STATE OF CALIFORIA

Energy Resource Conservation and Development Commission

Application for Certification for the RIO MESA SOLAR ELECTRIC GENERATING FACILITY	))))	Docket No. 11-AFC-04

REPLY BRIEF
OF
RIO MESA I, LLC, RIO MESA II, LLC, and RIO MESA III, LLC

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I. INTRODUCTION / SUMMARY

Rio Mesa Solar I, LLC, Rio Mesa Solar II LLC, and Rio Mesa Solar III, LLC (collectively "Applicant"), provide the following Reply Brief, responding to *Energy Commission Staff's Brief In Response To Topics Identified in Notice of March 19, 2012 Status Conference* ("Staff's Opening Brief"), and *Intervenor Center for Biological Diversity's Opening Brief Regarding Data Adequacy and Scheduling* ("CBD's Opening Brief").[1] Applicant's responses are summarized as follows.

In response to Staff's Opening Brief, Applicant discusses below how CEQA does not require exhaustive evaluation of cultural resources prior to approving a project. Staff's request for exhaustive geoarcheological surveys prior to certification is inconsistent with past commission practice and fails to account for the substantial efforts to date, which have cost the Applicant approximately 2.5 million dollars. Nevertheless, Applicant will work with staff and other parties to evaluate cultural resources, but the evaluation will not take 14 – 32 months. Regarding biological issues, Applicant provides additional information in support of its Opening Brief. Below, we note that the REAT requested surveys will take up to 25,514 hours, whereas Applicant's proposed additional surveys would provide more than enough information to evaluate impacts to birds, and take 8,373 hours. Finally, in response to CBD's Opening Brief, Applicant agrees that desert kit fox should be evaluated under CEQA, but there is no provision of California law supporting CBD's contention that a decision on the Project must await completion of the Desert Renewable Energy Conservation Plan ("DRECP").

II. DISCUSSION

A. CEQA Does Not Require Exhaustive Evaluation Of Cultural Resources Prior To Approving A Project.

Staff's Opening Brief discusses the need for additional cultural surveys. In particular, staff notes that in order to fully evaluate the significance of impacts and the need for additional mitigation, Applicant needs to conduct approximately 14 – 32 months of additional work, including Phase 2 geoarchaelogical field investigations. Despite the fact that this level of analysis has *not* been required prior to the preparation of a staff assessment (or even a Commission Decision), staff nevertheless asserts that these surveys are needed during the discovery phase of this proceeding. Staff states that this additional analysis is needed prior to the preparation of a Preliminary Staff Assessment because:

> While NEPA allows this work to be deferred until after the Record of Decision is approved, CEQA does not. Recent court decisions have been particularly adamant about the need to evaluate all resources and determine significance prior to approving a project.[2]

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[1] 11-AF-04, Staff's Opening Brief and CBD's Opening Brief are available at: http://energy.ca.gov/sitingcases/riomesa/documents/index.html

[2] See Staff Opening Brief at p. 7.

Contrary to staff's assertion, the California Environmental Quality Act ("CEQA") does not require either the Applicant, or the "lead agency to conduct every recommended test and perform all recommended research to evaluate the impacts of a proposed project. The fact that additional studies might be helpful does not mean that they are required."[3] Moreover, 'CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commentors."[4]

Rather, CEQA requires an Environmental Impact Report ("EIR") to "be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes into account environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible."[5]

With respect to Cultural Resources, Applicant has already provided a good faith analysis of cultural resources. Applicant conducted intensive pedestrian surveys of the cultural resources on the project site which took over three months to complete (with over twenty cultural resource specialists), including 100-percent cultural resources inventory of all portions of the project site. Applicant's assessment also included archival research, Class III pedestrian archeological surveys, and architectural surveys. URS, Principal Investigator ("PI"), Rachael Nixon, also coordinated directly with BLM, Energy Commission Staff, Landscapes Studies Team and other PIs to obtain guidance and approach prior to initiating fieldwork on the Project. Guidance documents and training provided by the agencies were utilized during all fieldwork and reporting. Moreover, since the Project site was formerly the Sun Desert Nuclear site, and there have been other subsequent cultural surveys, Applicant was also able to utilize twenty seven previous cultural surveys within the project site.

Prior to initiating fieldwork, Energy Commission Staff and BLM both provided verbal authorization to proceed with the approach outlined in the Applicant's work plan. During initial meetings and discussions with BLM and CEC there was never any indication that additional work would be required before preparing the ROD, FSA, or Final Decision. In fact, BLM stated that additional work would be required *after* the ROD had been signed, and based on conversations and previous projects in the area, Applicant understood that the Energy Commission would apply any additional studies to the Conditions of Certification upon final approval.

As a result of Applicant's significant efforts to date, the Technical Report includes the results of an approved approach (for field and reporting) for this project, and compiles a vast body of research conducted by recognized professionals and scholars that are experts in this region. The results of this intensive field and reporting effort took over six months to complete, and the final report consists of twenty five volumes and over 25,000 pages of valid data, which is more than sufficient for making informed significance decisions and/or mitigation recommendations for cultural resources discovered within the PAA. These efforts have cost

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[3] *Association of Irritated Residents v. County of Madera* (2003) 107 Cal.App.4th 1383, 1396 [133 Cal.Rptr.2d 718].

[4] 14 C.C.R. § 15204(a).

[5] 14 C.C.R § 15151.

approximately 2.5 million dollars, which is largely the result of following the required protocols set forth by the BLM and Energy Commission for this project for the purpose of preparing the PSA and FSA.

While Applicant will continue to work with staff and other parties to assist in their evaluation of cultural resources, Applicant disagrees with the suggestion that more comprehensive cultural surveys, including geoarcheological studies must be completed in order for staff to analyze potentially significant impacts on cultural resources, and "intelligently take into account environmental consequences". Staff estimates that 14-32 months worth of additional field investigations and evaluation are needed in order to fully assess the impacts on cultural resources. In light of Applicant's existing efforts, Staff's requests seek to create an exhaustive record of the potential impacts on cultural resources. CEQA does not require this level of analysis.

B. Staff's Request For Exhaustive Geoarcheological Surveys Prior To Certification Is Inconsistent With Past Commission Practice.

Staff's request for extensive Phase 2 geoarcheological surveys is inconsistent with the approach the Commission has taken in previous siting cases where it has allowed these surveys to take place during compliance.[6] For example, in the Almond 2 Power Plant Proceeding (09-AFC-02), the Commission concluded:

> As discussed above, **CUL-1**, **CUL-2, and CUL-3,** require a post-certification, pre-construction geoarchaeological study to identify the potential presence of buried prehistoric archaeological resources where the existing gas pipeline will be reinforced. **CUL-1** includes provisions for the geoarchaeologist to receive project-generated background data and for the treatment of any buried archaeological deposits, historic or prehistoric, encountered during geoarchaeological data collection.

Indeed, we are not aware of any case where the CEC has required this level of information before certification.[7] The Commission should continue the practice here because: a) as noted above, exhaustive surveys are not required in order for the Commission to evaluate the significance of potential impacts to cultural resources; and b) the Applicant must meet its deadlines under its PPAs. In particular, should a PSA be delayed by 32 months, as suggested in Staff's Opening Brief, Applicant's commercial online date (September 30, 2015) would pass well before the Applicant had any opportunity to even commence construction.

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[6] Docket Number: 09-AFC-2: Almond 2 Power Plant Project, California Energy Commission Decision, December 17, 2012, Publication CEC-800-2010-018-CMF, at p. 16, 20 (Cultural Resources Section); see also: 08-AFC-5: Imperial Valley Solar Energy Project (Formerly SES Solar Two): California Energy Commission Decision, Publication # CEC-800-2010-006-CMF. Posted: October 12, 2010, at p.431; 09-AFC-10: Rice Solar Energy Project: California Energy Commission Decision, December 2012: Publication CEC-800-2010-019 CMF, at pp. 12, 24 (Cultural Resources Section); Docket Number: 07-AFC-5: Ivanpah Solar Electric Generating System, California Energy Commission Decision, September 2010, Publication CEC-800-2010-004-CMF, at pp. 13-15 (Cultural Resources Section).

[7] Given the timeframe for submitting reply briefs, we were unable to review cultural certifications for every project approved by the Commission. However, the siting cases in the above footnote represent cases where the Commission allowed this level of information to be provided as a condition of certification.

C. Applicant Will Work With Staff And Other Parties To Evaluate Cultural Resources, But The Evaluation Will Not Take 14 – 32 Months.

Notwithstanding Applicant's comments above concerning the need and timing for Phase 2 geoarchaelogical surveys, the timeframes set forth in Staff's Brief are too long. Applicant will be able to provide this information within three to four months as shown below. Applicant's consultant has cultural resources staff with significant experience preparing and implementing research designs and evaluation plans for other solar projects with similar artifact classes and desert environments. Applicant will therefore be able to prepare a research design for a subset of the 319 prehistoric archaeological sites (and a geaorchaeological plan) within 30-60 days based on existing research and information readily available. Applicant would request that the agencies provide review and approval of the plan within two weeks. Both plans can be implemented within 30 days of approval and the final report of each (including any analysis) and mitigation recommendations can be provided 30 days after field work is complete. The historic sites within the project area have been completely inventoried, documented, and were identified as surface only sites. Additionally, the current historic archaeological 523 series forms include sufficient information for staff to assess the significance of these site types. Thus, as with other projects, no evaluation plan will be necessary for the historic archaeological sites within the PAA.

In sum, Staff's estimate that this work will take 14-32 months[8] grossly over-estimates the time needed for further evaluation of cultural resources prior to production of a PSA. Applicant believes that this work can be completed in three to four months, which should not delay the overall schedule for this Project.

D. Regarding Biological Issues, The REAT Requested Surveys Will Take Up To 25,514 Hours, Whereas Applicant's Proposed Additional Surveys Would Provide More Than Enough Information To Evaluate Impacts To Birds, And Take 8,373 Hours.

Applicant's Opening Brief notes that all other CEC projects have used the BLM point count transect protocol for solar projects to document migratory bird presence and relative abundance, and the level of effort to satisfy the BLM protocol is typically less than 600 field hours.[9] Based on Applicant's updated projections, the level of effort requested by the REAT agencies is more than 25,514 hours. If combined with the approximate 8,600 hours of surveys Applicant already conducted in 2011, the total biological survey costs would far exceed any project the Commission has ever licensed. As Applicant noted in its Opening Brief, additional surveys are neither necessary nor appropriate.[10] In further support of Applicant's comments that the Project technology is not unduly hazardous to birds, Applicant provides a detailed Risk Characterization Study (Attachment 1). In addition, Applicant provides detailed cost estimates of the various avian survey requests the REAT agencies have put forward. As demonstrated in Attachment 3, the REAT requested surveys would cost Applicant more than four million dollars. Finally, Applicant provides a revised Compromise Proposal as Attachment 2 to this Reply Brief.

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[8] See Staff Opening Brief at p. 7.

[9] See Applicant's Opening Brief at p. 6.

[10] Id. at p. 7.

The additional proposed surveys, which were presented at the March 13th, 2012 workshop are supported by Dr. Peter Bloom, a highly respected ornithologist. The REAT agency representatives recommended that applicant consult with Dr. Bloom on the avian impacts, and obtain Dr. Bloom's advice on additional surveys for the Project. Applicant anticipates that the proposed additional surveys endorsed by Dr. Bloom will take approximately 8,373 hours to conduct. The additional surveys will provide more than enough information for the agencies to evaluate risks the Project poses to birds.

E. Desert Kit Fox Should Be Evaluated Under CEQA.

CBD's Opening Brief asserts that:

> [A]pplicant and staff have failed to adequately address significant biological impacts to desert kit fox populations on and near the proposed site. The desert kit fox is a fully protected species under California law, 14 C.C.R. Sec. 460. The AFC acknowledges that at least 193 desert kit fox burrow complexes have been identified on site, and therefore may affect a significant number and population of this fully protected species. . . Because no take of desert kit fox is allowable under California law, except where the take is included in an NCCP, and the proposed project may take desert kit fox, the Committee should consider delaying processing of this project application until after the DRECP is concluded.

Desert kit fox is not listed or protected under the federal or state Endangered Species Acts. Take of this species is defined and covered under Fish and Game Code Section 460, which defines kit fox as a fur-bearing mammal, and take is not allowed *without the proper fur-bearing take permit*. While desert kit fox should be considered during staff's CEQA review of the Project, California law does not prohibit take except where the take is included in a Natural Communities Conservation Plan ("NCCP"). CBD does not cite, nor does any provision of California law support CBD's position that processing this Project must await completion of the DRECP. Rather, the NCCP process is a voluntary process and specifically provides for interim decisions on projects within a particular planning area.[11] As Applicant noted in its Opening Brief, consideration of potentially significant impacts to desert kit foxes under CEQA should not affect the scope or timeline of Commission review of the AFC.[12]

In addition, CBD misrepresents the conclusions reached in the AFC. While 193 dens were observed, Applicant did not conclude that the Project "may affect a significant number and population of this fully protected species…" Rather, Applicant came to the opposite conclusion:

> While desert kit fox den complexes were prevalent in the BSA (193 observed), many den complexes occur within the home ranges of each single female and can be used for birthing or as refuges from coyotes. The species is solitary except during the breeding season and does not maintain territories. Birthing dens are chosen in September and October after the female visits most of the dens in her home range and cleans them. Females usually use one complex for birthing that is

[11] See Cal. Fish and Game Code Sec. 2810(b)(8).

[12] Id. at p. 17.

three to four kilometers from the nearest neighbor to ensure a good hunting territory. Puppies are born in February or March and are weaned by June. Den changes are frequent during the summer when puppies are being fed. At three to four months the pups begin to forage with the parents. In October the pups head out away from their parents' home range. Young foxes may travel long distances (30 or more km) before settling down. With kit fox ranges varying from 1-2 square miles Morrell (1972), the193 den complexes observed may only represent 8 to 16 home ranges on site.[13]

III. CONCLUSION

CEQA does not require exhaustive evaluation of cultural resources prior to approving a project, and staff's request for exhaustive geoarcheological surveys prior to certification is inconsistent with past commission practice. Moreover, staff's request fails to account for the substantial efforts to date, which have cost the Applicant approximately 2.5 million dollars. Nevertheless, Applicant will work with staff and other parties to evaluate cultural resources, but the evaluation will not take 14 – 32 months.

Regarding biological issues, Applicant provides additional information in support of its Opening Brief. Applicant is pleased to provide the attached proposal for additional surveys, which has been endorsed by Dr. Pete Bloom, the ornithologist recommended by the REAT agencies. Applicant's proposal would provide more than enough information to evaluate impacts to birds. Finally, in response to CBD's Opening Brief, Applicant agrees that desert kit fox should be evaluated under CEQA, but there is no provision of California law supporting CBD's contention that a decision on the Project must await completion of the Desert Renewable Energy Conservation Plan ("DRECP").

Dated: March 14, 2012

Respectfully submitted,

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[13] See Application for Certification at p. 5.2-60.

ATTACHMENT 1

GOLDEN EAGLE AND AVIAN RISK CHARACTERIZATION OF THE RIO MESA SOLAR ELECTRIC GENERATING FACILITY, RIVERSIDE COUNTY, CA

Prepared for

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URS Project No. 27652103.00307a

March 13, 2012

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Appendices

Appendix A	Air Temperature Surrounding the SRSG report

AGL	Above ground level
APLIC	Avian Power Line Interaction Committee
BLM	Bureau of Land Management
CRS	Colorado River Substation
ECP	Eagle Conservation Plan
FAA	Federal Aviation Administration
km^2	square kilometer
LCRV	Lower Colorado River Valley
m	meters
MW	megawatts
MWD	Metropolitan Water District
SEDC	Solar Energy Development Center
SEGF	Solar Electric Generating Facility
SRSG	Solar Receiver Steam Generator
U.S.	United States
URS	URS Corporation
USFWS	United States Fish and Wildlife Service
WRI	Wildlife Research Institute

SECTION 1 INTRODUCTION

This report characterizes the risks associated with BrightSource's Solar Power Tower technology proposed for the Rio Mesa Solar Electric Generating Facility (Rio Mesa SEGF or the Project), and compares BrightSource's technology deployment with that of previous solar tower projects. The findings of the 1986 McCrary et al. Study, which discusses avian impacts attributed to the Solar One tower project, are analyzed and compared to the potential impacts to avian species using BrightSource's current technology. The report discusses the Solar One technology attributes, significant project features, and the surrounding habitat, and compares them to the deployed technology and operations experience at BrightSource's Solar Energy Development Center (SEDC) in the Negev Desert in southern Israel, as well as to the current technology, project features and surrounding habitat at the Rio Mesa SEGF.

SECTION 2 PROJECT DESCRIPTION

The proposed project site consists of three plants is situated on the Palo Verde Mesa in Riverside County, California, 13 miles southwest of Blythe, and is located partially on private land and partially on public land administered by BLM(see Figure 1, Project Features Map).

The first plant, a 250-megawatt (MW) (nominal) facility known as Rio Mesa I, will be constructed at the south end of the project and owned by Rio Mesa Solar I, LLC. The second plant, another 250-megawatt (MW) (nominal) facility known as Rio Mesa II, will be located in the central portion of the project site and owned by Rio Mesa Solar II, LLC. Rio Mesa III, a third 250-megawatt (MW) (nominal) facility, will be constructed in the northern portion of the Project site and owned by Rio Mesa Solar III, LLC. Collectively, these three plants are known as the Project or Rio Mesa SEGF.

Form SF-299 ROW grant applications for use of the BLM land were submitted by Rio Mesa Solar III, LLC to the BLM Desert District office in Moreno Valley, California on July 8, 2011 and revised on February 10, 2012. The project site has been previously disturbed by military training operations during World War II, and investigative activities resulting from the proposed SunDesert Nuclear Power Plant by San Diego Gas and Electric (SDG&E) in the 1970s. Additionally, existing transmission lines traverse the project site.

Four additional features, consisting of linear corridors used for site access and electrical service lines, are also part of the Project. For purposes of defining the approximate ROW for each 200-foot corridor, the areas extending 100 feet on either side of centerline are included in the ROW descriptions. These four features include:

1. Bradshaw Trail Access Road Corridor
2. 33-kV Service Line Corridor New ROW
3. 33-kV Service Line Corridor Existing ROW Overbuild
4. 34th Avenue Access Road Corridor

Each 250-MW plant requires about 1,850 acres (or 2.9 square miles) of land to operate. The total area required for all three plants, including the shared facilities, is approximately 5,750 acres. Rio Mesa Solar Holdings, LLC holds an option agreement with the Metropolitan Water District of Southern California (MWD) for approximately 6,741 acres, part of which is planned for the development of the middle and southern portions of the Project. In addition, Rio Mesa Solar III, LLC, has applied for ROW grants from BLM for two areas: a 2,800 acre parcel in which the northern portion of the project site is located, and an additional 1,300 acre study area in which the common generator tie line (gen-tie line) will be located. Portions of this ROW will be assigned to Rio Mesa Solar I, LLC (gen-tie line), and Rio Mesa Solar II, LLC (gen-tie line and portions of the solar field). The gen-tie line will link the project facilities to the new Southern California Edison (SCE) Colorado River Substation (CRS; see Figure 1, Project Features Map).

