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DOCKET	
09-AFC-10	
DATE	APR 07 2010
RECD.	APR 07 2010

April 7, 2010

Mr. John Kessler
Siting Project Manager
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814

Subject: Rice Solar Energy Project (09-AFC-10)
Response to CEC Workshop Queries 9 and 10

Dear Mr. Kessler:

Attached please find one hardcopy and one CD of Rice Solar Energy, LLC's responses to California Energy Commission Staff Workshop Queries 9 and 10 for the Application for Certification for the Rice Solar Energy Project (09-AFC-10).

If you have any questions about this matter, please contact me at (916) 286-0278 or Sarah Madams at (916) 286-0249.

Sincerely,

CH2M HILL

Douglas M. Davy, Ph.D.
AFC Project Manager

RSEP_Data_Req_Resp_WSQ 9-10 Cvr_Ltr.doc

cc: POS List
Project File

Supplemental Filing

Response to CEC Staff Workshop Queries 9 and 10

In support of the

Application for Certification

for the

Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

April 2010

Introduction

Attached are Rice Solar Energy, LLC's (RSE's) responses to California Energy Commission (CEC) Staff Workshop Queries 9 and 10. These are questions that Staff has raised outside the formal process of written data requests and for which RSE has agreed to provide a response or additional information to assist Staff in preparing their independent assessment. Workshop Queries 9 and 10 relate to the analysis of project alternatives.

Alternatives

Generator Tie-Line Alternative Route

WSQ 9 *Please provide a discussion of the environmental and engineering implications of a generator tie-line alternative routing that would follow only existing roadways, between the RSEP site and Rice Valley Road.*

Response: All of the net power produced by the Rice Solar Energy Project (RSEP) will be delivered to the electrical grid via a new 161-kilovolt (kV) transmission line that will interconnect the project with Western's Parker-Blythe transmission line at a location approximately 10.0 miles southeast of the RSEP site. As described in the Application For Certification (AFC), Section 3.0, the proposed generator tie-line would exit the RSEP's heliostat field and then would take the most direct path to reach an interconnection point with the Parker-Blythe line. This path would run 5.4 miles east-southeast along a newly constructed "two-track" dirt road from the RSEP fenceline to the existing U.S. Bureau of Land Management (BLM) maintained Rice Valley Road. From this point, the generator tie-line would run 4.6 miles southeast adjacent to Rice Valley Road to the interconnection point along public land managed by the BLM, with a small portion traversing private land. AFC Figure 3.1-1 shows this proposed route for the RSEP generator tie-line.

An alternate to the proposed route that would follow existing roadways and would not require construction of an access road is shown on Figure WSQ9-1. This alternate would exit the power block directly to the east and follow a proposed access road within the heliostat field. The tie-line would then turn north inside the RSEP property boundary and run along the RSEP's circular perimeter road to the north and northwest. At the north end of the heliostat field, the route would traverse the construction laydown area on previously disturbed land over a distance of approximately 500 feet to the southern side of State Route (SR) 62. From here, the route would turn at a right angle to the east and follow SR 62 to Rice Valley Road, a distance of 3.8 miles. The route would then follow the existing Rice Valley Road south for 4.1 miles (starting at the power block) to the point where the proposed routing connects with Rice Valley Road. This new route would therefore require 10.1 miles of new transmission line to cover the same distance that the existing route would cover in approximately 5.7 miles, an addition of approximately 4.4 miles of routing.

The resulting increase in the length of the generator tie line of 40 percent, to 15.4 miles from 11.0 miles (power block to substation), would increase the capital cost of the project approximately $4.5M (not including any additional costs for easements, land purchase options, BLM land leasing fees, additional environmental permitting studies, etc.). In addition, the project's operational cost would increase because of additional power line losses over the increased length of the conductor.

This alternative requires consideration of the following developmental constraints and environmental factors.

