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March 8, 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 Staff Data Requests 1 to 168

Dear Mr. Kessler:

Attached please find one original and 12 copies of Rice Solar Energy, LLC's (RSE's) responses to California Energy Commission Staff Data Requests 1 through 168 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

Attachment

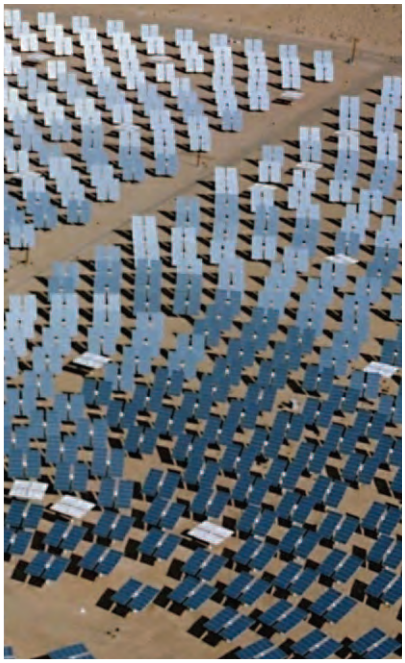
cc: POS List
Project File

Supplemental Filing

Application for Certification

Response to CEC Staff Data Requests 1 to 168

Rice Solar Energy Project



Submitted by

SOLARRESERVE

Submitted to

California Energy Commission

With Technical Assistance by

CH2MHILL

EY072009005SAC

March 2010

Supplemental Filing

Response to CEC Staff Data Requests 1 to 168

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

March 2010

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Introduction

Attached are Rice Solar Energy, LLC's (RSE's) responses to California Energy Commission (CEC) Staff data requests numbers 1 through 168 for the Rice Solar Energy Project (RSEP) (09-AFC-10). The CEC Staff served the data requests on February 16, 2010, as part of the discovery process for the RSEP.

The responses are grouped by individual discipline or topic area. Within each discipline area, the responses are presented in the same order as CEC Staff presented them and are keyed to the Data Request numbers (1 through 168). New or revised graphics or tables are numbered in reference to the Data Request number. For example, the first table used in response to Data Request 15 would be numbered Table DR15-1. The first figure used in response to Data Request 28 would be Figure DR28-1, and so on.

Additional tables, figures, or documents submitted in response to a data request (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of a discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Air Quality (1–35)

Existing Activities Causing Emissions

1. *Please describe the types of activities that currently emit combustion and fugitive dust emissions on the site, such as off-road use, and the quantities of those emissions that occur from those activities.*

Response: The RSEP site is located on private land which is composed of creosote bush-bursage desert scrub with some areas of disturbance where foundations or concrete from the runways and hardstands remain (no standing structures remain). Therefore, there are no known existing anthropogenic uses that emit exhaust emissions or generate fugitive dust emissions. There are likely naturally occurring fugitive dust emissions from the site, but these emissions are part of the project's baseline condition.

Will Emission-causing Activities Continue?

2. *Please describe whether those activities will be permanently discontinued when the project is completed and estimate the reductions from the current onsite baseline emissions.*

Response: As noted in the response to Data Request #1, there are no known existing anthropogenic activities that generate exhaust emissions or generate fugitive dust emissions at the project site. Therefore, the completion of the project would not result in a reduction in the baseline anthropogenic emissions onsite.

Non-stabilized Disturbed Land During Operation

3. *Please identify the increase or decrease in the acreage of non-stabilized disturbed land within the project site during operation and estimate the corresponding increase or decrease in wind erosion fugitive dust emissions at the site during construction and operation.*

Response: Wind erosion during construction and operation was addressed in AFC Section 5.11 (Soils). In that document, it is conservatively estimated there would be an increase of approximately 1,200 acres in non-stabilized disturbed area, assuming 80 percent of the project site will have bare soil exposure during the construction period, with a corresponding increase in the potential for emissions of total suspended particulate matter (TSP). The TSP emissions associated with windblown dust have been extracted from AFC Table 5.11-3 and are presented in Table DR3-1. As noted in AFC Section 5.11, the wind erosion potential will be reduced significantly by keeping soil moist or by covering, applying bonded fiber, or applying dust palliatives on the disturbed soil/stockpiles. However, for the purposes of responding to this data request, the PM_{10} and $PM_{2.5}$ wind-blown emissions were estimated by converting the wind-blown TSP emissions in Table 5.11-3 to PM_{10} and $PM_{2.5}$ size fractions using the particle size profile for windblown desert lands contained in the California Emission Inventory Development and Reporting System (CEIDARS) (ARB, 2008). According to CEIDARS, the PM_{10} fraction of windblown dust is 59.37 percent, which results in an estimated mitigated total of 239 tons of PM_{10} during construction, or approximately 106 tons per year assuming a 27-month construction

period. The PM2.5 fraction of wind-blown dust is 11.31 percent, which results in an estimated mitigated total of 46 tons of PM2.5 during construction, or approximately 20 tons per year assuming a 27-month construction period.

TABLE DR3-1 (EXTRACTED FROM AFC TABLE 5.11-3)
Soil Loss Estimates from Wind Erosion[a]

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Wind-blown dust:				
Project site	1,128	27	964.4	337.6
Laydown area	0.0	27	0.0	0.0
Generator tie-line corridor	44.6	10	14.12	4.94
Generator tie-line laydown area	0.50	10	0.0	0.0
Perimeter drainage swale	25	31	24.54	8.59
Estimated total			1,152	403.0
Estimated PM_{10} emissions (tons)[b]			684	239
Estimated $PM_{2.5}$ emissions (tons)[b]			130	46

[a]Assumptions for these calculations are found in Appendix 5.11A of the Application for Certification.
[b]The PM_{10} emissions were estimated by applying a size fraction of 59.37 percent to the TSP emissions. The $PM_{2.5}$ emissions were estimated by applying a size fraction of 11.31 percent to the TSP emissions.

Wind-blown fugitive dust emissions will also occur during operation of the RSEP. However, as stated in AFC Section 5.11, land surfaces will be stabilized and maintained to limit wind-blown sediment as much as possible after construction, both as a best management practice (BMP) and also because wind-blown sediment will negatively impact mirror reflectivity and therefore reduce the plant's efficiency and performance. Therefore, soil erosion losses from wind erosion during operation of the RSEP are expected to be similar to or less than pre-project wind erosion losses after implementation of soil stabilizers and incorporation of BMPs.

Reference

California Air Resources Board (ARB). 2009. California Emission Inventory and Reporting System. Summary of Overall Size Fractions and Reference Documentation (excel file). July.

Soil Silt Content

4. *Please provide an analysis of the available onsite surface/near surface soil sieve data that identifies a defensible site specific soil silt content value.*

Response: Based on the discussion in Section 3.3 "Typical Subsurface-Profile" of the Preliminary Geotechnical Report (Terracon, 2009), the near surface soils (i.e., a depth of 5 feet below the ground surface) consist of damp, dense silty sand and poorly graded sand. The Boring Location Diagram (boring logs in Plate 2 in Appendix A of the report) indicates that approximately half of the site has silty sand in the upper 5 feet. According to the grain size distributions in Appendix B, the silt content of the surface soils varies

through the site from 4.2 percent to 20.8 percent. Averaging the representative silt content of 5 percent for the poorly graded sand and 16 percent for the silty sand, the resulting average silt content at the site is approximately 10 percent.

Reference

Terracon. 2009. Preliminary *Geotechnical Engineering Report. Prepared for the Rice Solar Energy Project*. Section 3.3, Page 4. August 5.

Fugitive Dust Emissions

5. *Please provide an updated fugitive dust emission calculation for both construction and operations using the defensible soil silt content value*

Response: The fugitive dust emission calculations for construction and operations have been updated to reflect the increase in the surface silt content from 8.5 percent to 10 percent. The revised PM_{10} and $PM_{2.5}$construction fugitive dust emissions are presented in Tables DR5-1 and DR5-2. The increase in the offsite vehicle PM_{10} and $PM_{2.5}$ emissions is primarily due to a discrepancy discovered in the calculations (see Data Request #16), rather than an increase in the silt content. The detailed calculations can be found in Attachment DR5-1A.

TABLE DR5-1 (REPLACES AFC TABLE 5.1-9)
Maximum Daily Construction Emissions

	Emissions (lb/day)					
Construction Emission Source	**NOx**	**CO**	**VOC**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Onsite construction emissions	412	189	52	0.5	302	59
Offsite vehicle emissions	684	381	37	1.1	376	59
Offsite construction emissions	104	53	11	0.1	44	8

lbs/day = pounds per day

TABLE DR5-2 (REPLACES AFC TABLE 5.1-10)
Maximum Annual Construction Emissions

	Emissions (tons per year)					
Construction Emission Source	**NOx**	**CO**	**VOC**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Onsite construction emissions	37.0	18.9	6.6	0.055	31.3	5.2
Offsite vehicle emissions	72.2	44.6	4.0	0.1	43.3	6.5
Offsite construction emissions	2.9	1.7	0.3	0.004	2.3	0.3

For operation, the silt content was used to estimate fugitive emissions from truck travel on unpaved roads to wash the heliostats. The revised PM10 and PM2.5 emissions for the trucks used for heliostat washing are shown in Table DR5-3. The detailed calculations can be found in Attachment DR5-1B.

TABLE DR5-3 (REPLACES AFC TABLE 5.1-15)
Criteria Pollutant Emissions from Worker Commute, Heliostat Washing, and Deliveries during Operation

	Emissions (lb/yr)					
Emission Source	**VOC**	**CO**	**NOx**	**SOx**	**PM_{10}**	**$PM_{2.5}$**
Worker Commute	137	5,407	587	9	803	240
Trucks Used for Heliostat Washing	155	257	575	1	11,756	1,200
Material Deliveries	111	507	2,195	4	155	98
Total (lb/yr)	403	6,171	3,357	13	12,714	1,538
Total (tpy)	0.2	3.1	1.7	0.01	6.4	0.8

Off-Road Construction Equipment Emissions

6. *Please provide the URBEMIS off-road construction equipment emission factors used to calculate the off-road equipment emissions and the methodology used to determine these emission factors.*

Response: The URBEMIS2007 construction emission factors and the associated assumptions are presented in AFC Appendix 5.1A, Table 5.1A.29. The URBEMIS2007 User's Manual Appendix I contains a list of off-road equipment emission factors in units of grams per brake-horsepower hour (g/bhp-hr) for the years 2005 through 2020. The URBEMIS2007 construction equipment emission factors for the year 2011 were used for the RSEP emission calculations. According to the URBEMIS2007 User's Manual, the construction equipment emission factors originated from the ARB OFFROAD2007 model and represent a statewide average for each piece of equipment.

URBEMIS Emission Factors

7. *Please identify whether the derivation of the URBEMIS emission factors included any assumptions regarding the engine Tier level or age in determining the off-road emission factors, or if the emission factors are based on fleet average or some other basis.*

Response: As footnoted in AFC Appendix 5.1A, Table 5.1A.29, the mobile source load and emission factors for the year 2011 were used for the construction equipment exhaust emission calculations. The pound per hour construction equipment emission factors presented in AFC Appendix 5.1A, Table 5.1A.28 were derived using the information in Table 5.1A.29 as follows:

> Emission factor (lb/hr) = UBEMIS2007 Emission Factor (g/bhp-hr) * Rated Horsepower * Load Factor * 1 lb/453.6 g

As stated in the response to Data Request #6, the emission factors (g/bhp-hr) in AFC Appendix 5.1A, Table 5.1A.29, were copied from the URBEMIS2007 User's Manual, Appendix I and represent a statewide average emission rate for each piece of equipment. Therefore, no assumptions regarding the engine Tier level or age were used in deriving the pound per hour emission factors.

Salt Crushing Emissions

8. *Pease provide an estimation of any temporary point source and fugitive dust emissions associated with the dry salt crushing and handling activities.*

Response: Specific emission factors for estimating the fugitive dust emissions from the milling, handling, and conveying of sodium nitrate and potassium nitrate salts are unavailable in general reference materials such as AP-42. However, in order to provide an order of magnitude estimate of emissions, the AP-42 approach (EPA, 1995) for estimating phosphate rock emissions was used as a surrogate. Phosphate rock was selected as a surrogate because all three compounds are common materials used in fertilizers and the phosphate grinding would represent a conservative estimate because the rock-grinding emissions are expected to be higher than the milling activities associated with the project, which is intended to break up salt clumps. The fugitive emissions from the salt milling, blending, and handling activities will also be collected and exhausted through a fabric filter baghouse unit, which is expected to achieve a control efficiency greater than 99 percent. Furthermore, the milling and salt-handling equipment will be located within an enclosure.

Based on the phosphate rock grinding estimates, less than 155 pounds of PM_{10} total would be released inside the enclosure (see Attachment DR8-1). The remaining material collected in the baghouse will be recycled to the melting process.

The salt will be conveyed from the blended storage hopper to the salt-melting operation via an enclosed mechanical screw conveyor (or other similar conveyor). There are no plans at this time to convey the salt pneumatically. The salt will drop into the melting system, where the drop height will be minimized to reduce salt loss from wind erosion. Additionally, the drop point will include a snorkel to reduce the salt drop height. Emissions associated with the dry salt handling are expected to be negligible.

Therefore, the dry salt milling and handling activities will not result in a significant emission source, and fugitive dust emissions are expected to be less than significant. Fugitive dust emissions will be controlled by implementing a housekeeping program to minimize the collection of salt on the floor of the enclosure.

Reference

United States Environmental Protection Agency (EPA). 1995. AP42, Fifth Edition. Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources. Chapter 11.

Emissions Controls for Dry Salt Crushing

9. *Pease describe any emission controls that will be used to reduce any temporary point source and fugitive dust emissions associated with the dry salt crushing and handling activities.*

Response: As noted in the response to Data Request #8, the salt milling and blending activities will be vented to a fabric-filter baghouse unit and will take place within an enclosure. The transfer of salt to the melting system will take place using an enclosed system with the drop height reduced to minimize fugitive dust emissions. Therefore, the particulate emissions from these activities will be controlled.

Salt Trace Constituents

10. Please provide complete sodium and potassium nitrate salt trace constituent compositions down to the ppm level.

Response: A product data sheet on sodium nitrate from a potential supplier, SQM, is provided as Attachment DR10-1. A comparable grade or better of sodium nitrate will be procured for the project and the maximum allowable ("not to exceed") content of specific, detectable impurities in the sodium nitrate will be specified in the purchase order. These are as shown in Table DR10-1.

TABLE DR10-1
Sodium and Potassium Nitrate Salt Trace Constituent Composition

Detectable Constituent	Wt. %	Maximum Allowable
Total Chloride as Cl	0.2%	2,000 ppm
Magnesium (Mg)	0.045%	450 ppm
Nitrite (NO_2)	0.02%	200 ppm
Sulfate (SO_4)	0.10%	1,000 ppm
Carbonate (CO_3)	0.10%	1,000 ppm
Hydroxil (OH)	0.20%	2,000 ppm

Note that typical detectable constituent content in the salt supplied are far lower than the specified maximum values as also shown on the data sheet.

Non-detectable heavy metal constituents are shown in Table DR10-2, with their respective non-detect thresholds. Please note that these constituents are non-volatile and will remain in the solid form throughout the life of the salt and for this reason, 1 ppm of a constituent would not amount to 70 pounds of emissions.

TABLE DR10-2
Sodium and Potassium Nitrate Salt Trace Non-Detect Constituents

Non-Detect Constituent	Threshold
Iron (Fe)	< 10 ppm
Lead (Pb)	< 5 ppm
Cadmium (Cd)	< 1 ppm
Chromium (Cr)	< 0.5 ppm
Mercury (Hg)	< 0.5 ppm
Arsenic (As)	< 0.5 ppm

Similarly, a data sheet on potassium nitrate from a potential supplier, is attached as Attachment DR10-1. A comparable grade or better of potassium nitrate will be procured for

the project and the maximum allowable ("not to exceed") content of specific, detectable impurities in the potassium nitrate will be specified in the purchase order. These are shown in Table DR10-3.

Similarly, the data sheet for potassium nitrate from Haifa Chemicals, another supplier of solar salt is attached as Attachment DR10-1. The associated specifications will be incorporated into the purchase order to effectively guarantee the potassium nitrate delivered to the Project contains not less than 99.4% by weight. Maximum allowable ("not to exceed") content of specific, detectable impurities in the potassium nitrate are shown in Table DR10-3.

TABLE DR10-3
Maximum Allowable Impurity Content, Potassium Nitrate

Detectable Constituent	Wt. %	Maximum Allowable
Total Chloride as Cl	0.03%	300 ppm
Magnesium (Mg)	0.001%	10 ppm
Iron (Fe)	0.001%	10 ppm
Sulfate (SO_4)	0.02%	200 ppm

As shown on the data sheet, typical values in materials delivered for testing are generally well below the maximum levels.

Vendor Guarantees for Salt Constituents

11. *Please provide copies of any vendor guarantees associated with these trace compositions, including the vendor guarantee noted in 5.1B-3.*

Response: See the response to Data Request #10. The vendor information is included as Attachment DR10-1.

Magnesium Oxide Decomposition Product

12. *Please describe the disposition of the magnesium oxide decomposition product. Does it remain in the salt solution, is it emitted with the vented gas decomposition product, does is settle as a solid at the bottom of the salt tanks, or is it otherwise separated from the salts and trucked offsite?*

Response: The melting point for magnesium oxide (MgO) is 2,852°C. This material will stay as a fine solid and remain in solution within the liquid molten salt throughout the life of the salt. Some fraction will settle in the salt tanks, while some will remain in suspension and in recirculation. The final report on the Solar Two Project, published by Sandia National Laboratories (Sandia SAND2002-0120, J. Pacheco) documented that "MgO fines that accumulated in the tanks and elsewhere presented no problem" to the operation of the system as designed.

Salt Impurities—Decomposition Products and Emissions

13. *Please describe for all of the other salt impurities, which exist at or above 1 ppm in the raw incoming salts, the decomposition products and emissions or other final disposition.*

Response: Please refer to the response to Data Request #10 for a list of impurities in the salt. The melting and decomposition temperatures for the carbonates and sulfates contained in the salts are higher than the specified operating range for this application (maximum 1,075°F). Decomposition of magnesium nitrate was documented in the Sandia final Solar Two Project report (ibid.). This was discovered after Sandia researchers conducted detailed research and analysis of the salt. No other emissions were noted.

Offsite Construction Vehicle Usage

14. *Please confirm that the correct units for Table 5.1A.31 are trips per day, not trips per month, and confirm that the total number of trips is based on a 22 day per month construction schedule assumption.*

Response: The quantities presented in AFC Appendix 5.1A, Table 5.1A.31 represent the average trips per day per month. For example, the average daily number of construction workers commuting in month 4 is 222 workers.

Offsite Construction Motor Vehicle Miles Traveled

15. *Please confirm that the correct units for Table 5.1A.38 are miles per round trip, not miles per day.*

Response: As noted in the response to Data Request #14, the units for AFC Appendix 5.1A, Table 5.1A.31, are average roundtrips per day per month. Therefore, the quantities in AFC Appendix 5.1A, Table 5.1A.38, represent the miles per roundtrip per day and/or miles per day because it is assumed each vehicle makes one roundtrip per day.

Offsite Construction Motor Vehicle Emissions

16. *Please correct the SOx, NOx, and PM10/PM2.5 monthly emissions Tables 5.1A.34 through 5.1A.37 that provide lb/day values for the heavy diesel vehicles rather than lbs/month, and that provide lb/month values for the employee commute emissions that are approximately 4.5 times too low compared to VOC and CO, which appear to be correct*

Response: AFC Appendix 5.1A, Tables 5.1A.34 through 5.1A.37 have been corrected. The corrected tables are included as Attachment DR16-1.

Concrete Batch Plant Power Source

17. *Please identify whether the rock screening plant diesel engine emission source shown in Appendix 5.1A would power the temporary concrete batch plant, or provide an emission estimate for the power source necessary for the temporary concrete batch plant.*

Response: The electricity for the concrete batch plant will be provided by the generators located in the power block area.

Salt Decomposition and Venting

18. Please describe the potential for salt decomposition and venting after the initial salt conditioning.

Response: The mixture of sodium nitrate and potassium nitrate proposed for the project was employed and proven at the 10 MWe Solar Two central receiver plant in Barstow, California. It is documented in the Solar Two final report (ibid.) that, among many salt mixtures considered, this mixture has the highest thermal stability. At the temperature range for this application of 550 °F to 1,050 °F, the specified salt mixture exists in equilibrium between the nitrate and nitrite form of the salt as shown below:

$$NaNO_3 \leftrightarrow NaNO_2 + \tfrac{1}{2} O_2$$

$$KNO_3 \leftrightarrow KNO_2 + \tfrac{1}{2} O_2$$

Over time, the concentration of nitrite increases. This characteristic is anticipated and does not adversely affect the performance of the salt as documented in the Solar Two final report (ibid.). At the maximum operating temperature of 1,075 °F, there would be some degradation of the nitrite form of the salt as shown in the following equation.

$$5\ NaNO_2 \rightarrow 3NaNO_3 + Na_2O + N_2$$

This process, however, is very slow. It would take a much higher operating temperature, approaching 1,500°F, for nitrogen (N_2) to evolve so rapidly that the molten salt would appear to boil. In laboratory analyses, decomposition ceases as soon as the source of heat is removed, indicating that the decomposition reaction is endothermic.

Most nitrates tend to decompose on heating to metal oxide, nitrogen dioxide and oxygen. In general, group 1 minerals/metals (e.g., sodium, potassium), with the exception of lithium, are more stable than group 2 metals (beryllium, magnesium, calcium). Hence, magnesium nitrate decomposes irreversibly at lower temperature, approximately 900°F. This was documented in the Sandia final report on the Solar Two Project (ibid.). For sodium nitrate/nitrite, irreversible decomposition would occur closer to 1,470°F (800°C). The decomposition temperature for potassium nitrate/nitrite would be even higher, as the larger potassium cation (K+) has a less polarization (repelling) effect on the neighboring oxygen atoms of the nitrate. This allows the potassium and the nitrate to hold a more stable bond, which will take greater energy to break.

In summary, irreversible salt degradation and gas evolution throughout the operating life of the salt are not expected after the initial conditioning of the salt.

Salt Decomposition Temperature

19. Sodium nitrate is described as having a decomposition temperature of 716 degrees Fahrenheit (380 degrees Celsius) and potassium nitrate is described as having a decomposition temperature of 752 degrees Fahrenheit (400 degrees Celsius), while the hot salt storage is noted to be 1,050 degrees Fahrenheit. Please describe how the salt mixture does not decompose at the hot salt storage temperature and provide the decomposition temperature for the salt mixture.

Response: Some incorrect information exists in the literature about the decomposition point of molten salts, including sodium nitrate and potassium nitrate. In older literature, researchers may have observed oxygen evolution from the equilibration of nitrates and

nitrites (as described in the response to Data Request #18) or may have observed some gas from the decomposition of magnesium nitrate and mistakenly attributed this to salt decomposition. Decomposition temperatures of sodium nitrate and potassium nitrate are described in the response to Data Request #18 and are much higher than the plant operating temperature. As further evidence of the stability of sodium nitrate and potassium nitrate, laboratory tests at Sandia National Labs and periodic analysis of the salt during Solar Two operations did not indicate any long-term decomposition of the sodium nitrate / potassium nitrate salt mixture at 1,050°F.

Liquid Salt Storage Containment

20. *Please describe the molten salt storage containment and whether there is the potential for molten salt fume emissions being exhausted from the salt storage tanks.*

Response: Secondary containment for the salt tanks is provided by excavating the northern half of the power block to a depth sufficient to provide containment for a minimum of 110 percent (plus margin) of the molten salt inventory in the event of a catastrophic tank failure.

Volume change as the salt moves from one tank through the system and into the other will result in intake of ambient air that is later displaced with rising salt level. As described in prior responses, there are no volatile constituents in the salt mixture and only minimal release of oxygen and even less nitrogen would occur from the storage tanks during normal operation. No "fumes" are associated with this non-volatile liquid. At the maximum operating temperature of 1,075°F, the salt vapor pressure is extremely low at 0.002 psia.

Liquid Salt Working Pressure

21. *Please describe the working pressure for the molten salt and whether there are any pressure relief valves or similar components.*

Response: The molten salt storage tanks are open to the atmosphere through vents designed in accordance with relevant codes; therefore, no pressure relief valve is required for these tanks. However, pressurized salt-circulating piping (to and from the receiver and to and from the steam generator heat exchangers) and associated heat exchanger vessels will be protected against over-pressurization by safety-relief valves designed in accordance with relevant codes (e.g., ASME). The highest pressure developed in the system is about 700 psig at the discharge of the cold salt pumps. Numerous high-point vents are installed in order to expel air from the system when being filled (and vice versa). Air from these high-point piping vents is routed to ullage space in the cold molten salt storage tank.

Salt Decomposition

22. *Please describe whether a nitrogen blanket or similar will be used to prevent salt oxidation/decomposition and degradation.*

Response: The molten salt storage tanks will be open to the atmosphere and a nitrogen "blanket" atmosphere will not be needed. As described in the response to Data Request #18, the nitrate/nitrite equilibrium is anticipated as a normal process in the course of operation. The use of nitrogen cover gas would push the chemical equilibrium toward the formation of

more nitrites. Decomposition to the metal oxide form is not expected at or near the project's operating temperatures.

Liquid Salt Losses

23. *Please provide evidence that shows there will not be any other molten salt loss or describe what would be done to offset any such losses.*

Response: The final report for the 2.5 years of Solar Two Project operation (ibid.) did not report any loss of salt through decomposition or evaporation. The response to Data Request #18 shows some release and re-absorption of oxygen in the reversible nitrate/nitrite equilibrium. A small release of nitrogen is anticipated when an expected small amount of salt is oxidized in an irreversible decomposition process. However, it will not be necessary to add salt to the system during the life of the project.

Stack Removal

24. *Will the three stacks used to vent salt melting, salt heating, and salt conditioning – melting off-gases (stacks 1 to 3 on Figure 5.1C-3) be removed with removal of the fired heater and NOx scrubber system at the end of the commissioning process (page 5.1-13)? If not, what happens to these stacks?*

Response: The stacks will be removed along with the removal of the heaters and the NOx scrubber system at the end of the salt-commissioning process.

Heliostat Mirror Washing Frequency

25. *Please provide the technical basis for the heliostat mirror-washing frequency.*

Response: The basis for mirror washing frequency outlined in the AFC (Table 2.2-1) is historical data from Solar Two, the prototype for this technology. Actual mirror washing frequencies at the RSEP may be more or less frequent based on actual site conditions.

In general, the solar field performance and resultant power generation are dependent on the performance (reflectivity, accuracy) of the mirrors, itself directly dependent on the cleanliness and proper functioning of mirror drives and controls. For this reason, all mobile equipment operations within the facility and the solar field will be conducted with the utmost attention to reducing fugitive dust.

The performance and economic modeling for the project have assumed a high level of mirror cleanliness that would support a reflectivity greater than 95 percent of the rated maximum level. The rated reflectivity of the specified mirrors in the "new and clean" condition is 94 percent, therefore, the project operating criteria is to maintain the overall field reflectivity above 90 percent (i.e., 95 percent cleanliness x 94 percent rated reflectivity) through regular, non-abrasive cleaning methods (high-pressure demineralized water spray). Water consumption is estimated on the basis of achieving one pass of the complete solar field every 7 to 10 days. Slight adjustments to washing frequency may be warranted depending on local dust and wind conditions. Experience at Solar Two in similar desert conditions at Daggett, San Bernardino County where the washing frequency was once every two weeks documented achievement of a cleanliness factor of approximately 93 percent from the baseline mirror condition.

There will be one paved service road through the solar field as well as two unpaved service roads and an unpaved perimeter road that will encircle the solar field for general plant access. The service roads will be used to access the individual rows of heliostats for maintenance, using both on- and off-highway vehicles. Individual heliostat row access will be along a path established on every other row of heliostats.

Vehicle speeds while transiting through the facility and the heliostat field in particular will be strictly limited to avoid dust generation, which is counterproductive to cleaning operations. Generally speaking, vehicles leaving the improved road surfaces will transit on established trails when performing routine maintenance. Root systems will remain intact (i.e., site is not grubbed for construction) for vegetation within the field to the extent practicable, which should help minimize erosion and sedimentation. Approved dust palliatives may be applied to travel lanes depending on experience gained after operations commence.

A field maintenance program will be implemented when the plant commences operation. It is in the plant's best interest to adapt measures and best practices to optimize the solar field collection efficiency, field maintenance routines, and associated costs. Therefore, the mirror washing frequency will be adjusted with onsite operational experience.

Mirror Washing Route

26. *Please discuss any optimization of the mirror washing route and any other considered PM emission mitigation for mirror washing.*

Response: Please see the response to Data Request #25. The optimal mirror-washing routes (the most efficient and economical routes within the heliostat field) will be determined during the early operational phase. Dust palliatives may be used to control fugitive dust from truck traffic.

Operation Emissions Modeling

27. *Please revise the operation modeling to include the maintenance vehicle tailpipe and associated fugitive dust emissions, including any other changes in operating emission estimates as determined in response to other data requests.*

Response: The dispersion modeling for the operational impacts were revised to include the maintenance vehicle tailpipe emissions and the associated fugitive dust emissions. The maintenance vehicle tailpipe emissions and the associated fugitive dust emissions were modeled as volume sources conservatively located near the facility boundary. It was conservatively assumed that the 1-hour and 3-hour emissions from both trucks would be located in the same vicinity assuming the maximum predicted impacts identified in the AFC Table 5.1-15 and provide a very conservative predicted impact given the low probability that the worst-case meteorological conditions in the screening meteorological data set would occur at the same time that both trucks would be washing mirrors along the perimeter of the project area in the location of the maximum predicted impact resulting from the emergency generator tests, which are only tested 30 minutes each week.