The Project will include three concentrating solar thermal power plants and a shared common area to include shared systems. Each plant will utilize a solar power boiler, located on top of a dedicated concrete tower, and solar field based on heliostat mirror technology, developed by BrightSource, known as “Luz Power Tower” (LPT) technology. The reflecting area of an individual heliostat (which includes two mirrors) is about 19 square meters [205 square feet (sq. ft.)]. The heliostat fields will focus solar energy on the solar power boiler, referred to as "solar receiver steam generator" (SRSG), which converts the solar energy to superheated steam.

In each plant, a Rankine cycle non-reheat steam turbine receiving this superheated steam will be directly connected to a rotating synchronous generator that generates and pushes the electricity onto the transmission system.

Each power plant will generate electricity using solar energy as its primary fuel source. However, auxiliary boilers will be used to operate in parallel with the solar field during partial load conditions and occasionally in the afternoon, when power is needed after the solar energy has diminished to a level that no longer supports solar generation of electricity. The auxiliary boilers will also assist with daily start-up of the power generation equipment and night-time preservation.

The power generation equipment will be started up each morning before sunrise, and shut down every evening when insolation drops below the level required to keep the steam turbine generators (STGs) on line, except as described above.

The main parameters for the plants are presented in Table 2.1-1.

Table 2.1-1
Main Plant Parameters

Plant	Capacity (Nominal MW)	No. of Heliostats (approximately)	Annual Production Solar Boiler (Net MWHs)	Annual Production Nat. Gas Boilers (Net MWHs)	Total Annual Production (Net MWHs)	Utility Interconnection
Rio Mesa I	250 MW	85,000	705,300	30,000	735,300	SCE 220 kV
Rio Mesa II	250 MW	85,000	705,300	30,000	735,300	SCE 220 kV
Rio Mesa III	250 MW	85,000	705,300	30,000	735,300	SCE 220 kV

kV = kilovolt
MW = megawatt
MWH = megawatt hour
SCE = Southern California Edison

The shared facilities (located in the common area) will include a combined administration/control/maintenance/warehouse building, evaporation ponds, groundwater wells, water treatment plant, construction laydown and parking areas, mobile equipment maintenance facilities for the maintenance crew and operators, and natural gas tap and meter station. A common switchyard will be installed on site where all three underground plant substation -transmission lines will terminate. Electricity will be transmitted on a common line and tower system from the switchyard to SCE's new CRS, located approximately 9.7 miles to the northwest of the project site.

Raw water will be drawn daily from on-site wells designed to have sufficient capacity to supply water required for operation of the Project. Groundwater will pass through a treatment system before being used for potable water, service water, firewater, boiler make-up water, auxiliary cooling water, and to wash the heliostats. A raw water treatment plant will be located in the common area to clean raw well water for use by the Project. The treatment plant will be designed to remove impurities and make the water suitable for use in process production and mirror washing. Small supplemental water treatment may be added at each power block for domestic water purposes.

To save water in the desert environment in which the site is located, each plant will use an air-cooled condenser (ACC) for the main-steam cycle. Water consumption, therefore, will be minimal [estimated at no more than 84.5 acre-feet (ft) per year (afy) for each of the three plants, and 6.5 afy for the common area, for a total of 260afy]. Water consumption during construction will peak at no more than 400 afy (over a 12 month period). Major contributors to water use during construction will include dust control activities and on-site concrete batch plants. The land lease agreement with MWD allows for access to up to 600 afy of water.

The Project will also include an on-site wastewater treatment plant located in the common area. The wastewater effluent from the Project will be discharged to evaporation ponds that will be located in the common area. Provisions for avian protection, most likely netting, will be included in the final design. Each pond will be lined with a high-density polyethylene (HDPE) liner to prevent infiltration of process water into the soil below. When needed, pond sludge will be removed from the project site by an outside contractor. Domestic waste streams for such items as showers and toilets will be routed through on-site septic systems and leach fields. Sewage sludge from the septic tanks will be removed from the site by a sanitary service provider.

SECTION 3 ENVIRONMENTAL SETTING

The Rio Mesa SEGF project site is located on the Palo Verde Mesa, within the Colorado Desert, in gently rolling open terrain dominated by desert scrub vegetation. The Colorado Desert is a part of the larger Sonoran Desert, which extends across the southwest United States and into Mexico. The climate is very hot and dry in the summer months, and cool with occasional rain in the winter. Perennial and intermittent rivers and streams are rare, and most water flow occurs as flash flood flows within defined washes and less-defined flood-flow paths during major winter and summer rains. Habitats in this region of the Sonoran Desert vary with the landscape and precipitation levels. The Project site is comprised primarily of creosote desert scrub with areas of desert wash scrub within the onsite washes. The proposed gen-tie line alignment passes through BLM lands and other private lands and is mainly comprised of desert scrub habitat and disturbed lands associated with existing infrastructure.

The Project is located primarily on land owned by the Metropolitan Water District of Southern California (MWD). A portion of the Project site and the associated gen–tie line are located on public lands administered by the Bureau of Land Management (BLM). All lands associated with the Project are within Riverside County, with the nearest Project element approximately two miles west by northwest of the town of Palo Verde, California (the closest town to the project site).

The project site is currently disturbed but undeveloped land, and is surrounded by undeveloped desert land to the north, south, east, and west. There are irrigated agricultural lands located approximately one mile to the east. A graded BLM road, several utility lines and associated service roads run through the project site. Portions of the site are disturbed due to existing infrastructure including electric transmission lines and a natural gas pipeline. Additionally, the project area has been previously disturbed by off-road vehicle use, trash dumping, and historic use for military training during World War II, including training involving tanks and other heavy military vehicles. The military training activities have resulted in occasional discoveries of unexploded ordnance (UXO) on the site.

The Project site generally slopes to the east. The average slope is approximately 1 percent with the exception of rocky, somewhat steep slopes located along the northwestern boundary. The Project site and tributary area storm water runoff discharges east through several ephemeral washes on site. The washes convey runoff to Hodges Drain, which is approximately one mile east of the Project. Hodges Drain conveys runoff approximately two miles south to the Palo Verde Outfall Drain. Runoff continues south approximately 6.5 miles within the Palo Verde Outfall Drain where it discharges to the Colorado River. No dams or levees are located upstream of the project site.

Annual rainfall amounts in the Colorado River Hydrologic Region range from less than 3 inches to approximately 6 inches. Most of the precipitation for the region occurs in the winter and spring. However, monsoonal thunderstorms, created by the movement of subtropical air from the south, do occur in the summer and can generate significant rainfall in some years. Higher annual rainfall and milder summer temperatures occur in the mountains to the north and west of the hydrologic region. Clear and sunny conditions typically prevail, and the region receives 85 to 90 percent of the maximum possible sunshine each year; the highest value in the United States (U.S.).

The mean annual precipitation (1948 to 2010) recorded at the Blythe Airport weather station is 3.54 inches per year. The minimum and maximum annual precipitation for the period of record is 0.59 inches and 9.16 inches, respectively. According to the National Oceanic and Atmospheric Administration Atlas 14 for the Southeastern California (2003), between 3 and 3.5 inches of rain would be expected to fall in a 100-year, 24-hour storm event.

SECTION 4 AVIAN SURVEYS

4.1 EAGLE NEST SURVEYS FOR RIO MESA SEGF

Concern about golden eagle population decline has led to an increase in demand for golden-eagle-specific nest surveys on large-scale solar energy projects. Golden eagles are distributed throughout North America (Johnsgard 1990), and although they are an uncommon resident within California (Zeiner et al. 1990; Unitt2004), they can be locally abundant in locations such as the Altamont Pass and in the Tehachapi Mountains. As recently as 2002, golden eagle populations in the western United States were considered stable except in areas of increased habitat loss (Harlow and Bloom 1989). Migratory and wintering populations are also abundant at these localities. Mojave Desert breeding pairs tend to be widely distributed and nest sites are restricted to small island mountain ranges and occasional transmission line poles.. Similarly, wintering and migratory individuals also tend to be widely distributed across the Mojave Desert, but are found more often perched on transmission line structures in the desert valleys. Golden eagles forage in agricultural fields, grasslands, and open scrub habitats. They nest primarily on cliffs, but are known to occasionally nest in large trees (e.g., oaks, sycamores) and transmission line towers. Breeding pairs can occupy territories of several square miles and may use several nest sites, shifting nest sites from year to year. The species' population has declined because of loss of foraging and nesting habitat to urban and agricultural development, illegal shooting, incidental poisoning of prey species (e.g., ground squirrels, prairie dogs), egg collecting, power line electrocution, human disturbance at nest sites (Snow 1973; Johnsgard 1990; Scott 1985) and lead poisoning (Bloom et al. 1989, Pattee et al. 1990, Kelly et al. 2011). In recent decades, wind energy facilities in a few California localities have produced high levels of eagle mortality on an annual basis (Hunt 2002, Smallwood and Thelander2008).

The golden eagle population in the vicinity of the Rio Mesa SEGF interacts with other eagle populations throughout the western United States (Bittner et al. 2011, Nielson et al. 2011). The Great Basin golden eagle population estimates for 2006 to 2010 have varied from 4,200 to 6,000 individuals (all age classes; Nielson et al. 2011). The spring-summer eagle population in southern California and Arizona would add to these estimates. The total eagle population for the western United States (west of the Rockies, not including Alaska) is estimated to exceed 23,000 individuals (Nielson et al. 2011). Eagle densities in the Great Basin area are lower than other regions of the western U.S (8.9 eagles per 1000 square kilometer (km^2) vs. 12.1 eagles per 1000 km^2 for the entire western U.S). The current breeding population in the vicinity of the Rio Mesa site is one actively breeding pair located over 30 miles from the site (Figure 2).

Golden eagle nest surveys for the Rio Mesa SEGF were conducted by the Wildlife Research Institute (WRI) by helicopter on March 23, 2011. Three flights were conducted in order to determine the nesting golden eagle occupancy within a 10-mile buffer of the Project. A second survey effort was conducted on May 5, 6, and 7, 2011. All surveys were conducted in accordance with current protocol (Pagel et al. 2010, Gould and Schmidt 2011). During the preliminary survey, three inactive golden eagle nests were documented within the 10-mile spatial buffer, and an additional inactive nest was observed less than two miles outside the buffer. These four nests were determined to constitute two golden eagle territories. Additionally, one active golden eagle nest was incidentally observed more than four miles beyond the 10-mile spatial buffer in the Little Chuckwalla Mountains. During the second survey, one additional golden eagle nest that was not observed during the March 23 survey was observed within the 10-mile spatial buffer in the southern McCoy Mountains. This nest was determined to be inactive. No active or occupied nests were documented within the 10-mile spatial buffer during the 2011 breeding season (WRI 2011). However, two golden eagles were observed incidentally during the March 2011 spring botany survey. Both observations were fly-over's. No eagles were incidentally detected during the remainder of the intensive biological survey efforts conducted at the project site during the 2011 spring and summer seasons. In early February 2012, Dr. Jeep Pagel reported sighting a golden eagle about 1 mile west of the eagle nests detected 7 miles south of the Rio Mesa site in early February 2012. Due to the date of this sighting, this individual could be a transient individual or it could be a territorial resident eagle. Planned eagle surveys for the 2012 eagle breeding season will determine whether eagle territories in the Project vicinity are occupied in 2012.

Eagle Surveys for Other Solar Projects in Area

Eagle helicopter surveys have been conducted for other solar projects north and west of the Rio Mesa SEGF site. Table 1 summarizes these surveys and Figure 2shows the nest site locations detected during these surveys. Only six of 14 potential nesting territories in the Project region were considered occupied in 2009-2011, based on the presence of adult golden eagles in the vicinity of nest sites. Only one territory was documented as actually being used by a breeding pair (Figure 2). As shown in Figure 1, there are two unoccupied eagle territories within 10 miles of the Rio Mesa SEGF site and gen-tie transmission alignment. The nearest occupied eagle territory is 16 miles west of the site. No currently active breeding territories are known to occur within 30 miles of the Rio Mesa site (Figure 2). Given the distribution of "island" mountain ranges popping up out of the desert floor (Figure 2), the density of potential golden eagle territories is limited by the spatial distribution of suitable nesting habitat (cliffs). Nearly all mountain ranges have (or have had) an eagle territory documented historically. During high prey-base years, it is expected that some utility tower territories (not shown) may become active or new territories added during periods of eagle population increase due to improved food availability. The local golden eagle population does not appear to be expanding into historically occupied habitat, presumably due to low prey availability.

The non-breeding component of eagle populations includes juveniles (individuals fledged that year), subadults, and, in healthy populations, adult floaters that have not settled into a breeding territory (Hunt 1998). Golden eagles with natal areas in southern California have been tracked south to La Paz, Baja California and Guadalajara, Mexico, east to Arizona and Colorado, and north to Nevada, Utah, and Wyoming and many points in between (Bittner et al. 2011). In healthy eagle populations, where most potential territories are occupied, many non-breeding eagles may exist on the margins of territories occupied by breeding adults (McCrary et al. 1992, Watson 1997, Hunt 1998, Caro et al. 2010).

Eagle Prey Base Assessment

URS Corporation (URS) performed early and late spring rare plant surveys (30-meter wide transects) in March 2011 and late April to early May 2011, desert tortoise surveys (10-meter wide transects) in late April through mid-May, and burrowing owl surveys (30-meter wide transects) in late May through mid-June. All surveys covered 100% of the site to which biologists had access. Small mammals observed or indirectly detected from scat or tracks include black-tailed jackrabbit (*Lepus californicus*), white-tailed antelope ground squirrel (*Ammospermophilusleucurus*), desert kangaroo rat (*Dipodomys deserti*), woodrat (*Neotoma* sp.) and round-tailed ground squirrel (*Xerospermophilus tereticaudus*); however, unidentified rodent tracks and burrows were observed throughout the biological study area.

Despite the prevalence of burrows, direct observations of small mammals were infrequent. An estimated one jackrabbit per 100 acres was observed. Ground squirrels could be heard calling at more than half of the 128 bird count point locations. Direct observations occurred mostly when animals were flushed from underneath trees or denser shrub patches on the slopes leading to washes or in the washes themselves.

Predation pressure on small mammal populations by resident mammal and avian predators, combined with long-term drought conditions in the Mojave Desert have kept small populations low. Winter (October 1 – Mar 31) rainfall, which produces the most plant biomass upon which small mammals depend, has only exceeded 3 inches in 3 of the last 11 years (2000-2001, 2004-2005, and 2009-2010) in Blythe (Weather Underground 2012). The other years within this period had rainfall totals of less than 2 inches in these cooler season months. The approximate long-term average for these months is 2.4 inches. Blythe has received significantly less than this average rainfall for 8 out of the last 11 years. It may take 3 consecutive years of above average rainfall to raise prey populations to levels that would attract additional raptors and be able to support golden eagles (Dave Bittner pers. comm. 2011).

The common detection of red-tailed hawks and two great-horned owls within the Project assessment area would suggest that golden eagles are not using the area to the degree that would typically cause competitive interactions between eagles and these two other rival raptors (Rivard et al. 2011). If territorial eagles frequently used the Project site, then fewer red-tailed hawks and great-horned owls would be expected to be present due to competitive exclusion and predation of these two common raptors by resident eagles (Olendorff 1976, Marr and Knight 1983, Kochert et al. 2002, Sergio and Hiraldo 2008, Lourenco et al. 2011). Nesting golden eagles aggressively defend their nesting territory from other raptor species (Watson 1997,Carrete et al. 2002).

4.2 BIRD POINT COUNTS

Bird point count surveys were conducted in 2011 during both spring and fall. Point count survey methodology followed the BLM's Solar Facility Point Count Protocol (2009), which closely follows Ralph et al. (1995), with some modifications. This protocol was submitted for review and approval to all responsible agencies prior to implementation. BLM submitted concurrence with this protocol via email (Larry LaPre, pers. comm. 2011). Both spring and fall surveys were conducted one day a week for each transect, for four consecutive weeks, in order to identify species occupying the site during each season. Spring point counts began on April 5, 2011 and ended on May 5, 2011. Fall point counts began on November 9, 2011 and ended on December 9, 2011. Counts began at sunrise and ended within approximately four hours of sunrise.

Sixteen point count transects were surveyed due to the Project's approximately 14square-mile footprint, plus additional MWD lands south and east of the project limits. Each transect included eight points that were at least 250 meters apart. Transects were concentrated in areas with high potential for bird activities (e.g., washes, high vegetation areas). Out of 128 total survey points, 58 (45%) were located within microphyll woodland, and an additional 36 (28%) were located within 100 meters of microphyll woodland. The remaining 34 point locations were within upland desert scrub more than 100 meters from microphyll woodland.

Table 1
Recent Golden Eagle Survey Results at Solar Projects in Eastern Riverside County

Project Name	Helicopter Survey Dates	Number of Eagles Observed	Number of Occupied Territories	Number of Active Nests	Number of Inactive Nests
Rice Solar Energy Project	May 4, 2010 & May 29, 2010	0	0	0	12
Blythe Solar Power Project	No report found	n/a	n/a	n/a	n/a
Palen Solar Power Project	March 25-26 & April 2-3, 2010.	0	1	4 (no confirmed sign of reproduction)	4
Genesis Solar Energy Project	March 25-26 & April 2-3, 2010, Phase II May 14, 2010	7 (5 adults, 2 nestlings)	4	9 (one confirmed sign of reproduction)	5
Rio Mesa Solar Power Project	March 23, 2011, Phase II May 5-7, 2011	0 (2 incidental observations on Project Site during Botany Survey in March)	0	0	4

Ten minute periods were spent surveying a radius of 100 meters around each survey point. Birds were recorded as ≤50 meters away, ≥50 meters away (up to 100 meters), or as a fly-over. The surveys were conducted by two biologists. Surveyors scanned the sky and surrounding vegetation for perching birds and listened for calls. Survey starting and ending time, starting and ending temperature, cloud cover, and wind speeds were recorded on data sheets, along with any incidental sightings and species observed during transit between survey points.

A total of 81 bird species were observed at the project site and a total of 3,644 individuals were detected. No waterfowl (e.g., ducks, geese) or eagles were observed during the surveys; however, one incidental observation of two individual golden eagles were observed in March during early spring botany surveys. The only waterbird observation was a flock of 14 white pelicans flying over the Project site during the spring survey. There were also no observations of large migrating flocks of raptors with the exception of turkey vultures (the largest being 20-30 individuals observed incidentally during early spring botany surveys). Special status bird observations included the state threatened Swainson’s hawk (one individual observed during the spring survey) and state endangered Gila woodpecker (four individuals observed during the spring survey and one individual observed during the fall survey).

During the spring 2011 surveys, 68 bird species were detected with a total of 2,622 individuals (41.0 birds per transect-day). This represents a density of about 66 birds per 100 acres (163.1 birds per km^2). The most commonly observed species included: Tree swallow (10.3/transect-day), Mourning dove

(7.5/transect-day), Ash-throated fly-catcher (4.8/transect-day), Verdin (3.9/transect-day), Black-tailed gnatcatcher (1.3/transect-day), and Phainopepla (1.2/transect-day).

During the fall 2011 surveys, 47 bird species were detected with a total of 1,022 individuals (15.0 per birds per transect-day). This represents a density of about 23.5 birds per 100 acres (58 birds per km^2). The most commonly observed species included: Yellow-rumped warbler (2.8/transect-day), House finch (2.2/transect-day), Horned lark (1.8/transect-day), Phainopepla (1.3/transect-day),Verdin (1.3/transect-day), and Black-tailed gnatcatcher (1.1/transect-day).