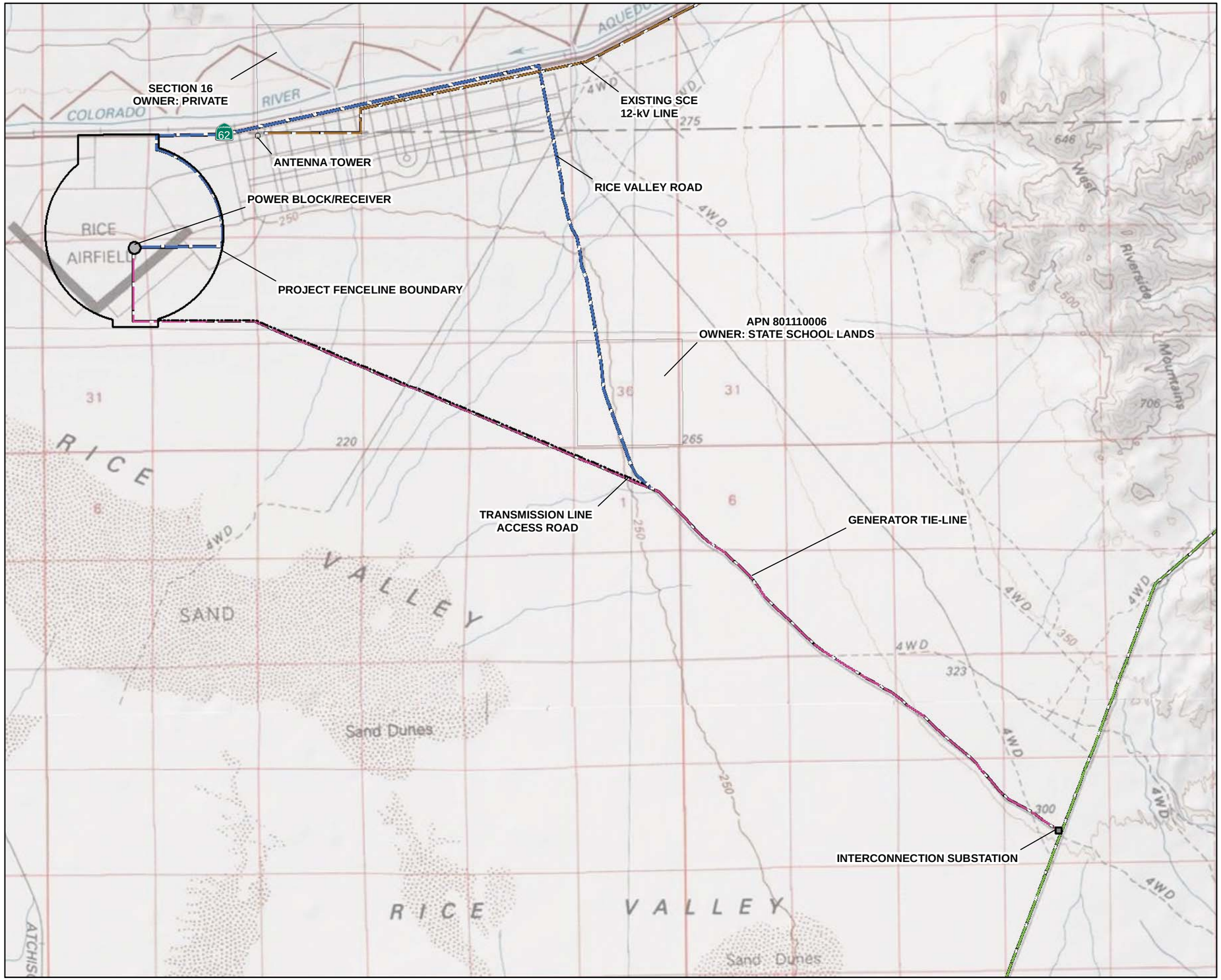
Developmental Constraints—The California Department of Transportation (Caltrans) holds a right-of-way easement on SR 62 that extends for 50 feet from the centerline of the road on the south side. The alternative routing discussed here assumes that it would be feasible to construct the new generator tie-line along SR 62 immediately adjacent to and outside of this Caltrans easement. For approximately 2 miles, there are no other utility uses along this roadway. From a point approximately 2.2 miles east of where the alternative generator tie-line route would exit the heliostat field and turn east along SR 62 east to Rice Valley Road, however, there is a Southern California Edison (SCE) 12-kV transmission line that runs approximately 60 feet south of the SR 62 centerline. For this reason, it would be necessary to move the generator tie-line to the south with sufficient distance for appropriate spacing between the two transmission lines, or to remove the 12-kV line entirely and to construct the generator tie-line with the additional 12-kV line installed on the same set of support poles.

