block area is centrally located within the solar field. The power block will drain via sheet flow away from equipment foundations to the solar field. The runoff will then flow through ditches to the relocated desert wash channel to the east. Local area contaminants will be provided around certain locations, such as oil-filled transformers and chemical storage areas. The water from these areas and from other plant drains will be sent to an onsite oil-water separator, which is designed to remove free floating oil, grease, and settleable oily coated solids from oil/water discharges associated with plant processes. The oil free water is then added to the plant cooling water.[186]

The AFC does not provide a discussion of the potential contaminants contained in these waste streams.

Data Requests

130. Please discuss why only 90 percent of the cooling tower makeup water would be treated via ion exchange and ten percent would be untreated raw water.

131. Please identify the "plant drains and other miscellaneous water waste streams" that would be collected and recycled back into the cooling towers.

132. Please discuss potential contaminant concentrations contained in each of the "plant drains and other miscellaneous water waste streams" before and after being sent through the oil-water separator.

133. Please discuss whether the Project waste streams would undergo additional treatment (in addition to the oil-water separator) before being recycled through the cooling towers and emitted to the atmosphere.

[183] *Id.* at p. 2-6.
[184] AFC, Figure 2-12.
[185] AFC, p. 5.17-33.
[186] *Id.* at p. 2-25.

134. Please demonstrate that the contaminant concentrations from the "plant drains and other miscellaneous water waster streams" are accounted for in the cooling tower emissions estimates and the Project health risk assessment. If not, please revise the cooling tower emissions estimates and the Project health risk assessment accordingly.

Background: EVAPORATION POND RESIDUES

The AFC states that evaporation ponds will be sized to retain all solids generated during the life of the plant; however, if required for maintenance, dewatered residues from the ponds will be characterized and, as appropriate, will be sent to an appropriate offsite landfill as non-hazardous waste.[187] The AFC does not contain sufficient information to determine whether the dewatered residues would, in fact, qualify as non-hazardous waste. Depending on the concentration constituents, if concentrations would exceed total threshold limits concentrations or soluble threshold limits concentrations, the dewatered residue might have to be disposed of as hazardous waste. This would require special handling and disposal.

The AFC estimates the discharge to the ponds at 710 tons of solids annually and a total of 21,000 tons for the 30-year Project operational life.[188] The AFC contains no discussion of the ultimate disposal of the solids and removal of the evaporation ponds.

Data Requests

135. Please provide an estimate of the chemical composition of the dewatered residue in mg/kg from the evaporation ponds for each constituent. Please include TTLCs and STLCs in a table and demonstrate that constituents of the dewatered residue will not exceed their respective thresholds and therefore will not represent hazardous waste.

136. Please provide a discussion of the disposal of solids and removal of the evaporation ponds at the end of the Project's operational life.

[187] *Id.* at p. 5.17-33.
[188] *Id.*

Background: HEAT TRANSFER FLUID SPILLS

The Project's solar array would contain 1,300,000 gallons of heat transfer fluid in a closed-loop system.[189] The AFC states that isolation valves will be installed throughout the solar field to minimize the heat transfer fluid loss in the event of a system leak.

Data Requests

137. Please specify how many isolation valves will be installed throughout the solar field and quantify the maximum quantity of heat transfer fluid that could potentially leak from the system between two isolation valves.

Background: HEAT TRANSFER FLUID FIRE RISK

Therminol VP-1, the heat transfer fluid used in the solar arrays for the Project, is a Class III-B combustible liquid.[190] Fires in parabolic trough solar generating facilities are serious threats which have occurred in the past. For example, in 1999, a storage tank containing 900,000 gallons of Therminol exploded at the SEGS II solar power plant in Daggett, CA.[191] In another incident on August 21, 1995, a heat transfer pump oil transfer that allowed the release of fluid caught fire at the Daggett facility.[192] On August 2, 1994, one of the heat transfer fluid pipes at the SEGS VI facility in Kramer Junction, CA ruptured and the spilled heat transfer fluid caught fire.[193] Yet, the AFC does not contain a discussion of potential risks due to the flammability of the heat transfer fluid beyond the statement that "HTF at high temperatures can also present a fire risk."

Data Requests

138. Please provide a discussion of potential fire and explosion risks due to the flammability of Therminol VP-1, the heat transfer fluid used in the solar arrays for the Project.

[189] AFC, p. 4-17.
[190] AFC, Table 5.6-3, p. 5.6-13.
[191] CBS News, Blast: Big Flames, No Injuries, February 27, 1999; http://www.cbsnews.com/stories/1999/02/27/national/main36899.shtml?source=search_story.
[192] Governor's Office of Emergency Services, Hazardous Materials Spill Report; http://www.oes.ca.gov/operational/malhaz.nsf/.
[193] *Id.*

Background: HERBICIDE USE

The AFC states that herbicides will be used in the solar field to kill weeds in order to minimize fire potential.[194]

Data Requests

139. Please provide information regarding the estimated frequency of herbicide application at the solar field, the annual quantity of herbicide(s) used, the active ingredient content in the formulation(s), the type of application, and the amount of the active ingredient applied per application.