Aerial foraging birds (swifts and swallows) detected during the surveys accounted for almost 30 percent of all spring season sightings. Tree swallow was the most common species recorded during the surveys. Doves and quail were the second most common group of birds detected, representing over 17 percent of all sightings. Migrant warblers represented less than 10 percent of all spring season sightings.

Raptor migration is often inconspicuous and poorly defined in the Lower Colorado River Valley (LCRV) (Rosenberg et al. 1991). Swainson's hawk, Cooper's hawk, Harris hawk, and Merlin detected during surveys are occasional migrants that are expected to use the site in small numbers. The site lies outside the main migration route of Swainson's hawk and contains potential wintering habitat for Cooper's hawks and Merlins; however, the detection of only one individual of each species suggests that they are not commonly present on site. The absence of these raptors in the project area is especially evident when compared to other locales, such as around Borrego Springs, where tens to hundreds of Swainson's hawks can be seen each day on their migration from South America to the California Central Valley and Great Basin (Anza Borrego Natural History Association 2011, Unitt 2004). The most common raptors detected in the project area were turkey vulture, red-tailed hawk, and prairie falcon.

A flock of 14 American white pelicans observed during the 2011 spring surveys was the only sighting of a waterbird species on, or flying over, the project site. This confirms the expectation, at least during the day, that waterbird presence at the Rio Mesa site is limited to the occasional flyover of birds wandering from the agricultural fields or passing through during migration. A flock of sandhill cranes was observed in fall, approximately two miles east of the site flying over the agricultural fields. No waterbirds were observed at or over the project site during diurnal fall surveys, when most waterbird species are present in the LCRV. This observation further demonstrates general waterbird fidelity to the agricultural fields and Colorado River floodplain east of the Project site. Given the Project site's peripheral location in relation to typical waterbird habitat and the one-mile buffer of desert habitat between the agricultural fields and the heliostat field, flyovers by waterbirds may be infrequent. Shorebirds present in the LCRV typically follow the river valley, but their numbers are small compared to large flocks that concentrate at the Salton Sea (Rosenberg et al. 1991, Patten et al 2006), which is located over 100 miles to the west-southwest of the Project site.

Most migrant flocks of birds fly at altitudes well above the proposed power tower height (760 feet/232 meters [m]). When migrating, neotropical songbirds tend to fly at night at relatively high altitudes (400 m to 2,000 m above ground level [AGL]) and many fly non-stop over the desert region unless they are low on fat reserves or poor weather forces them to the ground (Felix et al. 2008, Hardy et al. 2004). However, descending and ascending migratory birds or those migrating or moving below tower height are at greatest potential risk, and most neotropical birds and many local birds all have to do this either at dawn or dusk wherever they initiate or terminate their flight. Upland habitats, such as desert scrub, are not as attractive to migrating birds as riparian areas because of the comparatively lower abundance of food (DeLong et al. 2005). The flight altitude of wintering waterbirds is often less than 100 m AGL since these birds are moving from night roost sites along the river to forage in the agricultural fields during the day. The project site is not along the local potential routes between waterbird winter roost sites and foraging areas. Migrating flocks of waterbirds usually fly at much higher altitudes (1200 to 5000 m AGL; Beason 1978). Most migrating raptors tend to soar on thermal uplifts and glide between these thermals but many use powered flight when conditions require. The altitude for overflying raptors can be variable, but it would usually be less than 300 m AGL. Actively foraging raptors would usually be flying below 100 m AGL. Northern harriers forage low to the ground (<30 m AGL).

SECTION 5 PROJECT TECHNOLOGY DESCRIPTION

Below is a side-by-side comparison of the technical aspects of three projects: the DOE/SCE Solar One project developed and constructed in the 1980's, BrightSource Energy's Solar Energy Development Center (SEDC) currently operating in the Negev Desert in Israel, and the proposed Rio Mesa SEGF. Four risk factors are discussed:

- flux concentration
- elevated ambient air temp near the surface of the SRSG
- collision with heliostats and power tower
- environmental setting

In the following table we compare Solar One and SEDC in size and avian activity, and how those characteristics differ from the proposed Rio Mesa SEGF. We reason that the results and conclusions of the study done at the Solar One project are site-specific and in large part do not apply to the Rio Mesa SEGF.

Table 2
Comparison of Power Tower Technology at Three Project Sites

Risk Factor	Solar One 10 MW Demonstration Project, 282' Steel Lattice Tower, 126Acres Evaporation Ponds, 1,818 Heliostats	SEDC 6MW Pilot Project, 256' Steel Lattice Tower, 19 acres Evaporation Ponds, 1,610_Heliostats	Rio Mesa SEGF 3 Proposed 250 MW Plants 760'Concrete Towers, 5,570 Acres, 4 acres Evaporation Ponds 255,000 Heliostats
Flux Concentration			
Occurs when many heliostats are reflecting sunlight to a small area/volume in space. The concentration of energy in itself does not cause a significant rise in the ambient air temperature, but any matter (such as the SRSG or the body of a bird) will be heated. The rate of rise in temperature of a body or structure within the flux will be a function of the amount of flux. How absorptive the surface of the matter is and the time that matter stays in the concentrated flux also are key factors in determining the temperature and impact on the surface of the body or structure.	,When Solar One was operating, common practice in the boiler industry for conventional metal tubes was a maximum flux on the receiver of 500-600kW per square meter. Aiming controls were primitive by today's standards, so use of a four standby point system at Solar One was substantial and necessary to control flux on the boiler. (see Photo 2) Based on BSE's familiarity with the project and the state of heliostat control technology at the time, we estimate the flux concentration at those standby points to be approximately1500kW/m^2.	Maximum flux on the receiver is 600kW per square meter. Two standby points are used at SEDC since the boiler faces in one direction only. Improvements in the heliostat control technology allows reduction of the flux concentration at those standby points to around 1000kW/m^2. Although no formal study has been undertaken at SEDC, three years of daily ground activity at the facility has yielded no observations of avian mortality.	Maximum flux on the receiver will be 600kW per square meter. Given new advances in heliostat control technology, BrightSource power tower plants will no longer use standby points, but rather a standby zone that will form a ring-like shape around the SRSG. This will greatly reduce flux concentration, as each heliostat will be aimed at a slightly different point (see Photo 3). BSE estimates the flux concentration in the standby zone to be no more than 500kW/m^2.

Table 2
Comparison of Power Tower Technology at Three Project Sites

Risk Factor	Solar One 10 MW Demonstration Project, 282' Steel Lattice Tower, 126Acres Evaporation Ponds, 1,818 Heliostats	SEDC 6MW Pilot Project, 256' Steel Lattice Tower, 19 acres Evaporation Ponds, 1,610_Heliostats	Rio Mesa SEGF 3 Proposed 250 MW Plants 760'Concrete Towers, 5,570 Acres, 4 acres Evaporation Ponds 255,000 Heliostats
Elevated Temperature Near Surface of SRSG			
Occurs due to localized thermal convection near the face of the SRSG. The shape of the elevated temperature zone is not fixed and depends on atmospheric conditions, especially wind. In calm wind conditions the area of slightly elevated temperatures will tend to have a tear drop shape as hot air rises (see CFD model report in Appendix A).	No direct data about this factor at Solar One is available at this time. BSE has not modeled air temperatures around the Solar One boiler. However, since the boiler tube coating at Solar One and SEDC were the same, we can assume, with a certain amount of confidence, that the physical mechanism resulting in convective heat was very similar to what BSE has modeled for our SEDC and Ivanpah facilities.	Calculated by a CFD model[1] (see Appendix A -"Air Temperature Surrounding the SRSG" report for interpretation of the CFD model developed for SEDC and Ivanpah). The CFD model indicates that elevated air temperatures around the SRSG are limited to only a few inches from the surface, at which point the temperature is only 40^{o}C above ambient and then drops rapidly with further distance from the SRSG.	Based on the CFD model[1] done for Ivanpah and extrapolated for Rio Mesa Solar, this area will extend less than five meters horizontally and down wind from the SRSG face. At 1.5 meters above the SRSG the maximum air temperature will drop to ~15^{o}C above ambient. The elevated temperature dissipates rapidly such that at a distance of the SRSG width (approximately 20 meters), there is no measurable temperature increase from the SRSG (see Appendix A).

Note 1: CFD is Computational Fluid Dynamics

Table 2
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Collision with Heliostats and Power Towers (for Night Time Flyers)			
heliostats. This risk factor was mentioned as one of the primarycontributors to bird mortality in the 1986 McCrary report.	Solar One used several types of heliostats, most of which were large and had multiple mirrors (510ft^2) and reached as high as 26.5' above grade(See Photo 2). According to McCrary, over eighty percent of avian mortalities were from collisions with these large tall mirrors. No data exists for mortality of night-time migratory birds at Solar One.	SEDC uses mostly the single mirror LH-1 (75ft^2) and some dual mirror LH-2 (150ft^2) heliostats. Both types are much smaller than the Solar One heliostats, and only reach about 12-13 feet above grade. Although no formal study has been undertaken at SEDC, three years of daily ground activity at the facility has yielded no observations of avian mortality. The Gemasolar plant in Spain has similar results.	Rio Mesa will use all dual mirror LH-2.3 heliostats with a surface area of 204ft^2,(less than half the size of the Solar One heliostats) and a maximum height of 13.5 feet above grade. Six years of data collected during a radar study conducted from the Blythe airport revealed that approximately 85% of night-time migration occurred at an altitude of 1000ft or more (R.L. McKernan pers. comm. 2012). In addition, Rio Mesa SEGF risk of collision with the towers will be minimized by: non-reflective concrete construction, appropriate FAA lighting, and relatively small (60-80 ft.) horizontal profile. Additionally, unlike wind turbines, there are no spinning blades on the towers. There are no high-tension guy-wires. The highest risk of collision from nighttime migratory birds will be during inclement foggy whether (infrequent occurrence in Blythe area) and moonless nights (1-2 days/month)

Table 2
Comparison of Power Tower Technology at Three Project Sites

Risk Factor	Solar One 10 MW Demonstration Project, 282' Steel Lattice Tower, 126Acres Evaporation Ponds, 1,818 Heliostats	SEDC 6MW Pilot Project, 256' Steel Lattice Tower, 19 acres Evaporation Ponds, 1,610_Heliostats	Rio Mesa SEGF 3 Proposed 250 MW Plants 760'Concrete Towers, 5,570 Acres, 4 acres Evaporation Ponds 255,000 Heliostats
Environmental Setting			
Birds in the desert tend to be more plentiful where water, food and nesting habitat are present. Irrigated farmlands and riparian areas attract more species of birds and in greater numbers than desert scrub habitats due to there being permanent water and more foraging and nesting habitats.	Solar One was situated directly adjacent to irrigated farm land and had approximately126 acres of un-netted (open) evaporation ponds directly adjacent to the Solar field. According to McCrary, these ponds and the adjacent irrigated farm land attracted significant avian activity to the Solar One project site.	SEDC is located within the Syrian-African fault, a major flyway for migratory birds in the region. SEDC does not have ponds on site, nor is there open water or farm lands near the project site. Although no formal study has been undertaken at SEDC, three years of daily ground activity at the facility has yielded no observations of avian mortality. This suggests that Solar One's bird issues may be a site-specific issue and should not be extended to all projects employing solar power tower technology.	The heliostat fields at the Rio Mesa SEGF will be located in areas of desert scrub approximately one mile away from irrigated agricultural fields. There are no permanent streams or rivers on site and no riparian habitat. The Project will have only 4 acres of netted evaporation ponds east of the solar field, and the towers will be approximately 3 to 4 miles from the agricultural fields. The Colorado River is about 5 miles away at its closest reach, and is typically 6-8 miles from the site. It is considered a secondary flyway to the Pacific Flyway, which is over 100 miles to the west, and connects the Sea of Cortez with the Salton Sea and Peninsular Mountain Ranges to California Central Valley and Great Basin areas east of the Sierra Nevada Range.

SECTION 6 RISK CHARACTERIZATION FOR EAGLES AND OTHER BIRDS

Based on the available data outlined below, the potential for Project-related golden eagle mortality is expected to be low. This conclusion is supported by the small number of eagles observed and the relatively low density of occupied golden eagle breeding territories near the Project Area.

The most probable sources of potential eagle mortality within the 10-mile radius of the project are listed in Table 3. The very low abundance of eagles in the project vicinity found during 2011 would suggest that exposure to these risk factors will also be very low.

Table 3
Potential Eagle Risk Factors within 10 Miles of the Rio Mesa Project

Risk Category	Description
Collision with Motor Vehicles	Potential for collisions along I-10, SR-78, and local roads.
Electrocutions	Existing power lines (distribution and transmission) within 10 miles of the project. All are designed to prevent raptor electrocutions. The Gen-Tie transmission line will also be designed to prevent raptor electrocutions and will be parallel and adjacent to existing transmission lines. The 220kV transmission lines from the Power Blocks to the common area switchyard are planned for underground installation.
Rangeland Management and Grazing Practice	Livestock grazing in the vicinity could draw eagles into the area to forage on carcasses.
Habitat Loss and Fragmentation	OHV road use, current and future projects in vicinity.
Lead Poisoning	Hunting on private and public lands in multiple use areas.
Recreation Activities (motorized)	Disturbance caused by large-scale use of motorized vehicles.
Wildfire and Suppression	BLM management, wildfires.
Invasive Plant Species	Effects on native habitat could adversely affect jack-rabbit population (eagle prey base).
Cumulative Effects Renewable Energy	Several renewable energy projects north and west of the Rio Mesa SEGF: • Mortality or injury from disorientation and consequent strikes on reflective heliostat mirrors or supporting structures. • The effect from heat and bright light at highly concentrated focal points (McCrary et al. 1986). • Disorientation and strikes against structures because of artificial night lighting (Podolsky, 2006). • Bird strikes against solar receiver towers if they attract birds that are looking for roosting locations. • Bird strikes against heliostats that may attract birds seeking shade during hot days. • Bird strikes against or electrocution from contact with gen-tie lines that may not be visible to birds during flight or that may attract roosting birds.

The substantial distance of the project from the inactive eagle nests (more than 6 miles) also suggests little future interaction between the towers and young eagles or resident adults should the nest sites ever become active and produce young; however, potential eagle foraging habitat will be lost for the lifetime of the project.

Floaters have been shown to be more vulnerable to collision with turbine blades at wind-energy projects than locally-breeding adults and juveniles (Hunt et al. 2002). There are no reports of eagles colliding with tall structures. However, collisions of nocturnal avian migrants with transmission lines, radio towers, guy wires and tall buildings are well documented (Bevanger 1998, Kerlinger 2000, Erickson et al. 2001, Erickson et al. 2005).There are no data to determine eagle breeding trends in the region, but recent eagle survey results suggest that the breeding potential of the species in the region is currently limited. The nearest known actively breeding pair of eagles is over 30 miles from the project site. This limited breeding potential is further reduced by current weather trends causing low prey population cycles in the region.

Nest survey data and diurnal bird survey data for the Rio Mesa SEGF currently indicate low use by golden eagles in and near the Project Area with an associated low risk for mortality.

- Only six of 14 potential nesting territories in the Project region were considered occupied in 2009-2011, based on the presence of adult golden eagles in the vicinity of nest sites (Figure 2).
- Only one territory located over 30 miles from the Rio Mesa site was documented as actually being used by a breeding eagle pair.
- No active golden eagle nests were documented within 10 miles of the Project Area in 2011.
- No bald eagles are known to nest within 10 miles of the site. This species is a rare to uncommon winter visitor in the project vicinity (Rosenberg et al. 1991).
- Currently, the majority of the eagles present in the project vicinity are transient individuals and not resident breeding adults.

Golden eagles also could be exposed to the direct impact of collision or strikes with other human-made objects in the Project area. The transmission lines, substations, switchyard, and fences in the Project area nominally increase the risk of collisions. Transmission line impacts will be minimized by following Avian Power Line Interaction Committee guidelines for transmission lines. Potential impacts to eagles from the Project generator tie-line and associated facilities are expected to be minimal due to:

- the underground construction of transmission lines from the power blocks to the common area switchyard
- placement of the gen-tie line from the switchyard to CRS adjacent existing transmission lines,
- use of best practices in the construction of the proposed transmission lines
- due to the apparent low exposure level suggested by survey data.

It is possible that the regional golden eagle population will increase if their prey base populations recover. If the two unoccupied territories within 10 miles of the Project site become occupied, a monitoring and adaptive management program should be considered. If deemed appropriate, the Project proponent will prepare an Eagle Conservation Plan (ECP) that will follow the United State Fish and Wildlife Service (USFWS) ECP guidance. The ECP would contribute toward minimizing mortality of golden eagles associated with the Project.

Erickson et al. (2001) reported on 17 studies where collision mortality at communication towers was measured for periods of time ranging from one to 38 years. For studies conducted over a period of at least two years, with searches conducted on a daily or almost daily basis, the estimated mean number of annual collisions per tower ranged from approximately 82 birds per year at an 825-ft (250-m) tall television tower in Alabama to 3,199 birds per year at a 1,000-ft (305-m) tower in Eau Claire, Wisconsin. Avian mortality appears to increase with tower height. Taller towers also tend to have more guy wires and more lights, often more solid or pulsating red lights, which may increase the potential for collision mortality. Most lighted towers are lit due to FAA pilot warning regulations. On foggy or low cloud-ceiling nights, these lighted towers appear to attract neotropical nocturnal migrants (Manville 2000, Kerlinger 2000), increasing the risk of collision. Lighting appears to be the single most critical attractant, and preliminary research indicates that solid and pulsating red lights seem to be more attractive to birds at night during inclement weather conditions than are white strobe lights. It is speculated that the birds are attracted to the lighted towers, become disoriented and fly around them in a spiral, colliding with the tower, the guy wires, and other birds. Of note is that the towers for the Rio Mesa SEGF do not have guy wires, and the tower itself would be visible in moon light, as it is a solid 60-80 feet diameter concrete structure. However, the towers would be difficult to see on moonless nights. Successful methods of reducing the frequency of avian collisions with towers have been developed (Manville 2005, Gehring et al. 2009). Radar data for the Mojave Desert indicates that less than 15% of the nocturnal migrant birds fly below 300 meters (Felix et al. 2008, R.L. McKernan, pers. comm. 2012). The Rio Mesa SEGF towers will be 226 m tall.

In its draft Guidance (USFWS 2011), the Service provided a mathematical model that estimates fatality risk at wind project sites. The model relies on a logical assumption that there is a positive relationship between the number of minutes eagles are in close proximity to the turbines, the number of turbines, and risk of collisions by eagles. The results of the model predict the number of fatalities per year at a wind project site. An estimate of the amount of time eagles spend over/on the project site is required to estimate statistically the exposure risk at the project site. However, a recent study found no correlation between these predictive estimates and actual mortality (Ferrer et al. 2011). There was no clear relationship between predicted risk and the actual recorded bird mortality at wind farms. Risk assessment studies incorrectly assumed a linear relationship between frequency of observed birds and fatalities.