As previously noted in the Section 5.1 (Air Quality) of the AFC, the use of screening meteorological data and the use of the heliostat perimeter fenceline would also be expected

to result in a conservative estimate of the project impacts. For NO_2, the maximum NOx impact assumes a 100 percent conversion of NOx to NO_2. However, application of the ozone limiting principles would further reduce the predicted NO_2 concentrations for each of the individual plumes. For instance, the EPA's AERMOD-OLM (ozone limiting method) algorithm would offer a more realistic method of calculating concentrations of NO_2 by assuming approximately 10 percent of the combustion stack emissions are emitted as NO_2 and the remaining stack gas released as NO would be converted to NO_2 based on the quantity of ozone available.

As presented in Table 5.1-21 of the AFC, the predicted 1-hour NOx concentration was approximately 4 $\mu g/m^3$ below the 1-hour state NO_2 standard. This predicted impact was based on the assumption that only one of the two emergency generators would be tested at the same time as the two fire pumps. In order to meet the 1-hour state NO_2 standard after the inclusion of the maintenance vehicle tailpipe emissions, the revised 1-hour results represent the maximum predicted concentrations associated with the maintenance vehicle tailpipe emissions and the assumption that only one of the emergency generators would be tested at the same time.

The emissions for the 8-hour, 24-hour, and annual emissions were evenly distributed around the perimeter of the project area. It is also expected this will result in a conservative estimate given that the vehicles would not be operated near the perimeter of the project throughout the entire 8-hour, 24-hour, or annual periods. The fugitive dust emission calculations are also based on a conservative assumption that there would only be a 44 percent reduction in the estimated PM_{10} and $PM_{2.5}$ emissions for vehicle speeds less than 25 miles per hour (see Table 5.1B-10, Volume II of the AFC and the revised Table 5.1B-10 included in Attachment DR5-1B). However, it is likely that trucks involved in the truck washing will average speeds considerably less than 25 miles per hour and would therefore generate fugitive dust emissions at rates less than the predicted emissions in Attachment DR5-1B. As noted in the response to Data Request #3, fugitive wind-blown emissions during project operation are not expected to exceed the wind-blown emissions prior to construction. Therefore, the wind-blown emissions were not added to the dispersion modeling analysis for the operational impacts.

The results of the revised modeling are presented in Table DR27-1, which show that RSEP would not cause or contribute to the violation of a NO_2, CO, SO_2, or $PM_{2.5}$ standard. Therefore, the predicted project impacts would remain less than significant for the revised modeling assessment.

For PM_{10}, the background concentration exceeds the ambient air quality standards (AAQS) without adding the modeled concentrations. As a result, the predicted project impact plus background also exceeds the AAQS. However, operation of the project will result in minimal PM_{10} impacts and are not expected to significantly contribute to existing violations of the PM_{10} AAQS. Therefore, the PM_{10} impacts from operation would remain less than significant for the revised modeling assessment.

The revised dispersion modeling files are submitted on CD-ROM.

TABLE DR27-1 (REPLACES AFC TABLE 5.1-21)
Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration[a] (µg/m^3)	Background Concentration[b] (µg/m^3)	Total Predicted Concentration (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2[c]	1-hour	277	24	301	339	188
	Annual	0.31	4.9	5.2	57	100
SO_2	1-hour	0.26	47.1	47.4	655	—
	3-hour	0.097	31.4	31.5	—	1,300
	24-hour	0.0029	13.1	13.1	105	365
	Annual	0.00032	2.6	2.6	—	80
CO	1-hour	31	2634	2665	23,000	40,000
	8-hour	5.1	973	978	10,000	10,000
PM_{10}	24-hour	8.9	211	220	50	150
	Annual	1.2	56	57	20	—
$PM_{2.5}$	24-hour	1.7	26.7	28.4	—	35
	Annual	0.2	9.9	10.1	12	15

[a]The maximum modeled 1-hour concentrations were estimated assuming only one of the emergency generators would be tested at a time. The 3-hour, 8-hour, 24-hour, and annual concentrations were estimated assuming the emergency generators, fire pumps, WSAC unit, and the vehicle emissions associated with mirror washing would occur within the averaging period.

[b]Background concentrations were the highest concentrations monitored during 2006 through 2008.

[c]Maximum 1-hour and annual NO_2 concentrations assume 100 percent conversion of NO_x to NO_2.

Construction Modeling Analysis

28. Please revise the construction air dispersion modeling analysis to include any changes to the construction emissions estimate as determined in response to other data requests.

Response: The dispersion modeling for the construction impacts were revised to include the wind-blown fugitive dust emissions. The revised modeling did not include NO_2, CO, and SO_2 because the wind-blown fugitive dust would only affect the predicted PM_{10} and $PM_{2.5}$ concentrations. The wind-blown PM_{10} and $PM_{2.5}$ emissions were modeled as a large circular area source covering the heliostat field. The screening meteorological data set used in the AFC was modified to remove wind speeds less than 2.5 meters/second (5 miles per hour) in order to develop a screening meteorological data set that is more representative of conditions associated with wind-blown dust. The threshold for wind-blown dust is likely higher than 2.5 m/s, but this value was used as a conservative estimate for this analysis. A copy of the revised screening meteorological data set is included on the dispersion modeling CD-ROM.

The emissions were based on the emission estimation identified in the response to Data Request #3. As noted in Section 5.13 of the AFC, the wind-blown fugitive dust emission estimates assumes that approximately 1,100 acres of the 1,410-acre heliostat field are exposed to wind erosion each day. However, the Applicant expects a CEC Condition of Certification that requires "All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds." Therefore, it is expected that soil stabilizers will be required to control wind-

blown dust emissions beyond the watering assumptions used in the AFC Section 5.13 calculations.

The revised results are presented in Table DR28-1. The predicted $PM_{2.5}$ impacts during wind speeds greater than 5 mph, would not cause or contribute to the violation of the $PM_{2.5}$ standards. Therefore, the predicted project impacts would remain less than significant for the revised modeling assessment.

For PM_{10}, the annual and 24-hour background concentrations exceed the AAQS without adding the modeled concentrations. As a result, the predicted impacts also would be greater than the AAQS. It should be noted that the predicted impacts represent a conservative estimate at the fenceline of the heliostat field and does not represent the concentration at the boundary of the project parcel owned by the Applicant. Furthermore, the construction activity would be finite and best available fugitive dust emission control techniques would be used throughout the construction activity period based on the implementation of the CEC's Conditions of Certification associated with construction emissions mitigation (as identified in Section 5.1.6 of the AFC). Therefore, with implementation of best available fugitive dust emission control techniques and other proposed mitigation measures, the PM_{10} impacts from construction would remain less than significant for the revised modeling assessment.

TABLE DR28-1
Maximum Predicted Impacts from Construction During Wind Speeds Greater than 2.5 m/s

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration* ($\mu g/m^3$)	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
PM_{10}	24-hour	29	211	240	50	150
	Annual	5.0	56	61	20	—
$PM_{2.5}$	24-hour	5.8	26.7	32.5	—	35
	Annual	0.91	9.9	10.8	12	15

*Background concentrations were the highest concentrations monitored during 2006 through 2008.

Gasoline-fueled Vehicles

29. Please confirm that there will be no dedicated gasoline fueled onsite vehicles.

Response: Page 2-45 of the AFC states: "Given the limited number of gasoline powered engines, the project does not plan to provide gasoline storage on-site."

Gasoline Storage Tank

30. Please confirm that there will be no vehicle refueling gasoline storage tank at the site.

Response: Please see the response to Data Request #29.

SF_6 Emissions

31. Please provide an estimate of the SF_6 onsite inventory and annual leakage emissions.

Response: The estimated SF_6 inventory and annual leakage emissions are presented in Table DR31-1. It was assumed that one percent of the SF_6 contained in each piece of equipment would result in leakage emissions each year. Based on the anticipated onsite equipment, SF_6 leakage would result in an estimated 30 metric tons of CO_2-equivalent emissions each year. The calculations are included as Attachment DR31-1.

TABLE DR31-1
Estimated Onsite SF_6 Inventory and Leakage Emissions

Equipment Type	Number of Equipment	Amount of SF_6 (lb/piece of equipment)	Total SF_6 (lb)	Annual Leakage Rate*	Fugitive SF_6 Emissions (metric tons/yr)	CO_2 equivalent (metric tons/yr)
Switchyard Breaker	3	135	405	0.5%	0.0009	22
Generator Circuit Breaker	1	145.5	145.5	0.5%	0.0003	7.9
Estimated SF_6 Inventory (lb)			550.5	—	—	—
Estimated emissions (metric tons/yr)					0.0012	29.8

*The International Electrotechnical Commission, Standard 62271, for new equipment is a leakage rate of 0.5%

HFC Emissions

32. Please provide the type of HFCs used, their inventory, their CO_2 equivalency values, and an estimate of their annual leakage emissions.

Response: The types of HFCs/PFCs and annual emissions from leakage are presented in Table DR32-1. Based on the anticipated onsite equipment, leakage would result in an estimated 7 metric tons of CO_2-equivalent emissions each year. The calculations are included with Attachment DR31-1.

TABLE DR32-1
Estimated HFC/PFC Leakage Emissions

Equipment Type	Number of Equipment	Type of Refrigerant	Capacity (lb)	Annual Loss Rate*	Fugitive Emissions (metric tons/yr)	CO_2 equivalent (metric tons/yr)
Standalone Commercial Applications	2	HFC-134a	13.2	15%	0.002	2.34
Residential/Commercial AC	4	HFC-134a	3.3	20%	0.001	1.56
Fire Suppression	10	PFC-14 (CF_4)	10	1%	0.0005	2.95
Estimated emissions (metric tons/yr)						7

*The equipment annual loss rate values are from the California Action Registry General Reporting Protocol, Table III.11.3, January 2009.

PFC Emissions

33. *Please provide the type of PFCs used, their inventory, their CO_2 equivalency values, and an estimate of their annual leakage emissions.*

Response: PFCs will be used in the building HVAC systems. The type and quantity of PFC will be vendor-specific and is not known at this time. HVAC systems will be designed for zero leakage and emissions will only occur in the case of equipment failure.

Greenhouse Gas Emissions

34. *Please provide a complete assessment of the net generation for this facility, including the explicit efficiency assumptions for generation and a tally of all of the parasitic load sources, to determine an annual net generation value that can be used to determine GHG emissions performance for this facility.*

Response: The projected plant generation is based on modeling completed with 8 years of hourly meteorological data provided by the National Renewable Energy Lab (NREL). The projected steam-cycle efficiency is based on heat mass balance completed for this system, adjusted dynamically to the coincident ambient temperature. The plant is configured to supply its own parasitic demand when it generates power.

The steam turbine-generator is rated to produce a maximum of 172 MW gross with plant auxiliaries consuming up to 11.2 MW during simultaneous solar collection and power generation. Along with transmission line losses and inefficiencies during harsh operating conditions, the system is specified to enable net delivery of 150 MW to the grid tie-in point under typical conditions.

When the generator is not operating, such as during overnight holds and early mornings before the daily startup of the power generator, the plant will derive its parasitic power demand via back-feed from the transmission grid. This load, which is needed to operate the collector system, is anticipated to be approximately 1.2 to 4.9 megawatts, depending on whether solar collection is taking place. The various overnight parasitic loads include electric heat tracing (to maintain piping and vessels at the appropriate temperature), steam-turbine lube oil pump and turning gear, auxiliary cooling pumps and coolers, water treatment systems, plant controls, plant lighting and building HVAC (as required).

The generation output and backfeed will vary from year to year. On average (using 8 years of satellite-derived solar data from NREL), the annual net generation is projected to be approximately 450,000 MWh. The total annual parasitic load is estimated to be 36,400 MWh, of which 22,000 MWh will be met with onsite generation, and the balance of 14,400 MWh will be back-fed from the transmission grid. While GHG emissions are associated with this back-feed power, operation of the RSEP will result in avoidance of GHG emissions that will far exceed that associated with the offsite parasitic load.

MDAQQMD Correspondence

35. *Please provide copies of any official submittals and correspondence to or from MDAQMD within 5 days of their submittal to or their receipt from the District.*

Response: Copies of all substantive District correspondence regarding the RSEP's air permit application will be transmitted to the CEC within one week of receipt or submittal.

Attachment DR5-1A
Construction Fugitive Dust Emissions Calculations

Table 5.1A.13: Onsite Construction Fugitive Dust Monthly Activity Levels

Source	Monthly Activity Levels																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Grading (acres)*	55	182	201	146	109	55	55	55	36	55	55	55	55	55	55	36	36	36	36	36	36	18	18	18	0	0	0
Rock Screening (units)	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion of Earthen Stockpiles (acres)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5

*Assumes that the 1,496 acres subject to grading is graded during months 1 through 24. The average monthly acres graded was based on the number of scrapers, dozers, and excavators operating each month.

Table 5.1A.14R: Onsite Construction Fugitive PM_{10} Emissions

Source	Fugitive PM_{10} Emissions (lbs)																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Grading	547	1,824	2,007	1,460	1,095	547	547	547	365	547	547	547	547	547	547	365	365	365	365	365	365	182	182	182	0	0	0
Rock Screening	0	1,804	1,804	1,804	1,804	1,804	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion of Earthen Stockpiles	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Total (lbs/month)	**560**	**3,641**	**3,823**	**3,276**	**2,911**	**2,364**	**560**	**560**	**377**	**560**	**560**	**560**	**560**	**560**	**560**	**377**	**377**	**377**	**377**	**377**	**377**	**195**	**195**	**195**	**12**	**12**	**12**
Total (lbs/day)	**25.3**	**165.3**	**173.6**	**148.8**	**132.2**	**107.3**	**25.3**	**25.3**	**17.0**	**25.3**	**25.3**	**25.3**	**25.3**	**25.3**	**25.3**	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**	**17.0**	**8.7**	**8.7**	**8.7**	**0.4**	**0.4**	**0.4**

Based on 22 days/month for grading and rock screening and 30 days per month for wind erosion.

Table 5.1A.15R: Onsite Construction Fugitive $PM_{2.5}$ Emissions

Source	Fugitive $PM_{2.5}$ Emissions (lbs)																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Grading	113.8	379	417	304	228	114	114	114	76	114	114	114	114	114	114	76	76	76	76	76	76	38	38	38	0	0	0
Rock Screening	0	375	375	375	375	375	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wind Erosion of Earthen Stockpiles	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6
Total (lbs/month)	**116.4**	**757.3**	**795.2**	**681.4**	**605.5**	**491.7**	**116.4**	**116.4**	**78.5**	**116.4**	**116.4**	**116.4**	**116.4**	**116.4**	**116.4**	**78.5**	**78.5**	**78.5**	**78.5**	**78.5**	**78.5**	**40.5**	**40.5**	**40.5**	**2.6**	**2.6**	**2.6**
Total (lbs/day)	**5.3**	**34.4**	**36.1**	**30.9**	**27.5**	**22.3**	**5.3**	**5.3**	**3.5**	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**	**5.3**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**3.5**	**1.8**	**1.8**	**1.8**	**0.1**	**0.1**	**0.1**

Based on 22 days/month for grading and rock screening and 30 days per month for wind erosion.

Table 5.1A.16R: Onsite Construction Motor Vehicle Fugitive PM_{10} Emissions

Vehicle Type	Daily Fugitive PM_{10} Emissions (lb/day) for Each Month																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Onsite Pick up Truck	12.61	12.61	12.61	12.61	25.22	25.22	25.22	25.22	37.83	37.83	37.83	37.83	37.83	37.83	37.83	37.83	37.83	37.83	37.83	25.22	25.22	25.22	18.91	18.91	12.61	12.61	12.61
Onsite Fuel/Lube Truck	3.94	11.82	11.82	11.82	11.82	11.82	11.82	3.94	3.94	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	7.88	3.94	3.94	3.94	3.94	3.94	3.94	3.94
Onsite Dump Truck	3.94	3.94	3.94	3.94	3.94	7.88	7.88	7.88	7.88	15.76	15.76	15.76	15.76	15.76	15.76	15.76	15.76	11.82	7.88	7.88	3.94	3.94	3.94	3.94	3.94	3.94	3.94
Onsite Water Truck	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52	31.52
Onsite Welding Truck	3.94	3.94	0	3.94	7.88	7.88	7.88	7.88	15.76	23.64	23.64	23.64	23.64	23.64	23.64	23.64	23.64	11.82	23.64	23.64	15.76	7.88	7.88	7.88	3.94	3.94	3.94
Onsite Cement Truck	0	6.30	12.61	12.61	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	25.22	18.91	12.61	12.61	12.61	6.30	6.30
Onsite Flatbed Truck	3.94	3.94	3.94	7.88	7.88	7.88	7.88	11.82	11.82	19.70	19.70	19.70	19.70	19.70	19.70	19.70	11.82	11.82	11.82	11.82	11.82	11.82	11.82	11.82	11.82	3.94	3.94
Total (lbs/day)	**59.9**	**74.1**	**76.4**	**84.3**	**113.5**	**117.4**	**117.4**	**113.5**	**134.0**	**161.5**	**161.5**	**161.5**	**161.5**	**161.5**	**161.5**	**161.5**	**153.7**	**137.9**	**145.8**	**133.2**	**117.4**	**103.2**	**90.6**	**90.6**	**80.4**	**66.2**	**66.2**
	Monthly Fugitive PM_{10} Emissions (lb/month)																										
Vehicle Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Onsite Pick up Truck	277.4	277.4	277.4	277.4	554.8	554.8	554.8	554.8	832.2	832.2	832.2	832.2	832.2	832.2	832.2	832.2	832.2	832.2	832.2	554.8	554.8	554.8	416.1	416.1	277.4	277.4	277.4
Onsite Fuel/Lube Truck	86.7	260.1	260.1	260.1	260.1	260.1	260.1	86.7	86.7	173.4	173.4	173.4	173.4	173.4	173.4	173.4	173.4	173.4	173.4	173.4	86.7	86.7	86.7	86.7	86.7	86.7	86.7
Onsite Dump Truck	86.7	86.7	86.7	86.7	86.7	173.4	173.4	173.4	173.4	346.7	346.7	346.7	346.7	346.7	346.7	346.7	346.7	260.1	173.4	173.4	86.7	86.7	86.7	86.7	86.7	86.7	86.7
Onsite Water Truck	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5	693.5
Onsite Welding Truck	86.7	86.7	0	86.7	173.4	173.4	173.4	173.4	346.7	520.1	520.1	520.1	520.1	520.1	520.1	520.1	520.1	260.1	520.1	520.1	346.7	173.4	173.4	173.4	86.7	86.7	86.7
Onsite Cement Truck	0	138.7	277.4	277.4	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	554.8	416.1	277.4	277.4	277.4	138.7	138.7
Onsite Flatbed Truck	86.7	86.7	86.7	173.4	173.4	173.4	173.4	260.1	260.1	433.4	433.4	433.4	433.4	433.4	433.4	433.4	260.1	260.1	260.1	260.1	260.1	260.1	260.1	260.1	260.1	86.7	86.7
Total (lb/month)	**1,318**	**1,630**	**1,682**	**1,855**	**2,497**	**2,583**	**2,583**	**2,497**	**2,947**	**3,554**	**3,554**	**3,554**	**3,554**	**3,554**	**3,554**	**3,554**	**3,381**	**3,034**	**3,207**	**2,930**	**2,583**	**2,271**	**1,994**	**1,994**	**1,768**	**1,456**	**1,456**

[a] Calculation based on highest (controlled) unpaved road emission factor of 0.68 lb/mi for PM_{10}.
[b] Based on 22 days/month

Table 5.1A.17R: Onsite Construction Vehicle Fugitive $PM_{2.5}$ Emissions

Vehicle Type	Daily Fugitive $PM_{2.5}$ Emissions (lb/day) for Each Month																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Onsite Pick up Truck	1.261	1.261	1.261	1.261	2.522	2.522	2.522	2.522	3.783	3.783	3.783	3.783	3.783	3.783	3.783	3.783	3.783	3.783	3.783	2.522	2.522	2.522	1.891	1.891	1.261	1.261	1.261
Onsite Fuel/Lube Truck	0.394	1.182	1.182	1.182	1.182	1.182	1.182	0.394	0.394	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.788	0.394	0.394	0.394	0.394	0.394	0.394	0.394
Onsite Dump Truck	0.394	0.394	0.394	0.394	0.394	0.788	0.788	0.788	0.788	1.576	1.576	1.576	1.576	1.576	1.576	1.576	1.576	1.182	0.788	0.788	0.394	0.394	0.394	0.394	0.394	0.394	0.394
Onsite Water Truck	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152	3.152
Onsite Welding Truck	0.394	0.394	0	0.394	0.788	0.788	0.788	0.788	1.576	2.364	2.364	2.364	2.364	2.364	2.364	2.364	2.364	1.182	2.364	2.364	1.576	0.788	0.788	0.788	0.394	0.394	0.394
Onsite Cement Truck	0	0.630	1.261	1.261	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	2.522	1.891	1.261	1.261	1.261	0.630	0.630
Onsite Flatbed Truck	0.394	0.394	0.394	0.788	0.788	0.788	0.788	1.182	1.182	1.970	1.970	1.970	1.970	1.970	1.970	1.970	1.182	1.182	1.182	1.182	1.182	1.182	1.182	1.182	1.182	0.394	0.394
Total (lbs/day)	**5.99**	**7.41**	**7.64**	**8.43**	**11.35**	**11.74**	**11.74**	**11.35**	**13.40**	**16.15**	**16.15**	**16.15**	**16.15**	**16.15**	**16.15**	**16.15**	**15.37**	**13.79**	**14.58**	**13.32**	**11.74**	**10.32**	**9.06**	**9.06**	**8.04**	**6.62**	**6.62**
	Monthly Fugitive $PM_{2.5}$ Emissions (lb/month)																										
Vehicle Type	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Onsite Pick up Truck	27.74	27.74	27.74	27.74	55.48	55.48	55.48	55.48	83.22	83.22	83.22	83.22	83.22	83.22	83.22	83.22	83.22	83.22	83.22	55.48	55.48	55.48	41.61	41.61	27.74	27.74	27.74
Onsite Fuel/Lube Truck	8.67	26.01	26.01	26.01	26.01	26.01	26.01	8.67	8.67	17.34	17.34	17.34	17.34	17.34	17.34	17.34	17.34	17.34	17.34	17.34	8.67	8.67	8.67	8.67	8.67	8.67	8.67
Onsite Dump Truck	8.67	8.67	8.67	8.67	8.67	17.34	17.34	17.34	17.34	34.67	34.67	34.67	34.67	34.67	34.67	34.67	34.67	26.01	17.34	17.34	8.67	8.67	8.67	8.67	8.67	8.67	8.67
Onsite Water Truck	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35	69.35
Onsite Welding Truck	8.67	8.67	0	8.67	17.34	17.34	17.34	17.34	34.67	52.01	52.01	52.01	52.01	52.01	52.01	52.01	52.01	26.01	52.01	52.01	34.67	17.34	17.34	17.34	8.67	8.67	8.67
Onsite Cement Truck	0	13.87	27.74	27.74	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	55.48	41.61	27.74	27.74	27.74	13.87	13.87
Onsite Flatbed Truck	8.67	8.67	8.67	17.34	17.34	17.34	17.34	26.01	26.01	43.34	43.34	43.34	43.34	43.34	43.34	43.34	26.01	26.01	26.01	26.01	26.01	26.01	26.01	26.01	26.01	8.67	8.67
Total (lb/month)	**131.8**	**163.0**	**168.2**	**185.5**	**249.7**	**258.3**	**258.3**	**249.7**	**294.7**	**355.4**	**355.4**	**355.4**	**355.4**	**355.4**	**355.4**	**355.4**	**338.1**	**303.4**	**320.7**	**293.0**	**258.3**	**227.1**	**199.4**	**199.4**	**176.8**	**145.6**	**145.6**

[a] Calculation based on highest (controlled) unpaved road emission factor of 0.07 lb/mi for $PM_{2.5}$.
[b] Based on 22 days/month

Table 5.1A.18: Onsite Construction Motor Vehicle Activity

Vehicle Type	Miles/Day	Working Days per Month
Onsite Pick up Truck	8	22
Onsite Fuel/Lube Truck	5	22
Onsite Dump Truck	5	22
Onsite Water Truck	10	22
Onsite Welding Truck	5	22
Onsite Cement Truck	8	22
Onsite Flatbed Truck	5	22

Table 5.1A.19R: Fugitive PM_{10} Emission Factors for Grading, Rock Screening, and Stockpiles

Grading

Emission Factor (Uncontrolled)	20	lb/acre
Controlled Emission Factor	10	lb/acre

Reference: URBEMIS2007, Appendix A, Table A-4

Rock Screening

82	lb/day

Rate based on Portable Equipment Registration permit limit (Registration No. 142240)

Wind Erosion of Stockpiles

Emission Factor [lb/acre/day] = 1.7 x (silt content [%] / 1.5) x (365-H)/235 x I/15 x 0.5

Parameter	Value
Silt Content (%)	10.0
H = Number of Days with > 0.01 inch Precipitation per Year	17
I = Percent of time wind speed exceeds 12 mph	21.1
Emission Factor (Uncontrolled, lb/acre/day)	0.12

Emission Factor Calculation Source: SCAQMD CEQA Air Quality Handbook, November 1993, Table 9-9-E.
Reference for Silt Content: Terracon, 2009. Preliminary Geotechnical Engineering Report. Prepared for the Rice Solar Energy Project. August 5. See DR# 4.
Reference for Precipitation: Western Regional Climate Center, http://www.wrcc.dri.edu/CLIMATEDATA.html, Blythe Station.
Reference for Wind Speed: Combination of available meteorological data collected at Blythe and Rice Airfield in 1943-1944.

Table 5.1A.20R: Fugitive PM_{10} Emission Factors for Unpaved Roads

Motor Vehicles and Equipment on Unpaved Surfaces

Emission Factor [lb/mi] = 1.5 x (silt content [%] / 12)$^{0.9}$ x (average vehicle weight [tons] / 3)$^{0.45}$
Reference: AP-42, Section 13.2.2, November 2006

Parameter	Value
Average Vehicle Weight (tons)	13
Silt Content (%)	10.0
Emission Factor (Uncontrolled, lb/mile)	2.46
Reduction from Watering Twice/Day	68%
Controlled Emission Factor (lb/mile)	0.79

Average vehicle weight assumes that the weighted average truck weight (water truck, pickup, etc) is 13 tons.

Reference for Silt Content: Terracon, 2009. Preliminary Geotechnical Engineering Report. Prepared for the Rice Solar Energy Project. August 5. See DR# 4.
Reference for Control Efficiency: SCAQMD CEQA Handbook, Table 11-4

Table 5.1A.21R: Fugitive $PM_{2.5}$ Emission Factors for Unpaved Roads

Motor Vehicles and Equipment on Unpaved Surfaces

Emission Factor [lb/mi] = 0.15 x (silt content [%] / 12)$^{0.9}$ x (average vehicle weight [tons] / 3)$^{0.45}$
Reference: AP-42, Section 13.2.2, November 2006

Parameter	$PM_{2.5}$
Average Vehicle Weight (tons)	13
Silt Content (%)	10.0
Emission Factor (Uncontrolled, lb/mile)	0.25
Reduction from Watering Twice/Day	68%
Controlled Emission Factor (lb/mile)	0.08

Reference for Silt Content: Terracon, 2009. Preliminary Geotechnical Engineering Report. Prepared for the Rice Solar Energy Project. August 5. See DR# 4.
Reference for Control Efficiency: SCAQMD CEQA Handbook, Table 11-4

Attachment DR5-1B
Operation Fugitive Dust Emissions Calculations

Attachment DR5-1B
Table 5.1B-10R
Rice Solar Energy Project
Summary of Vehicle Emissions Associated with Project Operation
Revised March 2010

Table 5.1B-10aR Criteria Pollutant Emissions - Operation Vehicles

Emission Source	Number per day[a]	Roundtrip Vehicle Miles Traveled	Emissions (lbs/yr)[b]					
			ROG	CO	NOx	SOx	PM_{10}[c]	$PM_{2.5}$[c]
Operation Worker Commute	21	90	73	2,873	312	5	426	128
Heliostat Washers, Maintenance and Administration Worker Commute	26	90	64	2,534	275	4	376	113
Trucks for Heliostat Washing[d]	2	18.4	155	257	575	1	11,756	1,200
Material Deliveries	3	130	111	507	2,195	4	155	98
		TOTAL (lbs/yr)	**403**	**6,171**	**3,357**	**13**	**12,714**	**1,538**

[a] The number of workers is from Section 2.0 Project Description. The number of deliveries is based on a conservative estimate of truck deliveries (e.g., FedEx, garbage removal, chemical delivery, office supply deliveries, etc.).

[b] Calculations assume that operation workers are onsite 7 days per week and heliostat workers, maintenance, and admin staff would be onsite 5 days per week, 52 weeks per year.

[c] Calculations include paved road dust emissions for worker commutes and material deliveries and unpaved road dust for trucks for heliostat washing.

[d] The total distance traveled by one truck each day is approximately 18 miles (0.8 miles traveled per hour for washing + 1.5 miles traveled per hour to reload x 1 reload per hour x 8 hours per day = 18.4 miles traveled per truck).

Table 5.1B-10b. Criteria Pollutant Vehicle Emission Factors

Vehicle Type	Vehicle Emission Factors (lb/mile)[a]					
	ROG	CO	NOx	SOx	PM_{10}	$PM_{2.5}$
Passenger car	0.00011	0.00416	0.00045	0.00001	0.00006	0.00003
Trucks Used for Heliostat Washing	0.01616	0.02689	0.06009	0.00008	0.00317	0.00283
Material Delivery Truck	0.00109	0.00500	0.02165	0.00004	0.00097	0.00081

[a] Emission factors were derived from the emission factors [g/mi] from EMFAC2007 for calendar year 2013 for MDAQMD portion of Riverside County. A speed of 55 mph was assumed for offsite worker commutes and material deliveries and 2 mph was assumed for heliostat washing.