PROJECT DESCRIPTION

Background: SOLAR FIELD

The AFC states that the solar field comprises "many" rows of solar collectors, and each solar collector has a reflector that focuses the sun's radiation on a heat collection element.[195]

Data Requests

140. How many rows of solar collectors are proposed to be constructed?

CUMULATIVE IMPACTS

Background: CUMULATIVE EFFECTS ANALYSES

CEQA Guidelines section 15130 requires that a Project's cumulative impacts be discussed when "[t]he incremental effect is cumulatively considerable…" Cumulative impacts are:

> [t]wo or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changes resulting from a single project or a number of separate projects.
> (b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present and reasonably foreseeable probable future projects.

[194] AFC, p. 5.6-21.
[195] *Id.* at p. 2-7.

> Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.[196]

The AFC considers two projects, the Pine Tree Wind Development Project and the LADWP Barren Ridge-Castaic Transmission Project, as projects that have the potential to cause cumulative impacts. However, the AFC fails to include additional probable future projects. In the water supply alternatives analysis, the AFC dismisses the possible use of several wastewater treatment plants in the area because other entities, including solar and other power projects, are interested in using the water sources.[197] Yet, the AFC fails to include these entities in the cumulative effects analyses. In addition, the AFC fails to include the Ecosystem Solar Electric Corp. ("ESE") solar plant in the cumulative effects analyses. The ESE project site is just east of Boron and south of Highway 58 in Kern County. Nick Panchev, CEO of ESE, submitted a letter to the CEC regarding the Project, dated April 28, 2008. In his letter, Mr. Panchev stated that ESE will file an application with the CEC for its Boron facility "as soon as practical." Thus, the applicant is well aware that the ESE project is real and progressing, and the ESE project should be included in the cumulative effects analyses.

Data Requests

141. Please provide revised cumulative impact analyses for each resource area (*e.g.*, air quality, water resources) that include the entities referenced in the water supply alternatives analysis, as well as the ESE project.

142. If it is determined that significant cumulative impacts will occur, please propose mitigation measures to avoid cumulative impacts to each resource.

[196] CEQA Guidelines, section 15355.
[197] AFC, p. 4-16.

Background: ZLD SYSTEM AS ALTERNATIVE TO EVAPORATION PONDS

The AFC evaluates an alternative to evaporation ponds: a mechanical zero liquid discharge ("ZLD") system consisting of a reverse osmosis system and/or brine concentrator and a crystallizer, and supporting water treatment equipment including pumps, tanks, filters, mixing tanks, piping, control system, etc. The AFC finds that a mechanical ZLD system is not an economically feasible alternative to engineered evaporation ponds. The AFC provides a summary table of estimated capital and O&M costs for each alternative but does not include a detailed cost analysis that allows for a review of these cost estimates.[198] For example, the AFC does not indicate whether O&M costs for the evaporation ponds include costs for disposal of the deposits at the end of the 30-year plant life, monitoring costs for potential impacts to wildlife, or potentially required mitigation such as anti-perching devices or hazing activities to keep birds from accessing the evaporation ponds.

Data Requests

143. Please provide a detailed cost analysis for all proposed evaporation ponds and an alternative mechanical zero liquid discharge system. Please document all assumptions.

144. Please indicate the costs differential at which the mechanical zero liquid discharge system is considered not economically sound compared to the evaporation ponds.

Dated: January 26, 2009

Respectfully submitted,

_____/s/_____

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[198] AFC, p. 4-17.

STATE OF CALIFORNIA

California Energy Commission

In the Matter of: The Application for Certification for the BEACON SOLAR ENERGY PROJECT	Docket No. 08-AFC-2

PROOF OF SERVICE

I, Bonnie Heeley, declare that on January 26, 2009, transmission via electronic mail of the attached **CALIFORNIA UNIONS FOR RELIABLE ENERGY DATA REQUESTS, SET ONE** was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.6, and 1210. All electronic copies were sent to all those identified on the Proof of Service listed below.

Via U.S. Mail to:
CALIFORNIA ENERGY COMMISSION
DOCKET UNIT
ATTN: Docket Unit 08-AFC-2
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Via email to:
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kcelli@energy.state.ca.us
esolorio@energy.state.ca.us
jbabula@energy.state.ca.us
publicadviser@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct. Executed at South San Francisco, California, on January 26, 2009.

_____/s/_____
Bonnie Heeley

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January 26, 2009

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 08-AFC-2
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Re: Application for Certification, Beacon Solar Energy Project, 08-AFC-2

Dear Docket Clerk:

Enclosed are an original and two copies of California Unions for Reliable Energy's Data Requests, Set One. Please process and return a conformed copy in the envelope provided. This document was previously sent to the Docket Office via email.

Thank you for your assistance.

Sincerely,

Rachael E. Koss

Rachael E. Koss

REK:bh
Enclosures

2162-030a