Data are lacking for estimating the collision probability for structures associated with solar tower projects. It is expected the collision probability would be lower for solar projects due to the lack of moving parts (no turbine blades), absence of high tension guy wires and the small area of lower intensity flux energy associated with each power tower at the Rio Mesa SEGF. Shorter heliostats at the Rio Mesa SEGF are expected to reduce the incidence of collision compared to the Solar One project equipment. Whereas the heliostats at Solar One reached up to 26.5 feet in the air, the heliostats at the Rio Mesa SEGF will reach no more than 13.5 feet high. Some resident songbird collisions are expected to be unavoidable due to birds that fail to recognize clear or reflective glass panes as barriers and potential behavioral effects of mirrored glass inducing collisions (Klem 1989, 1990, Ericson et al 2005).

The Solar One project was an 80-acre project supported by the U.S. Department of Energy and SCE. They sponsored a study to determine the bird mortality rate and causes of mortality at the Solar One project site (McCrary et al., 1986). This study involved 40 weekly surveys for bird carcasses between May 1982 and May 1983. The study identified 70 bird fatalities including 26 species over a period of 40 weeks. The mean rate of mortality between weekly visits was 1.9 to 2.2 birds. The study made external examinations of broken bones and singed or burned feathers. Of the total 70 mortalities, 13 were from heat injury and 57 from impact trauma. The average daily bird count was 314 ± 203 standard deviation (111 to 517) over an area of 370 acres. Most of the fatal impacts were with mirrored heliostats.

Solar One utilized a concept of standby mirrors being focused on two “standby points” that are located several meters from the solar boiler. When many heliostats are focused on a standby point in the air, they can produce very high flux within a small zone. Birds may have flown into this zone and been unable to escape before receiving heat injury. The McCrary et al. (1986) states that all heat injuries were due to standby points. McCrary et al. (1986) concluded that mortalities represented only 0.6 to 0.7 percent of the local population present at any given time, based on the mean of total daily bird counts, which the authors characterized as minimal.

(1) At Solar One, 81.4 percent (57/70) of mortalities were due to strikes against the heliostats, whereas, 18.6 percent of mortalities (13/70) were due to heat injury. No fatal impacts from the tower or power lines were reported. Extrapolated estimated mortalities at Rio Mesa SEGF based on these data are not valid, as there are several important differences between the Solar One facility and the proposed Rio Mesa SEGF. The Solar One site was adjacent to 2700 acres of irrigated agricultural fields, and

(2) The Solar One site had approximately 126 acres of constructed water impoundments (evaporation ponds).

(3) Solar One utilized high flux concentration standby points, Rio Mesa SEGF utilizes a lower flux and dispersed standby ring.

(4) Solar One heliostats were more than twice as large (500ft^2 versus 204ft^2) and nearly double in height (26.5 ft. versus 13.5 ft.)as compared to Rio Mesa SEGF.

Based on observations of working tower facilities around the world, it does not appear that the solar towers will have a significant negative impact on bird populations. It is important to remember that the Solar Receiver Steam Generator (SRSG) is designed to absorb energy, not reflect it.From the total energy that is concentrated on the tower, ~96% is absorbed and only 4% reflected back to the atmosphere. While the SRSG shines bright, it is designed to minimize heat loss, and elevated air temperatures are limited to only about 5 meters from the SRSG’s surface and about 60 meters above it. The area of significant solar flux around the boiler where reflected sunbeams converge is also very small, and constitutesonly 0.0046% of the total airspace of the developed area of the Project.

A weekly mortality estimate was derived by adjusting the mortality data from Solar One (1.5 to 1.8 non-heat fatalities per week) and extrapolating to the size of Rio Mesa SEGF, the mortality at Rio Mesa SEGF is estimated to be between 5.8 to 6.7 birds per week [(1.5 to 1.8) (0.425) (8.75) = 5.6 to 6.7]. The technology at Rio Mesa SEGF does not produce hot standby zones as Solar One did, so no heat-related fatalities are expected. The worst-case mortalities by feature are estimated to be:

- Heliostat fields (impact mortality): 5.8 to 6.7 birds per week
- Power towers (heat mortality): 0.0 birds per week
- Fatal impacts with other structures: minimal
- Fatal impacts with the gen-tie lines: minimal

Impact Reduction Measures

The following are proactive measures designed to avoid and minimize risks to birds. Proactive measures are anticipatory actions that avert future impacts, rather than remedial measures that occur after the fact.

- Configure Federal Aviation Administration (FAA) lighting to have only red lights with the longest permissible interval between flashes and the shortest permissible flash duration.
- Synchronize FAA lighting to increase the flash effect.
- Use colored lights (yellow) that do not attract insects to avert fatal impacts by bats during night washing operations.
- Design and construct gen-tie poles according to industry guidelines in Avian Power Line Interaction Committee (APLIC [2006]) and Edison Electric Institute (2004) to prevent avian electrocution.
- Use closed tanks to store water associated with boiler commissioning and emergency outfalls.
- Design the plant lighting systems with hoods to minimize night sky illumination that could attract or disorient birds at night.
- Provide worker awareness programs that increase understanding of avian threats and enhance cooperation and compliance.
- Contain all trash associated with the project that could provide subsidies to predators in secure, self-closing receptacles to prevent the introduction of subsidized food resources.
- Promptly remove and dispose of all road-killed animals on the project site or its access roads.
- Use water for construction, operation, maintenance, and decommissioning (for example, truck washing, dust suppression, heliostat washing, landscaping) in a manner that does not result in puddling.

SECTION 7 CONCLUSIONS

- Based upon the limited number of golden eagle sightings during recent surveys and the distance from the nearest inactive or active nest, the current use by golden eagles of the project area appears to be currently limited to only a few individuals. Thus far, two eagles of unknown status were detected at the Project in March 2011. Planned fixed-point monitoring as defined by Peter Bloom will provide additional quantitative data of site use by eagles. This apparent extremely low eagle abundance reflects the paucity of the principal golden eagle prey species in the deserts of California and Nevada, the black-tailed jackrabbit (Bloom and Hawks 1982) and their habitat.
- Based on species relative abundance derived from diurnal bird point count transect data for the Rio Mesa site and flight behavior, bird species most at risk for potential mortality associated with the structures and operation of the power tower technology are swifts, swallows, common raptors (turkey vulture, red-tailed hawk), and possibly winter flocks of dove, quail, finches and horned larks.
- Diurnal surveys to date indicate an extremely low use of the project area by both eagles and migratory birds, due to perhaps to a lack of prey and other food, distance from migration routes and preferred riparian habitats, respectively. Thus, the low risks presented by the Rio Mesa SEGF technology, combined with the low levels of eagle and migratory bird activity in the project area, suggest relatively low potential for adverse impacts to bird populations as a result of the construction and operation of the Project, but on-site, radar technology at night should provide the most conclusive evidence for the potential frequency of nocturnal collisions by birds with the towers at night.
- Based on observations at working power tower facilities around the world, it is unlikely that BrightSource's facilities employing its current version of concentrating solar power technology will have a substantial impact on birds. Solar boilers are designed to absorb energy, not to reflect it, and that while the boiler shines bright, it is designed to significantly reduce heat loss, which results in elevated temperatures across only a small air space close the SRSG surface. The area of significant solar flux concentration, where reflected sunbeams converge, is also a very small. Portion of the total airspace above the developed area of the project from ground level to 760'(the tallest part of the towers). Finally, while heliostats at Solar One extendedover26 feet above the ground, the mirrors at Rio Mesa SEGF will reach approximately half that height.
- Birds that fly into the zone of converging reflected sunlight between the heliostats and the power towers are unlikely to be affected. The technology and operations of the Rio Mesa SEGF differ from Solar One, which, according to the McCrary study, caused avian fatalities due to heat loading and singeing. The technological progression from using standby points to using a standby ring with lower flux will minimize the risk to aerial foragers and low-flying birds.
- Studies in the Blythe area have shown that approximately 85 percent of birds that migrate at night have been found to fly at an altitude typically 1000 feet more above the ground, except in locations where crossing over topographic features, such as ridge tops, or when inclement weather forces them to fly closer to the ground. Shielding on lighting that directs light downward will reduce the potential for avian attraction and strikes. Appropriate design of the FAA lighting system on the towers would minimize attracting nocturnal migrating songbirds. The Rio Mesa

site does not experience poor visibility conditions (less than 10 days in 2011 noting visibility at less than 1 mile; typical visibility is 10+ miles; Weather Underground 2012) that could cause increased potential for night-time collisions into the towers and heliostats.

- There are three important differences between the Solar One facility (upon which the McCrary et al. 1986 study was based) that reduce the relative risks to avian populations from the Rio Mesa SEGF as compared to Solar One:
  - Location: Solar One was surrounded by fertile agricultural land and approximately 126 acres of un-netted evaporation ponds, which attracted birds. By contrast, Rio Mesa is buffered from any farmland (active or inactive) by more than one mile of desert scrub, and will have only 4 acres of netted evaporation ponds that will not be near the power block towers.
  - Advanced Heliostat Aiming Controls: Solar One was an early application of the tower technology and accordingly was a research and development project as well as an operating plant. When not directed at the boiler, Solar One's heliostats focused on two fairly small standby points, creating two high-concentration solar flux points that, according to McCrary, were responsible for the singeing of small birds. Our current control technology is much more sophisticated and efficient, which allows us to focus heliostats in a ring consisting of a much lower concentration flux standby zone when not focusing on the SRSG. This significantly reduces the amount of energy in any one point, decreasing the likelihood of harm to birds. This low flux ring has not resulted in any documented bird mortality to date (see Photos Section of this report).
  - Size of Heliostats: Heliostats at Solar One were more than twice as large (500ft.^{2} vs. 204 ft.^{2}) and nearly double the height (25 ft. versus 12 ft.) of the heliostats at the Rio Mesa SEGF.

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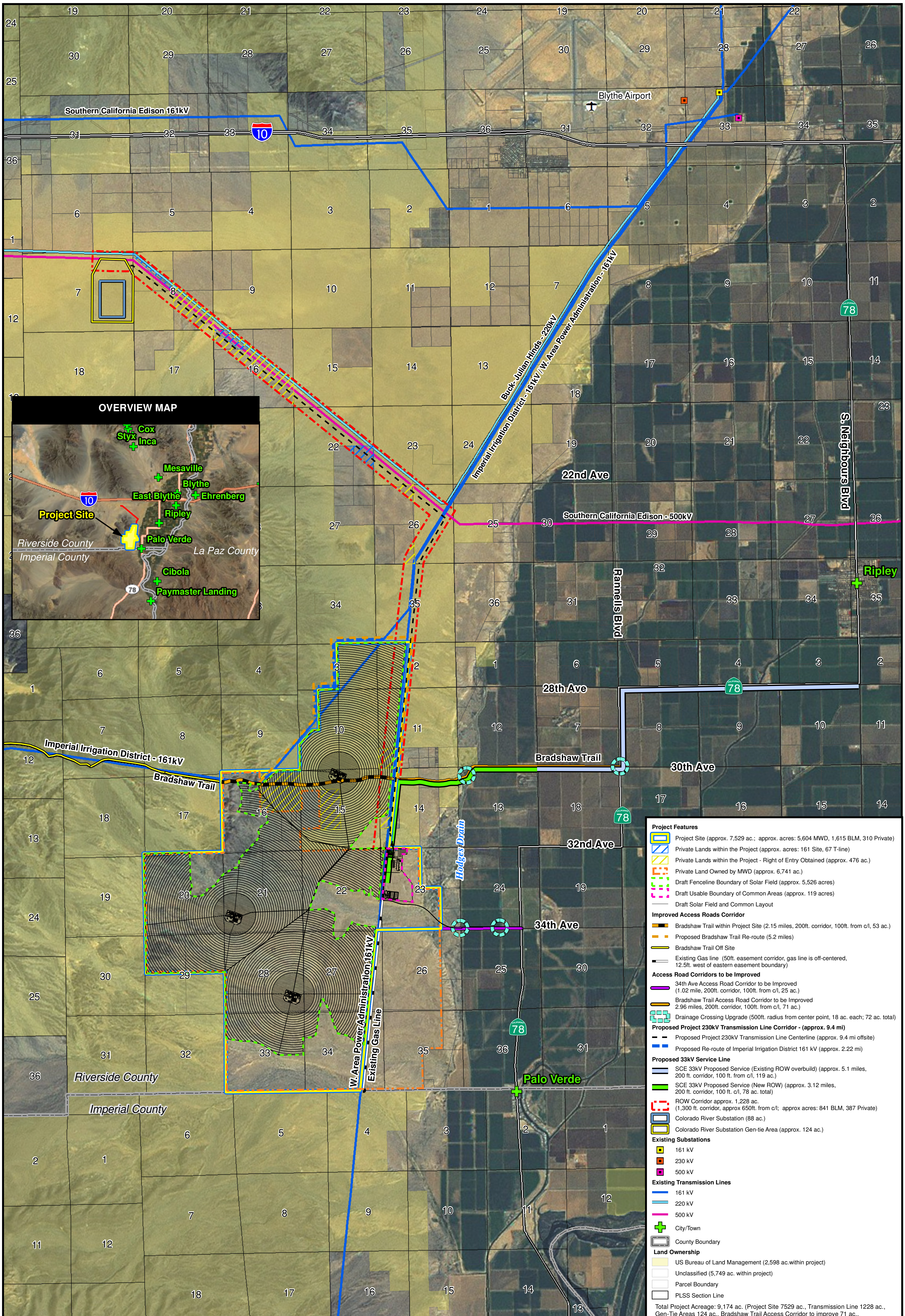

SOURCES: Draft Solar Field Layout & Fenceline (Bechtel, 8-03-2011). Project Site, Transmission Line Corridor, MWD Land, Private Lands, Existing Gasline (VTN, 3-15-2011). Transmission Line Centerline, Buck-Julian Hinds 220kV (Power Engineers, 8-2011). CRS Substation, Potential Gen-tie Area (Aspen, 3-11-2011). Aerial Imagery (NAIP, 5-25-2009). County, State Boundaries, Roads, Bradshaw Trail (ESRI, 2007). Parcels (BLM, 2006). Land Ownership (BLM, 3-03-2011). Existing Transmission Lines, Existing Substations (Platts, 2009). PLSS Sections (BLM, 12-11-2007). Improved Access Roads, Drainage Crossing Upgrade (URS, 3-18-2011). Bradshaw Trail Re-route, Imperial Irrigation District Re-route (URS, 6-2011). 33kV Proposed Service Transmission Lines (BSE, 2011).

COMPOSITE MAP
RIO MESA SOLAR
ELECTRIC GENERATING FACILITY

URS

3000 0 3000 6000 Feet
SCALE: 1" = 6000' (1:72,000)
SCALE CORRECT WHEN PRINTED AT 11X17

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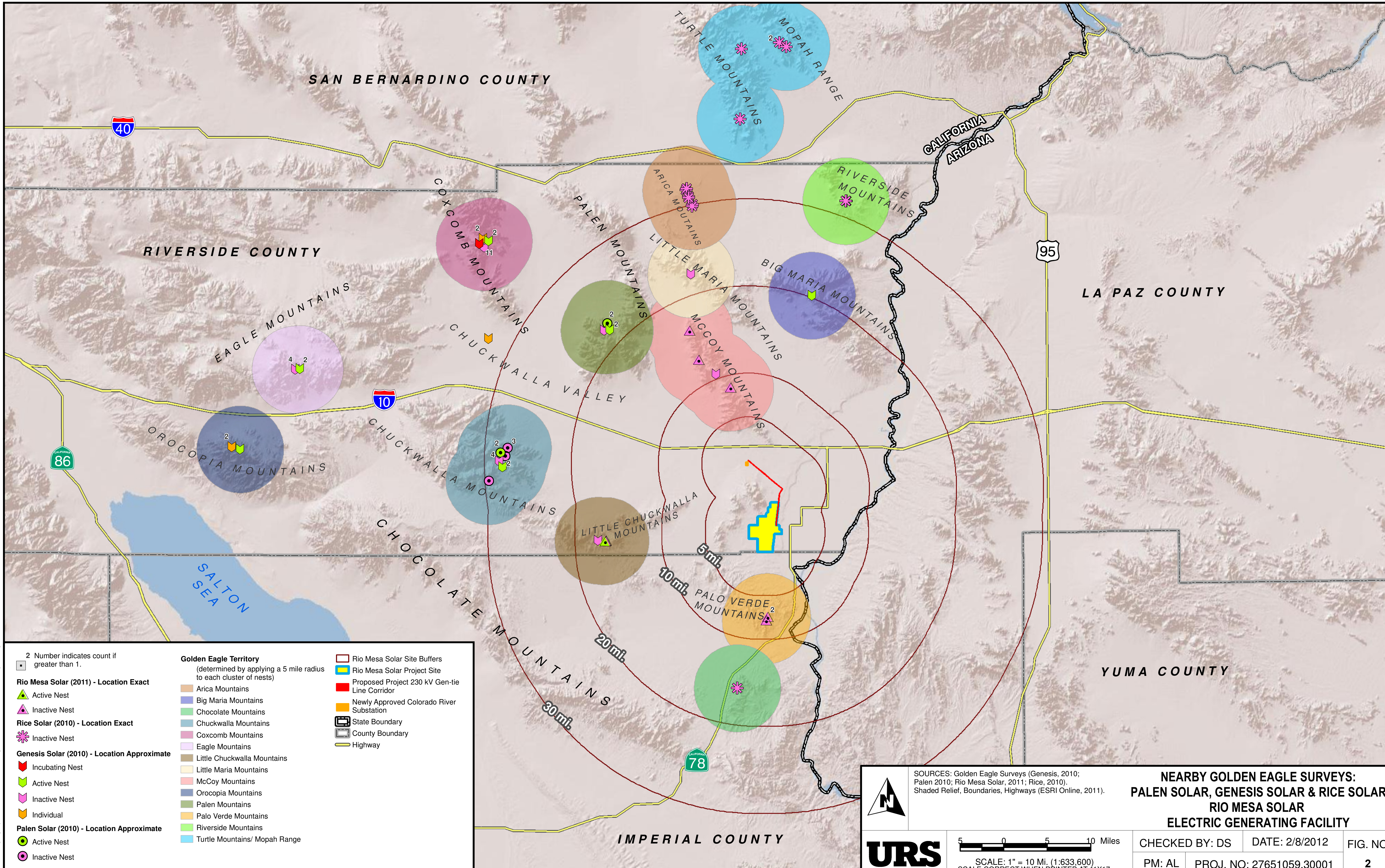

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Photo 1. Solar One with surrounding agricultural land, 126-acre pond not shown.

Photo 2. Solar One Standby Points which caused bird burn mortality.

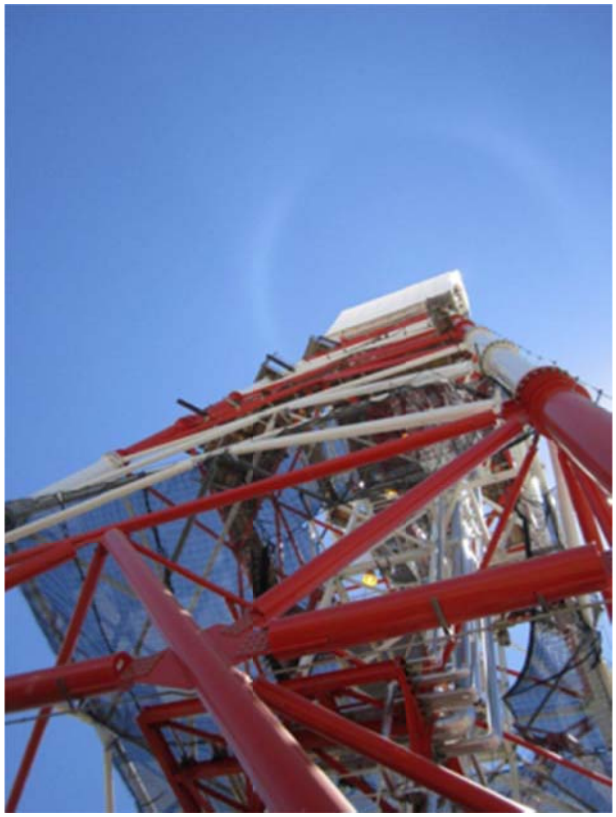

Photo 3. Low flux ring employed by Rio Mesa SEGF.
Flux concentration is lower compared to the Solar One design.