Motor Vehicles Fugitive Emission Factors for Travel on Unpaved Roads

Emission Factor [lb/mi] = 0.15 x (silt content [%] / 12)$^{0.9}$ x (average vehicle weight [tons] / 3)$^{0.45}$

Reference: AP-42, Section 13.2.2, November 2006

Parameter	PM_{10}	$PM_{2.5}$
Average Vehicle Weight (tons)	10	10
Silt Content (%)	10.0	10.0
Emission Factor (Uncontrolled, lb/mile)	2.19	0.22
Reduction from Speeds Less than 25 mph	44%	44%
Controlled Emission Factor (lb/mile)	1.23	0.12

Reference for Silt Content: Terracon, 2009. Preliminary Geotechnical Engineering Report. Prepared for the Rice Solar Energy Project. August 5. See DR# 4.

Reference for Control Efficiency: SCAQMD Table XI-D (WRAP Fugitive Dust Handbook, September 7, 2006) http://www.aqmd.gov/ceqa/handbook/mitigation/fugitive/MM_fugitive.html and http://www.wrapair.org/forums/dejf/fdh/content/FDHandbook_Rev_06.pdf

Average vehicle weight assumes trucks used to wash heliostats weigh 10 tons.

Motor Vehicles Fugitive Emission Factors for Travel on Paved Roads

$E = [k(sL/2)^{0.65} * (W/3)^{1.5}] - C$

Reference: AP-42, Section 13.2.1, November 2006

Parameter	PM_{10}	$PM_{2.5}$
k, particle size multiplier	7.3	1.1
sL, silt loading (g/m2)	0.03	0.03
W, average vehicle weight (tons)	3	3
C, emission factor for 1980's vehicle fleet exhaust, brake wear, and tire wear, g/VMT	0.2119	0.161700
Emission Factor (g/mile)	0.252	0.070
Emission Factor (lb/mile)	0.001	0.0002

Parameters from tables in AP-42, Section 13.2.1.

Average vehicle weight assumes worker commute vehicles weigh 2.5 tons and delivery trucks weigh 10 tons.

Table 5.1B-10c. Greenhouse Gas Emissions - Operation Vehicles

Emission Source	Number per day[a]	Roundtrip Vehicle Miles Traveled	Fuel economy (miles per gallon)[b]	Emissions (metric tons/yr)[c]			
				CO_2	CH_4	N_2O	CO_2 equivalent
Operation Worker Commute	21	90	18	338	0.010	0.005	340
Heliostat Washers, Maintenance and Administration	26	90	18	298	0.009	0.005	301
Trucks Used for Heliostat Washing[d]	2	18	6	16	0.000	0.000	16
Material Deliveries	3	130	6	172	0.005	0.005	172
			TOTAL (metric tons/yr)	**823**	**0.02**	**0.02**	**828**

[a] The number of workers is from Section 2.0 Project Description. The number of deliveries is based on a conservative estimate of truck deliveries (e.g., FedEx, garbage removal, chemical delivery, office supply deliveries, etc.).

[b] Fuel economy for trucks based on assumptions from the California Climate Action Registry, General Reporting Protocol, January 2009. Worker commute vehicle fuel economy based on assuming workers would drive model year 2005 or newer passenger cars and fuel economy data from EPA (www.fueleconomy.gov).

[c] Calcuations assume that operation workers are onsite 7 days per week and heliostat workers, maintenance, and admin staff would be onsite 5 days per week, 52 weeks per year.

[c] The total distance traveled by one truck each day is approximatey 18 miles (0.8 miles traveled per hour for washing + 1.5 miles traveled per hour to reload x 1 reload per hour x 8 hours per day = 18.4 miles traveled per truck).

Table 5.1-10d. Greenhouse Gas Emission Factors

Vehicle Type	Vehicle Emission Factors		
	CO_2 (kg/gallon)	CH_4 (g/mile)	N_2O (g/mile)
Passenger Car Model Year 2005-Present	8.81	0.0147	0.0079
Diesel Heavy-Duty Truck	10.15	0.051	0.048

Emission factors are from the California Climate Action Registry General Reporting Protocol, Version 3.1, Tables C.3 and C.4, January 2009.

Table 5.1-10e. Global Warming Potentials

CH_4	21
N_2O	310

Reference: Intergovernmental Panel on Climate Change, Second Assessment Report (SAR) (IPCC, 1996).

Attachment DR8-1
Salt Milling Emissions Calculations

Attachment DR8-1
Rice Solar Energy Project
Emission Estimates Associated with Salt Milling Activities During the Salt Commissioning Process
March 2010

Note: Emission factors for milling magnesium and sodium nitrate were not readily available. Therefore, phosphate rock processing was used to develop a conservative estimate of emissions from the salt milling activities.

	Quantity of Salt Material Milled		Emission Factor * (total particulate)	Total PM Emissions	
	(pounds)	(tons)	lb/ton	(pounds)	(tons)
Uncontrolled	70,000,000	35,000	1.50	52500	26.3
Controlled	70,000,000	35,000	0.0043	150.5	0.075

*Reference: Emission rate is based on the emission factors for phosphate rock grinding (AP-42, Table 11.21-4).

Attachment DR10-1
Sodium and Potassium Nitrate Product Data

SODIUM NITRATE

Technical Grade - Thermosolar - Crystals

CAS N° 7631 - 99 - 4

GENERAL DESCRIPTION	
CHEMICAL FORMULA	$NaNO_3$
APPEARANCE	White Crystals
INTERNAL CODE	SST-C

CHEMICAL SPECIFICATIONS GUARANTEED				
PURITY	$NaNO_3$	%	99.2	min
TOTAL CHLORIDE	as Cl	%	0.2	max
MAGNESIUM	Mg	%	0.045	max
NITRITE	NO_2	%	0.02	max
SULFATE	SO_4	%	0.10	max
CARBONATE	CO_3	%	0.10	max
HYDROXIL	OH	%	0.20	max

CHEMICAL SPECIFICATIONS TYPICAL			
MAGNESIUM	Mg	%	0.015
CALCIUM	Ca	%	0.003
NITRITE	NO_2	%	< 0.02
SULFATE	SO_4	%	< 0.01
IRON	Fe	ppm	< 10
LEAD	Pb	ppm	< 5
CADMIUM	Cd	ppm	< 1
CHROMIUM	Cr	ppm	< 0.5
MERCURY	Hg	ppm	< 0.5
ARSENIC	As	ppm	< 0.5
INSOLUBLES		%	0.02
MOISTURE		%	0.1

SCREEN ANALYSIS TYPICAL			
US Standard Sieve	Tyler	mm	
+ 40	+ 35	0.417	1%
+ 70	+ 65	0.21	19%
+ 100	+ 100	0.147	59%
+ 200	+ 200	0.074	91%

Note: Particle size is only referential

PHYSICAL PROPERTIES	
MELTING POINT	≈ 308 ºC
SPECIFIC GRAVITY	2.257

Before using this product, please read the product specifications, the material safety data sheet and any other applicable product literature.
The conditions of your use and application of our products, technical assistance and information (whether verbal, written, or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis at least must include testing to determine suitability from a technical as well as health, safety, and environmental standpoints. It is also not recommended that the product be used for any described purpose without verification by the user of compliance with all applicable laws, regulations and registration requirements. No warranty is made as to the accuracy of any data or statements contained herein. While this product is furnished in good faith, this product is provided to you without any representation or warranty, expressed or implied, as to quality, condition, utility, merchantability, completeness, suitability or fitness for any particular purpose or use or any other matter or thing whatsoever and without recourse against SQM in any event. Without limiting the generality of the foregoing, SQM specifically disclaims any responsibility or liability relating to the use of this product and shall not in any event, be liable for any special, incidental or consequential damages arising from such use.

Haifa K-Solar

CRYSTALLINE

Technical-grade potassium nitrate for use in thermo-solar power stations

PRODUCT SPECIFICATIONS			
ANALYTE	Unit	TYPICAL	SPECIFICATION
Appearance	White Crystals		
Assay (as KNO_3)	%	99.7	99.4 min
pH (10% sol.)	%	7.0	6.0-8.5
Magnesium (Mg)	ppm	5	10 max
Iron (Fe)	ppm	3	10 max
Chloride	ppm	160	300 max
Sulphate (SO_4)	ppm	<200	200 max
Water insoluble matter	ppm	180	350 max
Loss on drying	%	0.1	0.2

Note: The product does not contain any anti-caking agents

Uses:

A mixture of molten potassium nitrate (**Haifa K- Solar**) and sodium nitrate is an excellent heat-transfer medium for solar-powered steam generators. The salts not only efficient at transferring heat, but are also ideal for storing thermal energy. That allows operators to run turbines also at night or on cloudy days.

Packaging:

Haifa-K Solar is available in 1000kg / 1200kg big bags woven coated Polypropylene with discharge spout and lifting loops.

Updated: March 09

Haifa Chemicals P.O.Box 10809, Haifa Bay 26120, Israel
Tel: +972-4-8469616, Fax: +972-4-8469953,
E-mail: specialty@haifachem.com Web: www.haifachem.com

Attachment DR16-1
Revised AFC Appendix 5.1a Tables 5.1a.34-37

Table 5.1A.31R: Offsite Motor Vehicle Usage during Construction

	Number of Average Daily Trips per Month																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	4	4	4	4	4	9	9	12	12	15	15	15	12	12	12	10	10	8	8	5	5	3	3	1	1	1	1
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	16	16	16	16	0	0	0	0	0	0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	30	30	30	30	30	30	30	30	30	30	30	30	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	11	11	11	11	11	11	0	0	0	0	0	0	0	0	0	11	11	11	11	11	11	0	0	0
Off-Site Cement Trucks, Mack	0	0	1	1	10	10	16	16	16	24	24	16	16	16	16	12	12	12	12	12	12	12	2	1	1	0	0
Off-Site Dump Trucks	0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Off-Site Low Boy Trucks	0	0	0	5	5	5	5	5	5	3	3	3	3	3	1	1	0	0	1	1	1	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	3
Off-Site Pipe Hauling Trucks	0	0	0	2	2	2	4	4	4	8	8	8	8	4	4	2	2	2	2	1	1	1	1	1	0	0	0
Off-Site Water Trucks	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Off-Site Fuel Lube Trucks - Int	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Construction Worker Commute	43	78	171	222	287	341	403	418	438	436	436	430	420	414	399	394	375	366	317	295	272	281	265	236	196	180	140

Table 5.1A.32: Offsite Motor Vehicle CO Emissions

	Emissions (lbs/month)																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	88	88	88	88	88	198	198	264	264	330	330	330	264	264	264	220	220	176	176	110	110	66	66	22	22	22	22
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	33	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	921	921	921	921	0	0	0	0	0	0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	1,414	1,414	1,414	1,414	1,414	1,414	1,414	1,414	1,414	1,414	1,414	1,414	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	182	182	182	182	182	182	0	0	0	0	0	0	0	0	0	182	182	182	182	182	182	0	0	0
Off-Site Cement Trucks, Mack	0	0	17	17	166	166	265	265	265	397	397	265	265	265	265	199	199	199	199	199	199	199	33	17	17	0	0
Off-Site Dump Trucks	0	0	0	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36
Off-Site Low Boy Trucks	0	0	0	89	89	89	89	89	89	53	53	53	53	53	18	18	0	0	18	18	18	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	154	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	769	462
Off-Site Pipe Hauling Trucks	0	0	0	94	94	94	188	188	188	377	377	377	377	188	188	94	94	94	94	47	47	47	47	47	0	0	0
Off-Site Water Trucks	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Off-Site Fuel Lube Trucks - Int	0	0	0	154	308	308	308	308	308	308	308	308	308	308	308	154	154	154	154	154	154	154	154	154	154	154	154
Construction Worker Commute	431	782	1,715	2,227	2,879	3,421	4,042	4,193	4,394	4,373	4,373	4,313	4,213	4,153	4,002	3,952	3,762	3,671	3,180	2,959	2,728	2,819	2,658	2,367	1,966	1,806	1,404
Total (lbs/month)	**519**	**870**	**1,974**	**3,656**	**4,611**	**5,263**	**6,078**	**6,295**	**6,495**	**8,058**	**8,058**	**7,865**	**7,699**	**8,372**	**8,185**	**7,777**	**7,569**	**6,513**	**6,222**	**5,888**	**5,657**	**4,272**	**3,946**	**3,628**	**2,997**	**2,787**	**2,078**
Total (lbs/day)	**24**	**40**	**90**	**166**	**210**	**239**	**276**	**286**	**295**	**366**	**366**	**358**	**350**	**381**	**372**	**354**	**344**	**296**	**283**	**268**	**257**	**194**	**179**	**165**	**136**	**127**	**94**

Table 5.1A.33: Offsite Motor Vehicle VOC Emissions

	Emissions (lbs/month)																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	1.4	1.4	1.4	1.4	1.4	3.1	3.1	4.2	4.2	5.2	5.2	5.2	4.2	4.2	4.2	3.5	3.5	2.8	2.8	1.7	1.7	1.0	1.0	0.3	0.3	0.3	0.3
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.8	7.8	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	218	218	218	218	0	0	0.0	0.0	0.0	0.0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	334.9	334.9	334.9	334.9	334.9	334.9	334.9	334.9	334.9	334.9	334.9	334.9	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	43.1	43.1	43.1	43.1	43.1	43.1	0	0	0	0	0	0	0	0	0	43.1	43.1	43.1	43.1	43.1	43.1	0	0	0
Off-Site Cement Trucks, Mack	0	0	3.9	3.9	39.2	39.2	62.7	62.7	62.7	94.1	94.1	62.7	62.7	62.7	62.7	47.1	47.1	47.1	47.1	47.1	47.1	47.1	7.8	3.9	3.9	0	0
Off-Site Dump Trucks	0	0	0	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
Off-Site Low Boy Trucks	0	0	0	21.1	21.1	21.1	21.1	21.1	21.1	12.7	12.7	12.7	12.7	12.7	4.2	4.2	0.0	0.0	4.2	4.2	4.2	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	2.4	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	12.2	7.3
Off-Site Pipe Hauling Trucks	0	0	0	22.3	22.3	22.3	44.6	44.6	44.6	89.3	89.3	89.3	89.3	44.6	44.6	22.3	22.3	22.3	22.3	11.2	11.2	11.2	11.2	11.2	0	0	0
Off-Site Water Trucks	0	0	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Off-Site Fuel Lube Trucks - Int	0	0	0	2.4	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Construction Worker Commute	11.6	21.1	46.3	60.1	77.7	92.3	109.1	113.1	118.5	118.0	118.0	116.4	113.7	112.0	108.0	106.6	101.5	99.1	85.8	79.8	73.6	76.0	71.7	63.9	53.0	48.7	37.9
Total (lbs/month)	**13.0**	**22.5**	**54.0**	**175.2**	**230.6**	**246.9**	**309.6**	**314.7**	**320.1**	**679.9**	**679.9**	**646.9**	**643.1**	**815.0**	**802.5**	**760.0**	**750.7**	**529.4**	**563.5**	**545.3**	**539.1**	**201.7**	**158.2**	**153.6**	**88.4**	**72.3**	**56.6**
Total (lbs/day)	**0.6**	**1.0**	**2.5**	**8.0**	**10.5**	**11.2**	**14.1**	**14.3**	**14.5**	**30.9**	**30.9**	**29.4**	**29.2**	**37.0**	**36.5**	**34.5**	**34.1**	**24.1**	**25.6**	**24.8**	**24.5**	**9.2**	**7.2**	**7.0**	**4.0**	**3.3**	**2.6**

Table 5.1A.34R: Offsite Motor Vehicle SOx Emissions

	Emissions (lbs/month)																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	0.02	0.02	0.02	0.02	0.02	0.04	0.04	0.06	0.06	0.07	0.07	0.07	0.06	0.06	0.06	0.05	0.05	0.04	0.04	0.02	0.02	0.01	0.01	0	0	0	0
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.20	0.20	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	5.61	5.61	5.61	5.61	0	0	0	0	0	0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	8.61	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	1.11	1.11	1.11	1.11	1.11	1.11	0	0	0	0	0	0	0	0	0	1.11	1.11	1.11	1.11	1.11	1.11	0	0	0
Off-Site Cement Trucks, Mack	0	0	0.10	0.10	1.01	1.01	1.61	1.61	1.61	2.42	2.42	1.61	1.61	1.61	1.61	1.21	1.21	1.21	1.21	1.21	1.21	1.21	0.20	0.10	0.10	0	0
Off-Site Dump Trucks	0	0	0	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
Off-Site Low Boy Trucks	0	0	0	0.54	0.54	0.54	0.54	0.54	0.54	0.33	0.33	0.33	0.33	0.33	0.11	0.11	0	0	0.11	0.11	0.11	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	0.03	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.10
Off-Site Pipe Hauling Trucks	0	0	0	0.57	0.57	0.57	1.15	1.15	1.15	2.30	2.30	2.30	2.30	1.15	1.15	0.57	0.57	0.57	0.57	0.29	0.29	0.29	0.29	0.29	0	0	0
Off-Site Water Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Off-Site Fuel Lube Trucks - Int	0	0	0	0.03	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Construction Worker Commute	0.75	1.36	2.99	3.88	5.01	5.95	7.04	7.30	7.65	7.61	7.61	7.51	7.33	7.23	6.97	6.88	6.55	6.39	5.53	5.15	4.75	4.91	4.63	4.12	3.42	3.14	2.44
Total (lbs/month)	**0.77**	**1.38**	**3.14**	**6.65**	**8.73**	**9.69**	**11.95**	**12.23**	**12.58**	**21.80**	**21.80**	**20.89**	**20.70**	**25.06**	**24.58**	**23.47**	**23.03**	**17.25**	**17.62**	**16.93**	**16.53**	**7.95**	**6.66**	**6.25**	**4.15**	**3.57**	**2.81**
Total (lbs/day)	**0.04**	**0.06**	**0.14**	**0.30**	**0.40**	**0.44**	**0.54**	**0.56**	**0.57**	**0.99**	**0.99**	**0.95**	**0.94**	**1.14**	**1.12**	**1.07**	**1.05**	**0.78**	**0.80**	**0.77**	**0.75**	**0.36**	**0.30**	**0.28**	**0.19**	**0.16**	**0.13**

Table 5.1A.35R: Offsite Motor Vehicle NOx Emissions

	Emissions (lbs/month)																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	22	22	22	22	22	51	51	67	67	84	84	84	67	67	67	56	56	45	45	28	28	17	17	6	6	6	6
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	164	164	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	4,560	4,560	4,560	4,560	0	0	0	0	0	0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	6,999	6,999	6,999	6,999	6,999	6,999	6,999	6,999	6,999	6,999	6,999	6,999	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	902	902	902	902	902	902	0	0	0	0	0	0	0	0	0	902	902	902	902	902	902	0	0	0
Off-Site Cement Trucks, Mack	0	0	82	82	820	820	1,312	1,312	1,312	1,967	1,967	1,312	1,312	1,312	1,312	984	984	984	984	984	984	984	164	82	82	0	0
Off-Site Dump Trucks	0	0	0	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177	177
Off-Site Low Boy Trucks	0	0	0	441	441	441	441	441	441	265	265	265	265	265	88	88	0	0	88	88	88	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	39	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	197	118
Off-Site Pipe Hauling Trucks	0	0	0	467	467	467	933	933	933	1,866	1,866	1,866	1,866	933	933	467	467	467	467	233	233	233	233	233	0	0	0
Off-Site Water Trucks	0	0	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Off-Site Fuel Lube Trucks - Int	0	0	0	39	79	79	79	79	79	79	79	79	79	79	79	39	39	39	39	39	39	39	39	39	39	39	39
Construction Worker Commute	48	86	190	246	318	378	447	463	486	483	483	477	466	459	442	437	416	406	351	327	302	312	294	262	217	200	155
Total (lbs/month)	**70**	**109**	**333**	**2,576**	**3,425**	**3,513**	**4,540**	**4,574**	**4,596**	**12,121**	**12,121**	**11,458**	**11,430**	**15,051**	**14,857**	**14,007**	**13,897**	**9,316**	**10,252**	**9,977**	**9,952**	**2,863**	**2,025**	**2,064**	**885**	**621**	**498**
Total (lbs/day)	**3**	**5**	**15**	**117**	**156**	**160**	**206**	**208**	**209**	**551**	**551**	**521**	**520**	**684**	**675**	**637**	**632**	**423**	**466**	**454**	**452**	**130**	**92**	**94**	**40**	**28**	**23**

Table 5.1A.36R: Offsite Motor Vehicle PM_{10} Emissions (includes exhaust and paved road emissions)

	Emissions (lbs/month)																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	10	10	10	10	10	23	23	31	31	38	38	38	31	31	31	25	25	20	20	13	13	8	8	3	3	3	3
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	39	39	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	1,093	1,093	1,093	1,093	0	0	0	0	0	0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	1,677	1,677	1,677	1,677	1,677	1,677	1,677	1,677	1,677	1,677	1,677	1,677	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	216	216	216	216	216	216	0	0	0	0	0	0	0	0	0	216	216	216	216	216	216	0	0	0
Off-Site Cement Trucks, Mack	0	0	20	20	196	196	314	314	314	471	471	314	314	314	314	236	236	236	236	236	236	236	39	20	20	0	0
Off-Site Dump Trucks	0	0	0	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
Off-Site Low Boy Trucks	0	0	0	106	106	106	106	106	106	63	63	63	63	63	21	21	0	0	21	21	21	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	18	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89	53
Off-Site Pipe Hauling Trucks	0	0	0	112	112	112	224	224	224	447	447	447	447	224	224	112	112	112	112	56	56	56	56	56	0	0	0
Off-Site Water Trucks	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Off-Site Fuel Lube Trucks - Int	0	0	0	18	36	36	36	36	36	36	36	36	36	36	36	18	18	18	18	18	18	18	18	18	18	18	18
Construction Worker Commute	489	887	1,945	2,525	3,265	3,879	4,584	4,755	4,983	4,960	4,960	4,892	4,778	4,710	4,539	4,482	4,266	4,164	3,606	3,356	3,094	3,197	3,015	2,685	2,230	2,048	1,593
Total (lbs/month)	**499**	**898**	**1,993**	**3,139**	**4,073**	**4,700**	**5,635**	**5,813**	**6,041**	**7,825**	**7,825**	**7,600**	**7,478**	**8,279**	**8,066**	**7,796**	**7,559**	**6,358**	**6,038**	**5,724**	**5,463**	**3,862**	**3,483**	**3,168**	**2,441**	**2,200**	**1,710**
Total (lbs/day)	**23**	**41**	**91**	**143**	**185**	**214**	**256**	**264**	**275**	**356**	**356**	**345**	**340**	**376**	**367**	**354**	**344**	**289**	**274**	**260**	**248**	**176**	**158**	**144**	**111**	**100**	**78**

Table 5.1A.37R: Offsite Motor Vehicle PM2.5 Emissions (includes exhaust and paved road emissions)

	Emissions (lbs/month)																										
Vehicle Type	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**
Off-Site Flat Bed Trucks	1.1	1.1	1.1	1.1	1.1	2.4	2.4	3.3	3.3	4.1	4.1	4.1	3.3	3.3	3.3	2.7	2.7	2.2	2.2	1.4	1.4	0.8	0.8	0.3	0.3	0.3	0.3
Off-Site Asphalt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.0	9.0	0	0
Off-Site Salt Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	250.7	250.7	250.7	250.7	0	0	0	0	0	0	0	0	0	0
Off-Site Heliostat Trucks	0	0	0	0	0	0	0	0	0	384.8	384.8	384.8	384.8	384.8	384.8	384.8	384.8	384.8	384.8	384.8	384.8	0	0	0	0	0	0
Off-Site Rock trucks	0	0	0	49.6	49.6	49.6	49.6	49.6	49.6	0	0	0	0	0	0	0	0	0	49.6	49.6	49.6	49.6	49.6	49.6	0	0	0
Off-Site Cement Trucks, Mack	0	0	4.5	4.5	45.1	45.1	72.1	72.1	72.1	108.2	108.2	72.1	72.1	72.1	72.1	54.1	54.1	54.1	54.1	54.1	54.1	54.1	9.0	4.5	4.5	0	0
Off-Site Dump Trucks	0	0	0	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
Off-Site Low Boy Trucks	0	0	0	24.3	24.3	24.3	24.3	24.3	24.3	14.6	14.6	14.6	14.6	14.6	4.9	4.9	0.0	0.0	4.9	4.9	4.9	0	0	0	0	0	0
Off-Site Pickup Trucks	0	0	1.9	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	5.7
Off-Site Pipe Hauling Trucks	0	0	0	25.7	25.7	25.7	51.3	51.3	51.3	102.6	102.6	102.6	102.6	51.3	51.3	25.7	25.7	25.7	25.7	12.8	12.8	12.8	12.8	12.8	0	0	0
Off-Site Water Trucks	0	0	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Off-Site Fuel Lube Trucks - Int	0	0	0	1.9	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Construction Worker Commute	51.2	92.9	203.6	264.3	341.6	405.9	479.7	497.6	521.4	519.0	519.0	511.9	500.0	492.8	475.0	469.0	446.4	435.7	377.4	351.2	323.8	334.5	315.5	280.9	233.3	214.3	166.7
Total (lbs/month)	**52.3**	**93.9**	**211.1**	**390.6**	**510.5**	**576.1**	**702.6**	**721.3**	**745.1**	**1156.4**	**1156.4**	**1113.2**	**1100.4**	**1292.7**	**1265.1**	**1213.1**	**1185.6**	**923.6**	**919.7**	**879.9**	**852.5**	**473.1**	**409.0**	**378.4**	**268.4**	**235.8**	**184.4**
Total (lbs/day)	**2.4**	**4.3**	**9.6**	**17.8**	**23.2**	**26.2**	**31.9**	**32.8**	**33.9**	**52.6**	**52.6**	**50.6**	**50.0**	**58.8**	**57.5**	**55.1**	**53.9**	**42.0**	**41.8**	**40.0**	**38.8**	**21.5**	**18.6**	**17.2**	**12.2**	**10.7**	**8.4**

Table 5.1A.38: Offsite Motor Vehicle Miles Traveled

Vehicle Type	**Miles per Day**
Off-Site Flat Bed Trucks	20
Off-Site Asphalt Trucks	130
Off-Site Salt Trucks	452
Off-Site Heliostat Trucks	370
Off-Site Rock trucks	130
Off-Site Cement Trucks, Mack	130
Off-Site Dump Trucks	140
Off-Site Low Boy Trucks	140
Off-Site Pickup Trucks	140
Off-Site Pipe Hauling Trucks	370
Off-Site Water Trucks	5
Off-Site Fuel Lube Trucks - Int	140
Construction Worker Commute	90

Attachment DR31-1
SF6 Emissions Calculations

Table 5.1B-11
Rice Solar Energy Project
Summary of Fugitive SF6, HFC, and PFC Emissions Associated with Project Operation
March 2010

Table 5.1B-11a. Greenhouse Gas Emissions - Operation

Emission Source	CO_2 equivalent Emissions (metric tons/yr)
SF_6 Leakage	30
HFC Leakage	4
PFC Leakage	3
TOTAL (metric tons/yr)	**37**

Table 5.1B-11b. Fugitive SF_6 Emissions from Equipment Leakage

Equipment Type	Number of Equipment	Amount of SF_6 (lbs/piece of equipment)	Total SF_6 (lbs)	Annual Leakage Rate[a]	Fugitive SF_6 Emissions (metric tons/yr)	CO_2 equivalent (metric tons/yr)
Switchyard Breaker	3	135	405	0.5%	0.0009	22.0
Generator Circuit Breaker	1	145.5	145.5	0.5%	0.0003	7.9
				Total (metric tons)	0.0012	29.8

[a] The International Electrotechnical Commission, Standard 62271, for new equipment is a leakage rate of 0.5%.

Table 5.1B-11c. Fugitive HFC and PFC Emissions from Equipment Leakage

Type of Equipment[a]	Number of Equipment	Type of Refrigerant Used	Equipment Capacity (lbs)	Annual Loss Rate (% of capacity)[b]	Emissions (metric tons/yr)	CO_2 equivalent (metric tons/yr)
Stand Alone Commercial Applications	2	HFC-134a	13.2	15%	0.002	2.34
Residential/Commercial AC	4	HFC-134a	3.3	20%	0.001	1.56
Fire Suppression	10	PFC-14 (CF_4)	10	1%	0.0005	2.95
				Total HFC (metric tons)	0.003	
				Total PFC (metric tons)	0.0005	7

[a] Calculations assume two stand alone commercial units for the electrical building, 2 AC units in the admin building, 1 AC unit in the control building, 1 AC unit in the water building, and 10 fire extinguishers throughout the site.
[b] The annual loss rate values are from the California Action Registry General Reporting Protocol, Table III.11.3, January 2009

Table 5.1B-11d. Global Warming Potentials

SF_6	23,900
HFC-134a	1,300
CF_4	6,500

Reference: Intergovernmental Panel on Climate Change, Second Assessment Report (SAR) (IPCC, 1996).

Alternatives (36–43)

Alternative Site Locations

36. *Please provide the exact locations of the two alternative sites (Township/Range/Section and/or parcel numbers) and provide shape files for the two sites*

Response: The McCoy Site is located in Riverside County, approximately 25 miles southeast of the RSEP. The Cadiz Alternative Site is located in San Bernardino County, approximately 45 miles northwest of the RSEP. The table below specifies Township, Range, and Section and parcel numbers for each site. Attachment 36-1 provides the electronic files (ArcGIS shape files), which are being provided to CEC Staff under separate cover.

TABLE DR36-1
Alternative Site Location Information

Alternative Site	Township	Range	Sections	Parcels
McCoy	5.0S	21.0E	24, 25	812-110-003; 812-110-009; 812-130-011; 812-161-020; 812-220-025
	5.0S	22.0E	19, 30	
Cadiz	4.0N	14.0E	2, 3	055-63-2104; 055-63-1117; 055-63-2105; 055-63-1116
	5.0N	14.0E	34, 35	

Alternative Site Sizes and Dimensions

37. *Please identify the size (total acreage) and dimensions of each alternative site.*

Response: The McCoy site is 1,904.9 acres. It occupies an area approximately 2 miles by 2 miles, minus one square mile in the southeastern corner. The Cadiz site is 2,551.3 acres, measuring approximately 2 miles by 2 miles.