The 12-kV line does not parallel SR 62 along its entire length, instead making a jog to the south for approximately 1.5 miles. This is likely because the parcel of land encompassing this portion of the line (Section 16) is privately owned (see Figure WSQ9-1). Because it was not possible or feasible for SCE to route its 12-kV line through this private parcel, it also may not be feasible for RSE to route a generator tie-line through it. If this were the case, then the generator tie-line would take the same route as the SCE 12-kV line. This route diverges from SR 62 for more than a mile, however, and could require that RSE construct new access road in this routing because there is not an adequate existing access road that accompanies this line.

Continuing south along Rice Valley Road, the alternative generator tie-line route would cross through Section 36 (APN 801110006), which is also privately owned, with the APN registered as "State School Lands." Routing the generator tie-line through this parcel would require a lease of state lands from the California State Lands Commission, with additional costs of annual lease payments and lease application processing.

Environmental Factors—Constructing the alternative generator tie-line along SR 62 to Rice Valley Road would require construction within and along the margins of the World War II Desert Training Center site known as Camp Rice. Camp Rice has been found by the BLM to be eligible for listing in the National Register of Historic Places. Although the tie-line would cause only a small amount of direct physical disturbance to this historic site, it would alter the setting. This effect would occur across the length and width of Camp Rice. If the generator tie-line were required to parallel or replace the existing SCE 12-kV line where the SCE line is routed south to avoid private property, then the new line would run through the Camp Rice site, instead of along the margins of it, for a greater distance.

Constructing a new 230-kV transmission line for more than 3 miles along SR 62 would introduce a new visual element along this highway. The generator tie-line towers would be significantly taller than the existing 12-kV transmission line. Although the towers would not obstruct significant views, and SR 62 is not a designated scenic highway, this effect would take place at the highway edge, where views from the greatest number of viewers, who are travelers in vehicles along this highway, would be located. The transmission line in this location would affect the views across the broader landscape from the roadway over a relatively long distance of SR 62. By contrast, the proposed route is located, at the nearest, about 2 miles away from the highway and will be much less noticeable.



LEGEND

- TRANSMISSION LINE ACCESS ROAD
- GENERATOR TIE-LINE
- PROPOSED GENERATOR TIE-LINE ALTERNATIVE
- PARKER-BLYTHE TRANSMISSION LINE
- EXISTING SCE 12-kV LINE
- INTERCONNECTION SUBSTATION
- POWER BLOCK/RECEIVER
- PROJECT FENCELINE BOUNDARY

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 2,500 5,000
Feet

FIGURE WSQ9-1
GENERATOR TIE-LINE ALTERNATIVE ROUTING
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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Increasing the length of the transmission line also would increase the potential hazard collision to birds associated with the project. Migrating birds are attracted to the Colorado River Aqueduct, which is located just north of SR 62, as a source of water. The addition of a number of transmission towers and the conductors at a location much closer to the aqueduct than the proposed route could increase the risk of bird collision and mortality associated with the generator tie-lines. Again, by contrast, the proposed route is more than 2 miles, at the nearest, from the aqueduct.