Air Temperature Surrounding the SRSG

REVISIONS			
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BrightSource

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1. INTRODUCTION

This document shows the expected temperature of the air surrounding BrightSource's solar receiver steam generator (SRSG).

1.1. Abbreviations

CFD	Computational Fluid Dynamics
EVA	Evaporator
SEDC	Solar Energy Development Center
SH	Superheater
SRSG	Solar Receiver Steam Generator

1.2. Relevant Documents

1.2.1. Company-Specific Documents

The following documents are relevant for this document:

Doc Number	Doc Title

1.2.2. Standards

The following documents are relevant for this document:

Doc Number	Doc Title

2. SUMMARY

Computational fluid dynamics (CFD) work to date has focused on BrightSource's pilot SRSG at the Solar Energy Development Center (SEDC); a separate model was developed for the planned Ivanpah SRSG. The two models use different parameters (e.g., wind speed) but still show the same qualitative results.

Wind speed used on the two models assumed low wind speed at the SRSG altitude for worst case scenario.

Both models show a very modest temperature effect at distances of a few meters from the SRSG surface. In terms of natural convection (in the vertical direction), the effect of the SRSG on air temperature is negligible more than a few meters above the SRSG.

3. RESULTS

Figure 1 is a plot of a CFD model of the pilot SRSG at SEDC, showing the air temperature at a cross section of the evaporator (EVA) section of the SRSG, with sustained wind at 2.2 m/s across the SRSG face (east to west). The surface temperatures on the EVA section range from roughly 300–450°C (572–842°F), while the superheater (SH) section temperatures range between 300–600°C (572–1110°F). The evaporator section is 5m high by 5m wide, and rises to approximately 75m above ground level. Figure 2 shows a similar plot for the 4m x 4m SEDC pilot superheater section just below the evaporator section.

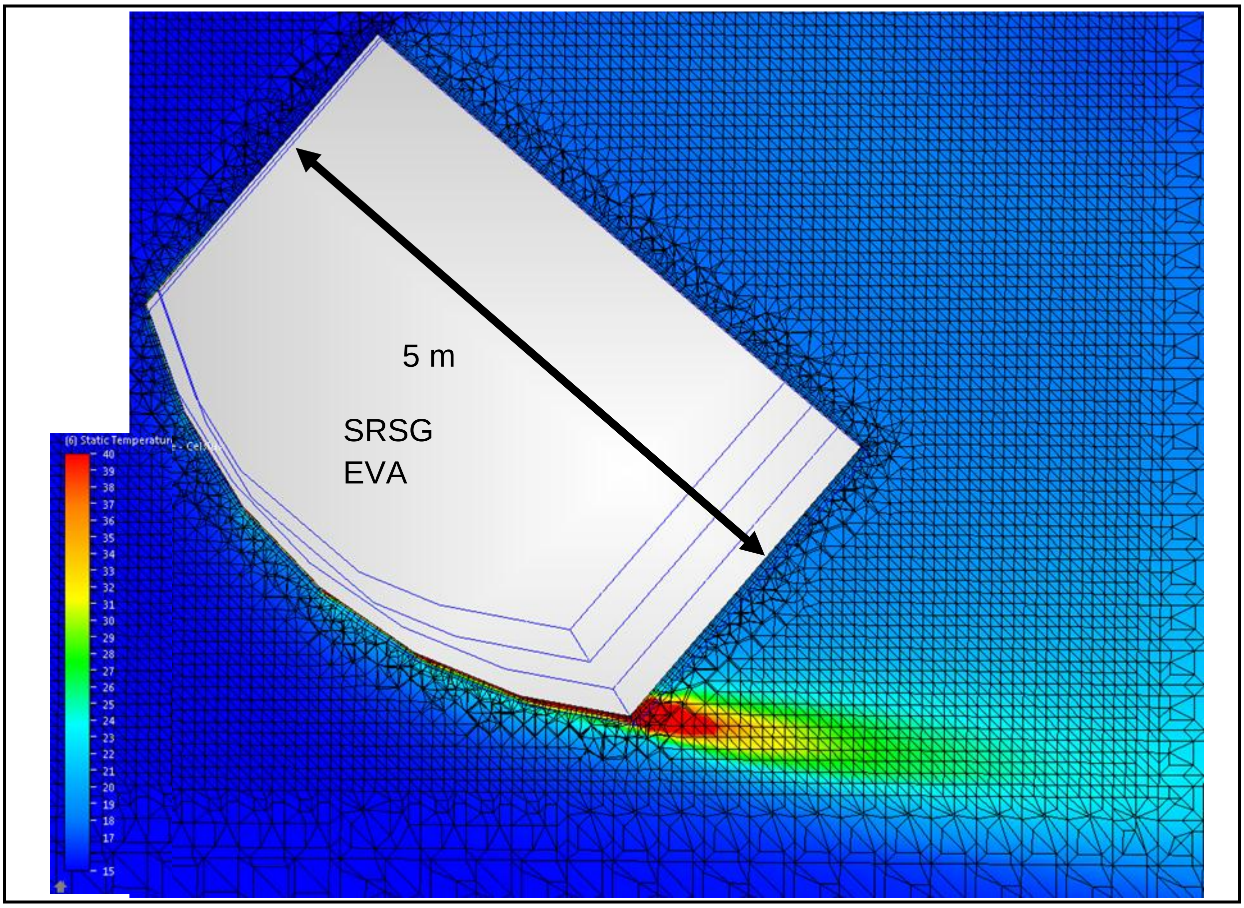

Figure 1: Air temperature at SEDC pilot evaporator cross section; wind velocity is 2.2 m/s

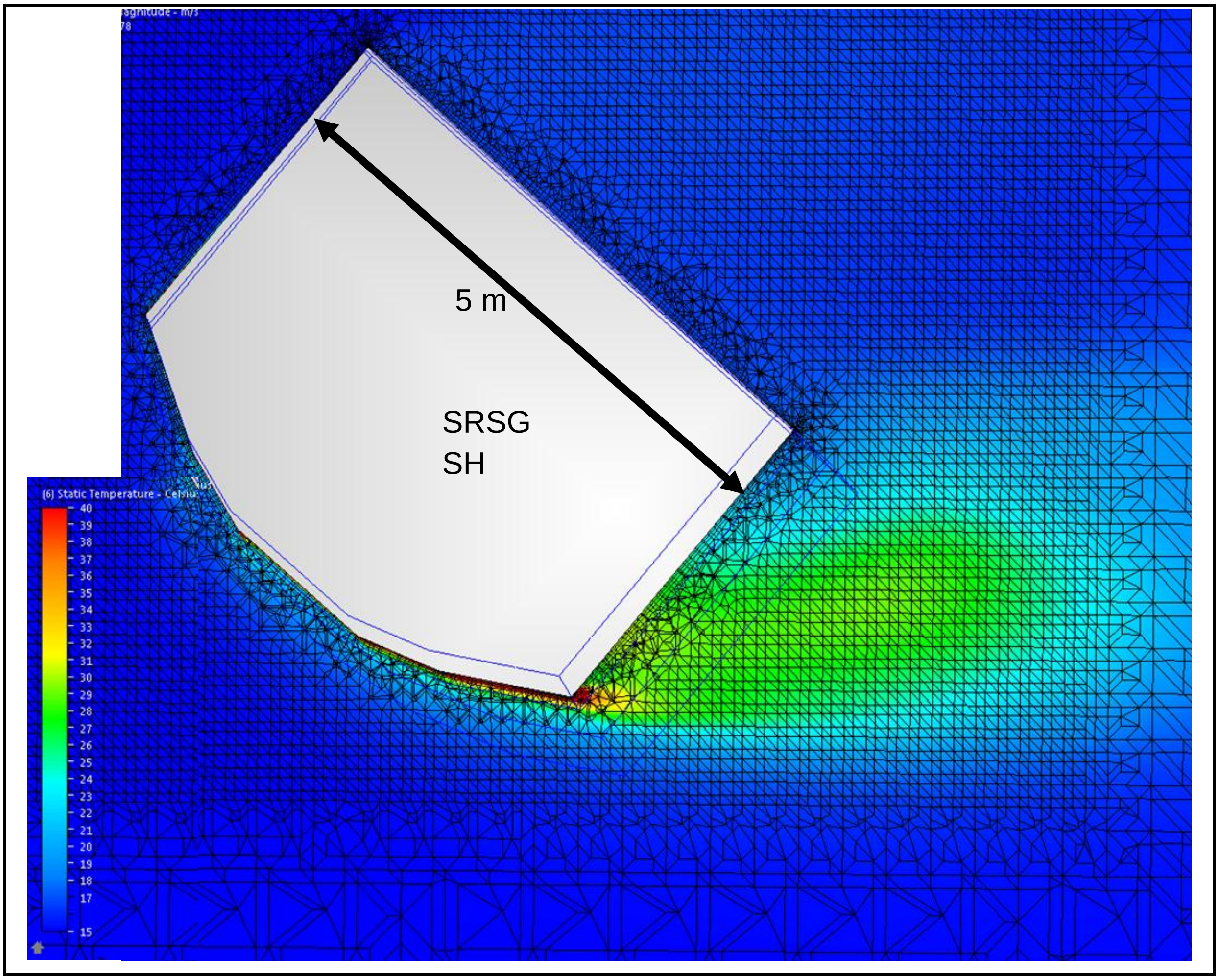

Figure 2: Air temperature at SEDC pilot superheater cross section. Wind speed is 2.2 m/s

Both **Error! Reference source not found.** and Figure 2 show that the only noticeable temperature effect in the air temperature is downwind of the SRSG, and even there, only a 10°C (18°F) temperature rise is indicated.

Figure 3 below shows the vertical temperature profile for the SEDC pilot SRSG. An isosurface of the air at 20°C (68°F) is traced around the SRSG.

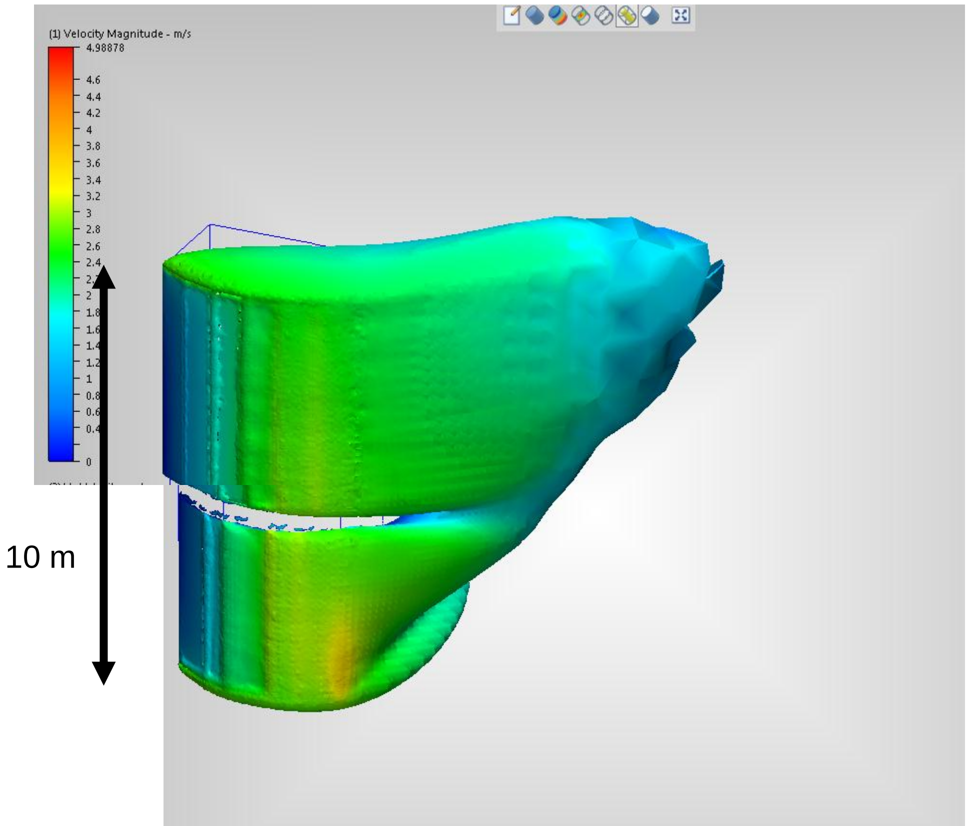

Figure 3: Isosurface for air around SEDC SRSG at 20°C. The color of the surface represents the wind velocity.

It is evident that just above the SRSG, air temperature is reduced to 20°C (compared with the 15°C ambient temperature assumed in this model). In the downwind direction (to the right in Figure 3) air temperature of only 20°C is indicated within 5 meters of the SRSG skin edge. Again, based on Figure 2, within 5 meters the temperature does not exceed 25°C.

The same type of CFD analysis was conducted for the planned SRSG at Ivanpah. In this model, the ambient temperature is 27°C (80°F) and the nominal wind speed is 5 m/s, wind direction from bottom right to top left. Figure 4, Figure 5 and Figure 6 show the air temperature at various elevations relative to the SRSG. Surface temperatures are similar to the simulations shown previously and range from ~300–600°C.

Figure 4 shows the air temperature around the SRSG itself.

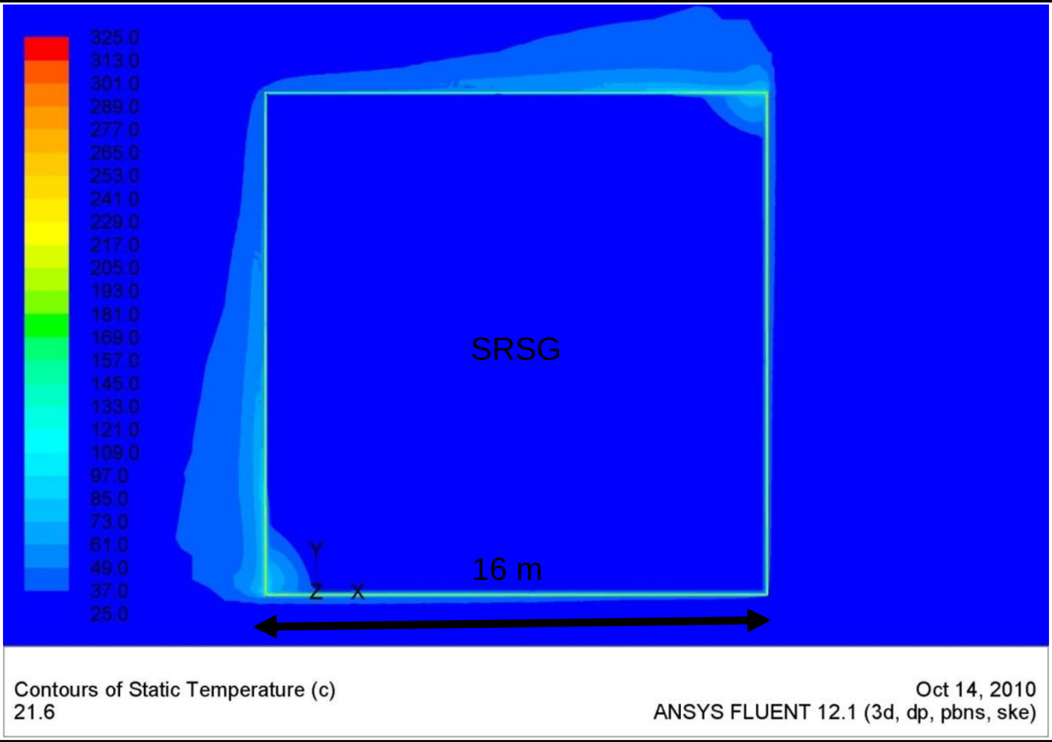

Figure 4: Air temperature across the Ivanpah SRSG

Clearly, the air temperature directly adjacent to the SRSG is high, but within 1m (about 3ft), air temperature falls to only about 35°C (95°F), only 8°C (~15°F) above ambient. Within 2 meters, no noticeable change at all is indicated.

To evaluate the air temperature above the SRSG, cross plots of the air temperature above the SRSG are displayed.