Alternative Sites Maps

38. *For each alternative site, please provide an aerial or topographic map identifying the site boundary, township ranges, property parcels, roads, transmission line to which the site could interconnect, and any other pertinent features.*

Response: Figures DR38-1 and DR38-2 are maps on aerial photographic base that show the two alternative site locations and identify the site boundaries, township ranges, roads, transmission lines, and other features.

BLM Right-of-way Applications

39. *For BLM-administered land, please indicate if the BLM has received a right-of-way application for use of any of the parcels on BLM land.*

Response: A query of the Bureau of Land Management's Land and Mineral Legacy Rehost 2000 System (LR2000) for the properties managed by BLM within the McCoy site did not indicate that any right-of-way applications have been filed with the BLM for these properties.

CNDDB Search

40. *Please provide results of the CNDDB search of the quadrangles within which the alternative sites are located.*

Response: The McCoy site is located within the McCoy Peak and McCoy Wash U.S. Geological Survey 7.5-minute topographic quadrangles. The Cadiz site is located within the Cadiz Lake NW and Calumet Mine quadrangles. Results of the CNDDB search for the McCoy Peak, McCoy Wash, and Cadiz Lake NW quadrangles are included here as Attachments DR40-1 and DR40-2. There were no CNDDB records in the Calumet Mine quadrangle.

CHRIS Search

41. *Please provide an Information Center search (Class I) for recorded sites identified within the McCoy Site Alternative and the Cadiz Site Alternative.*

Response: RSE has requested a search of the California Historical Information System archaeological and historic sites database for the McCoy and Cadiz alternative sites and will provide the results of the record search as soon as these are available.

Alternatives Sites Summary Table

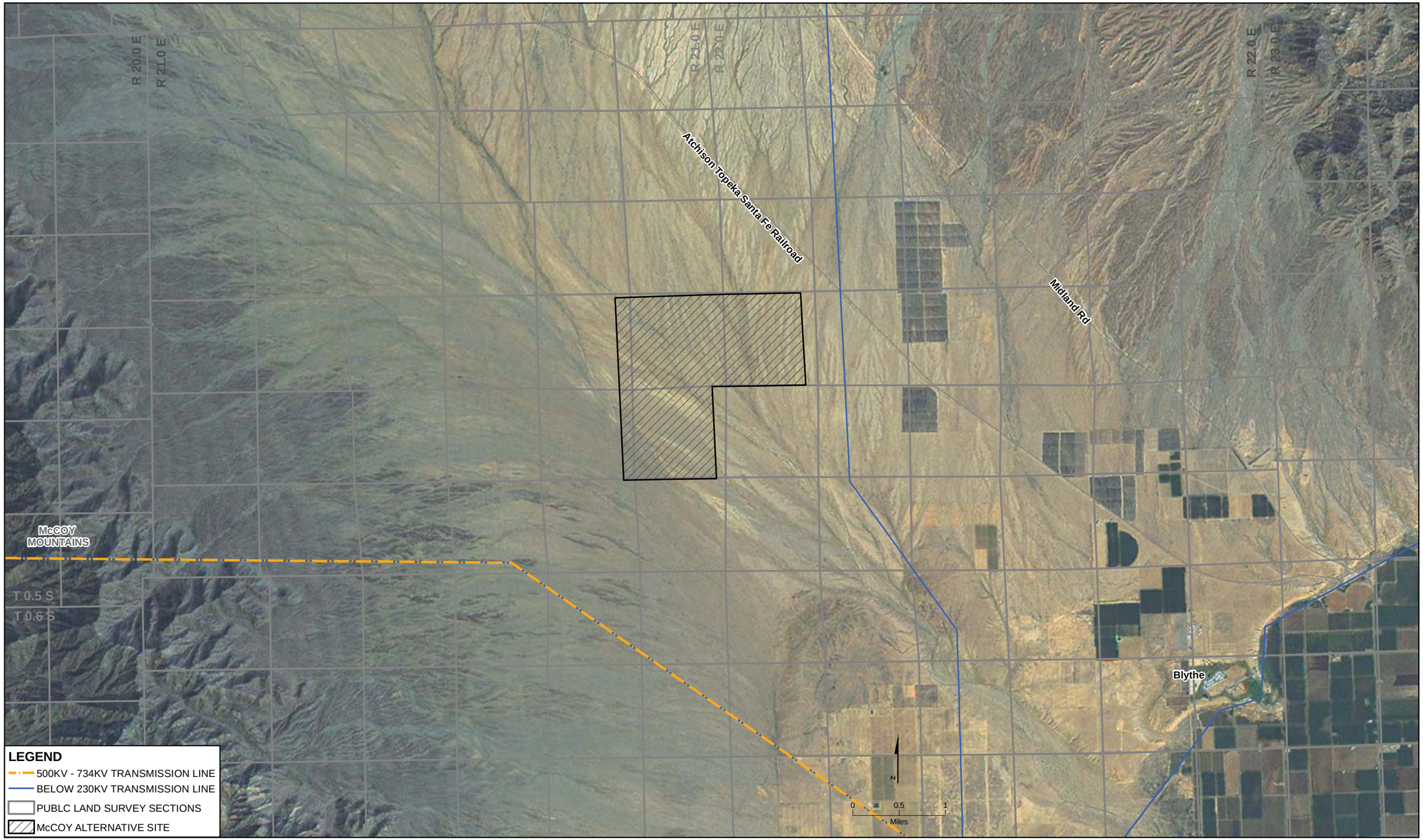
42. *Please fill in Table 1 on the last page of this Alternatives Data Request, using available data, to compare the alternative sites with the proposed project using the criteria developed by the environmental community.*

Response: Please see Table DR42-1.

Tower Height

43. *Please reconcile the table and text and indicate whether the taller tower case reduces or increases electricity cost.*

Response: The analysis completed for AFC Table 6.7-1 was based on a publicly available tool (the Solar Advisor Model – SAM2009), which closely approximates the Pratt Whitney Rocketdyne/SolarReserve internal models using proprietary engineering, performance and cost data. The slightly higher generation shown for a tower that is 30 meters (98 feet) taller is within the range of modeling certainty with no appreciable difference in the first year power purchase agreement (PPA) price.



Township 5.0S
Range 21.0E to 22.0E

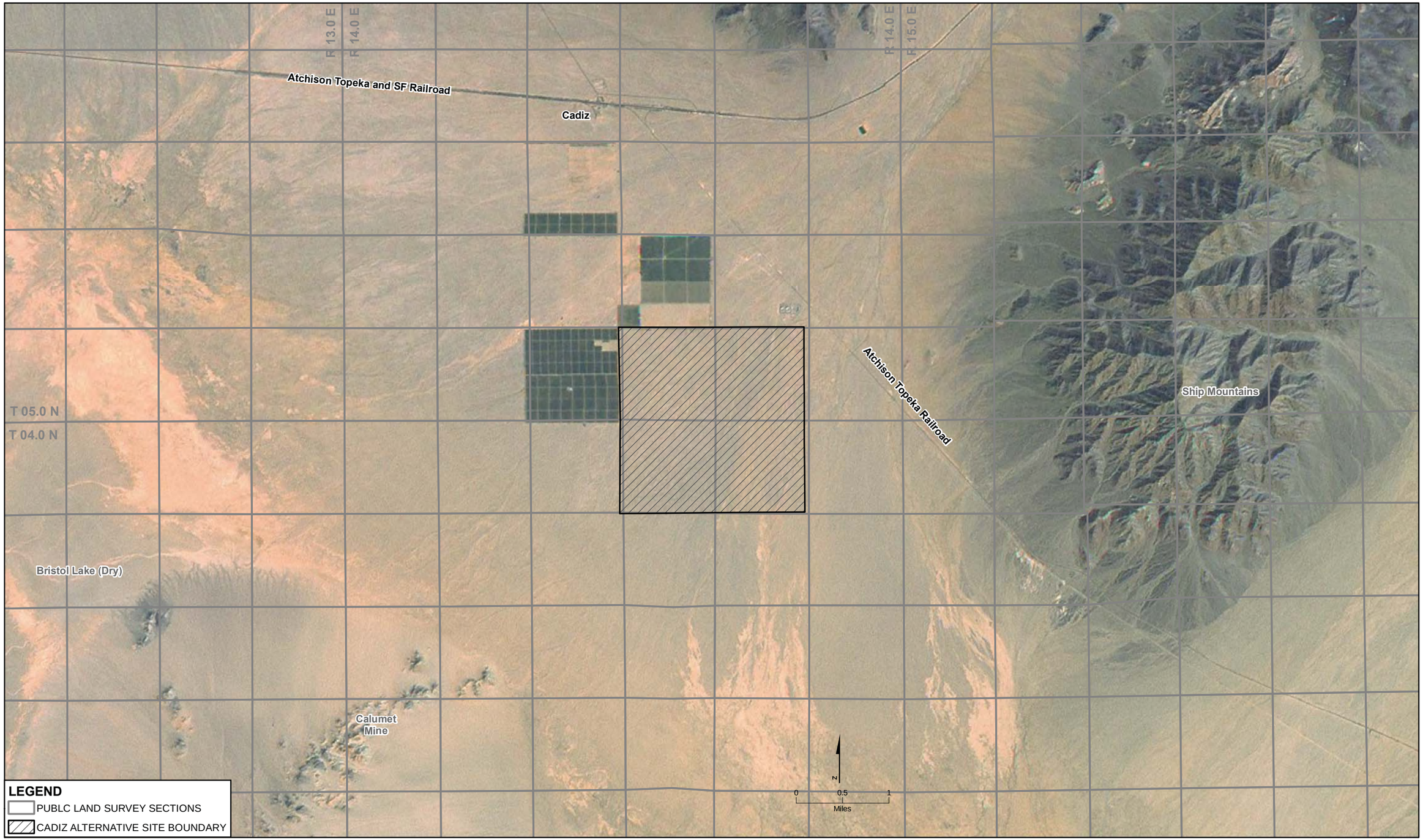
Parcels 812-11-0003, 812-13-0011, 812-11-0009, and 812-16-1020

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

FIGURE DR138-1
McCOY ALTERNATIVE SITE LOCATION
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

CH2MHILL

\\ZION\SACGIS\PROJ\SOLARPROJECTS\SOLARRESERVE_377714\MAPFILES\SITELOCATIONMAP_MCCOY.MXD KSWANSO3 3/1/2010 14:09:20



Township 4.0N to 5.0N
Range 14.0E

Parcels 055-63-2104, 055-63-1117, 055-63-2105, and 055-63-1116

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

FIGURE DR38-2
CADIZ ALTERNATIVE SITE LOCATION
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

CH2MHILL

\\ZION\SACGIS\PROJ\SOLARPROJECTS\SOLARRESERVE_377714\MAPFILES\SITELOCATIONMAP_CADIZ.MXD KSWANSO3 3/1/2010 13:55:05

TABLE DR42-1
Alternatives Comparison

Environmental Criteria	Proposed Project Site	McCoy Site	Cadiz Site
Is site mechanically disturbed?	Yes. Site is a former airfield.	Does not appear to have contained recent uses.	Does not appear to have contained recent uses.
Is site located adjacent to degraded and impacted private lands?	Yes. Site does not include entirety of former airfield.	No.	Yes. Adjacent lands have been / are under agricultural production.
Is site a Brownfield?	Yes.	No.	No.
Is site located adjacent to urbanized areas (indicate distance)?	No. The nearest town offering services is Parker, AZ, approximately 35 miles to the east.	No. The site is approximately 8 miles northwest of Blythe, CA.	No. The site is approximately 65 miles northeast of Twentynine Palms, CA.
Does site require the building of new roads (indicate length)?	No. The proposed project site is adjacent to State Route 62.	Yes. The nearest major road is Midland Road, approximately 3.5 miles to the east of the McCoy site. A network of unpaved roads extends from the northwest corner of Blythe to within approximately 1 mile of the McCoy site.	No. Cadiz Road is adjacent to the Cadiz site. However, approximately 3 miles of Cadiz Road would likely need to be paved or otherwise improved to adequately serve the site.
Could site be served by existing substations (indicate name and distance)?	No. A new interconnection substation would be constructed at the point of intersection with the Western Area Power Administration's Parker-Blythe transmission line.	No. A new interconnection substation would be constructed at the point of intersection with the Western Area Power Administration's Parker-Blythe transmission line.	Yes. The Cadiz site would be served by the Pisgah Station, near Barstow, approximately 60 miles to the northwest.
Is site located proximate to sources of municipal wastewater (indicate name and distance)?	No.	The McCoy site is within 10 miles of Blythe. However, treated wastewater from the City of Blythe infiltrates into the Colorado River Aquifer and is accounted for as Colorado River Water under allocation to the Palo Verde Irrigation District. Water from the Colorado River is fully allocated and therefore is not considered to be a feasible water supply for industrial uses.	No.

TABLE DR42-1
Alternatives Comparison

Environmental Criteria	Proposed Project Site	McCoy Site	Cadiz Site
Is site located proximate to load centers (indicate name and distance?)	Nearest load center is Parker, Arizona, approximately 30 miles east. However, for a renewable energy project that relies on good solar insulation and a large quantity of land it is difficult to find both near large load centers.	Nearest load center is Blythe, California, approximately 8 miles south	Nearest load center is Needles, approximately 55 miles east.
Is site located adjacent to federally designated corridors with existing transmission lines?	The proposed project site is located within the Southwest Area National Corridor. However, a 10-mile-long generation tie-line would need to be constructed to connect with the Western Area Power Administration's Parker-Blythe transmission line.	The proposed project site is located within the Southwest Area National Corridor. However, a 1-mile-long generation tie-line would need to be constructed to connect with the Western Area Power Administration's Parker-Blythe transmission line.	The proposed project site is located within the Southwest Area National Corridor. However, a 60-mile-long generation tie-line would need to be constructed to connect with the Western Area Power Administration's Parker-Blythe transmission line.
Does site support sensitive biological resources, including federally designated and proposed critical habitat; significant populations of federal or state threatened and endangered species, significant populations of sensitive, rare and special status species and rare or unique plant communities?	Yes. The following species have either been observed or potentially occur at or near the proposed project site: Bendire's thrasher; cave myotis; cheeseweed owlfly (cheeseweed moth lacewing); desert tortoise; Harwood's eriastrum; Le Conte's thrasher; Mojave fringe-toed lizard; Nelson's bighorn sheep; and prairie falcon. However, due to the disturbed nature of the site, the habitat values are low.	Yes. The following species have either been observed or potentially occur at or near the McCoy site: bitter hymenoxys; California leaf-nose bat; California Mccoy snail; desert tortoise; dwarf germander; and vermilion flycatcher.	Yes. The following species have either been observed or potentially occur at or near the Cadiz site: Harwood's eriastrum; and Nelson's bighorn sheep
Is site within an Area of Critical Environmental Concern, Wildlife Habitat Management Area, proposed HCP and NCCP Conservation Reserves?	The proposed project site is located within the Northern and Eastern Colorado Plan area of the California Desert Conservation Area Plan but is not within any Area of Critical Environmental Concern.	The McCoy site is located within the Northern and Eastern Colorado Plan area of the California Desert Conservation Area Plan.	The Cadiz site is located within the Northern and Eastern Colorado Plan area of the California Desert Conservation Area Plan.

TABLE DR42-1
Alternatives Comparison

Environmental Criteria	Proposed Project Site	McCoy Site	Cadiz Site
Does site contain land purchased for conservation including those conveyed to BLM?	No.	No.	No.
Does site contain landscape-level biological linkage areas required for the continued functioning of biological and ecological processes?	No.	No.	No.
Is the site within Proposed Wilderness Area, proposed National Monuments, and Citizens' Wilderness Inventory Areas	No.	No.	All or part of the Cadiz Site may be within the Mojave Trails Proposed National Monument.
Does the site contain wetlands and riparian areas, including the upland habitat and groundwater resources required to protect the integrity of seeps, springs, streams or wetlands?	No.	No.	No.
Is the site a National Historic Register eligible site and does it contain other known cultural resources?	The project site occupies the former Rice Army Airfield and portions of Camp Rice, which were part of the World War II-era Desert Training Center. These properties have been found eligible for listing in the National Register. The site does not contain other known cultural resources.	The McCoy site is not listed as being eligible for the National Historic Register. Because a cultural resources assessment for a nearby project recently identified 200 archaeological sites and 1 historic archaeological site, it is assumed that the McCoy site contains cultural resources.	The Cadiz site is not listed as being eligible for the National Historic Register. However, the site is located in a region that was used by Native Americans, including Mojave and Chemehuevi groups. Additionally, three potential historic cultural resources are nearby: an old road that runs between Cadiz and Amboy; sections of the original Route 66 (National Trails Highway) north of the site; and the railroad line originally built in 1883 by the Atlantic and Pacific Rail Road Company that is now owned by the BNSF.
Is the site located directly adjacent to National or State Park units?	No.	No.	No.

Attachment DR40-1
CNDDB Search Results, McCoy Site

Eremarionta rowelli mccoiana

California Mccoy snail

Element Code: IMGASB9102

Status

Federal: None
State: None

NDDB Element Ranks

Global: G1T1
State: S1

Other Lists

CDFG Status:

Habitat Associations

General: FOUND IN VARIOUS SITES IN THE MCCOY MTNS AND THE BIG MARIA MTNS.
Micro: INHABITS ROCKSLIDES IN GULLIES.

Occurrence No. 2 **Map Index:** 25144 **EO Index:** 5971

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: XXXX-XX-XX
Site: XXXX-XX-XX

Record Last Updated: 1994-02-14

Quad Summary: McCoy Peak (3311467/059A)
County Summary: Riverside

Lat/Long: 33.64920° / -114.85748°
UTM: Zone-11 N3725320 E698684
Radius: 1 mile
Elevation: 1,000 ft

Mapping PrecisionNON-SPECIFIC
Symbol Type:POINT

Township: 06S
Range: 20E
Section: XX **Qtr:** XX
Meridian: S

Location: VICINITY OF MCCOY PEAK, WEST-NORTHWEST OF BLYTHE.

Ecological: MCCOY MOUNTAINS ARE VOLCANIC IN ORIGIN, BUT SNAILS ARE TYPICALLY FOUND IN GULLIES THAT CARVE THROUGH THE LAVA ROCK AND INTO UNDERLYING GRANITE AND SANDSTONE.

General: SNAILS WERE FOUND 200 FEET ABOVE MINE 64-A (BLM DESIGNATION?), NEAR MCCOY PEAK.

Owner/Manager: UNKNOWN

Gopherus agassizii

desert tortoise

Element Code: ARAAF01010

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G4	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: MOST COMMON IN DESERT SCRUB, DESERT WASH, AND JOSHUA TREE HABITATS; OCCURS IN ALMOST EVERY DESERT HABITAT.

Micro: REQUIRE FRIABLE SOIL FOR BURROW AND NEST CONSTRUCTION. CREOSOTE BUSH HABITAT WITH LG ANNUAL WILDFLOWER BLOOMS PREFERRED.

Occurrence No. 12 **Map Index:** 06576 **EO Index:** 14794

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1986-XX-XX
Site: 1986-XX-XX
Record Last Updated: 1996-01-02

Quad Summary: McCoy Peak (3311467/059A), McCoy Wash (3311466/058B), Inca (3311477/076D), Big Maria Mts. SW (3311476/075C)
County Summary: Riverside

Lat/Long: 33.74136º / -114.72653º
UTM: Zone-11 N3735800 E710605
Area: 41,558.3 acres
Elevation:

Mapping Precision SPECIFIC
Symbol Type: POLYGON

Township: 05S
Range: 22E
Section: 17 **Qtr:** XX
Meridian: S

Location: MCCOY WASH AREA BTWN BIG MARIA AND MCCOY MTNS NW OF BLYTHE.
Location Detail: MODERATELY SIZED AREA WITH TORTOISE DENSITIES OF 20 TO 50/SQ MI.

Owner/Manager: BLM, PVT

Macrotus californicus

California leaf-nosed bat

Element Code: AMACB01010

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4
State: S2S3

Other Lists
CDFG Status: SC

Habitat Associations
General: DESERT RIPARIAN, DESERT WASH, DESERT SCRUB, DESERT SUCCULENT SCRUB, ALKALI SCRUB AND PALM OASIS HABITATS.
Micro: NEEDS ROCKY, RUGGED TERRAIN WITH MINES OR CAVES FOR ROOSTING.

Occurrence No. 19 **Map Index:** 33098 **EO Index:** 3596
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1993-01-23
Site: 1993-01-23
Record Last Updated: 1995-04-05

Quad Summary: McCoy Peak (3311467/059A)
County Summary: Riverside

Lat/Long: 33.63907º / -114.83516º
UTM: Zone-11 N3724239 E700778
Radius: 1/5 mile
Elevation: 860 ft
Mapping Precision NON-SPECIFIC
Symbol Type: POINT
Township: 06S
Range: 21E
Section: 19 **Qtr:** XX
Meridian: S

Location: "SE MCCOY MINE," SE OF MCCOY PEAK, IN THE MCCOY MOUNTAINS.
Ecological: HABITAT CONSISTS OF CREOSOTE BUSH SCRUB IN THE LOWER SONORAN LIFE ZONE.
Threat: POSSIBLE THREAT FROM HUMAN (RECREATIONAL) DISTURBANCE.
General: 300 ADULTS OBSERVED ROOSTING ON 23 JANUARY 1993.
Owner/Manager: BLM

Occurrence No. 20 **Map Index:** 33099 **EO Index:** 3597
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1993-01-23
Site: 1993-01-23
Record Last Updated: 1995-04-05

Quad Summary: McCoy Peak (3311467/059A)
County Summary: Riverside

Lat/Long: 33.64220º / -114.85724º
UTM: Zone-11 N3724544 E698723
Radius: 1/5 mile
Elevation: 925 ft
Mapping Precision NON-SPECIFIC
Symbol Type: POINT
Township: 06S
Range: 20E
Section: XX **Qtr:** XX
Meridian: S

Location: "SOUTH MCCOY MINE," SOUTH OF MCCOY PEAK, IN THE MCCOY MOUNTAINS.
Ecological: HABITAT CONSISTS OF CREOSOTE BUSH SCRUB IN THE LOWER SONORAN LIFE ZONE.
General: 11 ADULTS OBSERVED WINTER-ROOSTING ON 23 JANUARY 1993.
Owner/Manager: BLM

Occurrence No. 21 **Map Index:** 33100 **EO Index:** 3598
Occ Rank: Good
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1993-01-22
Site: 1993-01-22
Record Last Updated: 1995-04-05

Quad Summary: McCoy Peak (3311467/059A)
County Summary: Riverside

Lat/Long: 33.64618º / -114.86494º
UTM: Zone-11 N3724970 E698000
Radius: 1/5 mile
Elevation: 760 ft
Mapping Precision NON-SPECIFIC
Symbol Type: POINT
Township: 06S
Range: 20E
Section: XX **Qtr:** XX
Meridian: S

Location: "SW MCCOY MINE," SW OF MCCOY PEAK, IN THE MCCOY MOUNTAINS.
Ecological: HABITAT CONSISTS OF CREOSOTE BUSH SCRUB IN THE LOWER SONORAN LIFE ZONE.
Threat: POSSIBLE THREAT FROM HUMAN (RECREATIONAL) DISTURBANCE.
General: LOTS OF OLD GUANO; 12 ADULTS OBSERVED WINTER-ROOSTING ON 22 JANUARY 1993.
Owner/Manager: BLM

Gopherus agassizii

desert tortoise

Element Code: ARAAF01010

Status	NDDB Element Ranks	Other Lists
Federal: Threatened	**Global:** G4	**CDFG Status:**
State: Threatened	**State:** S2	

Habitat Associations

General: MOST COMMON IN DESERT SCRUB, DESERT WASH, AND JOSHUA TREE HABITATS; OCCURS IN ALMOST EVERY DESERT HABITAT.

Micro: REQUIRE FRIABLE SOIL FOR BURROW AND NEST CONSTRUCTION. CREOSOTE BUSH HABITAT WITH LG ANNUAL WILDFLOWER BLOOMS PREFERRED.

Occurrence No. 12 **Map Index:** 06576 **EO Index:** 14794

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1986-XX-XX
Site: 1986-XX-XX
Record Last Updated: 1996-01-02

Quad Summary: McCoy Peak (3311467/059A), McCoy Wash (3311466/058B), Inca (3311477/076D), Big Maria Mts. SW (3311476/075C)
County Summary: Riverside

Lat/Long: 33.74136° / -114.72653°
UTM: Zone-11 N3735800 E710605
Area: 41,558.3 acres
Elevation:

Mapping Precision SPECIFIC
Symbol Type: POLYGON

Township: 05S
Range: 22E
Section: 17 **Qtr:** XX
Meridian: S

Location: MCCOY WASH AREA BTWN BIG MARIA AND MCCOY MTNS NW OF BLYTHE.
Location Detail: MODERATELY SIZED AREA WITH TORTOISE DENSITIES OF 20 TO 50/SQ MI.

Owner/Manager: BLM, PVT

Hymenoxys odorata

bitter hymenoxys

Element Code: PDAST530E0

Status
Federal: None
State: None

NDDB Element Ranks
Global: G5
State: S2

Other Lists
CNPS List: 2

Habitat Associations
General: RIPARIAN SCRUB, SONORAN DESERT SCRUB.
Micro: SANDY SITES. 45-150M.

Occurrence No. 3 **Map Index:** 72304 **EO Index:** 74011

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1922-04-06
Site: 1922-04-06
Record Last Updated: 2008-12-04

Quad Summary: Blythe NE (3311465/058A), Blythe (3311455/058D), Ripley (3311456/058C), McCoy Wash (3311466/058B)
County Summary: Riverside, Arizona State

Lat/Long: 33.61053º / -114.59646º
UTM: Zone-11 N3721564 E722994
Radius: 5 mile
Elevation:

Mapping Precision NON-SPECIFIC
Symbol Type: POINT

Township: 06S
Range: 23E
Section: 32 **Qtr:** XX
Meridian: S

Location: NEAR BLYTHE.

Location Detail: EXACT LOCATION UNKNOWN. UNCERTAIN IF COLLECTIONS WERE MADE WITHIN BLYTHE OR AT THE EDGE OF THE COLORADO RIVER NEAR BLYTHE. MOST LIKELY THE JEPSON COLLECTION WAS FROM IMMEDIATELY NEAR THE RIVER. MAPPED AS A LARGE, VAGUE 5 MILE RADIUS CIRCLE.

Ecological: HABITAT DESCRIBED AS "SANDY SLOPE" "LOW BOTTOM LANDS" AND "OVERFLOW FLATS"

General: ONLY SOURCES OF INFORMATION ARE 3 COLLECTIONS: JEPSON, IN 1912, FROM "FLATS, OVERFLOW, BLYTHE" TAKEN DURING FLOAT TRIP DOWN RIVER; MUNZ, IN 1920 FROM "NEAR BLYTHE" AND JAEGER IN 1922 FROM "BLYTHE, ON LOW BOTTOM LANDS." NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Pyrocephalus rubinus

vermilion flycatcher

Element Code: ABPAE36010

Status
Federal: None
State: None

NDDB Element Ranks
Global: G5
State: S2S3

Other Lists
CDFG Status: SC

Habitat Associations
General: DURING NESTING, INHABITS DESERT RIPARIAN ADJACENT TO IRRIGATED FIELDS, IRRIGATION DITCHES, PASTURES, & OTHER OPEN, MESIC
Micro: NEST IN COTTONWOOD, WILLOW, MESQUITE, AND OTHER LARGE DESERT RIPARIAN TREES.

Occurrence No. 18 **Map Index:** 06617 **EO Index:** 25275

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1977-XX-XX
Site: 1983-09-20
Record Last Updated: 1996-03-28

Quad Summary: McCoy Wash (3311466/058B), Blythe NE (3311465/058A)
County Summary: Riverside

Lat/Long: 33.64224º / -114.62051º
UTM: Zone-11 N3725028 E720682
Radius: 1 mile
Elevation: 260 ft

Mapping Precision NON-SPECIFIC
Symbol Type: POINT

Township: 06S
Range: 23E
Section: 19 **Qtr:** NW
Meridian: S

Location: BLYTHE GOLF COURSE, ABOUT 7 KM (4.3 MILES) NORTH OF BLYTHE.
Ecological: HABITAT CONSISTS OF MANY EXOTIC TREE SPECIES AND SOME COTTONWOODS.
General: A PAIR REPORTEDLY NESTED HERE IN 1977.
Owner/Manager: PVT

Teucrium cubense ssp. depressum

dwarf germander

Element Code: PDLAM20032

Status
Federal: None
State: None

NDDB Element Ranks
Global: G4G5T3T4
State: S2

Other Lists
CNPS List: 2.2

Habitat Associations
General: DESERT DUNES, PLAYAS, SONORAN DESERT SCRUB.
Micro: DUNES, PLAYA MARGINS AND SCRUB. 45-400M.

Occurrence No. 3 **Map Index:** 72304 **EO Index:** 73264

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1912-XX-XX
Site: 1912-XX-XX
Record Last Updated: 2008-09-16

Quad Summary: Blythe NE (3311465/058A), Blythe (3311455/058D), Ripley (3311456/058C), McCoy Wash (3311466/058B)
County Summary: Riverside, Arizona State

Lat/Long: 33.61053º / -114.59646º
UTM: Zone-11 N3721564 E722994
Radius: 5 mile
Elevation:

Mapping Precision NON-SPECIFIC
Symbol Type: POINT

Township: 06S
Range: 23E
Section: 32 **Qtr:** XX
Meridian: S

Location: BLYTHE OVERFLOW FLATS, PALO VERDE VALLEY.

Location Detail: EXACT LOCATION UNKNOWN. MAPPED BY CNDDB CENTERED ON THE CITY OF BLYTHE, BUT THE LOCATION DESCRIPTIONS ARE SO VAGUE THAT THESE COLLECTIONS COULD HAVE COME FROM ELSEWHERE IN THE PALO VERDE VALLEY. MAPPED AS LARGE 5 MI RADIUS CIRCLE.