In terms of natural habitat disturbance, the alternative generator tie-line route would be routed adjacent to the existing highway and would therefore be removing wildlife habitat of relatively low quality, compared with the proposed route, for the portion of the route that runs along SR 62. The alternative routing would require 30 to 35 additional tower bases, compared with the proposed route, with temporary construction disturbance over a 400-square-foot area and permanent habitat removal of approximately 100 square feet per base. The proposed route would not require these additional tower bases, but does require a new access road approximately 5.4 miles long and approximately 15 feet wide in disturbance area, totaling nearly 10 acres of disturbance. However, RSE will be mitigating the loss of habitat in full using land adjacent to the project site. In addition, the proposed route access road is not located in critical habitat or habitat of special importance to listed or other sensitive species.

Conclusion—An alternative generator tie-line that would use only existing roadways would increase the use of public lands because it would require a longer route that would cross federal land managed by the BLM and state land managed by the State Lands Commission. It would affect views from vehicles traveling on SR 62 to the south by introducing larger transmission towers that would be located at the margins of SR 62 over a portion of their route extending for several miles. If the existing SCE 12-kV line were not reinstalled on the new RSEP transmission towers, then visual effects would include two adjacent transmission lines.

An alternative transmission line along SR 62 and Rice Valley Road also would traverse the margins of Camp Rice, a contributing site to the World War II–era National Register–eligible Desert Training Center. The alternative route would thus have an effect on the integrity of setting of this property.

The additional costs of the additional 4.4 miles of transmission line that would be required to implement this alternative would be significant, and this route would not provide significant environmental benefits. Although the proposed route would remove more natural habitat than the alternative route, the habitat removed is small in amount, is not critical habitat for any particular listed species or important habitat for unlisted species, and will be fully mitigated by RSE by conserving property adjacent to RSEP. For these reasons, this alternative transmission line routing offers no significant benefit compared with the proposed route and was rejected.

Alternative Heliostat Field Size

WSQ 10 *Please provide a discussion of the effects on project efficiency and the environment, of an alternative project configuration that would feature a smaller heliostat field size.*

Response: During the preliminary project design phase, engineers at United Technologies Corporation (UTC) optimized the heliostat field size and tower height for energy production and overall project cost-effectiveness based on available land and other project constraints. A significant number of project design iterations were considered, featuring differing heliostat field sizes and tower heights, to arrive at the configuration described in the AFC. Although a larger heliostat field configuration or multiple heliostat fields could potentially enhance the project, the proposed RSEP configuration is based on a commitment to stay within the boundary of previously disturbed land that is privately held. UTC therefore designed the proposed RSEP system to fit within the project constraints and rigorous design parameters on which the power purchase agreement (PPA) signed with Pacific Gas and Electric Company (PG&E) was founded.

AFC Section 6.7.4 described the results of using the Solar Advisory Model 2009 (SAM2009) to illustrate the impact on other design parameters with varying tower height. This analysis tool was published by the U.S. Department of Energy's National Renewable Energy Laboratories (NREL) and was used for the analysis because it is a publicly available model and protects the confidentiality of RSEP's proprietary technology specifications. For the same reason, the model is used here to illustrate the impact of alternative heliostat field configurations.

To be consistent with the AFC discussion regarding the implications of varying the tower height, the same default case with the same discrete adjustments is used here and identified as the base case for comparison. Similarly, the number of heliostats[1] and the corresponding mirror surface area were kept the same as the default case to maintain the same relationship of heliostat field to solar receiver configuration. The relative power output and electricity price were evaluated by varying the heliostat field sizes. The results are presented in Table WSQ10-1 below. The differences are expressed in percentages and can therefore be appropriately applied to the RSEP heliostat field and receiver configuration.