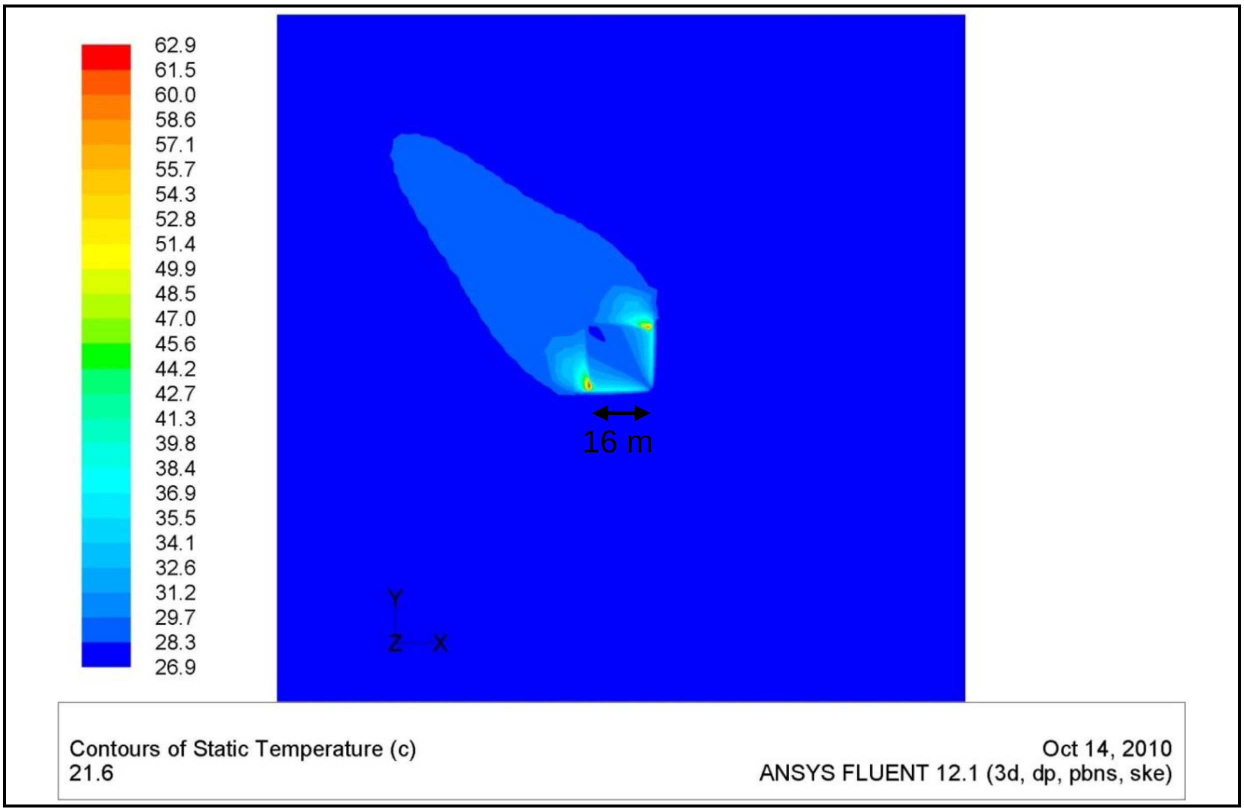

Figure 5: Air temperature .5 meter above the Ivanpah SRSG

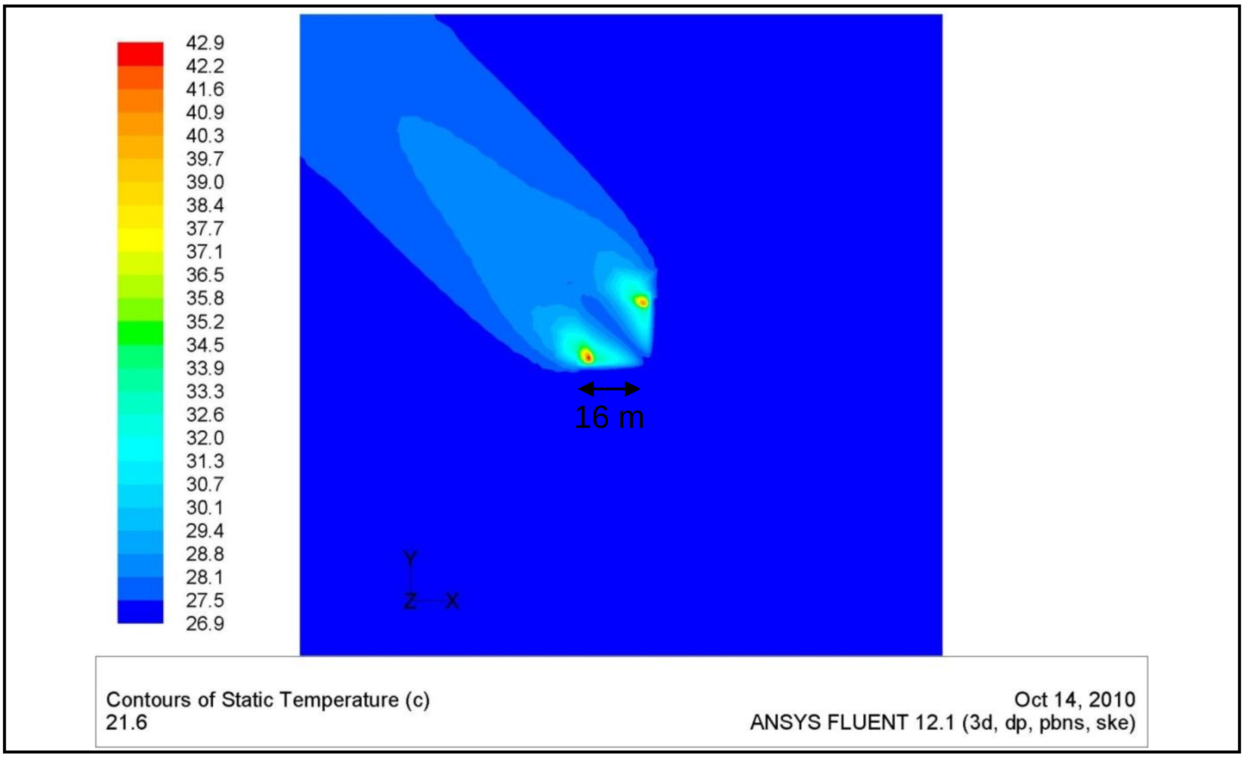

Figure 6: Air temperature 1.50 meters above the Ivanpah SRSG

Figure 5 shows a maximum temperature of 63°C (145°F) in the plane 0.5 meters above the SRSG, while at 1.5 meters above the SRSG (Figure 6), the maximum air temperature drops to only 43°C (109°F). The temperature increase dissipates rapidly, such that at a distance of the SRSG width, the there is no noticeable temperature effect from the SRSG.

(Note that the scale changes between Figure 5 and Figure 6, so the meaning of the colors changes between these two figures).

4. CONCLUSIONS

The results from the CFD simulations for SEDC and Ivanpah SRSGs show slight changes in temperature at distances of a few meters from the SRSG surface. This is true both in the horizontal and vertical direction (natural convection), where the temperature difference is negligible more than a few meters above the SRSG.

At the horizontal axis the change in air temperature was not greater than 10°C (18°F) and decreased to ambient within 5m from the SRSG surface in the downwind direction. Above the SRSG the air temperature dropped rapidly, where at 1.5m above the SRSG the maximum temperature was only 43°C (109°F) and decreased to ambient at a distance equal to the SRSG width.

Air Temperature Surrounding the SRSG

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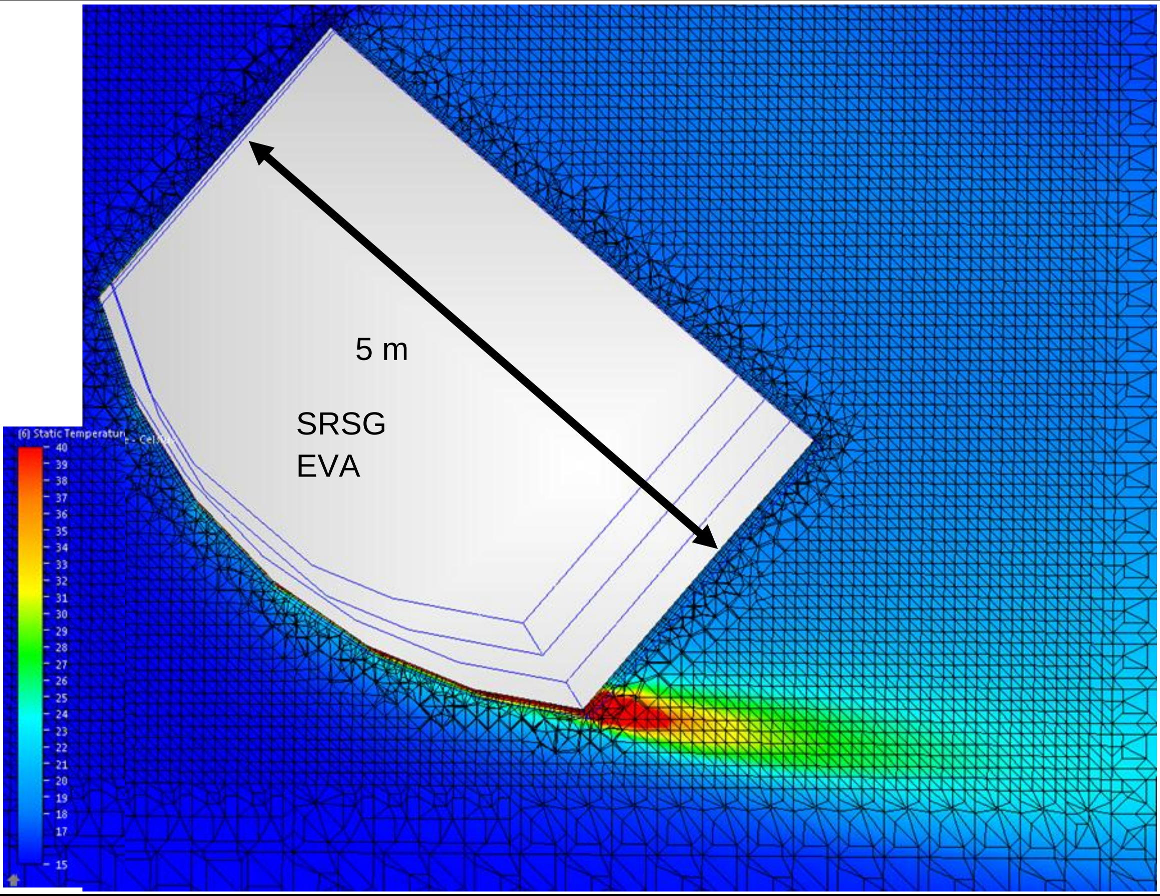

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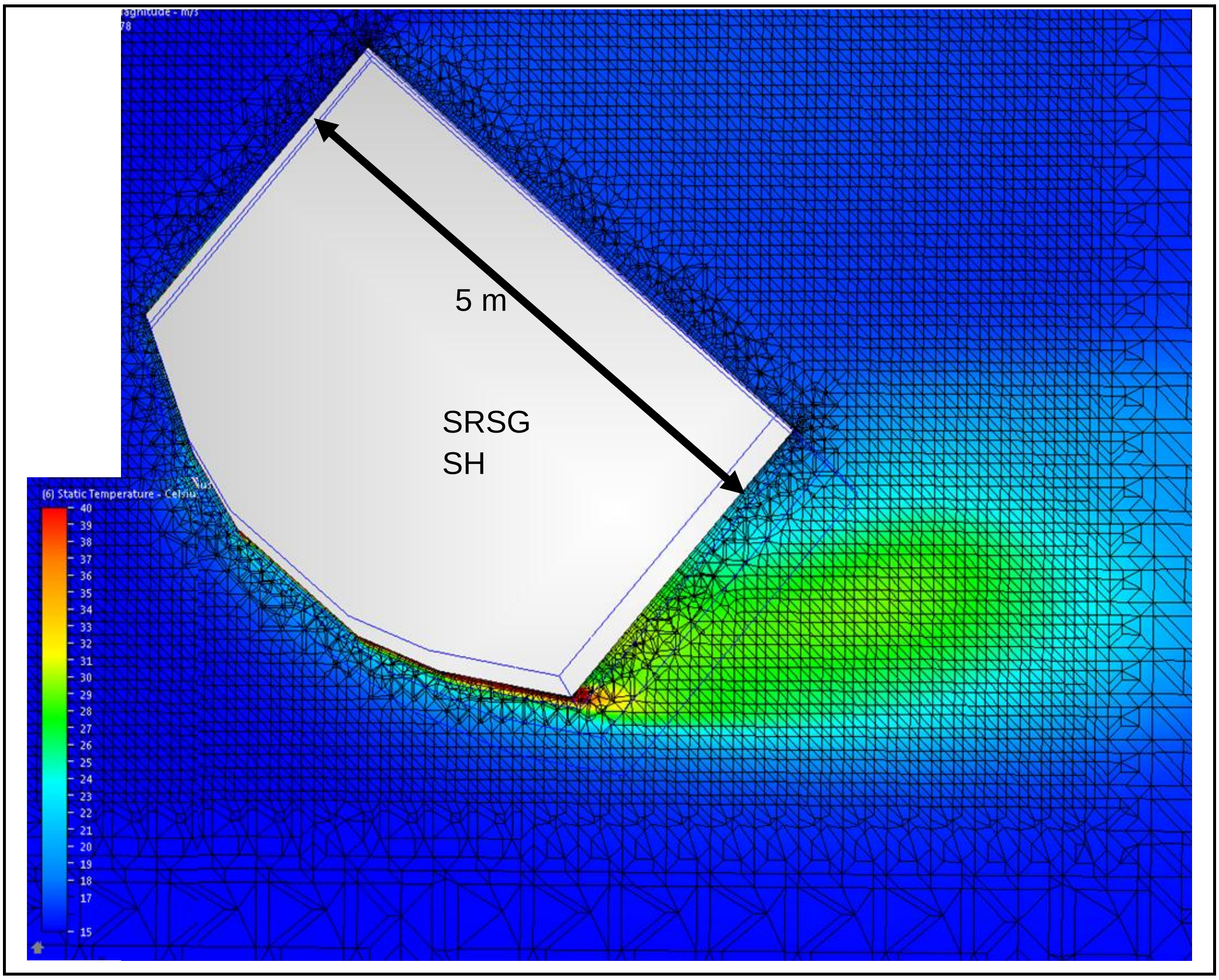

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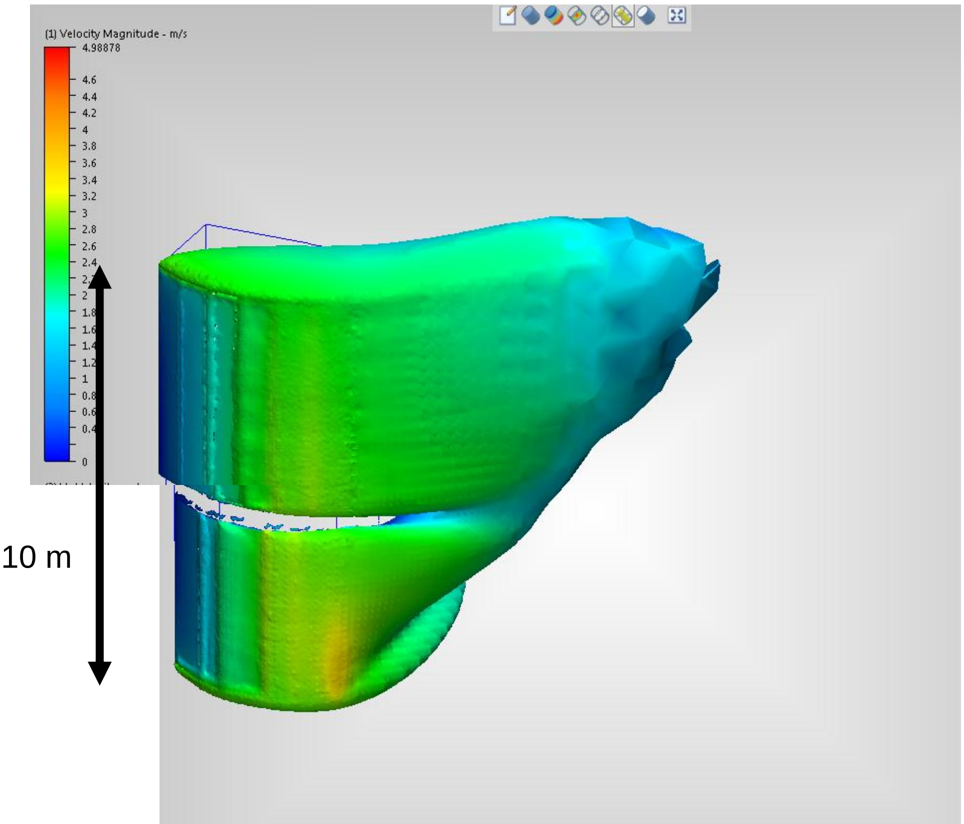

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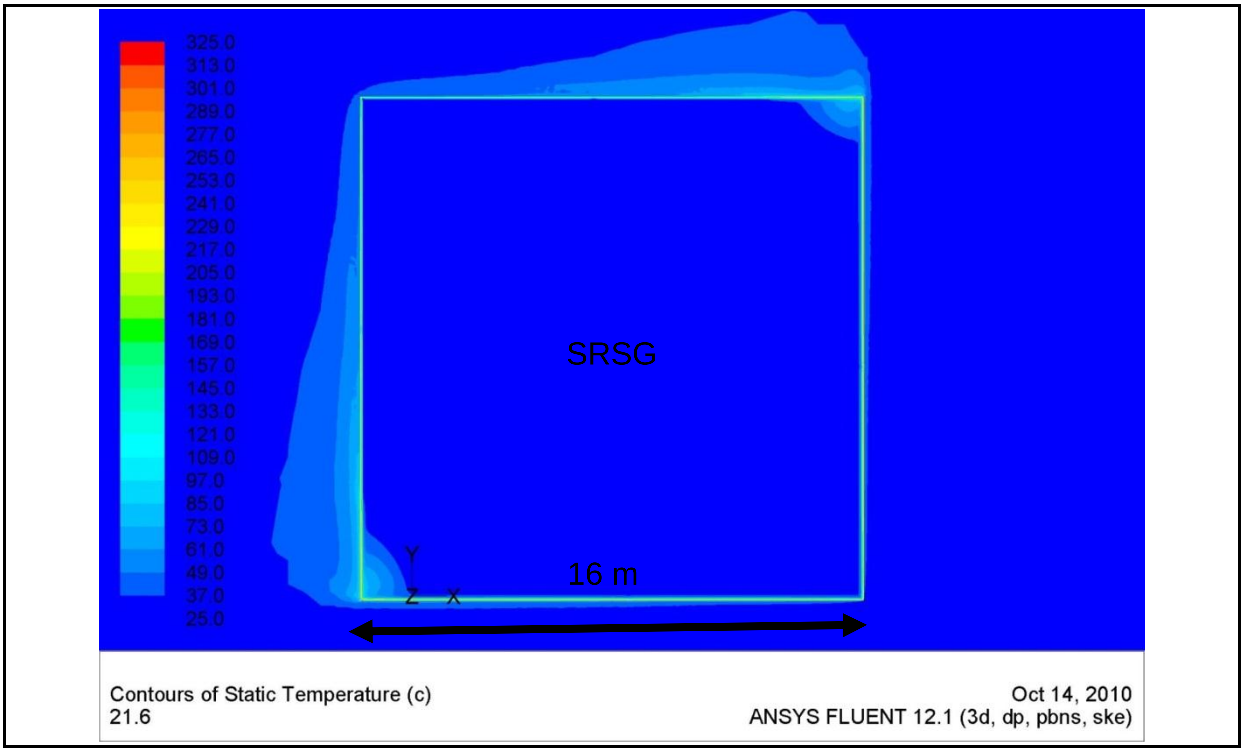

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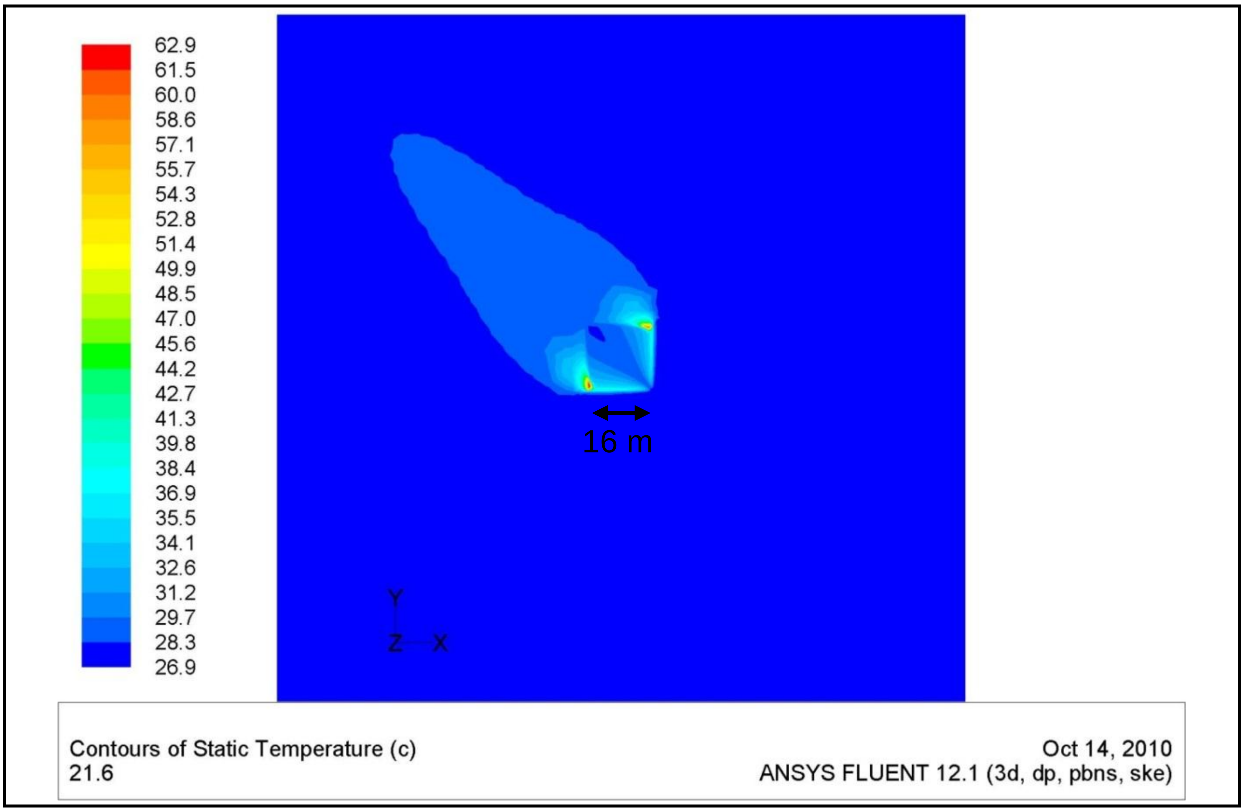