General: ONLY SOURCES OF INFORMATION FOR THIS OCCURRENCE ARE A 1904 SCHELLENGER COLLECTION FROM "PALO VERDE" AND A 1912 JEPSON COLLECTION FROM LOCATION DESCRIBED AS "BLYTHE. OVERFLOW FLATS" AND "PALO VERDE VALLEY." NEEDS FIELDWORK.

Owner/Manager: UNKNOWN

Attachment DR40-2
CNDDB Search Results, Cadiz Site

Eriastrum harwoodii

Harwood's eriastrum

Element Code: PDPLM030B1

Status
Federal: None
State: None

NDDB Element Ranks
Global: G2
State: S2

Other Lists
CNPS List: 1B.2

Habitat Associations
General: DESERT DUNES.
Micro: 200-915M.

Occurrence No. 7 **Map Index:** 71979 **EO Index:** 72872

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1978-04-14
Site: 1978-04-14
Record Last Updated: 2008-08-19

Quad Summary: Cadiz Lake (3411534/125C), Cadiz Lake NW (3411544/125B)
County Summary: San Bernardino

Lat/Long: 34.37707° / -115.41286°
UTM: Zone-11 N3805108 E645924
Area:
Elevation: 600 ft

Mapping PrecisionNON-SPECIFIC
Symbol Type:POLYGON

Township: 03N
Range: 15E
Section: 04 **Qtr:** XX
Meridian: S

Location: N EDGE OF CADIZ LAKE, 10 MILES S OF CADIZ.
Location Detail: MAPPED ACCORDING TO TRS INFORMATION ON SPECIMEN LABEL IN T3N R15E SECTION 4.
Ecological: DUNES; SANDY SOIL, SLOPE 0-60 %, EXPOSURE VARIABLE. ASSOCIATED WITH LARREA & OENOTHERA.
General: UNKNOWN NUMBER OF PLANTS SEEN IN 1978.
Owner/Manager: BLM

Ovis canadensis nelsoni

Nelson's bighorn sheep

Element Code: AMALE04013

Status	NDDB Element Ranks	Other Lists
Federal: None	**Global:** G4T4	**CDFG Status:**
State: None	**State:** S3	

Habitat Associations

General: WIDELY DISTRIBUTED FROM THE WHITE MTNS IN MONO CO. TO THE CHOCOLATE MTS IN IMPERIAL CO.

Micro: OPEN, ROCKY, STEEP AREAS WITH AVAILABLE WATER AND HERBACEOUS FORAGE.

Occurrence No. 40 **Map Index:** 06416 **EO Index:** 12413

Occ Rank: Unknown
Origin: Natural/Native occurrence
Presence: Presumed Extant
Trend: Unknown

Dates Last Seen
Element: 1986-XX-XX
Site: 1986-XX-XX

Record Last Updated: 1989-08-10

Quad Summary: Cadiz Lake NW (3411544/125B), Painted Rock Wash (3411551/149D), Essex (3411562/149B), Milligan (3411532/124C), Cadiz Summit (3411554/150C), Wilhelm Spring (3411541/124A), Cadiz Lake NE (3411543/125A), Sheep Camp Spring (3411542/124B), Skeleton Pass (3411553/150D), Old Woman Statue (3411552/149C)

County Summary: San Bernardino

Lat/Long: 34.46315º / -115.24143º
UTM: Zone-11 N3814914 E661522
Area: 82,410.1 acres
Elevation:

Mapping Precision SPECIFIC
Symbol Type: POLYGON

Township: 05N
Range: 17E
Section: XX **Qtr:** XX
Meridian: S

Location: OLD WOMAN MOUNTAINS AND SHIP MOUNTAINS.

Location Detail: SHEEP MOVE INTO SHIP MTNS WHEN FORAGE HAS GREENED UP. POPULATIONS CONCENTRATE NEAR PERMANENT, UNDISTURBED WATERS NEAR DRIPPING SPRING, SHEEP CAMP, PAINTED ROCK, AND OLD WOMAN STATUE AREA.

General: POPULATION ESTIMATE OF 45 ANIMALS IN 1985; CURRENT POPULATION ESTIMATE OF 70 ANIMALS, WITH NUMBERS REMAINING FAIRLY STATIC.

Owner/Manager: BLM, PVT

Biological Resources (44–77)

Temporary Drainage Swale

44. *Please provide an alternate plan for the temporary drainage swale that would be located outside of the perimeter fence to avoid any potential take of desert tortoises.*

Response: Tortoise fencing would be installed on the outside of the temporary drainage swale before construction and tortoises would be removed from within this area. This fencing would be removed after construction is complete. Permanent tortoise fencing will be installed at the base of the facility security fence.

Biological Assessment for Desert Tortoise

45. *Please provide a copy of the Draft Biological Assessment to address project impacts to desert tortoises.*

Response: Western Area Power Administration (Western), as lead federal agency, will be submitting a Biological Assessment (BA) to the U.S. Fish and Wildlife Service (USFWS) to initiate formal consultation for the project's effects on the desert tortoise. RSE is currently developing the tortoise translocation and relocation plan and conducting assessments of the potential for raven predation on juvenile tortoises at this site. These are prerequisites to finalizing the BA for desert tortoises. An outline of environmental impact analyses and mitigation measures that may be proposed is found in Section 5.2 (Biological Resources) of the AFC. The Draft BA will be submitted to Western and BLM by March 26, 2010

Desert Tortoise – Incidental Take Permit Application

46. *Please file the Incidental Take Permit application, per Section 2081 of the California Endangered Species Act, with the CDFG and provide Energy Commission Staff with a copy of the completed document.*

Response: The Incidental Take Permit Application is in preparation and will be provided to the regulatory agencies and CEC by March 26, 2010. However, RSE would like Staff to consider that for previous solar energy projects under the jurisdiction of the CEC, the California Department of Fish and Game (CDFG) has indicated that Section 2081 compliance would be satisfied through the CEC process and an individual ITP would not be needed. Additionally, it may be feasible for CDFG to make a finding that the Biological Opinion prepared by the USFWS to document compliance with the federal Endangered Species Act compliance would also be consistent with the California Endangered Species Act and could serve in lieu of a separate CDFG evaluation.

Draft Desert Tortoise Relocation/Translocation Plan

47. *Please provide a draft Desert Tortoise Relocation/Translocation Plan, incorporating the elements described in the AFC mitigation section as well as the information summarized here. The Plan should incorporate the most recent guidance from the USFWS and CDFG. All methods discussed in the plan should be consistent with the Guidelines for Handling Desert Tortoises During*

Construction Projects (Desert Tortoise Council 1999) or the most recent handling guidance provided by the USFWS. Translocation is required when a desert tortoise must be moved more than 1000 meters to clear it from the project site, while relocation is required when a desert tortoise can be moved less than 1000 meters to clear it from the project site.

The goals of this relocation/translocation effort should be to:

- *Relocate/translocate all desert tortoises from the project site to nearby suitable habitat,*
- *Minimize impacts on resident desert tortoises outside the project site,*
- *Minimize stress, disturbance, and injuries to relocated/translocated tortoises, and*
- *Assess the success of the relocation/translocation effort through monitoring.*
- *The translocation site must:*
- *Be on Federal or State lands in California that are located outside of desert tortoise critical habitat, off-highway vehicle management areas, and desert wildlife management areas;*
- *Have no proposed rights-of-way or other encumbrances at the time of its establishment; and*
- *Be at least 10 kilometers away from major highways (e.g., Interstate 10) to provide a safety buffer for long-distance movements that some desert tortoises are likely to make following translocation.*

Generally, the translocation plan should include the following information:

a. *Discussion of the relocation/translocation procedures and guidance in the plan, including a description of clearance survey protocol and desert tortoise transportation and release procedures;*

b. *Identification of potential relocation areas within 1,000 meters of the project site based on the presence of suitable soils, vegetation (annual and perennial species composition, shrub density and cover, forage species availability, geomorphology, slope, existing and proposed future land uses, and existing or potential future threats to desert tortoise (e.g., dispersal barriers).*

c. *Surveys of resident populations at translocation sites, including health assessment sampling.*

d. *Description of measures that would be implemented to prevent relocated/ translocated desert tortoise from reentering the site or other hazardous areas.*

e. *Description of quarantine facilities to provide individual quarantine for all tortoises prior to translocation.*

f. *Description of health assessments to be performed by a qualified biologist or veterinarian on each tortoise prior to translocation.*

g. *A treatment/disposition plan for each tortoise, including any that may be unfit for translocation.*

h. *Description of translocation procedures, including timing (e.g., time of year, time of day). Note that desert tortoises may only be moved during spring and fall; the fall 'window' is*

quite narrow; and that timing of desert tortoise relocation/ translocation can have broader implications for the project construction schedule.

i. *Description of post-translocation monitoring and adaptive management activities.*

j. *Description of methods used to mark relocated/translocated tortoises and fit them with transmitters to so that they can be located and identified during post-relocation/translocation monitoring.*

k. *Description of how data would be compiled, synthesized, and reported to USFWS, CDFG, BLM, Western and Energy Commission staff.*

Response: RSE will be drafting a desert tortoise translocation/relocation plan as part of the biological assessment that will be submitted to the USFWS by Western (see the response to Data Request #45).

Raven Management and Control Plan

48. *Please provide a Draft Raven Management and Control Plan that describes methods to avoid attracting common ravens and/or providing subsidies during all phases of project development and use, including construction, operation, and decommissioning. In situations where subsides such as power lines and structures for perching cannot be eliminated, the plan should require implementation of best management practices such as reduction of available subsidies, raven monitoring and raven nest removal. Potential subsidies to be considered in the plan should include but not be limited to:*

- *Availability of water from dust abatement activities, equipment cleaning and maintenance, evaporation and retention ponds, drainage areas or landscaping;*
- *Potential perching, roosting, or nesting sites;*
- *Food sources from soil disturbance and road kill (e.g., small mammals, insects); and*
- *Food sources and attractants from human and animal food and waste.*

To address the indirect and cumulative effects of the project, participation would also be recommended in a regional raven management plan either through monetary or in-kind contributions coordinated by the Desert Managers Group. The draft Raven Monitoring and Control Plan should incorporate the most recent guidance from the USFWS and include at least the following elements:

a. *Purpose/objectives of the Plan;*

b. *Identification of project design features and other measures to manage potential introduction of subsidies that may attract ravens to the area;*

c. *Identification of the area covered by the monitoring and raven control activities;*

d. *Description of baseline data documenting the abundance of raven on the project site;*

e. *Establishment of quantitative success criteria for achieving the objectives of the plan;*

f. *Documentation of the effectiveness of project design features and BMPs;*

g. *Identification of triggers that will prompt implementation of management actions to control ravens, and a description of those management actions (e.g., nest removal, elimination of problem ravens);*

h. *Description of a monitoring plan, including a discussion of survey methods and frequency, for establishing baseline data on pre-project raven numbers and activities and assessing post-project changes from this baseline;*

i. *Description of adaptive management practices used to ensure effectiveness of accomplishing the purpose of the raven management plan;*

j. *Regular reporting to document raven management measures that have been implemented and results of raven abundance and effectiveness monitoring throughout the life of the project; and*

k. *Description of worker education, at all phases of development, as it pertains to avoiding and reducing subsidies for ravens and to promoting desert tortoise awareness.*

Response: RSE will be drafting a raven management plan as part of the biological assessment that will be submitted to the USFWS by Western (see the response to Data Request #45).

Aeolian Sand Habitat Creation

49. *Please provide information, including any appropriate modeling and quantitative analysis, describing how wind and water contribute to the creation and maintenance of any aeolian sand habitat (e.g., dunes, sand hummocks, sandfields, or partially stabilized sand dunes) on the project site and between the site's southern boundary and the larger Rice Valley dune system, approximately 0.75 mile to the south.*

Response: The responses to Data Requests #49 through #51 require an understanding of the interrelationship between local and regional sand sources and aeolian sand deposition in the Rice Valley, the distribution of aeolian sand habitat within the project site area, including the transmission line corridor, and the difference between fluvial and aeolian sand surfaces across the site.

Physiography of the Project Area—The physiographic setting of Rice Valley affects the direction of the prevailing winds, and the mobility and deposition of aeolian sand in the immediate area. The solar array, plant site, and the first several miles of the generator tie-line are located on the southern bajada of the Turtle Mountains. (A bajada is the ramp of alluvium that extends from the axes of southwest desert valleys to the piedmonts of surrounding mountain ranges, and is composed of coalescing alluvial fans.) The southernmost 5 miles of the generator tie-line are located in similar habitat near the toe of the bajada extending west from the West Riverside Mountains (AFC Figures 1.0-2, 5.4-1, and 5.8-1). The entire project area is on the northern and northeastern portion of Rice Valley. Rice Valley is an intermountain basin in the Colorado Desert.

The Rice Valley lies in the Basin and Range physiographic province of the interior West (Fenneman, 1931), typified by internally drained basins separated by intervening mountain ranges. The physiography of this area, the northernmost portion of the Colorado Desert subarea of the Sonoran Desert, according to Shreve (1964), is best characterized as being

dominated by many smaller mountain ranges surrounding large valleys. In most of the Basin and Range, the mountains and valleys are oriented generally north-south, but this is not the case in the project area due to differences in the direction of crustal deformation here. A zone of anomalous deformation through this region is called the Maria Fold and Thrust Belt (Glazner et al., 1994). The Rice Valley is bounded by the Turtle Mountains to the north, the West Riverside Mountains to the east, the Big Maria and Little Maria mountains to the southeast and southwest, respectively, and the low Arica Mountains to the west (see AFC Figure 5.8-1). The valley axis is oriented generally west-northwest to east-southeast with relatively low alluvial sills separating it from the Danby Dry Lake basin to the northwest, and the Colorado River Valley to the southeast. Elevations range from approximately 690 feet above mean sea level (amsl) in the valley bottom about 1.75 miles south of the project area, to 740 and 930 feet amsl on the southern and northern boundaries, respectively, of the project area on the Turtle Mountains bajada.

Aeolian Geomorphology of the Study Area—As noted above, the extension and then rotation of crustal blocks in this area has been so extreme that mountain ranges and their associated grabens were given a largely east-west orientation. This physiography is important in funneling the regional winds responsible for sand transport and deposition. The Rice Valley lies near the eastern end of a series of valleys that form a generally continuous corridor known as the Bristol Trough (Pease and Tchakerian, 2003), named for Bristol Dry Lake near the western beginning of this trough, some 60 miles upwind, northwest of the RSEP site. Whether sand is transported along this corridor from one basin to the next has been the subject of recent study (Pease and Tchakerian, 2003; Muhs, 2004). They found that sand deposits in the individual valleys comprising the Bristol Trough are not intergrated, and most of the sand in the individual valleys must come from local sources.

The RSEP study area, including the planned solar facility itself and the transmission line, lies on the northern margin of Rice Valley at the foot of the Turtle Mountains bajada. While Rice Valley is well known for its aeolian sand habitats, the study area is not where major sand deposits are found. These occur in the form of sand sheets, stabilized hummock and coppice dunes, as well as stabilized linear dune fields in the axial portion of Rice Valley. In this region, sand deposits thicken as they run up to the foot of windward-facing mountain ranges, such as the Big Maria Mountains, leaving relatively massive sand ramps. The smaller, more ephemeral sand deposits of the valley bottom are not favored by geomorphologists for investigation. The sand ramps with their thick aeolian sand deposits intercalated with layers of fluvial and colluvial sediments, as well as paleosols, offer optimum study sites. In this area, the Big Maria Mountains sand ramp has been studied extensively, and the chronology from this deposit is considered representative of the major episodes of sand mobilization and deposition in the Rice Valley.

Rendell and Sheffer (1996) provide a chronology for a number of sand ramps along the Bristol Trough as well as the Mojave River farther northwest, and establish that the last major episode of sand accumulation on the Big Maria Sand Ramp occurred between about 14 and 7 ka (thousands of years ago). Lancaster and Tchakerian (1996), Pease and Tchakerian (2003), and Muhs (2004) marshal different lines of evidence to all conclude that the sands deposited were locally derived and, therefore, local flood events and mass wasting processes generally on alluvial fans surfaces are the main source of sand mobilization, and also of subsequent

local down-wind deposition. However, the last time this occurred in the study area was apparently at the end of the last glacial age (ca. 14 to 8 ka). Hillslopes lost their vegetation cover during post-glacial climate change, and desertification led to hill-slope stripping (Dohrenwend et al., 1991), and a large supply of new sand to be mobilized. It is significant that dates on sand deposits in the area provide no evidence for sand mobilization and accumulation during the subsequent hyperarid Middle Holocene (ca. 7 to 5 ka) (e.g., Spaulding, 1991). Evidence for sporadic Late Holocene sand deposits is found in areas downwind of the Mojave River, an ample sediment source regularly replenished (Rendell and Sheffer, 1996), but not elsewhere and not in the Rice Valley.

A literature review revealed the following salient findings:

- Despite theories that invoke regional sources, several lines of evidence show that aeolian sand deposits in the Colorado and Mojave deserts are locally derived.
- Recent research shows that the last period of substantial mobilization and deposition of aeolian sand occurred during the last deglaciation, and ended about 7,000 years ago.
- Aeolian sand mobilization and deposition does not appear to be directly related to periods of maximum aridity.
- Despite fluctuations in effective moisture over the last 7,000 years, these have not resulted in the widespread mobilization of sand deposits.

In conclusion, there have been no environmental changes over the last 7,000 years sufficient to mobilize substantial aeolian sand deposits. By inference, the limited construction activities required to develop this facility are unlikely to measurably affect the distribution and abundance of aeolian sand habitats in the vicinity.

References Cited or Consulted

Dohrenwend, J. C., W. B. Bull, L. D. McFadden, G. I. Smith, R. S. U. Smith, and S. G. Wells. 1991. Quaternary Geology of the Basin and Range Province in California. In *The geology of North America, Volume K-2, Quaternary non-glacial geology: conterminous U.S.,* edited by R. B. Morrison, pp. 321-352. Geological Society of America, Boulder, CO.

Fenneman, N. M. 1931. *Physiography of Western United States*. McGraw-Hill Book Company: New York, NY.

Glazner, A. F., J. D. Walker, J. M. Bartley, J. M. Fletcher, et al. 1994. Reconstruction of the Mojave Block. Pp. 3-30 in (S. F. McGill and T. M. Ross, eds.) *Geological Investigations of an Active Margin.* Geological Society of America Cordilleran Section Guidebook, San Bernardino County Museum Association, Redlands, CA.

Lancaster, N., and V. P. Tchakerian, 1996. Geomorphology and sediments of sand ramps in the Mojave Desert. *Geomorphology* 17: 151-165.

Muhs, D. R. 2004. Mineralogical maturity in dunefields of North America, Africa and Australia. *Geomorphology* 59:247-269.

Pease, P. P., and V. P. Tchakerian. 2003. Geochemistry of sediments from Quaternary sand ramps in the southeastern Mojave Desert, California. *Quaternary International* 104: 19-29.

Rendell, H. L., and N. L. Sheffer. 1996. Luminescense dating of sand ramps in the eastern Mojave Desert. *Geomorphology 17: 187-197.*

Shreve, Forrest. 1964. Vegetation of the Sonoran Desert in Shreve, Forest and Wiggins, I.L., *Vegetation and flora of the Sonoran Desert*. pp. 9-187. Stanford University Press, CA.

Spaulding, W. G. 1991. A middle Holocene vegetation record from the Mojave Desert and its paleoclimatic significance. *Quaternary Research* 35: 427-437.

Aeolian Sand Habitat Changes

50. *Please provide an analysis, including any appropriate modeling or quantitative assessment, of the potential direct and indirect effects of project construction and operation (for example, alteration of hydrology, dust palliatives, fencing) on creation and maintenance of aeolian sand habitat.*

Response: As stated in the response to Data Request #49, it is unlikely that construction or operation of the project would have a significant effect on creation or maintenance of aeolian sand habitat. Direct effects to aeolian habitats will be absent to negligible. There is no identifiable aeolian habitat on site. Terraces and stabilized washes (alluvial surfaces with fine-sand deflated out) dominate the project site. This is evident from the hue and pattern of surfaces that indicate low-albedo alluvium in most areas. This includes the WWII areas—high-albedo sands and silts have been deflated from ~70-year-old surfaces.

Indirect effect to aeolian habitats by affecting sand source will also be negligible to minor, and may even be beneficial. There are essentially no sand sources on the project site. Remote imagery reveals very few recently disturbed areas and washes within the project boundary that could represent sand sources for downwind habitat. Disturbance is in fact likely to increase sand supply.

Mitigation Plan for Aeolian Sand Habitat

51. *Please provide a draft mitigation plan for avoidance and minimization of direct and indirect impacts to aeolian sand habitat. The mitigation plan should include measures for minimizing direct impacts to any preserved habitat during construction, indirect effects of operation, and a plan for compensatory mitigation.*

Response: Field surveys and ground truthing of aerial photographs indicates that the project would not affect aeolian sand habitats in the center of Rice Valley or on the project site (see also the response to Data Request #71 and Figure DR70-1). For this reason, a plan to avoid such habitats during construction of the RSEP power block and heliostat field is not necessary. There will be no indirect effects of operation on such habitats, the nearest of which appears to be at least a mile from the project site fenceline boundary.

Because aeolian sand habitats may be present along the generator tie-line, mitigation measures may be necessary to avoid and protect these areas during construction. Judicious placement of generator tie-line towers, however, may lead to avoidance of such habitats. Under these circumstances, a plan to avoid impacts during construction by fencing and monitoring these areas would be appropriate, but a plan for compensatory mitigation would not be required.

Burrowing Owl Survey Information

52. *Please provide a summary of all available burrowing owl field data, including date, start, and stop times of the surveys (not including travel time to reach the survey area), personnel conducting the survey, number and location of burrows surveyed during each visit, evidence of nesting activity at any occupied burrows. The summary of field data should apply to the extent data exists for the project site, transmission line alignment, and within 500 feet of both project elements.*

Response: The burrowing owl survey conducted is fully documented in the report of the general wildlife and desert tortoise survey that was conducted by Sundance Biology, Inc. for the AFC (AFC Section 5.2 and Appendix 5.2C). As stated in the AFC and wildlife/desert tortoise survey report, the RSEP site was surveyed for burrowing owls and other species between April 18, 2009 and May 18, 2009. Survey transects followed the federal desert tortoise protocol, covered the entire project site, and included zone of influence (ZOI) transects

ZOI transects were in suitable adjacent habitat at 100 feet, 300 feet, 600 feet, 1,200 feet, 2,400 feet, ¾ mile and 1 mile from the outside edge of the 2,560-acre main survey area. ZOI transects were also conducted along the 10-mile-long generator tie-line in suitable adjacent habitat at 100, 300, 600, 1,200 and 2,400 feet from the outside edge of the generator tie-line corridor.

Field surveys conducted for the AFC in April and May recorded all burrowing owl "sign" observed, which included birds and burrows with and without whitewash (i.e., droppings, feathers, and diagnostic pellets) (see Table DR52-1).

TABLE DR52-1
Burrowing Owl Observations on the RSEP Site and Transmission Line Route, Spring 2009

Date	Observation	Location	UTM Easting	UTM Northing
13-May	Burrow	Transmission line 100-foot ZOI transect	707,161	3,769,005
14-May	Burrow, whitewash, pellets	RSEP site	702,875	3,771,926
14-May	Burrow, whitewash, pellets	RSEP site	702,854	3,771,805
14-May	Burrow, whitewash, pellets	RSEP site	703,036	3,771,885
15-May	Burrow, whitewash	RSEP site	702,711	3,772,178
15-May	Burrow	RSEP site	702,644	3,771,112
16-May	Burrow, whitewash, pellets, recent use	Transmission line	705,284	3,770,626

Burrowing Owl Population Estimates

53. *Please provide estimates of the total number of active burrows and number of burrowing owls on the project site, transmission line alignment, and within 500 feet of both project elements.*

Response: During the spring field surveys in 2009, six burrows were located that showed an indication of burrowing owl use; and one of these, located along the generator tie-line route, showed evidence of recent use. Burrowing owl population on the project site is thus likely to be somewhere between one and five nesting pairs on the project site and one or two nesting pairs along the transmission line.

Draft Burrowing Owl Mitigation and Monitoring Plan

54. Please provide a draft Burrowing Owl Mitigation and Monitoring Plan.

Response: The Burrowing Owl Mitigation and Monitoring Plan is in preparation and will be provided to the CEC by March 22.

Bird Collision and Incineration

55. Please provide an expanded analysis of potential bird collisions and incinerations. The analysis should:

a. Summarize available data on tendency for resident or migratory birds to be attracted to evaporation ponds or other anthropogenic water sources (e.g., sewage ponds and artificial lakes) where they are found in arid desert landscapes.

Response: The Solar One project in the Mojave Desert near Barstow, California, was a prototype and pilot project to demonstrate the concentrating solar tower-and-heliostat technology that is being developed at the RSEP and was a precursor to the Solar Two project, which also demonstrated this technology. Because this project uses the same technology as RSEP and because it was sited adjacent to artificial sources of water, it provides a good perspective from which to examine the potential effects of the RSEP in terms of bird collisions and interceptions. In addition, a bird mortality study was conducted for this project to assess the project's effects.

As part of the Solar One project, the United States Department of Energy and Southern California Edison sponsored a study to determine the bird mortality rate and causes of mortality at this experimental project (McCrary, et al.,1986). This study involved six bird carcass surveys from May 3 to June 8, 1982, and 34 carcass surveys from September 16, 1982, through May 1983. The study found 70 bird fatalities involving 26 species of birds over a period of 40 weeks. The study determined that the causes of the fatalities included collisions with structures (mostly the mirrored heliostats), based on external examination of broken mandibles and bones, and burning in the heliostat standby points or target points, based on singed or burned feathers observed on the carcasses. The standby points are the focal points in the air adjacent to the solar concentrator tower target, on which groups of heliostats may be focused when they are not stowed and when the power plant is on standby mode and not generating electricity. If several heliostats are focused on three or four points in the air, they can cause very high temperatures to occur within a relatively restricted zone near the top of the solar concentrator tower. Birds may fly into this zone and be unable to escape before being burned.

Additionally, avian surveys were conducted over 150 ha of the area surrounding the Solar One site (including the 32 ha Solar One site) during the carcass surveys and on the same

days. These identified 107 species of birds using the immediate area. Fifteen species (14 percent) were residents of the area and the rest were migrants.

The mean mortality rate during the study period was 1.7 birds per week (70 fatalities over 40 weeks) and scavenger bias experiments indicated that 10 to 30 percent of the carcasses were removed by scavengers, resulting in a scavenger-adjusted mortality rate of 1.9 to 2.2 birds per week. Collision with structures was identified as causing 57 (81 percent) of the bird deaths (22 species). The remaining 13 (19 percent) birds (9 species) were identified as being killed by burning as birds entered the "heat zone" where heliostats reflections converge and were unable to avoid the effects of high heat in this area.

One feature of the Solar One site is that it was built near irrigated agricultural fields and an 80-acre constructed water impoundment. The study notes that creosote bush scrub is a habitat that is "usually only sparsely inhabited by birds." Nineteen of the 57 (33 percent) birds (9 species) that were killed by collision were birds that are associated with water, however, and would not be likely to be at the site if the water feature were not there. In addition, other birds may have been attracted to the site by the large water features and the increased potential food resources (e.g., invertebrate blooms from the water impoundment and irrigated fields).

Seven of the 13 (54 percent) birds (5 out of 9 species) that burned in the standby points were aerial foraging species (swifts and swallows) that may be more at risk for this type of mortality because they forage at the elevation of the standby points to a greater degree than other species. These species may also be more attracted to the site because of the increased aerial invertebrate populations that would be expected to be produced by the water feature and the irrigated fields.

Compared with the Solar One site, RSEP will not be located next to irrigated fields and the large artificial ponds (approximately 80 acres) at Solar One. RSEP will have 15 acres of evaporation ponds that will contain water most of the year, although the ponds may dry out from time to time during times of intense heat in the summer. Although it is possible that RSEP's ponds could attract migrating birds that would otherwise not be resident in this area, it is likely that this effect would be much less than what took place in the vicinity of Solar One, which is a western Mojave Desert location along the Mojave River corridor and adjacent to an area of groundwater pumping for irrigated agriculture.

Other examples of the attraction of anthropogenic water sources to birds include shorebird and waterfowl use of agricultural evaporation ponds in the Central Valley of California (Euliss et al., 1991; Shuford et al., 1998) and migratory bird use of mill tailing ponds at gold mines (Henny et al., 1994). In the west, millions of migratory birds depend on stopover habitats for refueling during migration (Carlisle et al., 2009). Stopover sites in a large portion of the western United States are restricted to relatively defined areas. Songbirds looking for stopover sites rely heavily on shelter belts and hedgerows in agricultural areas, and desert oases and riparian corridors in the more arid regions. These stopover sites include anthropogenic water bodies that produce food for hungry migrants.

In summary, the Solar One study shows that non-native or migratory birds are attracted to ponds and irrigated areas (studies of evaporation ponds associated with desert mining installations also show this), that birds are also attracted to reflective surfaces such as

heliostats and will collide with them, and that birds will enter the target point zones and be injured or die from heat exposure.

Compared with Solar One's location, the RSEP site is much less likely to have a high density of migratory birds in the local area. There is some uncertainty, however, regarding the extent to which birds flying in the vicinity of the RSEP might be attracted to the heliostat field, believing it to be a body of water, or to the evaporation ponds. The Evaporation Pond Bird Mortality Monitoring and Mitigation Plan (see response to Data Request #58) will include measures to monitor attraction of birds to the evaporation ponds and adaptive measures to deter birds from approaching the ponds if needed.

References

Carlisle, J. D., S. K. Skagen, B. E. Kus, C. van Riper III, K. L. Paxton, and J. F. Kelly. 2009. Landbird Migration in the American West: Recent Progress and Future Research Directions. *Condor* 111:211-225.

Euliss, N. E., R. L. Jarvis, and D. S. Gilmer. 1991. Feeding Ecology of Waterfowl Wintering on Evaporation Ponds in California. *The Condor* 93:582-590.