In Cases F1 and F2, the maximum distance from the tower to field boundary was changed by ±5 percent while maintaining the same number of heliostats. Reducing the distance from the tower to the outer boundary in this case has the effect of packing the heliostats more densely. Conversely, when the heliostat field diameter is increased, the heliostats are less densely packed. As shown in Table WSQ10-1, the annual power output would be lower under both of these cases. Additionally, the first year PPA prices would increase by 2.5 percent under both alternatives. Either configuration would generate less electricity and at a higher cost to the customer.

[1] Note that the default sample case uses a larger heliostat and so the mirror surface area is only about 25 percent less than RSE, even with a much smaller number of heliostats.

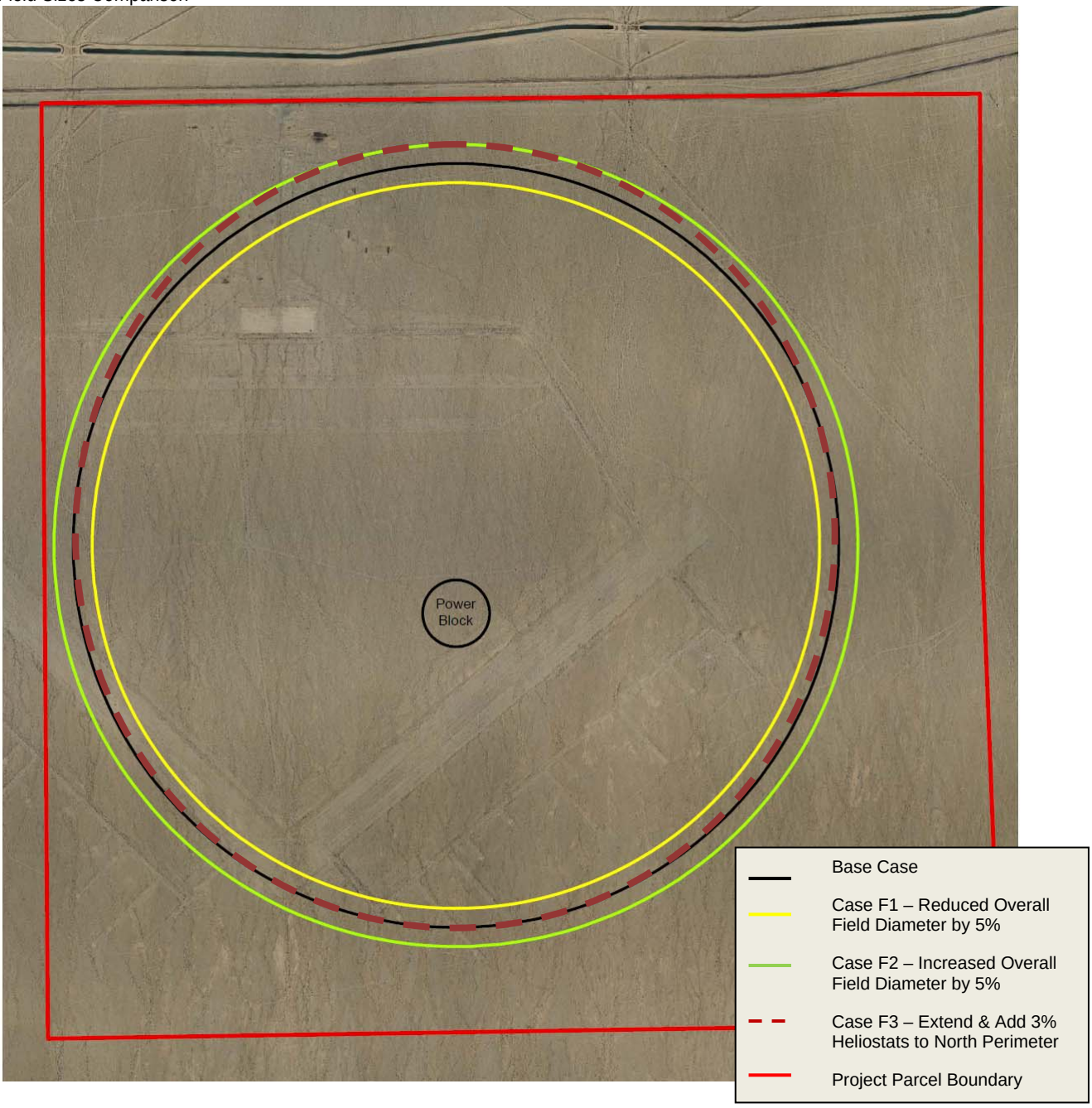
TABLE WSQ10-1
Field Size Analysis

				150 MWe Project		
Parameter	**Units**	**SAM2009 Default Parameters**	**Base**	**Reduced Overall Field Distance by 5% Case F1**	**Increased Overall Field Distance by 5% Case F2**	**Extend and Add 3% Heliostats to North Perimeter Case F3**
Nameplate Capacity	MWE	100	150	Same	Same	Same
Cooling Mode	Wet/Dry	Wet	Dry	Same	Same	Same
Tower Height	Meters	194.4	176	Same	Same	Same
Heliostats	No.	5,438	5,438	Same	Same	5,612 (+3%)
Mirror Area	M^2	783,566	783,566	Same	Same	783,566 (+3%)
Maximum Distance from Tower	Meters	-	1,150	1,093	1,208	1,208
Field Diameter Difference	-	-	-	- 5% Overall	+ 5% Overall	+ 5% North Perimeter
Storage Volume	M^3	6,568	9,852	Same	Same	Same
PPA Escalation	%	1.2	2.5	Same	Same	Same
Debt Service Coverage Ratio		1.4	1.6	Same	Same	Same
Debt Fraction	%	40	60	Same	Same	Same
Annual Generation	MWh	311,084	304,135	300,184	302,871	307,353
Differential (1st Yearr PPA Price)			Base	+ 1.32%	+ 0.43%	Same as Base
Differential (Net Output)			Base	- 1.3%	- 0.42%	+ 1.05%