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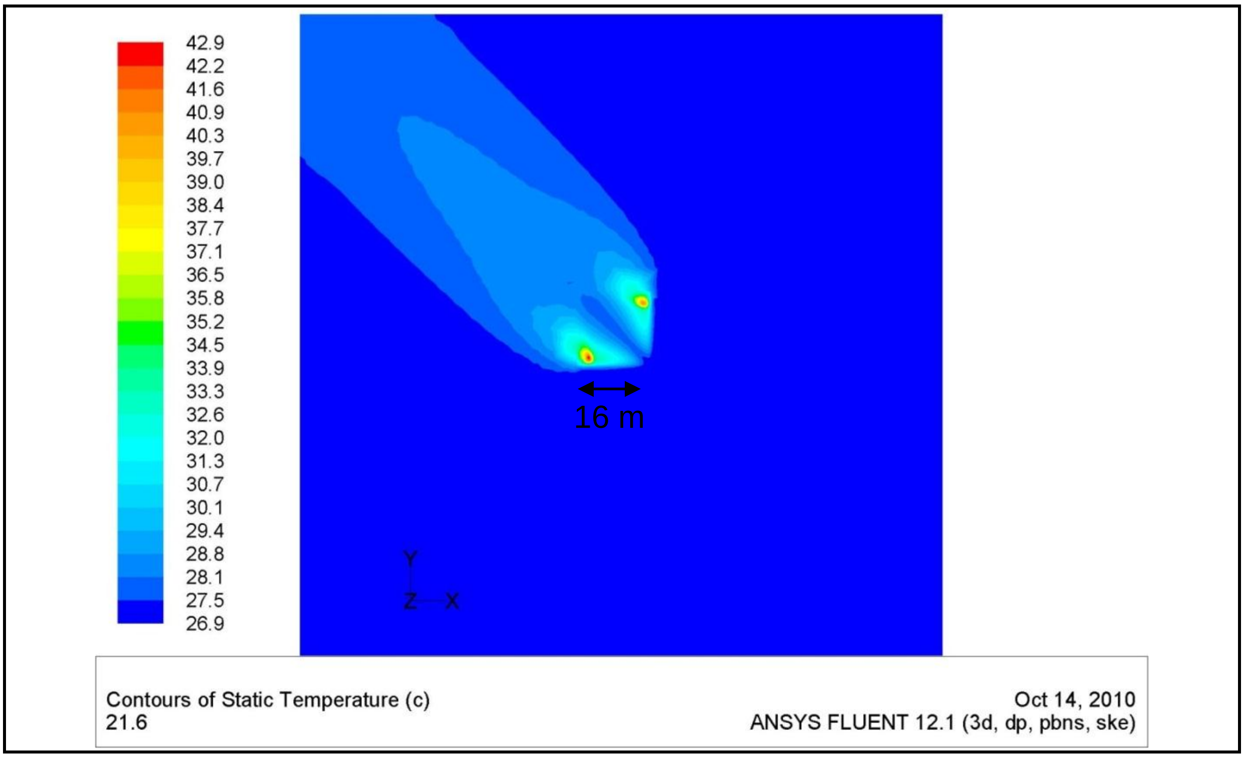

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ATTACHMENT 2

BrightSource

March 13, 2012

Pierre Martinez, Project Manager for Rio Mesa SEGF
California Energy Commission
1516 Ninth Street,
Sacramento, CA 95814-5512

Dear Mr. Martinez,

We are pleased to provide our proposal for undertaking additional bird and bat survey activities. As discussed herein, we have initiated Anabat acoustical monitoring as of February 9, 2012, migratory bird surveys as of February 21, 2012, breeding bird and Gila woodpecker surveys as of March 7, 2012, nocturnal radar monitoring as of March 12, 2012, and golden eagle aerial and ground surveys will be initiated by Bloom Biological, Inc. on March 24, 2012.

Applicant thanks the agencies for participating in the Biological Resources Workshops on January 6 and February 13, 2012. The Renewable Energy Action Team (REAT) should consider the full year of survey data already collected, along with the information presented during the January 6 and February 13, 2012 Workshops (detailed below), in its evaluation of the additional 2012 surveys we are now proposing. Applicant believes the work already accomplished is sufficient for the analyses of potential impacts to avian and bat species. The additional surveys Applicant is proposing will provide an enhanced set of data—well in excess of existing BLM and FWS protocols and in excess of surveys required for other solar and wind projects to date—for the evaluation of impacts that may result from the project

Background on Technology Discussed at the Workshops. We would like to reiterate a few key points relevant to the potential impacts to avian species that were discussed during the Workshops, specifically the area of elevated temperature near the surface of the SRSG, and the concentration of solar flux where reflected sunlight beams converge.

Elevated Temperature Near the Surface of the SRSG.

This occurs due to localized thermal convection near the face of the SRSG. The shape of the elevated temperature zone is not fixed and depends on atmospheric conditions, especially wind. In calm wind conditions the area of slightly elevated temperatures will tend to have a tear drop shape as hot air rises.

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Solar One:

BrightSource does not have any of the model data relative to this factor for Solar One. Although BrightSource has not modeled the Solar One boiler, the science that applies to convective heat transfer is very similar to what we have modeled for our SEDC and Ivanpah plants. BrightSource is aware that the heat absorptive coating on the surface of the boiler tubes at Solar One was the same coating in use at SEDC. A more efficient coating that further improves absorptive efficiency is being proposed for Ivanpah and Rio Mesa. However, since the boiler tube coatings used at Solar One and SEDC are the same, similar results are expected for the two facilities for convective heat transfer at the surface of the solar boiler.

SEDC:

The elevated temperatures around the boiler at SEDC have been predicted and calculated using a Computational Fluid Dynamics (CFD) model. The CFD model for SEDC demonstrates that the elevated air temperature around the SRSG is limited to only several inches near the surface, at which point the temperature is only 40^{o}C above ambient, and then drops rapidly as distance from the SRSG increases.

Rio Mesa Solar:

Based on the data from the CFD model run for Ivanpah and extrapolated for Rio Mesa Solar, the elevated temperature area will extend less than 5 meters from the SRSG face horizontally and down-wind. Above the SRSG at 1.5 meters, the air temperature will drop to ~15^{o}C above ambient, and will continue to dissipate rapidly such that at a distance of 20 meters (SRSG width) above the SRSG temperature is at ambient.

Solar Flux Concentration.

Occurs when the reflected sunlight of many heliostats are concentrated into a small volume in space. The concentration of energy in itself does not cause a rise in the ambient air temperature, but any surface (such as the tubes of the Solar Receiver Steam Generator (SRSG) or the body of a bird) will be heated. The rate of temperature rise and the ultimate temperature of that a body or structure surface within the flux will be a function of the amount of flux. The characteristics of the body or structure subjected to the flux, such as how absorptive the surface is, its conductivity, the movement or circulation of air around it (cooling), and the time the body or structure stays in the area of concentrated flux, are all key factors in determining if and how a body or structure will be heated, and what potential impacts could result.

Solar One:

Based on our knowledge of solar thermal power tower technology at the time Solar One was in operation, common practice in the boiler industry for conventional metal tubes was to limit the maximum solar flux on the receiver to 500-600kW per square meter. To control process steam pressure and temperature in the SRSG, heliostats would be moved between a standby point and the SRSG.

Heliostat aiming controls at Solar One were primitive by today's standards and calculation abilities were very limited. As a result, when heliostats were not focused on the boiler, they were focused onto four points in the space around the boiler, called "standby points." Although we don't know what the actual flux concentration level was at those points at Solar One, our familiarity with the project and the state of heliostat control technology at the time suggests it was around 1500kW/m^2. See Photo 1 for a view of Solar One and its standby points while in operation.

SEDC:

At SEDC, the maximum flux on the receiver is limited to 600kW per square meter. SEDC continues to utilize the standby point system similar to that used at Solar One, except that SEDC has only two standby points. The flux concentration at those standby points has been calculated at approximately 1000kW/m^2.

While no formal study to measure bird mortality has been undertaken, during the more than 3 years of operation with the plant manned daily including daily inspections of the solar field and area around the tower and boiler, no bird mortality has been observed.

Rio Mesa Solar:

The proposed maximum flux on the receiver will be limited to 600kW per square meter. In addition FAA regulations governing glint and glare above the plant limit the permissible amount of flux concentration at a distance of no less than 500 feet, to the Maximum Permissible Exposure (MPE) for the human eye, (10kW/m^2 for any size image, and 75kW/m^2 – 126.5kWm^2 from a single heliostat. To ensure compliance with this standard, new advances in heliostat control technology allow BrightSource power tower plants to utilize a standby zone that will form a ring-like or halo shape around and above the SRSG, rather than a few points. This ring-like shape around and above the SRSG zone will greatly reduce flux concentration, as each heliostat will be aimed at a slightly different point (see Photos 2 & 3 attached). We estimate the flux concentration in the standby zone to be no more than 500kW/m^2 (see Photo 2).

Proposal for Additional Surveys & Studies:

Our proposal for additional surveys and studies is summarized in the following paragraphs, and each element is then discussed in greater detail thereafter.

a. Additional migratory bird surveys will be conducted from February 21, 2012 to May 31, 2012, and from August 15, 2012 to November 1, 2012. The REAT recommended survey protocol dated 12/16/11[4] and the observation points approved in Data Request Set 1A will be used.
b. Raptor migration surveys will be conducted from March 6, 2012 through April 30, 2012, and from September 1, 2012 to November 30, 2012. The REAT recommended survey protocol dated 12/16/11[4]and the observation points approved in Data Request Set 1A will be used.
c. Phase 1 and 2 golden eagle helicopter surveys will be conducted during the 2012 breeding season following Pagel et al. 2010[7] as suggested in the REAT recommended protocol dated 12/16/11[4].
d. Surveys for Gila woodpecker and other breeding birds will be conducted based on the protocol described in Data Request Set 1A.
e. Surveys for elf owl will be conducted based on the cactus ferruginous pygmy-owl protocol as suggested in Data Request Set 1A, if required by the Committee.
f. Bat monitoring will continue for 1 full year from February 9, 2012 via Anabat acoustic monitoring on the project site, per the REAT recommended protocol dated 12/16/11[4] and the three REAT approved Anabat monitoring station locations.
g. Radar technology will be utilized to monitor spring and fall nocturnal migration pulses of avifauna from March 12, 2012 through May 31, 2012, and from September 1, 2012 to October 31, 2012.

Below we discuss the survey work performed in 2011, followed by a discussion of the additional survey work Applicant is proposing to conduct in 2012.

BrightSource

Summary of Spring and Fall 2011 Avian Surveys Including Methodologies and Key Findings:

- ***Summary of Golden Eagle Nest Surveys***
  In February 2011 URS submitted a workplan of all surveys proposed to be conducted[1]. Those included eagle surveys. BLM recommended using subcontractor Wildlife Research Institute (WRI) to conduct the surveys. URS subcontracted WRI to perform eagle nest surveys per FWS protocols[2]. WRI conducted Phase 1 helicopter surveys in mid-March 2011 within 10 miles of the project site, gen-tie line and alternative substation locations to identify golden eagle nests. Phase 2 helicopter surveys were conducted in early May 2011 to determine occupation of the identified nests by golden eagles. No golden eagle nests (active or inactive) were found on the project site, within the gen-tie corridor, or within the alternative substation locations associated with the project. Four inactive golden eagle nests were found between 5 and 10miles of the project, the closest of which is 6.25 miles away. One incidental sighting of two golden eagles west of the project site in the Mule Mountains occurred during botanical surveys. Those two eagles were the only sightings of eagles, incidental or otherwise, during all surveys conducted in 2011. All participants of golden eagle surveys have several years of experience conducting helicopter surveys and were fully qualified.

- ***Summary of Migratory and Resident Bird Populations***
  URS followed BLM protocol[3] for avian surveys in both spring and winter 2011. The main points of the protocol are: one point count transect was to be performed per square mile of the project site, for a total of 16 transects (14 on the Project area and two on the potential mitigation lands to the east of the Project). Surveys were conducted on each transect once per week for four weeks in the spring and fall 2011. Transects were concentrated on areas with high potential for bird activity (e.g., washes, higher density vegetated areas). Each transect had eight point count locations, a minimum of 250 meters apart, where two biologists recorded all birds that were observed during a 10 minute duration within a 100 meter radius. All species of passerine, upland, waterfowl, and raptors observed during these surveys were counted.

  Additionally, the 2011 Spring and Fall Bird Point Count Survey for the Rio Mesa Solar Electric Generating Facility, Riverside County, California report was docketed on February 13, 2012. This report provides detailed information on the methods and results of the avian point count data that was requested in Data Request Set 1A. Within Data Request Set 1A on Page 20, the agencies have stated that this data may suffice for the weekly line transects or point counts, and that the fourth day of transects previously recommended by the REAT agencies would therefore not be needed. Data Request Set 1A recommends that transects should be conducted until the REAT agencies complete their review of the data. Applicant is providing the raw data (electronically) as required in Data Request 50 to facilitate Staff and REAT review and determination. Applicant is available to answer any further questions that Staff or REAT may have.

BrightSource

Additional Survey Work Proposed by Applicant:

a. ***Migratory Bird Surveys:*** Weekly surveys for migratory birds will be conducted using the REAT recommendations dated 12/16/11[4]and the observation points approved in Data Request Set 1A. Surveys will be conducted from February 21, 2012 through May 31, 2012, and from August 15, 2012 to November 1, 2012. Conducting surveys during these time periods will cover the entire migration of passerine bird species in the area, and will provide a robust dataset to utilize in assessing migratory bird abundance in the area. Qualified biologists will be stationed at four observation points eight hours per day for three consecutive days per week (total survey effort of 324 person days onsite). Additionally, qualified biologists conducting raptor migration surveys (see b. below) will be stationed at three observation points eight hours per day for four consecutive days per week, and will be recording all observations of migratory birds in addition to raptors (252 person days onsite). Observation point locations are located throughout the project site and in the approximately 1 mile wide buffer zone of similar habitat between the project site and the agricultural fields east of the project site. Three of the seven total observation points within the project site are located at the proposed RMS tower locations (please see Figure 1). All observation points will allow a wide expanse of observation area from a single point and afford a location where topographic and biological features are likely to be used by migratory birds and raptors during migration. All species of passerine, upland, waterfowl, and raptors observed during these surveys will be counted. This survey methodology received REAT agency approval on Page 19 of Data Requests Set 1A docketed on the CEC website on February 7, 2012.

b. **Raptor Migration Surveys:** Weekly surveys for raptors will be conducted using the REAT recommendations dated 12/16/11[4] and the observation points approved in Data Request Set 1A. Surveys will be conducted from March 6, 2012 through April 30, 2012, and from September 1, 2012 to November 30, 2012. Conducting surveys during these time periods will cover the vast majority of the migration for all species of raptors and provide a robust dataset to utilize in assessing raptor abundance in the area. The month of November will be focused more on wintering raptors. Qualified raptor biologists will be stationed at three observation points eight hours per day for four consecutive days per week (252 person days onsite). Raptor observation point locations are spaced more than two miles apart and will be staffed by biologists who are qualified to conduct both raptor and passerine surveys. Additionally, qualified biologists conducting migratory bird surveys (see a. above) will be recording all observations of raptors in addition to migratory birds (total survey effort of 324 person days onsite). All observation points will allow a wide expanse of observation area from a single point and afford a location where topographic and biological features are likely to be used by migratory birds and raptors during migration. All species of passerine, upland, waterfowl, and raptors observed during these surveys will be counted. This survey methodology received REAT agency approval, as noted on page 19 of Data Requests Set 1A docketed on the CEC website on February 7, 2012.

c. ***Golden Eagle Breeding Season Surveys:*** Phase 1 and 2 golden eagle helicopter surveys will be conducted following Pagel et al. 2010[7].The purpose of a Phase 1 golden eagle survey is to locate nest sites and determine occupancy. The Phase 1 nest survey will be done via helicopter over 2 days and on foot over 1 day in March and/or April with Peter H. Bloom as the lead biologist. The ground survey will be used to reexamine nest sites found during helicopter flights and to survey cliff areas where there was uncertainty due to visibility issues from the helicopter. The study area is the proposed project and all lands within ten miles of the proposed project. The purpose of a Phase 2 survey is to determine productivity of active nests from the Phase 1 survey. This survey will be conducted in late April or early May with Peter H. Bloom as the lead biologist. The Phase 2 survey will be done by helicopter over 2 days and on foot over 1 day. This protocol for helicopter surveys was submitted to URS from Bloom Biological, Inc. and described as the appropriate timing for helicopter surveys (total survey effort: 16 person days onsite).

d. ***Gila Woodpecker Surveys:*** Focused surveys for Gila woodpecker and other breeding birds in the microphyll woodlands within the project fenceline and a 500 foot buffer are being conducted based on the protocol presented in Data Request Set 1A. During the breeding season, focused survey techniques to determine distribution and abundance of Gila woodpecker and other breeding birds in the microphyll woodlands within the project fence line will be conducted. Three line-transect surveys providing complete coverage of microphyll woodland habitat, one during the week of March 5, 2012, one at the end of March/early April, and one at the end of April/early May, will be performed (survey effort: 36 person days onsite). If any Gila woodpecker nests are located in either of the first two surveys, the acreage of established territories will be considered occupied and no subsequent surveys will occur in these areas.

e. ***Elf Owl Surveys:*** Substantial evidence has been provided to the CEC indicating that elf owls are not expected to occur on the Rio Mesa site due to a lack of suitable habitat and the absence of any known and validated occupied habitat within 13 miles of the site. The nearest reported observation of elf owl (from Robert McKernan, Director, San Bernardino County Museum, Redlands, California) is from Wiley's Well in 1976 (pers. comm. with Jon Goin, February 24, 2012). This location is to the west of the project area on the other side of the Mule Mountains, and the elf owls were observed nesting in a palo verde tree, although elf owls are not known to commonly utilize this tree species for nesting. After reviewing the aerial photo of the Wiley's Well area (please see Figures 2, 3, and 4) and conducting a site visit, URS compared the microphyll woodland habitat at the Rio Mesa site to the microphyll woodland habitat at Wiley's Well. Wiley's Well contains dense windrow-like clusters of tall palo verde trees along the drainage channels (see attached aerial photo), whereas this configuration of trees is lacking at the Rio Mesa site. The trees at Rio Mesa are widely dispersed with inter-tree distances of 50+ feet being most common. URS identified small areas in the microphyll woodlands onsite where the inter-tree distance appears to be less than 50 feet. These areas amount to a total of 250 acres that could be extremely marginal habitat for elf owl.