Henny, C. J., R. J. Hallock, and E. F. Hill. 1994. Cyanide and migratory birds at gold mines in Nevada. *Ecotoxicology*. 3:45-58

McCrary, M. D, R. L. McKernan, R. W. Schreiber, W. D. Wagner, and T. C. Scarriota. 1986. Avian Mortality at a Solar Energy Power Plant. *Journal of Field Ornithology* 57(2): 135-141.

Shuford, W. D., G. W. Page, and J. E. Kjelmyr. 1998. Patterns and Dynamics of Shorebird Use of California's Central Valley. *Condor* 100:277-244.

b. *Provide simulated views of the proposed mirror field, from flight altitudes of migratory birds and foraging raptors, from several directions and in varying light conditions to indicate any similarities or dissimilarities to natural or anthropogenic ponds or lakes.*

Response: The rendering of the project from an aerial oblique angle shown in AFC Figure 1.2-1 makes it evident that the heliostat field will reflect the sky in a similar way that a pond would and, therefore, may attract birds. Whether birds recognize this similarity and act on it would depend on the visual acuity of the various bird species and their ability to interpret visual signals from the air. Studies of arid lands mining ponds have shown that birds have the ability to identify and will seek sources of water in the deserts. Preparing simulations of the view to the project site from various vantage points in the air and under various conditions would not necessarily help in predicting whether or not birds would be attracted to the evaporation ponds at the RSEP, however. The Evaporation Pond Bird Mortality Monitoring and Mitigation Plan (see response to Data Request #58) will include measures to monitor attraction of birds to the evaporation ponds and adaptive measures to deter birds from approaching the ponds if needed.

c. *Describe the flight patterns and altitudes of migratory birds, particularly waterfowl, which could affect their likelihood of striking the solar receiver tower, particularly at night.*

Response: Generally speaking, most birds migrate within the following ranges of altitudes:

- Songbirds: 500 to 6,000 feet (75 percent of songbirds migrate between 500 and 2,000 feet)
- Shorebirds: 1,000 to 13,000 feet
- Waterfowl: 200 to 4,000 feet
- Raptors: 700 to 4,000 feet

If there is nothing to attract birds migrating over the site, they will likely fly at higher altitudes passing from one stopover site to another. Birds that are attracted to a water body near the site will be flying at a much lower altitude in preparation for landing.

Wildlife field surveys were conducted for the RSEP AFC between April 18, and May 18, 2009, and included listing of all bird species identified on site during the intensive transect and zone of influence surveys (see Table 5, AFC Appendix 5.2C). Of the 18 species listed, none would qualify as waterfowl, as expected, since the RSEP site is more than 30 miles from any large body of water supporting riparian vegetation (the Colorado River Aqueduct, is nearby, but is a fast-moving body of water that does not support riparian vegetation).

Several of the species identified are migratory birds that could be at risk of collision with the solar collector tower, and migratory bird collision deaths are most often associated with facilities ranging from 500 to 650 feet high (Maehr et al., 1983; Zimmerman, 1975), which is in the range of the solar collector tower (maximum height 653 feet). The tower, however, would be visible during the daytime and, per FAA regulations, would be fitted with lights that may deter or warn birds at night. The bird collision and incineration monitoring and mitigation plan (see response to Data Request #56) will include measures to monitor the extent of bird collisions with the solar collector tower and adaptive measures to deter birds if needed.

References

Maehr, D. S., A. G. Spratt, and D. K. Voigts. 1983. Bird Casualties at a Central Florida Power Plant. Florida Field Naturalist 11:45-68.

Weir, R. D. 1974. Bird Kills at the Lennox Generating Plant, Spring and Autumn 1974. *Blue Bird* 21(4): 61-62.

d. *Describe the flight patterns and altitudes of migratory and resident raptors, particularly during foraging, which could affect their likelihood of flying over the project site, leading to collision or incineration.*

Response: Four of the 18 species observed during wildlife surveys that took place between April 18 and May 18, 2009 (see Table 5, AFC Appendix 5.2C), are raptors, including:

- Turkey vulture (*Cathartes aura*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Prairie falcon (*Falco mexicanus*)
- Burrowing owl (*Athene cunicularia*)

Of these, the burrowing owl and prairie falcon are migratory and the turkey vulture and red-tailed hawk may be resident. Burrowing owls eat mainly insects and spend most of their time relatively near the ground surface.

Prairie falcons eat insects, birds, and small rodents and forage in open areas. Squires, Anderson, and Oakleaf (1993) studied foraging habits of prairie falcons in Wyoming, and found that nesting pairs foraged over home range areas averaging 69 km^2 from eyries located among rocky cliffs, feeding mainly on ground squirrels and medium-sized birds. Regarding the co-existence of prairie falcons and oil development in this area, they conclude:

- Prairie Falcons did not overfly the entire oil field, but foraged in the undisturbed areas between wells. The scientists conducting the study did not observe falcons hunting or perching on the actual drill pads, but they did observe them perching on powerlines leading to the wells.
- Prairie falcons in the RSEP area, by this token, would be likely to avoid the heliostat field altogether, for better foraging grounds.
- Turkey vultures and red-tailed hawks soar to higher elevations seeking carrion, in the case of turkey vultures, and larger live prey, in the case of red-tailed hawks. Both of these species adapt well to man-made structures, however, and routinely perch on office buildings in urban or suburban areas that overlook forested parking lots or empty lots. They seem to have little or no trouble navigating around tall structures.

Either of these species routinely flies at and above the elevation of the solar collector tower and could enter the standby target zone of high heat when flying near the tower. Under these circumstances, these species could experience high heat, injury, and death. The bird collision and incineration monitoring and mitigation plan (see response to Data Request #56) will include measures to monitor the extent of raptor collision with the solar collector tower and adaptive measures to deter birds if needed.

References

Squires, J.R., S.H. Anderson, and R. Oakleaf. 1993. Home Range Size and Habitat-Use Patterns of Nesting Prairie Falcons Near Oil Developments In Northeastern Wyoming. *Journal of Field Ornithology* 64(1): 1-10.

Bird Collision and Incineration Monitoring and Mitigation Plan

56. *Please provide a Draft Bird Collision and Incineration Monitoring and Mitigation Plan to describe the following, in detail:*

    a. *Specific methods and schedules for locating and quantifying the remains of birds killed by collision with the solar collector tower or incinerated by flying between the tower and the reflector field. Include methods for identifying dead birds to species or higher taxonomic rank.*

    b. *Quantitative thresholds to determine the point at which bird mortality mitigation measures must be implemented. Please include a descriptive rationale to validate the recommended thresholds.*

c. *Feasible measures to be implemented by the operator in the event that bird mortality exceeds proposed thresholds, and follow-up monitoring to evaluate their efficacy.*

d. *Describe method and location for disposition of bird specimens (e.g., to a resource agency, museum, or on-site facility). List any necessary permits for specimen handling or disposition.*

Response: A detailed bird collision and incineration monitoring and mitigation plan will be prepared and filed with the CEC by March 22. This plan will describe the program under which project personnel will collect and report the carcasses of dead or injured bats and birds found within the solar facility. RSE's compliance manager will be responsible for implementing the program during its operational lifespan.

The draft plan will be based on the concept that onsite personnel will collect the carcasses and record when and where they were found. The locations of the carcasses will be recorded in relation to project features, such as the closest mirror (which will be identifiable by a label on the mirror). As a maintenance measure, the infrastructure will be inspected for damage, which will be recorded as part of the carcass report. Signs of damage to infrastructure may suggest the cause of death or injury. The carcasses will be removed as directed by the Raven Management Plan but will be photographed before disposal. The photograph will be used by a designated biologist to identify the bird and possibly identify the cause of death. Injured animals will be taken to a veterinarian. Birds with leg bands or other identifiable markers will be retained and reported to the appropriate agency.

The risks of large-scale solar facilities on birds and bats are still relatively unknown and may remain unclear until the first facilities begin operation. Establishment of a significance or threshold criteria is difficult because "take" authorization of migratory birds is not issued under the Migratory Bird Treaty Act (MBTA). Effective measures to decrease bird or bat mortality during operation may have to be developed through an adaptive management plan that would emphasize deterrence of animals and avoidance of impacts.

RSE requests Staff to include in its analysis a Condition of Certification that sets forth performance standards that would guide finalization and implementation of the plan.

Evaporation Pond Design

57. *Please describe the proposed design of the evaporation ponds in further detail, including design elements to lessen the likelihood of bird usage such as steep sides and netting over the pond surfaces.*

Response: As outlined in the Report of Waste Discharge (ROWD) (AFC Appendix 5.15B), the evaporation ponds have a proposed average design depth of 6 feet across each pond, which incorporates:

- 1 foot of sludge accumulation
- 3 feet of operational depth (water level)
- 2 feet of freeboard

The side slopes within the pond are 3:1 (horizontal:vertical).

Section 9.5.2 of the ROWD outlines the design elements in relation to the biological conditions. Anti-perching devices will be used around the perimeter of each pond to assist

in excluding ravens and other birds from accessing the edge of the pond to drink the water. Additionally, the 2 feet of freeboard and the 33 percent interior side slopes would make it difficult for perching birds/shore birds to access the water.

The ponds will remain uncovered to maximize evaporation. A monitoring and mitigation approach has been selected to manage potential adverse effects on birds. Section 9.5.3 of the ROWD outlines different potential measures that can be implemented as necessary including: air cannon, "Bird-B-Gone Balloon," or other deterrent devices. The monitoring program will include assessing bird populations at the ponds, and measuring the water quality (including total dissolved solids).

Evaporation Pond Bird Mortality Monitoring and Mitigation Plan

58. *Please provide a Draft Evaporation Pond Bird Mortality Monitoring and Mitigation Plan to describe the following, in detail:*

    a. *Characterizing the wastewater quality to be evaporated during initial discharge to the ponds and in its highest concentration before complete evaporation;*

    b. *The concentrations of mineral solids that would result;*

    c. *A table comparing (a) and (b) above with the thresholds at which concentrations of water quality and solid constituents would be toxic to wildlife;*

    d. *Specific methods and schedules for locating and quantifying bird use and bird mortality at the proposed evaporation ponds; Include methods for identifying dead birds to species or higher taxonomic rank.*

    e. *Quantitative thresholds to determine the point at which bird mortality mitigation measures must be implemented; Please include a descriptive rationale to validate the recommended thresholds.*

    f. *Feasible measures to be implemented by the operator in the event that bird mortality exceeds proposed thresholds, and follow-up monitoring to evaluate their efficacy; and*

    g. *A description of the method and location for disposition of bird specimens (e.g., to a resource agency, museum, or on-site facility). List any necessary permits for specimen handling or disposition.*

Response: The Evaporation Pond Bird Mortality Monitoring and Mitigation Plan is in preparation and will be provided to the CEC by March 22.

Wildlife Corridors

59. *Expanded analysis of site conditions and project impacts to wildlife movement. Please provide the following:*

    a. *A description and map of all drainage channels crossing beneath the aqueduct and rail lines near the northern boundary of the project site and within five miles east or west of the site that have potential to serve as crossing points for terrestrial wildlife;*

Response: The following wildlife movement discussion is restricted to the consideration of terrestrial wildlife with particular focus on desert tortoise and desert bighorn sheep.

Baseline Wildlife Movement—Historically, the Rice Valley had more constructed barriers to wildlife movement than it does today. The community of Rice and the Rice Army Airfield and Camp Rice, which were World War II-era military training facilities, have long been abandoned and those areas are once again open desert and provide contiguous habitat for desert wildlife movement.

Three remaining features, the Colorado River Aqueduct, Arizona-California Railroad, and State Route 62 are laid out parallel and adjacent to one another forming a significant barrier corridor to north-south wildlife passage into and from Rice Valley (Figure DR59-1). The aqueduct presents the greatest barrier, with 15 overcrossings within an area 5 miles east and west of RSEP. These overcrossings pass funneled drainage and are therefore fairly wide (for example, approximately 1,705 feet wide at Crossing 10), providing narrow passage and some vegetative cover for large wildlife such as bighorn sheep. Within this stretch, the railroad has just as many bridge crossings, each one matched with an aqueduct crossing. The railroad bridge at Crossing 10 is approximately 45 feet wide, with about 6 feet of vertical clearance. There are no structures to allow safe passage across State Route 62 (Figure DR59-2)

The semi-permeable barrier created by the aqueduct, railroad, and highway corridor reduces baseline north-south wildlife movement between the Turtle Mountains and Rice Valley. There are no significant constructed barriers to east-west wildlife movement through the proposed project area and the Rice Valley, south of State Route 62. The dune system extending down the center of the valley, and the Arica Mountains and Little Riverside Mountains interrupt the continuity of creosote bush scrub habitat and likely effect how different wildlife species use and move through the area (see Figure DR59-3).

RSEP as a Barrier—The 1,410-acre RSEP will be surrounded by a security fence that will effectively exclude wildlife movement. The site will be contained within a primarily circular fence with an approximately 5.8-mile circumference and 1.8-mile diameter (see Figure DR59-1).

The utilities associated with RSEP are not included in this discussion because, following construction, they are not expected to impede movement as a physical or behavioral barrier.

The circular exclusion will result in less connectivity loss as well as less friction and deflection to wildlife movement than a square-shaped fenceline design would have, as the corners of a square-shaped fenced parcel would deflect wildlife movement in a way that a circular fenceline shape will not.

RSEP will limit north-south movement through the Rice Valley over baseline conditions. Two aqueduct crossings open into the northern edge of the RSEP (crossings 10 and 11 on Figure DR59-1). RSEP will likely prevent most wildlife movement from the Rice Valley toward the Turtle Mountains by way of these two crossings. The next closest crossing opportunities are located 0.4 mile to the west (Crossing 9) and 1.5 miles to the east (Crossing 12). Wildlife moving southward through Crossings 10 and 11 will likely be diverted around RSEP, and may be subjected to an increased potential of road mortality if the diversion results in increased activity along State Route 62. RSEP is not expected to have

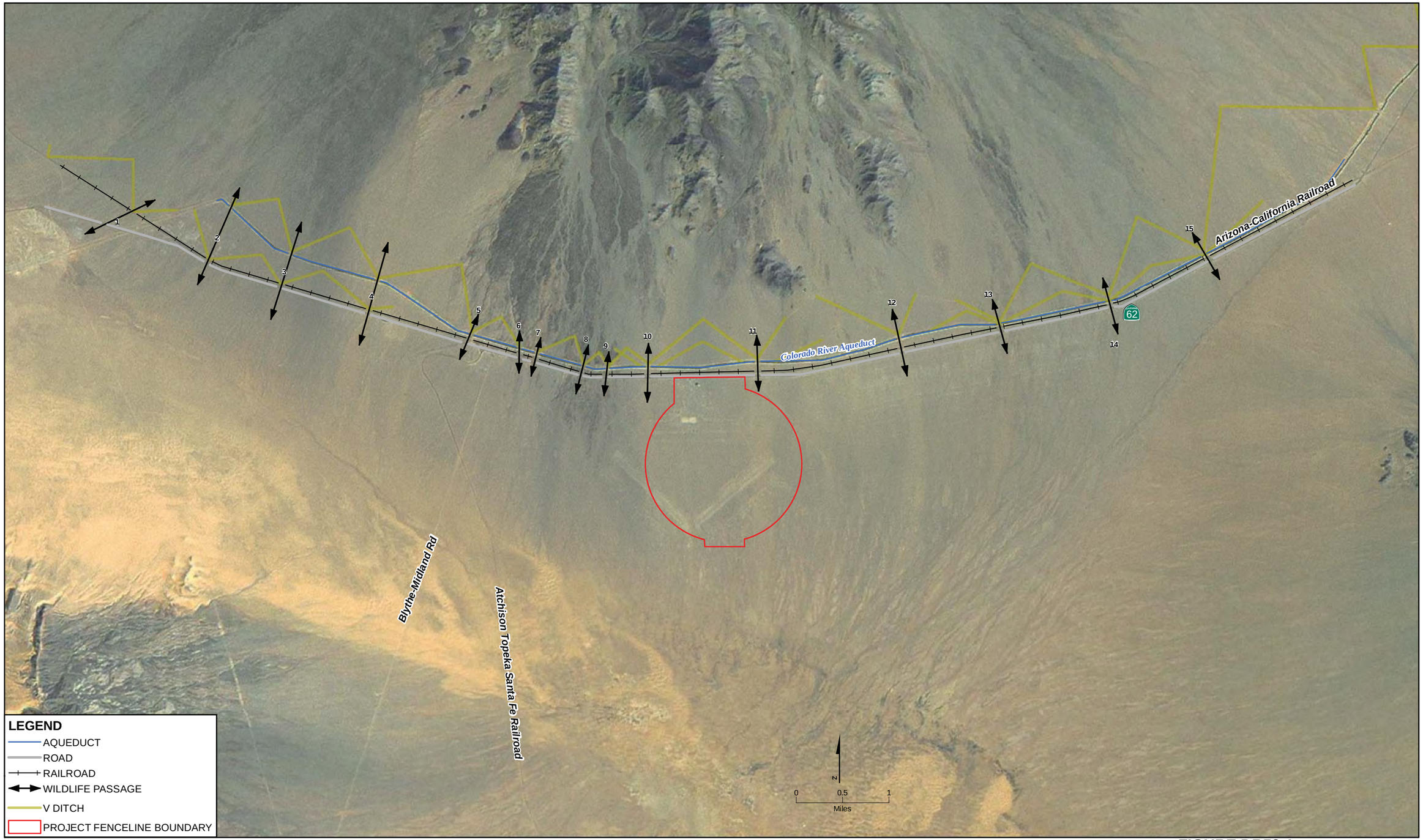


FIGURE DR59-1
WILDLIFE CORRIDORS 5 MILES EAST AND WEST OF RSEP
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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

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FIGURE DR59-2
WILDLIFE MOVEMENT - BIGHORN SHEEP
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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

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Figure DR59-3a.
View upslope (north) across State Route 62 to the Crossing 10 trestle

Figure DR59-3b.
View downslope (south) of the Crossing 10 trestle

FIGURE DR59-3
WILDLIFE CROSSINGS 10 AND 11

Rice Solar Energy Project
Riverside County, California

Figure DR59-3c.
View east of the Colorado River Aqueduct wash passage at Crossing 11

Figure DR59-3d.
View upslope (north) of the Crossing 11 trestle

FIGURE DR59-3
WILDLIFE CROSSINGS 10 AND 11

Rice Solar Energy Project
Riverside County, California

significant effects on north-south movement through the other 13 crossings within 5 miles east and west of the solar facility. Large-scale north-south habitat connectivity will still be primarily limited by the Colorado River Aqueduct.

Discussion of east-west wildlife movement is restricted to Rice Valley, south of State Route 62, because RSEP would not affect east-west movement north of the highway, railroad, and aqueduct, which, as stated above, restrict and funnel north-south movement north of the project site. Wildlife encountering the approximately 1.82-mile-diameter RSEP and intent upon continuing to travel in the east-west direction will be directed north or south around the arc of the exclusion fence. Individuals directed northwards will become confined within the narrow passage between the barrier corridor and the north end of RSEP. This path includes a greater risk of road mortality. Individuals directed to the south will encounter an approximately 1.2-mile-wide corridor of creosote bush scrub habitat between RSEP and the dune system and at least 7 miles of valley between the southern edge of RSEP and the Little Maria Mountains. RSEP will primarily redirect large-scale habitat connectivity and wildlife passage south of the exclusion.

Desert Tortoise—The RSEP's effects on desert tortoise movement include the interruption of individual movement within home ranges and the longer-distance dispersal movement that maintain the integrity of a population.

Desert tortoise home ranges can be dependent upon a number of factors, including age, density, and the concentration and location of resources. Desert tortoise home ranges have been estimated at between 10 and 450 acres and can have a great deal of overlap (USFWS, 1994). More than 1.5 square miles of habitat may be required to meet the life history needs of a tortoise and individuals have been known to travel as much or more than seven miles at a time (BLM, 2001). In drought years, tortoises can be expected to wander farther in search of forage.

As a result of the 2009 desert tortoise survey, one tortoise was found within the RSEP parcel boundary, located near the northwestern edge of the proposed exclusion (Figure DR59-4). A concentration of recent tortoise sign (scat, tracks, and burrows) was found in proximity to this tortoise. Approximately half of the sign cluster occurred outside the boundary of the RSEP, suggesting that a portion of this animal's home range may be located outside the proposed exclusion fence. There is a potential that this individual can be relocated outside the RSEP but remain within a portion of its original home range, therefore minimizing the effects to its routine annual movement.

Desert tortoises and associated sign were found north of RSEP on widely-spaced zone-of-influence survey transects (see Figure DR59-3). These observations were in proximity to the V-ditches. It is likely that additional tortoises are found north of State Route 62, actively use the V-ditch areas and the aqueduct crossing structures, and move north and south between RSEP and the Turtle Mountain bajada. Their southward movement will be restricted by Crossings 10 and 11, and the exclusion may result in greater mortality risk if tortoises are deflected such that they increase activity near State Route 62.

By eliminating all or portions of individual home ranges, RSEP will eliminate the movement corridors that this and other tortoises in the area utilize to meet their life history needs (i.e., food, water, shelter, breeding opportunities). Given the low densities of tortoise and

tortoise sign found during the surveys it is likely that RSEP will result in a loss of a few individual movement corridors. Once the exclusion is in place, open habitat to the east, west, and south should continue to provide uninterrupted movement for access to forage, shelter, and reproduction. No remarkable desert tortoise resources, such as large wintering burrows, were observed to suggest that tortoises would be making long-distance seasonal movements into RSEP.

Desert tortoises typically remain within established home ranges but can also travel considerable distances. The proposed approximately 1,410-acre exclusion will restrict individual movements but is likely small enough and oriented such that connectivity south of RSEP will be retained as a sufficient movement corridor to maintain overall population connectivity.

Nelson's Bighorn Sheep—RSEP is unlikely to affect bighorn sheep movement in their mountainous home ranges but may affect dispersal through Rice Valley. Bighorn sheep are known to occupy the Turtle Mountains north of RSEP and the Granite and Palen mountains to the west end of Rice Valley, and may occupy the Maria Mountains south of RSEP (see Figure DR59-2). It is likely that bighorn sheep primarily enter Rice Valley for the purpose of moving to an adjacent mountain range and not as part of their annual movement. Bighorn sheep can move considerable distances and it is possible that they would travel through Rice Valley for the approximately 13 miles between the Turtle Mountains and Little Maria Mountains or the approximately 16 miles between the Turtle Mountains and the Granite Mountains. The valley provides little cover and forage and is unlikely to be of better value than in the lower elevations of their home range. The habitat within the RSEP does not appear to include resources that would be of particular benefit to bighorn sheep passage relative to the contiguous habitat that would remain to the east and west of the exclusion.

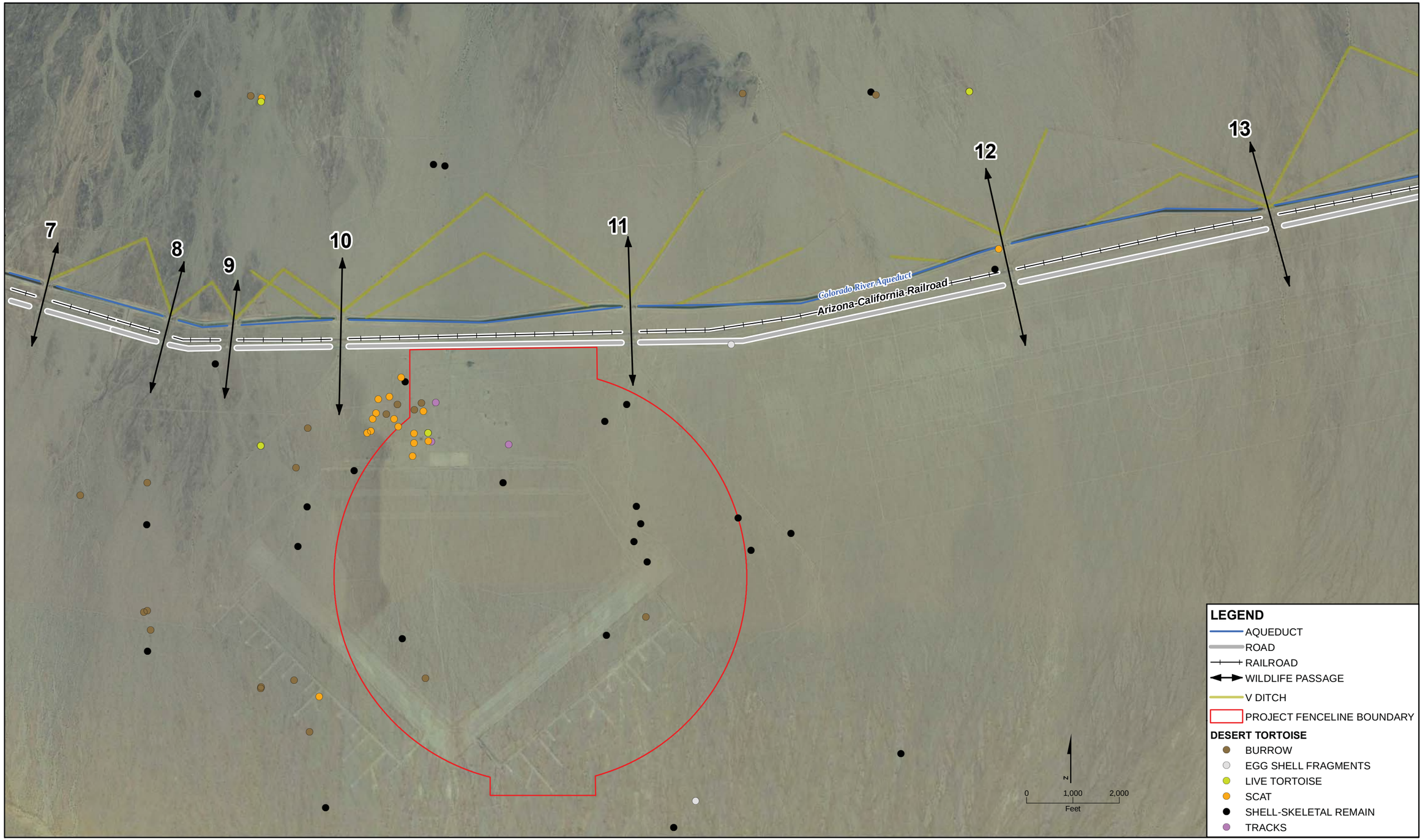
Bighorn sheep traveling south from the Turtle Mountains have more than one aqueduct crossing opportunity but would likely encounter the RSEP exclusion fence if they used Crossings 10 or 11. It is likely that bighorn sheep can effectively navigate around RSEP to their destination. The sheep may be more likely to travel north and south by way of the Arica Mountains to the west and the West Riverside Mountains to the east rather than move directly through Rice Valley.

It is unclear whether RSEP would result in a behavioral barrier to bighorn sheep movement in Rice Valley, yet the extensive passage opportunities both east and west of the exclusion will likely provide enough buffer to facilitate movement between metapopulations and future occupation of former habitat.

References

U.S. Bureau of Land Management (BLM). 2001. Proposed Northern and Eastern Mojave Desert Management Plan (NEMO), Amendment to the California Desert Conservation Area Plan, Draft California Desert Conservation Area Plan Amendments for the Northern and Eastern Mojave Planning Area Final Environmental Impact Statement. January 2001. Available at: http://www.blm.gov/ca/news/pdfs/nemo2002/.

U.S. Fish and Wildlife Service (USFWS). 1994. Desert Tortoise (Mojave population) Recovery Plan. Portland, Oregon. 73 pages plus appendices.



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

FIGURE DR59-4
WILDLIFE MOVEMENT - DESERT TORTOISE
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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Jurisdictional Delineation

60. *Please revise the delineation of desert washes and ephemeral drainages to include all the drainage features within active floodplains with a well-defined channel. Smaller features with no surface connection to a larger downstream hydrologic feature may be omitted. Please delineate jurisdictional lakebed, streambed, and other jurisdictional features over 100 percent of the proposed project* site *and transmission line corridor.*

Response: Attachment DR60-1 is a delineation of desert washes and ephemeral drainages that includes all of the drainage features within active floodplains that have a well-defined channel on the entire project site and the generator tie-line route.

Lake and Streambed Alteration Notification

61. *After completing the revised delineation, please prepare and submit a Lake and Streambed Alteration Notification to the California Department of Fish and Game and Energy Commission staff.*

Response: The notification will be submitted to the CDFG and CEC Staff by March 29.

Army Corps of Engineers Correspondence

62. *Please provide written indication from the Army Corps of Engineers Regulatory Division that they do not consider the drainages to be waters of the US. Please also provide any other follow-up correspondence with the Corps of Engineers regarding federal Clean Water Act jurisdiction for the proposed project.*

Response: RSE has been in contact with the U.S. Army Corps of Engineers (USACE) Regulatory Division and has asked for a written indication that they do not consider the drainages in the Rice Valley to be waters of the U.S. RSE will docket any correspondence received from the USACE.

Construction Methodology

63. *Please describe the construction methodology, including proposed acreage of vegetation mowing, soil treatments, paving, and other surface alterations, and analyze the associated impacts to soils, vegetation, and habitat within the proposed project area. Please include a graphic and description of areas to be graded and areas where root systems would be left in place, and indicate whether or not those plants will be allowed to regrow on-site or whether they would be continually mown.*

Response: Figure DR63-1 shows the general locations of the three types of construction disturbances anticipated and their respective estimated acreages. The areas fall into three categories:

Area 1: Temporary disturbance during construction—These areas will be used for construction trailers, lay down, and construction vehicle parking outside of the heliostat field. Within these areas, the vegetation will be completely removed.

Area 2: Grading areas for roads, ponds, power block, etc.—These are areas where vegetation removal will be complete and material will be cut and placed to create design lines and grades for features such as evaporation ponds, roads, ditches, power block equipment, and buildings. Within these areas, the vegetation will be completely removed,

and will not be allowed to regrow, except for those areas that fall outside the perimeter fence (i.e., the diversion ditches).