In Case F3, the heliostat field is increased similarly to Case F2, but only on the north side. As shown in the data summary, additional power output could be achieved without adverse impacts to the unit cost of energy under this scenario. As explained, additional heliostats can enhance project economics when placed effectively. Conversely, a reduced number of heliostats would erode the cost-effectiveness of the facility. Similarly, a less optimally packed heliostat field with the same number of heliostats, as in Case F1, would reduce power output and increase the unit cost of energy. The power output shortfall in these cases would necessarily have to come from a separate project with greater incremental environmental impacts.

Figure WSQ10-1 below illustrates the heliostat field for each of three cases discussed.

FIGURE WSQ10-1
Field Sizes Comparison



The base case, as demonstrated, provides an efficient field configuration designed to function effectively within the previously disturbed project parcel boundary. Although additional power can be achieved with a larger heliostat field, a reduced heliostat field will further burden the economics of the project and create greater incremental environmental impacts from having to make up the shortfall from a supplemental project.

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

APPLICATION FOR CERTIFICATION FOR THE *RICE SOLAR ENERGY POWER PLANT PROJECT*

Docket No. 09-AFC-10

PROOF OF SERVICE
(Revised 3/4/2010)

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DECLARATION OF SERVICE

I, Mary Finn, declare that on April 7, 2010 , I served and filed copies of the attached, RSEP Response to Workshop Queries #9 and #10. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: **[http://www.energy.ca.gov/sitingcases/ricesolar].**

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

(Check all that Apply)

FOR SERVICE TO ALL OTHER PARTIES:

x ____ sent electronically to all email addresses on the Proof of Service list;

_____by personal delivery

_____by delivering on this date for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for the mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

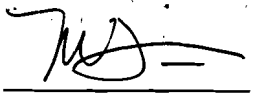
x ____ sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (***preferred method***);

OR

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

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-10
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

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



Mary Finn