If, after considering this information indicating that there is little likelihood of elf owl occurrence on or near the Rio Mesa site, the Committee determines that surveys should be required, focused surveys for elf owl will be conducted in these marginal areas and in any additional areas where Gila woodpecker are detected during surveys (see d. above), as elf owls are capable of utilizing abandoned woodpecker cavities for nests and roosts. Any elf owl surveys required by the Committee would be conducted using the cactus ferruginous pygmy-owl protocol requiring three night visits and using taped vocalizations of elf owl to elicit a response(survey effort: 15 person days onsite).

f. ***Bat Monitoring:*** Anabat acoustical monitoring stations were installed on February 9 and 10, 2012 and will provide acoustic monitoring for bats following the REAT protocols dated 12/16/11[4]. The three stations are within three different drainages supporting microphyll woodland habitat within the project fence line. These will collect continuous data and be adequately spaced to provide maximum coverage of the project area (please see Figure 1) (total field effort: 56 person days onsite to download data from Anabat units). Extensive effort will be required to analyze this data. No mist net surveys will be conducted. This protocol and the three Anabat locations were approved via email from Heather Blair at Aspen Environmental Group on January 25, 2012.

g. ***Radar Monitoring:*** Radar technology will be utilized to monitor spring and fall nocturnal migration pulses of avifauna at tower locations from March 12, 2012 through May 31, 2012, and from September 1, 2012 to October 31, 2012. A single radar unit will be utilized to capture these data.

Additional Reports & Information to be Provided:

Applicant will provide the following information to the REAT in further support of our proposal:

1. Eagle survey report from FWS protocol[2] eagle surveys conducted in March and May of 2011. (Please see appendices to the Biological Technical Report submitted with the AFC document)

2. Cibola research and Blythe 15-mile circle Christmas surveys (Audubon Society).

3. 2011 Spring and Fall Bird Point Count Survey for the Rio Mesa Solar Electric Generating Facility, Riverside County, California report (docketed on February 13, 2012).

4. Information that describes the relative status of the Colorado River path of the Pacific Flyway as a minor route, and the main flyway as over the Salton Sea.

5. Information on BSE proposed evaporation ponds (located in the Project's Common Area, more than a mile from Power Towers). These ponds will be netted, as described in the AFC submitted the CEC and BLM on October 14, 2011.

6. Historic bat survey data from Pat Brown and map bat foraging area as it relates to the bat roosting locations at the two mines (Hodge and Roosevelt) in the Mule Mountains near the project site.

Summary

Applicant believes that survey work conducted to date and the proposed additional surveys are sufficient to achieve the REAT's request for additional information on resident and migratory birds, raptors, and bats in the project area. The total additional survey effort proposed includes 699 person days onsite quantifying resident and migratory bird, raptor, and bat use of the project area, and 142 nights of monitoring spring and fall nocturnal migration pulses of avifauna at tower locations.

Respectfully Submitted,

Todd Stewart
Sr. Director Project Development
Project Manager, Rio Mesa Solar
BrightSource Energy, Inc.

Attachments.

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[1]URS 2011. Biological Resources Workplan. February 21, 2011.

[2]USFWS 2010. Surveys and reporting were all done in compliance with the FWS Interim Golden Eagle Technical Guidance: Inventory and Monitoring Protocols; and Other Recommendations in Support of Golden Eagle Management and Permit Issuance (Pagel et al. 2010) and the subsequent Draft Eagle Conservation Plan Guidance (Gould and Schmidt 2011).

[3]BLM 2009. BLM Solar Facility Point Count Protocol. March 9, 2009.

[4] FWS 2011. Interagency Recommendations: Migratory and Breeding Season Bird and Bat Baseline Data, Rio Mesa Solar Project, Riverside County, California. December 16, 2011.

[5]Halterman, M.D., S.A. Laymon, and M.J. Whitfield. 1989. Status and Distribution of the Elf Owl in California. Western Birds 20: 71-80.

[6]CDFG 2005. The Status of Rare Threatened, and Endangered Plants and Animals of California 2000-2004. http://www.dfg.ca.gove/wildlife/nongame/t_e_spp/new_te_rpt.html

[7]Pagel, J.E., D.M. Whittington, and G.T. Allen. 2010. Interim golden eagle inventory and monitoring protocols; and other recommendations. Division of Migratory Bird Management, U.S. Fish and Wildlife Service.

[8]Komenda-Zehnder, S., Jenni, L., and Liechti, F. 2010. Do bird captures reflect migration intensity? – Trapping numbers on an Alpine pass compared with radar counts. Journal of Avian Biology 41: 434-444.

[9]Wang, Y. and Finch, D.M. 2002. Consistency of mist netting and point counts in assessing landbird species richness and relative abundance during migration. The Condor, Vol. 104, No. 1 (Feb., 2002), pp. 59-72.

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Photo 1: Standby points and mirrors for Solar One project

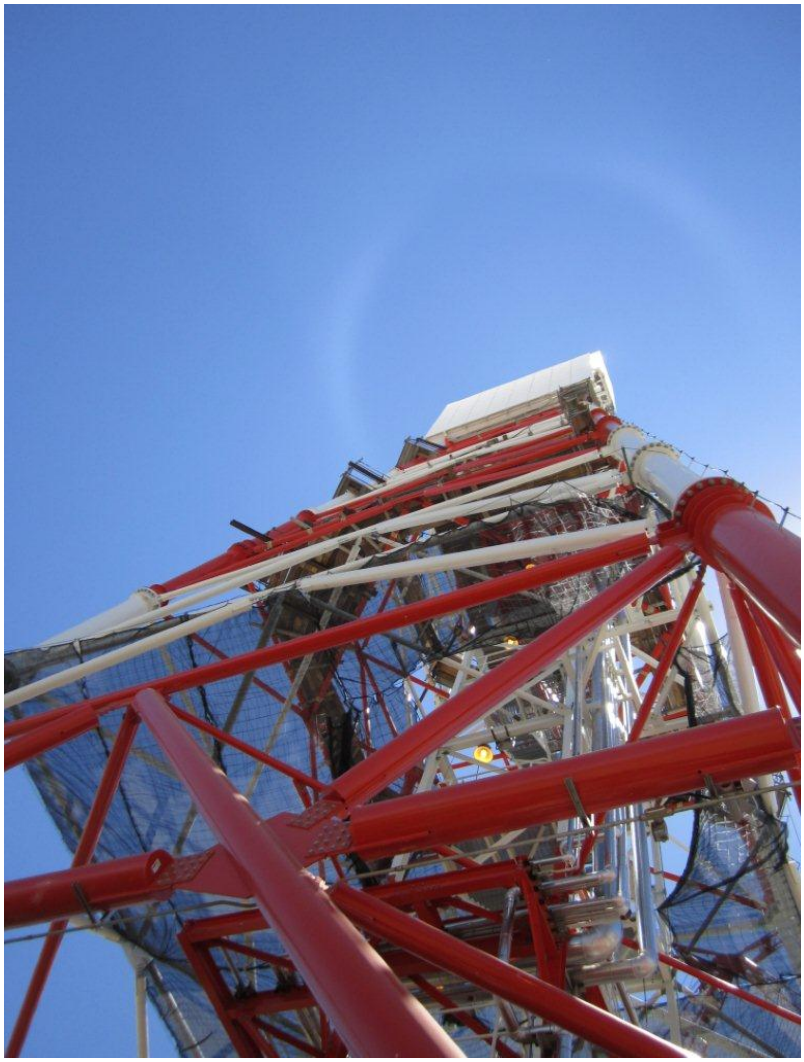


Photo 2: Standby ring at Coalinga project

BrightSource

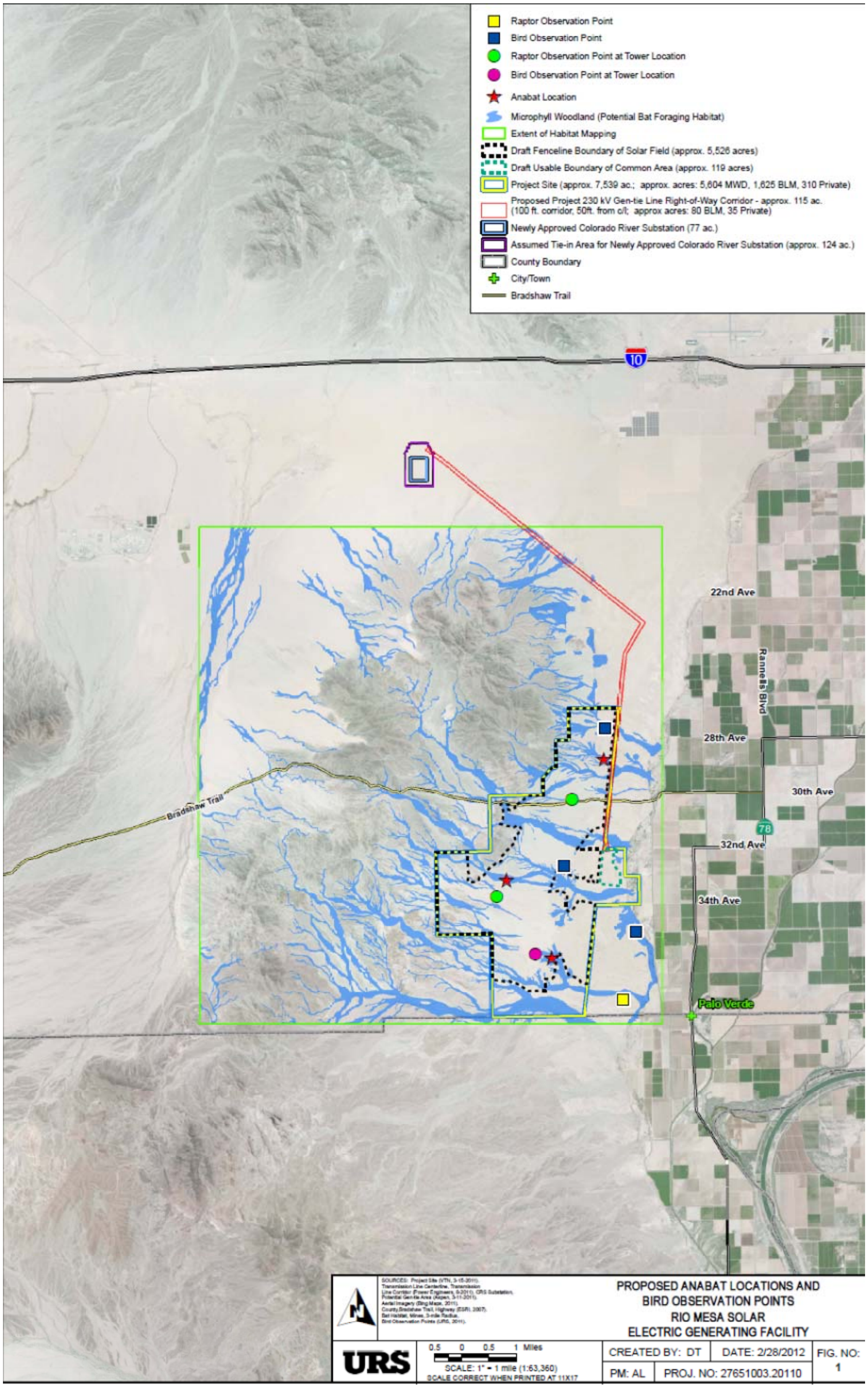


Figure 1: Proposed Anabat Locations and Bird Observation Points

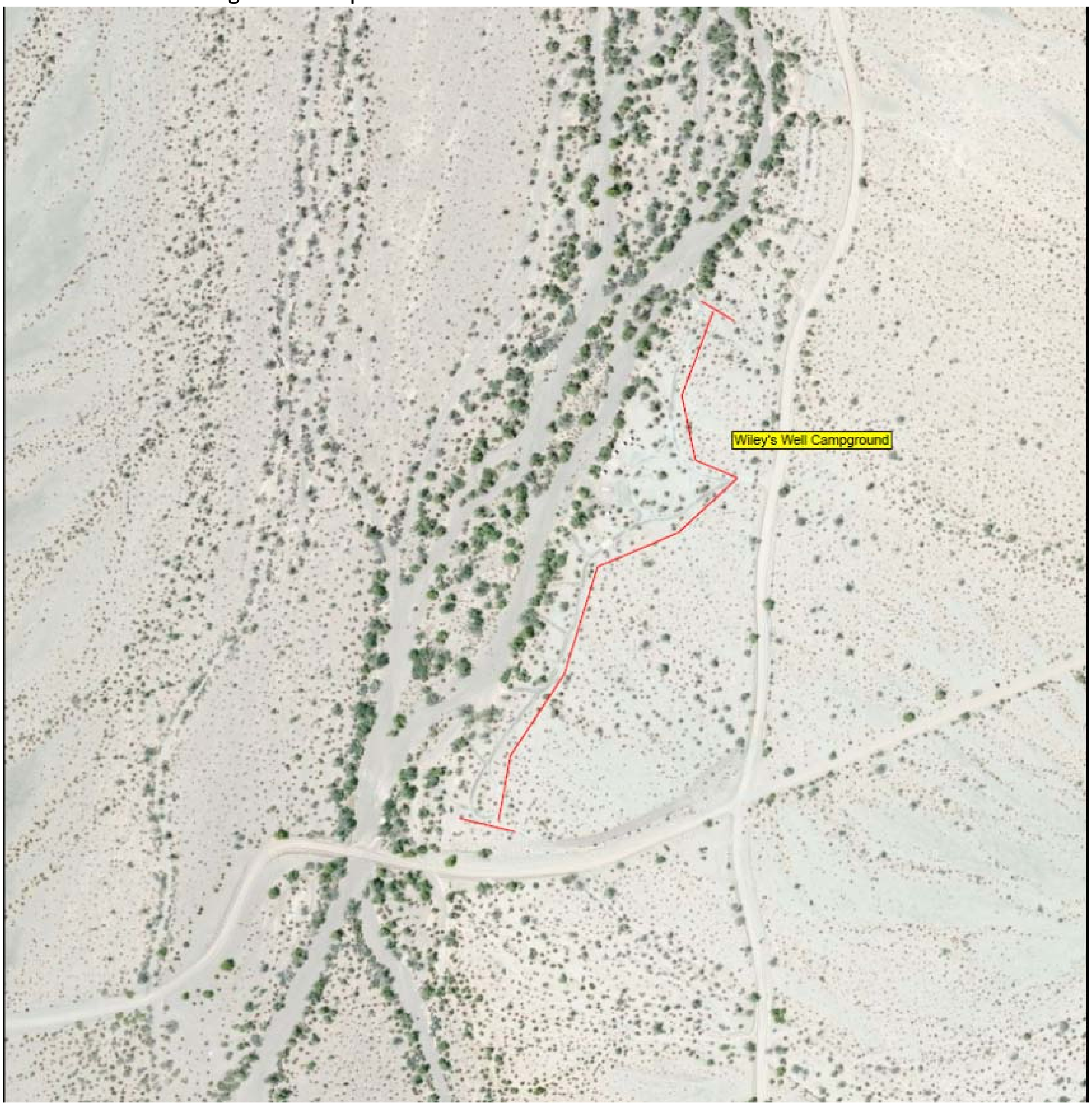
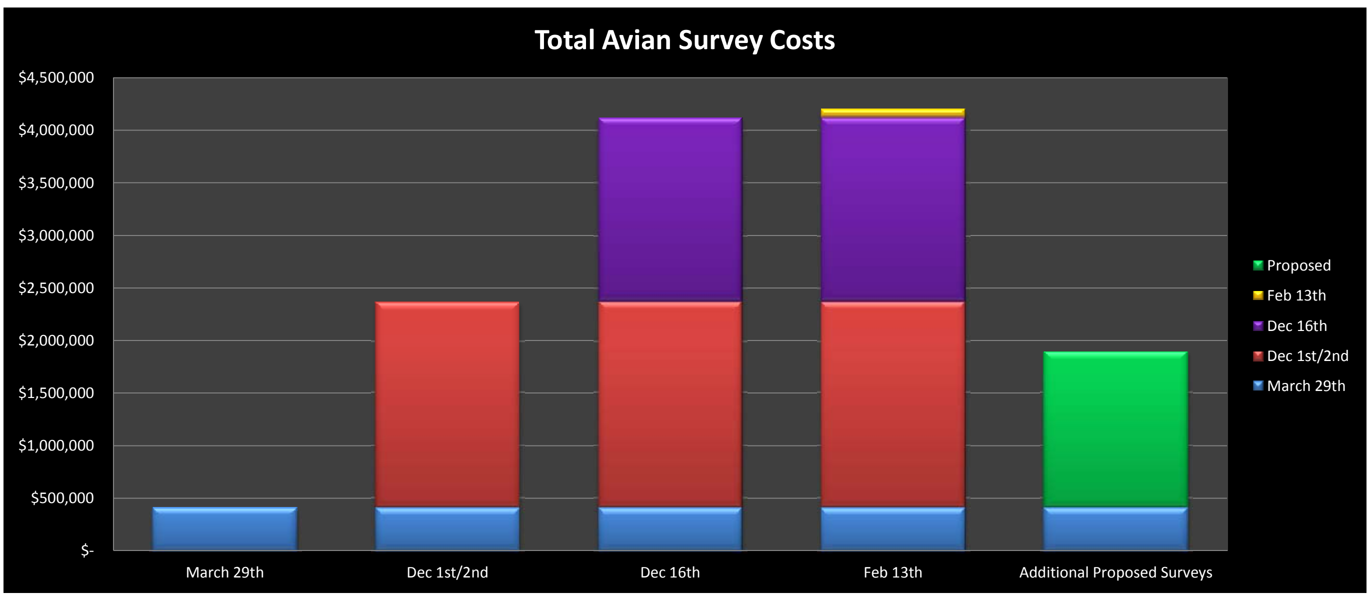


Figure 2: Aerial Photo of Wiley's Well Campground. Notice windrow of closely packed pale verde trees


Figures 3 and 4: Habitat at Wiley's Well Camp

BrightSource

ATTACHMENT 3



Total Avian Survey Costs
$4,500,000
$4,000,000
$3,500,000
$3,000,000
$2,500,000
$2,000,000
$1,500,000
$1,000,000
$500,000
$-
March 29th
Dec 1st/2nd
Dec 16th
Feb 13th
Additional Proposed Surveys
Proposed
Feb 13th
Dec 16th
Dec 1st/2nd
March 29th

STATE OF CALIFORNIA

Energy Resources Conservation
and Development Commission

APPLICATION FOR CERTIFICATION for the RIO MESA SOLAR ELECTRIC GENERATING FACILITY	))))	Docket No. 11-AFC-04

PROOF OF SERVICE

I, Karen A. Mitchell, declare that on March 14, 2012, I served the attached *REPLY BRIEF OF RIO MESA I, LLC, RIO MESA II, LLC, and RIO MESA III, LLC* via electronic and U.S. mail to all parties on the attached service list.

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

Karen A. Mitchell
Karen A. Mitchell

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11-AFC-04

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