Area 3: Heliostat field disturbance area—The heliostats can be installed at the existing grades. Therefore, it is not necessary to completely remove the vegetation or to completely grade the site surface. It is expected that vegetation will be crushed, trampled, and mowed to the ground surface. Some areas of the heliostat field will be lightly graded to allow vehicles to pass smoothly along the surface for mirror washing and maintenance access.

Where light grading occurs the vegetation will be completely removed. This will take place over no more than 20 percent of the heliostat field surface. During operation, the vegetation will be sprayed or mowed in these areas and will not be allowed to regrow. The plant root systems will be left in place in all other portions of the heliostat field, which make up 80 percent of this area.

After construction, those areas that are categorized as Area 1 above will be allowed to return to natural conditions. Grades will be restored to original grades, trailers will be removed, temporary surfacing will be removed, and volunteer vegetation will be allowed to grow.

In those areas described above as Area 2 or Area 3, it is expected that all or nearly all vegetation will be destroyed during construction, even though the root system will be left in place over a portion of Area 3. As stated previously, the majority (80 percent) of this area will be allowed to regrow.

Construction methodology will employ typical earthwork equipment and techniques. No special equipment will be developed or used for the grading or construction of the site. Motor graders, scrapers, bull dozers, and compacters will be used for site development.

Post-construction Ground Disturbance

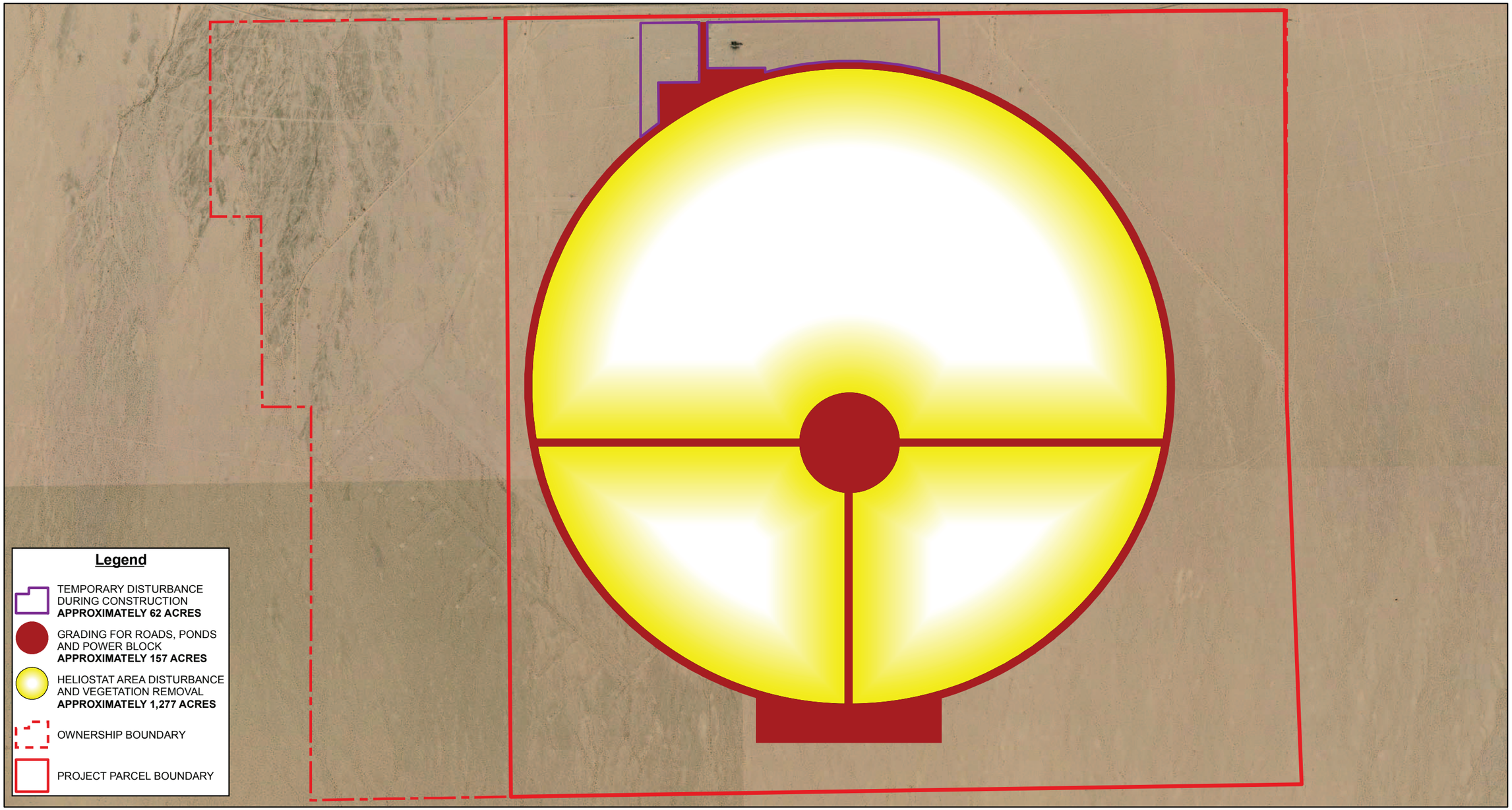
64. *Please provide a detailed description and analyze the associated biological resource impacts related to ground disturbance from post-construction operations and maintenance.*

Response: There will be little or no ground disturbance on the project site after construction is complete. Maintenance and mirror washing vehicles will drive through the heliostat field on tracks established during construction, but these roadways will not require significant grading or surfacing to maintain.

Low-impact Development

65. *Please provide a detailed description and feasibility assessment of a low impact development approach to native vegetation and habitat (i.e., by minimizing removal of native vegetation, grading, paving, and other soil disturbance).*

Response: Because the heliostats can be installed at the existing grades, the majority of the site will not require grading or change in drainage systems, thus minimizing impact to native vegetation. Although the vegetation within most of the heliostat field will be cut or removed during construction, it will be allowed to regrow over 80 percent of the heliostat field after construction (see response to Data Request #63).



All locations approximate
SOURCE:
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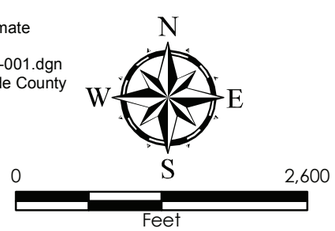
USDA NAIP, Riverside County



Source: WorleyParsons, Ltd., Drawing 52006721, Rev. 1, February 2010.

FIGURE DR63-1
CONSTRUCTION SITE DISTURBANCE AREAS
Rice Solar Energy Project
Riverside County, California

Paving of surface roads will be minimized by limiting paving to the primary access road from State Route 62 to the power block, and also the roadways within the power block area. Vegetation will be completely removed from approximately 475 acres (Areas 1 and 2 as described in Data Response #63 plus 20 percent of Area 3), and trampled, cut, or mowed to the ground surface over approximately 1,021 acres (80 percent of Area 3). Due to the extent of activities within the heliostat field, it is not feasible to limit vegetation removal specifically beyond this. Construction vehicles, equipment, and materials in the heliostat field will trample vegetation when accessing the heliostat installation areas. Additionally, the site is formerly disturbed because of its use as Rice Army Airfield during World War II and as a municipal airfield during the 1950s. By selecting this site for development, employing the solar tower technology, reestablishing the previous drainage control, the RSEP is utilizing a low-impact development approach and will have a lower impact than if it were constructed on pristine desert land.

Functions and Values of Washes

66. Functions and Values of Project Area Washes.

a. Please provide a description of the beneficial functions and values provided by the ephemeral washes on the project site, and

b. Discuss how the proposed project would affect these functions and values within the project footprint and downslope of the project boundaries.

Response: The following is an analysis of the designated beneficial uses (BUs) of ephemeral washes on the RSEP site. The BUs are identified and defined in the Water Quality Control Plan (Basin Plan). The evaluation concludes that the project would have no permanent impacts to BUs, and that long-term and temporary impacts to BUs would be fully mitigated.

Municipal and Domestic Supply (MUN)—Project construction, operations, and closure activities would have no impact on this beneficial use. Conditions within surface drainages do not currently and have not historically supported MUN, since water is rarely present. Drainages are ephemeral and convey only short-duration flows in response to major storm events. Volume and duration of flow would not be substantially altered by the project.

Water quality objectives that are aimed at protecting the designated MUN beneficial use could be violated if pollutants were discharged into Waters of the State. Project construction and operation activities could potentially lead to accelerated erosion and sediment transport, introduce pollutants through improper material handling, equipment maintenance and storage. By implementing BMPs that are identified in the construction and industrial Stormwater Pollution Prevention Plans (SWPPPs) and the Drainage, Erosion and Sediment Control Plan (DESCP), impacts to water quality will be avoided or minimized during construction and operations activities.

Agricultural Supply (AGR)—Land downgradient of the RSEP site is leased from BLM for grazing purposes. Ephemeral washes located downgradient from RSEP do not carry water except during large storm events, and RSEP would have a negligible effect on the amount, timing, or quality of surface flows in them. Therefore, no impacts to AGR beneficial use would occur.

Groundwater Recharge (GWR)—RSEP would not negatively impact GWR, because it would not create substantial impervious surfaces that would generate substantial increased volumes and velocities of stormwater runoff that would preclude recharge. Most recharge occurs in the area via streambed infiltration of water generated through runoff-producing precipitation in the mountains. Infiltration rates associated with minor surface waters within the project study area would not be substantially impacted by the RSEP; therefore, GWR will not be impacted.

Water Contact Recreation (REC-1)—Minor surface waters within the project study area do not currently support REC-1, nor are they likely to support it in the future, because surface flows do not normally occur except during substantial storms. While REC-1 is normally a designated BU for all waters to meet the Clean Water Act (CWA) presumption of "fishable and swimmable," because this BU is not supported in minor surface waters in the project study area, it cannot be impacted by the project.

Noncontact Water Recreation (REC-2)—Water quality considerations relevant to noncontact water recreation include, but are not limited to, activities such as hiking, camping, and aesthetic enjoyment. Recreation within the project boundary is not currently allowed because the project site is located on private land. The generator tie-line and electrical substation are located on federal land. The generator tie-line will not interfere with or preclude any recreation activities. The substation will preclude such activities but only within a very small (less than 3-acre) area. Therefore, there will be no impacts to REC-2 BU.

Commercial and Sportfishing (COMM)—Minor surface waters within the project study area do not support, nor are they likely to support in the future, commercial or sportfishing. Therefore, the project will not have an impact on COMM.

Warm Freshwater Habitat (WARM)—Minor surface waters within the project study area have never been known to support aquatic habitat or aquatic organisms. Therefore, the project is not expected to have an impact on WARM.

Cold Freshwater Habitat (COLD)—Minor surface waters (ephemeral washes) within the project study area do not support, nor are they likely to support in the future, cold freshwater habitat. Therefore, the project will have no impact on COLD.

Wildlife Habitat (WILD)—Ephemeral washes create a mosaic of habitat areas due to changes in soil texture, distance, increased moisture and other factors that increase the diversity of vegetation across the landscape. In some areas, open sandy banks may provide suitable burrow sites for the desert tortoise and areas with increased soil moisture support diverse Mojave wash scrub habitats. Ephemeral washes may also provide suitable microsite habitat conditions for special-status plant species. Ephemeral channels provide important wildlife movement corridors in arid regions because they contain continuous chains of vegetation that wildlife can use for cover and food (EPA, 2008); however, smaller ephemeral washes on the RSEP site would likely have limited wildlife corridor function, since they are very narrow and shallow with plant diversity and density not substantially different than surrounding areas.

According to the EPA (2008), vegetation in ephemeral stream channels can be important for resource retention by protecting soils from wind and water erosion, slowing storm flow

velocity, and moderating temperatures. Ephemeral stream vegetation also influences biogeochemical cycles by providing leaf litter along with food and cover for wildlife.

During construction, vegetation within the channels may be mowed to a height of about 1 foot (but root systems will remain intact) to accommodate construction of heliostats. Vegetation height and presence will be managed in washes during the project construction and operations. Upon decommissioning at project closure, all disturbed areas will be rehabilitated and revegetated. By allowing vegetation within the heliostat arrays to remain intact and to regrow after project closure, temporal loss of WILD would be partially mitigated. Because the entire site will be fenced to prevent desert tortoise from migrating into the area, ephemeral washes will not be available for wildlife use and will not function as wildlife corridors during project construction and operations. Fencing would effectively reduce the ecosystem connectivity function of the washes, by putting a barrier to wildlife movement across the project site. This barrier will also protect the desert tortoise and other wildlife that could be adversely affected by project activities during construction and operation.

Two special-status plants were observed during 2009 surveys: chaparral sand verbena (*Abronia villosa* var. *aurit*a) (CNPS 1B.1) and Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*) (CNPS 2.2). Harwood's milk-vetch was found along the generator tie-line in several locations and chaparral sand verbena was found in the heliostat field.

The RSEP project study area is not located within designated critical habitat for the desert tortoise. The project study area is within suitable habitat for the desert tortoise, and surveys conducted in 2009 found desert tortoise sign, including live tortoises, carcasses, and burrows within the project area (including project site and generator tie-line route). The desert tortoise is listed as threatened species under the federal Endangered Species Act (USFWS, 1990a).

Before starting construction activities, impacts to desert tortoise would be mitigated by constructing exclusionary fencing around the entire project boundary; surveying and relocating/translocating any desert tortoises that are present on the site. The project would indirectly impact WILD through the loss of burrowing, breeding, and foraging habitat for desert tortoise over the 50-year period of project operations. Furthermore, habitat quality would potentially be reduced if invasive plant species are introduced or soils become compacted as the result of the project. The Biological Assessment for the project will provide a thorough description of potential direct and indirect impacts to desert tortoise.

Rehabilitation and revegetation activities would partially mitigate impacts to WILD that occurred as a result of habitat degradation during project operations, although it may take many years for restored habitat to be adequate to support desert tortoise. Removal of fencing and restoration of the site upon project closure would allow desert tortoises to once again use the site as habitat following completion of restoration activities.

A compensatory mitigation plan to address significant direct, indirect, and cumulative impacts to desert tortoise, loss of habitat for special-status plant and animal species, and impacts to Waters of the State is being developed in coordination with the USFWS, CDFG, BLM, and CEC. Mitigation may include appropriate levels of habitat preservation and

enhancement, as well as funding for other agency-sponsored actions that would benefit desert tortoise and desert plant and animal communities.

Conclusions—The preceding analysis indicates that beneficial uses of all Waters of the State within the project study area will be adequately protected during project construction, operations, and decommissioning activities. While some beneficial uses, such as WILD, will have temporal impacts associated with the 50-year period of operation, mitigation to be implemented in coordination with the CDFG will ensure that wildlife species and their habitat are fully protected. The LID approach to project design, development, and implementation of construction and operations SWPPPs and DESCP, implementation of mitigation to be specified by CDFG, and implementation of a Rehabilitation and Restoration Plan upon project closure will ensure that impacts to all beneficial uses of Waters of the State are avoided, minimized or mitigated.

References Cited

U.S. Environmental Protection Agency (EPA). 2008. *The Ecological and Hydrological Significance of Ephemeral and Intermittent Streams in the Arid and Semi-arid American Southwest*. EPA/600/R-08/134

U.S. Fish and Wildlife Service (USFWS). 1990. Endangered and threatened wildlife and plants; determination of threatened status for the Mojave population of the desert tortoise. *Federal Register* 55(63):12178-1219.

Low-impact Development Approach (Desert Washes)

67. *Please provide a detailed discussion, with supporting quantitative analysis, of implementation of a low impact development approach to managing stormwater flows on-site (i.e., by reducing the diversion of surface storm flows around the project site perimeter, and instead allowing some or all surface flow to cross the site in existing ephemeral washes) including the following:*

    a. *An assessment of the feasibility of reconfiguring the project footprint to retain some or all of the project area ephemeral drainages with setbacks from the banks of the drainages to accommodate a buffer for protection of water quality and to provide a wildlife movement corridor across the site.*

Response: Drainage into the RSEP site is significantly constrained by Colorado River Aqueduct, the Arizona-California Railroad, and State Route 62 located immediately upgradient of the project, which block and channel the natural flow of drainage in this area. Large berms funnel runoff from the Turtle Mountains into channels that run over the aqueduct, under the railroad, and over the roadway onto the project site area. The RSEP site is located, however, such that it affects mostly one of the two drainage channels that emerge on the south side of State Route 62; this drainage crosses the highway to the northeast of the site. The drainage channel to the northwest and its subsidiary channels cross only a small portion of the RSEP site and carry their stormwater runoff from the Turtle Mountains mostly to the west and south of the RSEP. During World War II, both drainages were routed entirely around the Rice Army Airfield by diagonal berms constructed intercept this runoff; however, these berms have breached and some of the runoff formerly routed around the airfield now flows across it.

The small drainage channels that have developed on the RSEP site since World War II will be intercepted and diverted into engineered channels around the east and west sides of the proposed heliostat field. The flow from these two drainages that cross State Route 62 currently broadens out to fill numerous ephemeral drainage channels south of the highway. These drainage channels convey some runoff from north of State Route 62 and also limited runoff from the project site itself and do so in channels that are small and shallow, may change from year to year, and do not support typical desert wash shrub or tree vegetation. The project site, therefore, could be characterized as a 'fine-grained' mosaic of channeled and non-channeled desert surfaces with associated minor variations in vegetation. It does not contain many large or deep (more than 6 inches deep) washes with typical desert riparian vegetation that provide corridors of cover and other important resources for desert wildlife transiting through an area and that convey large volumes of stormwater during major storms. These more typical and larger-scale desert washes do occur along the generator tie-line route. Careful placement of the transmission towers, however, will be avoid these washes, thus protecting their ecological and water quality value while at the same time avoiding erosional scour to the tower bases.

Delineation of the onsite washes (see the delineation report, Attachment DR60-1) indicates that the majority of washes (1,948 of 2,282 channels, or 85 percent) within the project site fenceline are less than 5 feet wide. Only three are wider than 20 feet. Also within the project fenceline, only eight channels were measured at depths greater than 6 inches. Three channels were measured at 7 inches; four channels at 8 inches, and one at 18 inches.

Establishing wildlife movement corridors or setbacks along the drainages would not provide significant value to wildlife because the channels on site are small and shallow and do not contain significant additional cover or food value for wildlife. The project will be fenced, all desert tortoises will be removed, and desert tortoise fencing will be installed to prevent tortoises from recolonizing the site and thereby being exposed to impacts of project operation. The security fencing will prevent larger wildlife (such as bighorn sheep) from transiting through the project site and the tortoise fencing may inhibit the movement of smaller animals. For wildlife resident within the heliostat field or that is capable of moving past the fencing, the heliostat field will not prevent movement.

Additionally, reconfiguration of the project to retain these small drainages with setbacks would not be feasible, because these ephemeral drainage channels are so numerous and small that any setbacks from their banks would overlap adjacent setbacks so that there would be little or no area remaining for installing the project features. Also, these drainage channels are so ephemeral that they are likely to undergo constant shifting and changing of boundaries, making the designation of stable channel setbacks impossible.

The existing ephemeral drainages will continue to function as drainages to channel runoff at the project site and can also thus continue to function in a limited way as cover for small animals moving through the area and for plants that are more habituated to ephemeral wash channels than other areas. The existing project design provides a low-impact development approach that will preserve the functions and values of the onsite ephemeral drainages to the maximum extent practicable. The existing channels will continue to carry stormwater runoff, with as little disruption as possible, to areas south of and outside of the heliostat field. Stormwater conveyed around the project site will not be exposed to potential contamination from maintenance vehicle or heliostat operating fluids.

b. *Quantitative results of models and/or analyses describing representative on-site depths and velocities of stormwater flows; and*

Response: With the exception of the offsite drainage wash starting from the northeastern corner of the site and flowing south, the only other significant source of water for the project site is the localized rainfall. The existing drainage that flows across State Route 62 broadens out to numerous small little drainages and, since they are interconnected, an average width is taken across that drainage wash to calculate the onsite depths and velocities of stormwater flows. The fan width assumed is about 1000 feet, the slope about 1.5 percent, and the flow approximately 659 cubic feet per second. The calculated onsite flow depth and velocity is 0.22 feet and 3.0 feet per second, respectively for the 100-year flow, across a flow width of 1,000 feet. See Attachment DR67-1 for further details of flow depths.

c. *Potential impacts to project features if some or all of the natural drainages were left intact, and an analysis of how this flooding might affect project features and operations under 10-year and 100-year, 24-hour storm flood events.*

Response: If the existing drainage that flows into the RSEP site from the northeastern corner were to be left in place, the proposed perimeter access road would have to be built at grade to allow the offsite storm flows to pass through the project, increasing periodic maintenance costs. Currently, this road is designed to be elevated and will act as a berm that diverts stormwater flow. Under this same scenario, for both the 10-year and 100-year storm events, the flows pass through the perimeter fence and could cause debris buildup, particularly at the tortoise fence, and possible undermining of the fence. This would cause increased maintenance cost and reduce the effectiveness of the fencing to deter tortoises from coming on site and being exposed to hazards of project operation. Additionally, if the flows from the northeastern channel source were allowed to pass through the heliostat field, there would be an increased risk of scouring around the heliostat tower bases.

Diversion Channel Design Drawings

68. *Please provide conceptual design drawings for design of the diversion channels, upstream- and downstream- transitions, bank protection, and grade control structures using hydraulic criteria appropriate for the anticipated channel stability thresholds. These thresholds should be based on the Riverside County standards where applicable. If warranted, the design should also address stilling basins and features needed to prevent perched groundwater conditions and promote groundwater recharge. Design drawings should include typical channel cross section dimensions, typical details for all grade control structures and structural elements needed to protect the channel from erosion, and a grading plan for proposed conditions that ties into existing topography.*

Response: An updated conceptual plan and updated cross-sections are provided in Attachment DR68-1 (Drawings SRCC-0-SK-112-735-004 through SRCC-0-SK-112-735-008) for the diversion channels. See the responses to Data Requests #114 through #116 for information on bank protection and sheet flow at discharge points. See Attachment DR68-1d (SRCC-0-SK-112-735-007) for a typical grade control detail and Attachment DR68-1e (SRCC-0-SK-112-735-008) for grade control locations and grading for both channels. For both channels, drop structures will be constructed so that the slope of the channel is no greater than 1 percent. At the bottom of the drop structures, energy dissipater devices such as

concrete blocks, stilling basins, and/or concrete walls will be constructed to reduce velocities and potential erosion.

Revegetation Plan for Re-routed Channels

69. *Please provide a draft Revegetation Plan for the re-routed channels that include at least the following elements:*

    a. *Overall Goals: Explicitly state the overarching goal of the revegetation plan, which should include at least replicating the hydrological and biological functions and values of the impacted desert washes.*

    b. *Existing Functions and Values: Describe the existing functions and values of the drainages that are being replaced by the engineered channels including a discussion of the following:*

        i. *Characteristics of soils (Cryptobiotic soil crust, permeability), sediment transport and other geomorphic processes, and microtopography (microcatchments for moisture, seeds);*

        ii. *Vegetation (zonation, composition, cover density, dominants in each stratum, rare or uncommon species or communities, non-native component); and*

        iii. *Wildlife habitat and values (connectivity and corridors, rare species, habitat elements).*

    c. *Reference Reach. Select one or several reference reach(es) of the existing channels that would provide a target for mitigation design and success criteria, and provide the following:*

        i. *Photos and a hard-copy and GIS [shape files & metadata] map of the reference reach(es);*

        ii. *A detailed description of the reference reach and how the features of the reach(es) relate to the success criteria for the mitigation design and goals; And*

        iii. *Rationale for selection for the reference reach(es).*

    d. *Proposed Mitigation Design. Describe the mitigation design including:*

        i. *Goals and target functions/values (hydrologic, geomorphic, water quality, habitat function/value) of the revegetation plan;*

        ii. *Rationale for these goals and targets; and*

        iii. *A discussion of compensation ratios, indicating the ratio(s) of acreage of impacted vegetated wash to the recreated acreage, long-term goal(s) for target habitat to be created at the site 10, 20, and 30 years following implementation.*

    e. *Success Criteria. Provide a table of success criteria and quantitative parameters to measure successful achievement of these criteria for each major aspect of the project including:*

        i. *Replication of natural hydrological and geomorphological processes;*

        ii. *Establishment of appropriate vegetation values; and*

        iii. *Establishment of appropriate wildlife habitat values.*

    f. *Monitoring Methods. Describe proposed methodology for measuring progress toward success criteria including:*

i. *Rationale for each method that has been chosen to evaluate progress in relation to each success criterion; and*

ii. *Sampling methods used including size of sample units and number of samples.*

g. *Monitoring Schedule. Monitoring should be tied to the appropriate spring growing season, with the "first year" of monitoring occurring one full growing season following completion of installation. Given the slow pace of revegetation in desert ecosystems, a monitoring period of 10 years is appropriate. In addition to quantitative methods, ground and/or aerial photos can be used to illustrate year-to-year progress of the overall project.*

h. *Implementation Plan. Describe equipment, procedures, access paths, and any measures used to avoid sensitive areas outside of the grading plan during revegetation. Topsoil storage and disposition are particularly important. The implementation plan should include:*

i. *A description of how the top layer (top 1 inch) of soil will be salvaged from the existing washes, stockpiled and maintained to sustain viability;*

ii. *How these soils will be applied during revegetation efforts*

iii. *Storage location of topsoil, area required for storage, duration of intended storage, and ultimate disposition of topsoil material in the engineered channels;*

iv. *Discussion of how the area available for revegetation in the channel bottom would integrate with the channel slope protection and erosion control and any opportunities for bioengineering.*

i. *Weed Control. Describe method(s) to be used to remove noxious plants from the mitigation site during the course of revegetation and monitoring, and specific triggers for when weed control is required.*

j. *Planting/Seeding. Provide a table of species to be planted and indicate the following:*

i. *Geographic source of plants (of local origin);*

ii. *Type of propagules to be used; and season in which seeding/planting/transplanting is to be done;*

iii. *Size and quantity of propagules and/or intended spacing; and*

iv. *For transplant propagules, describe method, location of harvest site, and duration of storage, if applicable.*

k. *Irrigation. Most mitigation projects should become hydrologically self-sustaining. The function of irrigation in the early years of a project is to give new vegetation a head start at becoming established. Describe any proposed irrigation methods including:*

i. *Estimated frequency, and indicate month(s) in which it is to occur;. And*

ii. *Water source(s) for irrigation.*

l. *Implementation Schedule. Provide a schedule showing intended timing (by month) of site preparation, any seed/topsoil storage, seed/topsoil application, and plantings.*

m. *Maintenance and Monitoring. Please describe the following:*

i. *Planned maintenance activities (e.g. inspection of irrigation system, inspection of water structure(s), erosion control, weeding, etc.);.*

ii. *Identification of any pest species (plant and/or animal) that might cause problems on the site, and provide a control plan for these species if appropriate;*

iii. *Critical threshold of disturbance that will trigger the implementation of control methods; and*

iv. *A table showing proposed schedule of frequency of maintenance inspections over the life of the project.*

n. *Monitoring Reports. Monitoring reports to the Compliance Project Manager (CPM) are typically due January 31st of each year. Describe the overall content and purpose of the annual reports.*

o. *Contingency Measures. If an annual performance goal is not met for all or any portion of the mitigation project in any year, or if the final success criteria are not met, please describe how the failure will be remedied including:*

i. *A process for analysis of the cause(s) of failure and propose remedial action for CPM and agency approval. Remedial actions might include replanting, weed or herbivore control.*

ii. *A funding mechanism to pay for planning, implementation, and monitoring of any contingency procedures that may be required; and*

iii. *Assurances that the funds will remain available until success criteria have been achieved.*

p. *Long-Term Management. Integrate long-term management (weed/vegetation management, preventing wildlife entrapment hazards) with the Channel Maintenance Program described above so as to achieve and meet the revegetation success criteria.*

Response: The ephemeral wash channels that cross the RSEP site are overwhelmingly narrow and shallow in size and it will not be necessary to reroute them. These channels will continue to provide the functions and values that they currently provide during RSEP project operation. It will therefore not be necessary to mitigate for the loss of these channels, because, for the most part, these channels will not be lost. Hence, it will also not be necessary to revegetate onsite ephemeral wash channels after construction. Although the RSEP will involve rerouting of a portion of one of the drainage systems that crosses State Route 62 upgradient of the RSEP, and will thus result in reduced stormwater runoff in some of the small, ephemeral wash channels that drain the site, these channels will continue to convey stormwater runoff through the RSEP site.

Biological Communities

70. *Please provide a revised discussion of Biological Communities to include the following:*

a. *A description of the analytical methods and results to support the conclusion that no special status vegetation types occur; and*

b. *If appropriate, add any of the vegetation types listed above to the discussion of biological communities occurring on the proposed project site or transmission line corridor, and map and quantify their acreages.*

Response:

Analytical Methods—Responding to Data Request #70 involved reviewing aerial photographs, reviewing the second edition of *A Manual of California Vegetation* (Sawyer et al., 2009), resurveying the project area, and using the CNPS (2007) Rapid Assessment Protocol to obtain data for the purpose of identifying special-status vegetation communities.

Between February 19–22, and March 4, 2010, Sycamore Environmental botanists conducted additional surveys of the RSEP site and the generator tie-line. The survey area included the entire heliostat field and power block area and a 1,000-foot-wide corridor (500 feet on either side of the generator tie-line centerline) up to and including the electrical substation.

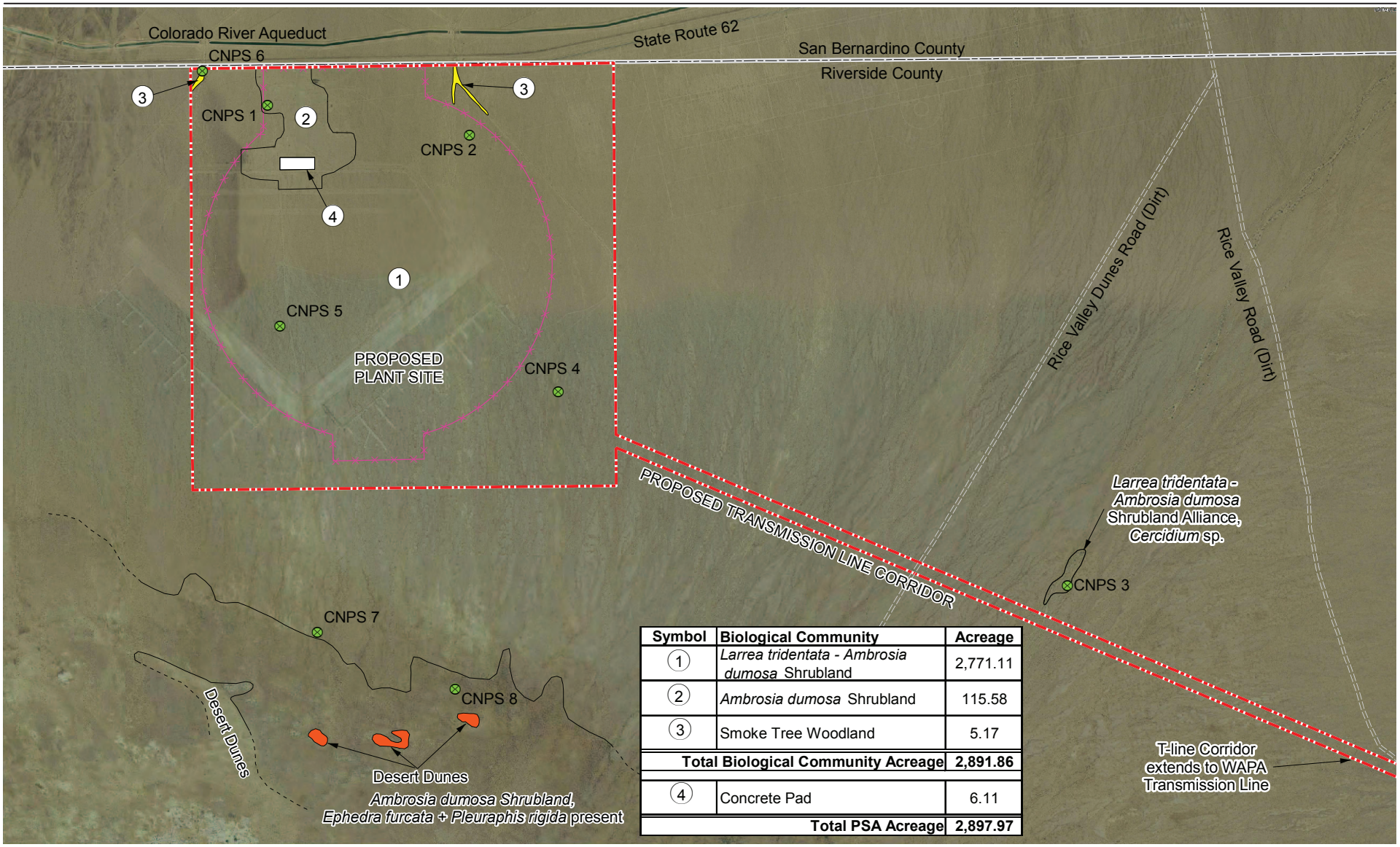
The CNPS (2007) Rapid Assessment Protocol was used to obtain quantitative vegetation community data. To identify visually distinct vegetation stands, an aerial photograph of the project area dated April 1, 2007, was reviewed, based on a minimum mapping unit of 5 acres. Two different stands were identified based on the aerial photograph analysis: (1) creosote bush scrub, which occupies most of the project site; and (2) a small patch more gray in color in the photograph, located in the north central portion of the project site. (As discussed below, Creosote bush scrub is now treated as *Larrea tridentata-Ambrosia dumosa* Shrubland by Sawyer et al., 2009.) The area appearing in the photographs as "grayer" is *Ambrosia dumosa* Shrubland, based on the description in Sawyer et al., 2009.

Two areas of smoke tree woodland were mapped in the project area. These areas were identified on the ground and because they occupy such a small area they are not evident on the aerial photograph. No minimum mapping unit was used for these areas.

To document the observations made during the field survey, six Rapid Assessment Protocol sampling points (CNPS, 2007) were recorded and CNPS data forms were completed (see Attachment DR70-1; two other forms are described in the response to Data Request #71). The sampling point locations were mapped using a Trimble® Geo-XT sub-meter accurate global positioning system (see Figure DR70-1). Using vegetation and GPS data obtained during the field survey, vegetation community boundaries were drawn on a high resolution aerial image (see Figure DR70-1).

Results—The second edition of *A Manual of California Vegetation* (Sawyer et al., 2009) was published after the botanical report had been completed for the RSEP AFC. The community descriptions and "membership rules" were used to refine the types of vegetation communities found in the general project area.

The botanical report (AFC Appendix 5.2B) identified the entire project area as Sonoran Creosote Bush Scrub. Based on the new definitions and "membership rules" in Sawyer et al. (2009), a total of three vegetation communities have now been identified within the project boundary. These are listed in Table DR70-1 and described below.



Symbol	Biological Community	Acreage
1	*Larrea tridentata - Ambrosia dumosa* Shrubland	2,771.11
2	*Ambrosia dumosa* Shrubland	115.58
3	Smoke Tree Woodland	5.17
	Total Biological Community Acreage	**2,891.86**
4	Concrete Pad	6.11
	Total PSA Acreage	**2,897.97**

CNPS Rapid Assessment Point
Project Study Area (PSA)
Concrete Pad
Proposed Fenceline

3,500 1,750 0 3,500 Feet

Scale: 1 inch = 3,500 feet

N

Source: SYCAMORE Environmental Consultants, Inc.

Aerial Photo:
29 May 2005
Copyright © 2010 GlobeXplorer,
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FIGURE DR70-1
BIOLOGICAL COMMUNITIES

Rice Solar Energy Project
Riverside County, California

CH2MHILL

EY072009005SAC Figure_DR70-1.ai 03.05.2010 tdaus

TABLE DR70-1
Biological Communities in Proposed Plant Site and Generator Tie-line Corridor

Biological Community	Common Name	Global & State Rarity Rank*	Acreage
Larrea tridentata-Ambrosia dumosa Shrubland	Creosote bush – white bursage scrub	G5 S5	2,571.49
Ambrosia dumosa Shrubland	White bursage scrub	G5 S4	115.58
Psorothamnus spinosus Woodland	Smoke tree woodland	G4 S3.3	5.17

*Source: Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation*, 2nd ed. California Native Plant Society, Sacramento, CA.

Larrea tridentata-Ambrosia dumosa Shrubland has a state rarity ranking of S5 (Sawyer et al., 2009). *Ambrosia dumosa* Shrubland has a state rarity ranking of S4 (Sawyer et al.,2009). Community types with state rarity rankings of S1, S2, or S3 are considered of high inventory priority (or special-status) by the CDFG (CDFG, 2007). *Larrea tridentata-Ambrosia dumosa* Shrubland and *Ambrosia dumosa* Shrubland are not special-status vegetation communities. The *Psorothamnus spinosus* Woodland community has a state rarity ranking of S3 and is a special-status vegetation community.

***Larrea tridentata-Ambrosia dumosa* Shrubland**—This community was previously known as Creosote Bush Scrub. The common name used by Sawyer et al. (2009) for this community is Creosote bush-white bursage scrub. This community occupies 2,571.49 acres in the project site area (see Figure DR70-1). It is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*) (Sawyer et al., 2009). In many areas of the study area, white bursage has greater absolute cover than creosote bush, but not sufficient for these areas to be classified as *Ambrosia dumosa* Shrubland (see below). Other shrubs present at low abundance are burrobrush (*Hymenoclea salsola* var. *salsola*), brittlebush (*Encelia farinosa*), and white rhatany (*Krameria grayi*). Common species in the herb layer are white tackstem (*Calycoseris wrightii*), pebble pincushion (*Chaenactis carphoclinia* var. *carphoclinia*), desert dandelion (*Malacothrix glabrata*), devil's lettuce (*Amsinckia tessellata*), *Cryptantha nevadensis*, *Pectocarya platycarpa*, mustard (*Brassica tournefortii*), rattlesnake weed (*Chamaesyce albomarginata*), *Camissonia boothii* ssp. *condensata*, plantain (*Plantago ovata*), and Mediterranean grass (*Schismus barbatus*). There are no trees present.

***Ambrosia dumosa* Shrubland**—This community was not previously recognized in the project site area. It occupies 115.58 acres in the study area (see Figure DR70-1). This community is dominated by white bursage, although creosote bush is also common (Sawyer et al., 2009). This community can be separated from *Larrea tridentata-Ambrosia dumosa* Shrubland as areas where white bursage plants have greater than twice the absolute cover that creosote scrub has (Sawyer et al., 2009). Burrobrush is also present at low cover levels in the community. The herb layer is similar to the *Larrea tridentata-Ambrosia dumosa* Shrubland. There are no trees present.

***Psorothamnus spinosus* Woodland**—This community was not previously recognized in the project site area. It occupies 5.17 acres in the project study area (see Figure DR70-1). This community is characterized by smoke tree (*Psorothamnus spinosus*), although smaller shrubs may have greater cover (Sawyer et al., 2009). In the project site area, burrobrush has

approximately equal cover as smoke tree within this area. In the project site area, palo verde (*Cercidium* sp.) is also present in the tree layer and white bursage and creosote bush are present in the shrub layer. The nonnative, invasive annual, *Brassica tournefortii* is common in the herb layer. This community is equivalent to the Smoketree wash woodland (61.570.01; CDFG, 2003), one of the special-status vegetation types mentioned in Data Request 70.

Summary—Of the 14 special-status vegetation communities listed in Data Request #70, only one occurs in the project study area, *Psorothamnus spinosus* Woodland. This community occurs in two washes south of State Route 62 and occupies a total of 5.17 acres.

References

California Department of Fish and Game (CDFG). 2003. *List of California terrestrial natural communities recognized by the California Natural Diversity Database*. Natural Heritage Division, CNDDB, Sacramento, CA. September

California Native Plant Society (CNPS). 2007. Vegetation Rapid Assessment Protocol. . 5 November 2001, Revised 21 February 2007. CNPS Vegetation Committee, California Native Plant Society, Sacramento, CA.

Holland, R. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game, Sacramento, CA.

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A manual of California vegetation*, 2nd edition. California Native Plant Society, Sacramento, CA.

Special-status Vegetation

71. Describe offsite vegetation or habitat and analyze potential impacts. Please provide the following:

a. Maps and discussions of any special status off-site vegetation or habitat between the project site's southern boundary and the extensive dune system to the south that could be affected by altered upstream hydrology or upwind sand supply/transport; and

b. An evaluation of the project's likely contributions to existing hydrologic and aeolian sand supply transport, and any likely effects of the proposed project.

Response:

Methods—On February 19 and 22, 2010, Sycamore Environmental botanists conducted a field survey of the area between the southern project boundary and the Rice Valley Dunes located approximately 0.75 mile south of the project boundary to determine whether special-status vegetation comminutes are present. Prior to the field survey, aerial images (dated April 1, 2007) were reviewed to identify vegetation differences in the survey area. The field survey consisted of walking four east-west-oriented transects located approximately 1,000 feet apart and looking for changes in species composition and abundance.

To document the observations made during the field survey, two Rapid Assessment Protocol sampling points (CNPS, 2007) were recorded and CNPS data forms were completed (Attachment DR71-1). The sampling point locations were mapped using a

Trimble® Geo-XT sub-meter accurate global positioning system (see Figure DR70-1). Using vegetation and GPS data obtained during the field survey, vegetation community boundaries were drawn on a high resolution aerial image.

Results--None of the 14 special-status vegetation communities listed in Data Request #70 and referenced in Data Request #71 were observed in the area between the southern project boundary and the northern limits of the Rice Valley Dunes.

Two vegetation communities were identified between the southern project boundary and the northern edge of the Rice Valley Dunes and are described below.

***Larrea tridentata-Ambrosia dumosa* Shrubland**--This community is dominated by creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). This community extends south from the project boundary approximately 2,300 feet to the west to approximately 6,550 feet to the east (see Figure DR70-1). Other shrubs present at low abundance are burrobrush (*Hymenoclea salsola* var. *salsola*), brittlebush (*Encelia farinosa*), and white rhatany (*Krameria grayi*). Common species in the herb layer are white tackstem (*Calycoseris wrightii*), pebble pincushion (*Chaenactis carphoclinia* var. *carphoclinia*), desert dandelion (*Malacothrix glabrata*), devil's lettuce (*Amsinckia tessellata*), *Cryptantha nevadensis*, *Pectocarya platycarpa*, mustard (*Brassica tournefortii*), rattlesnake weed (*Chamaesyce albomarginata*), *Camissonia boothii* ssp. *condensata*, plantain (*Plantago ovata*), and Mediterranean grass (*Schismus barbatus*). There are no trees present. No aeolian sand was observed in this biological community.

***Ambrosia dumosa* Shrubland**—This community is dominated by white bursage. This community is located between the Rice Valley Dunes to the south and *Larrea tridentata-Ambrosia dumosa* Shrubland to the north (see Figure DR70-1). Significant numbers of ephedra (*Ephedra trifurca*) and big galleta (*Pleuraphis rigida*) individuals were observed in this community. However, the number of ephedra and big galleta plants in this area was not high enough to change the classification of this community (Sawyer et al., 2009). Aeolian sand deposits are noticeably present in this area, in contrast to the *Larrea tridentata-Ambrosia dumosa* Shrubland areas to the north. Three small areas of active sand dune were mapped within this community.

Larrea tridentata-Ambrosia dumosa Shrubland has a state rarity ranking of S5 (Sawyer et al., 2009). *Ambrosia dumosa* Shrubland has a state rarity ranking of S4 (Sawyer et al., 2009). Community types with state rarity rankings of S1, S2, or S3 are considered of high inventory priority (or special-status as described in Data Request #71) by the CDFG (CDFG, 2007). *Larrea tridentata-Ambrosia dumosa* Shrubland and *Ambrosia dumosa* Shrubland are not special-status vegetation communities.

Summary—A field survey was conducted of the area between the southern project boundary and the Rice Valley Dunes located approximately 0.75 mile south of the project boundary, to determine if special status vegetation communities are present. The 14 special-status vegetation communities listed in Data Request #70 and referenced in Data Request #71 were not observed in the area between the southern project boundary and the northern limits of the Rice Valley Dunes. *Larrea tridentata-Ambrosia dumosa* Shrubland and *Ambrosia dumosa* Shrubland communities were identified in this area. Neither of these are special-status vegetation communities (Sawyer et al., 2009).

References

California Department of Fish and Game (CDFG). 2007. Vegetation classification and mapping program: List of California vegetation alliances. Sacramento, CA. October 22. http://www.dfg.ca.gov/biogeodata/vegcamp/pdfs/NaturalCommunitiesList_Oct07.pdf

Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A manual of California vegetation*, 2nd ed. California Native Plant Society, Sacramento, CA.

Special-status Plants

72. *Please evaluate potential for occurrence on the project site and potential for on-site or off-site adverse project impacts to the plants listed above. For species with potential to occur on-site but which would not have been found during March 2009 field surveys (i.e., generally, those plants flowering later in the season, including some that may flower in late summer), please provide follow-up field survey methods and results, including mapping of any special status species found on or near the proposed project site. Field survey methods, results, and report contents should follow the most recent guidelines provided by CDFG (2009) and BLM (2009).*

Methods—Each of the 15 plant species listed in Data Request #72 is discussed in the attached Table DR72-1. (Note: *Physalis lobata*, lobed ground cherry, was listed twice in Data Request #72.) The habitat, range, and blooming times mentioned in the table were compiled from the following sources:

- The California Native Plant Society (2010) Inventory of Rare and Endangered Plants
- The Jepson Desert Manual (Baldwin et al., 2002)
- Taxonomic treatments currently available online from the 2nd edition of The Jepson Manual (cited by individual treatment author)
- The Flora of North America (FNA) North of Mexico (cited by individual treatment author)
- Specimen collection records available online from the Consortium of California Herbaria (CCH; 2010)
- Specimen collection records available online from the Southwestern Environmental Information Network (SEI-Net; 2010)
- Other sources as cited

Results—The CNPS Inventory (2010) includes March in the blooming period for eight of the 15 species (species 2, 4, 6, 7, 8, 9, 12, and 13; see Table DR72-1). From information derived from other sources, species 1, 3, and 10 are known to bloom in March and would have been observed if present.

Species 5 and 11 are perennial shrubs that can be identified at any time of year. These species would have been observed if present.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
1. *Acleisanthes longiflora* Angel trumpets	--/–	--/ 2.3	CNPS: A perennial herb found in carbonate soils in Sonoran desert scrub. Only known CA occurrence is in the Maria Mountains at about 300 ft in elevation. Blooms May. Jepson Desert: Describes the habitat as “dry places, generally on limestone” and the elevation range as 30-8,200 ft. The Jepson 2nd edition treatment adds no additional information. FNA: Poole (2003) reports angel trumpets as blooming from February through November, and the habitat as “rocky, gravelly, loamy, or sandy calcareous, gypseous, or igneous-derived soils in deserts, grasslands, shrublands, or woodlands.” Online CCH & SEI-Net: Two collections in CCH, one in December 1970 and one simply as “1906.” The 1970 record is from the southern end of the Santa Maria Mts. very close to the Colorado River. The 1906 record is from near Palo Verde Valley, Santa Maria Mts., suggesting a location near the 1970 record. The five closest collections in SEI-Net (all in the region east of Blythe) were collected in March, April, August, September, and December.	1. The entire project area is derived from alluvium and there are no limestone or other carbonate rich outcrops. Soils (NRCS 2006) information for the project site is large-scale and not mapped with a spatial accuracy suitable for determining the extent of any carbonate substrates. Some soil series that may occur in the PSA may have significant calcium carbonate components, but the chemical soil properties data is incomplete (NRCS 2006). 2. There are too few collections from CA to ascribe a blooming period based solely on those collections. The blooming period from FNA, as well as the dates of collections online in CCH and SEI-Net indicate angel trumpets would have been evident and identifiable during the botanical surveys at the project site. 3. Angel trumpets is known from CA only at the southern end of the Santa Maria Mountains, approximately 10.5 mi SW of the eastern end of the transmission line for this project. Conclusion: The botanical surveys would have detected angel trumpets if present. No additional surveys are warranted.
2. *Androstephium breviflorum* Small-flowered androstephium	--/ --	--/ 2.2	CNPS: Bulbiferous herb found in desert dunes and Mojavean desert scrub bajadas from about 700 to 2,100 ft in elevation. Blooms March through April.	Species not found during the 23-27 March 2009 botanical survey.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
3. *Bouteloua trifida* Three-awned grass	--/ --	--/ 2.3	CNPS: Perennial herb found in carbonate, rocky Mojavean desert scrub from about 2,300 to 6,600 ft in elevation. Blooms May through September. Jepson Desert: Describes the habitat as "dry, rocky, often calcareous slopes, crevices, scrub." The treatment for the Jepson 2nd edition has not been published online and thus is not available to the public. FNA: Wipff (2003) describes the habitat as "dry plains and rocky slopes," and the elevation range as about 950-4,950 ft. Online CCH & SEI-Net: The two nearest collections with geographic coordinates in CCH were both collected in March in the Whipple Mts. Of the 12 nearest SEI-Net collections east of Lake Havasu City and Blythe, 5 were made in March, 3 in April, 2 in December, and one each in October and November.	1. The entire project area is derived from alluvium and there are no limestone or other carbonate rich outcrops. Soils (NRCS 2006) information for the project site is large-scale and not mapped with a spatial accuracy suitable for determining the extent of any carbonate substrates. Some soil series that may occur in the PSA may have significant calcium carbonate components, but the chemical soil properties data is incomplete (NRCS 2006). 2. The PSA does not have rocky slopes or crevices. The PSA provides marginal habitat for this species. 3. Most of the collections of three-awned grass closest to the PSA have been made in March. Conclusion: The botanical surveys would have detected three-awned grass if present. No additional surveys are warranted.
4. *Calliandra eriophylla* Pink fairy-duster	--/ --	--/ 2.3	CNPS: Deciduous shrub found in sandy or rocky Sonoran desert scrub from about 400 to 4,950 ft in elevation. Blooms January through March.	Species not found during the 23-27 March 2009 botanical survey.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
5. *Castela emoryi* Emory's crucifixion-thorn	--/ --	--/ 2.3	CNPS: Deciduous shrub found in gravelly substrates in Mojavean desert scrub, playas, and Sonoran desert scrub from about 300 to 2,200 ft in elevation. Blooms June through July, and uncommonly as early as April. Jepson Desert: A perennial shrub with an intricate branching pattern and large thorns, and fruit sometimes persists for several years. Describes the habitat as "dry, gravelly washes, slopes, plains." The Jepson 2nd edition online treatment adds no new relevant information. FNA: The FNA treatment for this species has not been published and thus is not available to the public. Online CCH & SEI-Net: Of the 14 collections in CCH nearest the PSA, 3 are in February, 2 are in March, 3 are in April, 2 are in October, and 1 each in May, June, August, and November. Of the 5 SEI-Net collections nearest the PSA east of Blythe, two were made in May and one each in February, March, and April.	1. Sandy substrates are common in the PSA. Some small areas are more gravelly, but these areas are nearly devoid of vegetation. A few larger washes in the PSA support small areas of larger shrubs and small trees, which provide marginal habitat for Emory's crucifixion-thorn. 2. The thorns, branching pattern, and sometimes persistent fruit make Emory's crucifixion-thorn evident and identifiable year-round. Conclusion: The botanical surveys would have detected Emory's crucifixion-thorn if present. No additional surveys are warranted.
6. *Ditaxis claryana* Glandular ditaxis	--/ --	--/ 2.2	CNPS: Perennial herb found in sandy substrates in Mojavean desert scrub and Sonoran desert scrub from about 0 to 1,550 ft in elevation. Blooms October through March.	Species not found during the 23-27 March 2009 botanical survey.
7. *Ditaxis serrata* var. *californica* California ditaxis	--/ --	--/ 3.2	CNPS: Perennial herb found in Sonoran desert scrub from about 100 to 3,300 ft in elevation. Blooms March through December.	Species not found during the 23-27 March 2009 botanical survey.
8. *Mentzelia puberula* Argus blazing star	-- /--	--/ --	Brokaw et al. (2009): Perennial herb found in sandy crevices in cliffs or rocky slopes from about 300 to 4,200 ft in elevation. Blooms March through May.	Species not found during the 23-27 March 2009 botanical survey. There are no cliffs or rocky slopes in the PSA.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
9. *Pholistoma auritum* var. *arizonicum* Arizona pholistoma	--/ --	--/ 2.3	CNPS: Annual herb found in Mojavean desert scrub from about 900 to 2,750 ft in elevation. Known in CA only from the Whipple Mountains. Blooms March.	Species not found during the 23-27 March 2009 botanical survey.
10. *Physalis lobata* Lobed ground cherry	--/ --	--/ 2.3	CNPS: Perennial herb found in decomposed granitic Mojavean desert scrub and playas from about 1,600 to 2,650 ft in elevation. Blooms September through January. Jepson Desert: Describes habitat as “granitic soils, dry lake margins.” The Jepson 2nd edition treatment adds no additional information. FNA: The FNA treatment has not been published for this species and thus is not available to the public. Online CCH & SEI-Net: Of six records in CCH, 3 were made in April, 2 in November, and 1 in September. Of the 4 nearest SEI-Net collections east of Blythe and Lake Havasu City, 2 were made in March, and one each in April and May. Jones et al. 1979: R. John Little, Ph.D., the lead botanist on this project, was one the authors of the first report of the species from CA. Jones et al. 1979 report that lobed ground cherry “flowers sporadically all year with rains, peak flowering September through January, fruits October through March.”	1. The PSA does not contain playas or lakes. The PSA does not contain decomposing granitic bedrock, but may contain scattered mixed alluvium containing decomposed granite (sand). The PSA provides marginal habitat for lobed ground cherry. 2. Lobed ground cherry may be evident and identifiable year-round, and fruits through March and would have been evident and identifiable in March from leaves and fruit, and possibly flowers. Conclusion: The botanical surveys would have detected lobed ground cherry if present. No additional surveys are warranted.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
11. *Psorothamnus fremontii* var. *attenuatus* Narrow-leaved psorothamnus	--/ --	--/ 2.3	CNPS: Perennial shrub found in granitic or volcanic Sonoran desert scrub from about 1,100 to 3,000 ft in elevation. In CA known only from the Whipple Mountains. Blooms April (CNPS 2010). Jepson Desert: Describes habitat as "granite and volcanic slopes, flats, canyons" and gives elevation range as 1,450-2,950 ft. Jepson 2nd edition treatment could expand the elevation range if new collections are verified, and could expand the range greatly to the east if new collections are verified. The nearest potential collection to the PSA is in the vicinity of Needles. FNA: The FNA treatment has not been published for this species and thus is not available to the public. Online CCH & SEI-Net: Of 17 collections in CCH with geographic coordinates, all 17 are in the Whipple Mts. Five collections were made each in March, April, and May. One collection was made each in January and October. There are no collections in SEI-Net closer to the PSA than the Whipple Mountains.	1. Narrow-leaved psorothamnus has not been verified in CA beyond the Whipple Mts. 2. Collection notes indicate narrow-leaved psorothamnus usually occurs in areas that are rockier and more sloped than the PSA, although one collection notes the habitat as "upland bajada." 3. Narrow-leaved psorothamnus is a perennial shrub that may be evident and identifiable year-round. Collections reported in CCH indicate March through May surveys are appropriate. 4. P. spinosus was detected in the PSA in March 2009. The published blooming period for P. spinosus is June-July (Baldwin et al. 2002). Conclusion: The PSA provides marginal habitat for narrow-leaved psorothamnus. The PSA is outside the known range of narrow-leaved psorothamnus. The botanical surveys would have detected narrow-leaved psorothamnus if present. No additional surveys are warranted.
12. *Senna covesii* Coves' cassia	--/ --	--/ 2.2	CNPS: Perennial herb found in sandy Sonoran desert scrub from about 1,000 to 3,550 ft in elevation. Blooms March through June.	Species not found during the 23-27 March 2009 botanical survey.
13. *Teucrium cubense* var. *depressum* Dwarf germander	--/ --	--/ 2.2	CNPS: Annual herb found in desert dunes, playa margins, and Sonoran desert scrub from about 150 to 1,350 ft in elevation. Blooms March through May, and uncommonly into September or November.	Species not found during the 23-27 March 2009 botanical survey.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
14. *Teucrium glandulosum* Desert germander	--/ --	--/ 2.3	CNPS: A perennial, stoloniferous herb found in rocky Sonoran desert scrub from about 1,300 to 2,600 ft in elevation. In CA known only from the Whipple Mountains. Blooms April through May. Jepson Desert: Describes the habitat as “rocky slopes, canyons.” The Jepson 2nd edition treatment adds no additional information. FNA: The FNA treatment has not been published for this species and thus is not available to the public. Online CCH & SEI-Net: All 15 collections in CCH are from the Whipple Mts. Nine of the collections are from April, two each are from May, September, and October. SEI-Net has three records for this species. All CA records are from the Whipple Mts. and were collected in April, September, and October. One SEI-Net record from Mexico was collected in March.	1. The PSA does not provide the rocky habitat necessary for desert germander. 2. Desert germander has not been found in CA outside the Whipple Mts. The PSA is outside the range of this species. 3. Desert germander would have been evident and identifiable during the botanical surveys conducted about a week before the CNPS published blooming period. The collections nearest the PSA to the south outside the Whipple Mts., were made in March. Conclusion: The PSA does not provide habitat for desert germander. The PSA is outside the known range of desert germander. The botanical surveys would have detected desert germander if present. No additional surveys are warranted.

TABLE DR72-1
Data Request 72 Species and Habitat

Special-Status Species Common Name	FED/BLM Status	State Status [a, b]	Habitat and Range	Potential to Occur in Project Study Area
15. *Wislizenia refracta* ssp. *refracta* Jackass clover	--/ --	--/ 2.2	CNPS: Annual herb found in desert dunes, Mojavean desert scrub, playas, and Sonoran desert scrub from about 1,950 to 2,650 ft in elevation. Blooms April through November (CNPS 2010). Jepson Desert: Describes habitat as "sandy washes, roadsides, alkaline flats." The treatment for the Jepson 2nd edition has not been published online and thus is not available to the public. FNA: The FNA treatment has not been published for this species and thus is not available to the public. Online CCH & SEI-Net: Of the 19 collections in CCH, 7 were made in April, 3 in July, 5 in October, and 1 each in May, June, August, and September. One outlier collection in CCH is along I-5 west of Bakersfield at an elevation of 290 ft. All the other collections are in the desert at elevations of at least 1,750 ft. SEI-Net does not provide any additional information.	1. Jackass clover does not appear to have particularly specific habitat requirements. 2. The outlier collection west of Bakersfield may be the other subspecies, as ssp. refracta appears to be restricted to desert areas. The lowest elevation Jackass clover has been collected at in deserts is about 1,750 ft. Conclusion: The PSA provides marginal habitat for Jackass clover. Botanical surveys in the PSA were conducted from 23-27 March 2009. If Jackass clover occurs at elevations lower than those in the literature it would be expected to bloom slightly earlier in the growing season. Because the project area is approximately 750-1,000 ft lower in elevation than the published elevation range, the late March surveys in 2009 would have detected Jackass clover as it would have been blooming or at least evident and identifiable. No additional surveys are warranted.

[a] **Listing Status** Federal status determined from USFWS letter (USFWS 2009). State status determined from CDFG (2009a, b, and c). Bureau of Land Management status determined from BLM (2009a and b).

Codes used in table are: **E** = Endangered; **T** = Threatened; **P** = Proposed; **C** = Candidate; **R** = California Rare; * = Possibly extinct.

[b] **Other Codes** Other codes determined from DFG (2009a, b, and c) and CNPS (2009). Codes used in table are as follows:

CNPS List (plants only): **1A** = Presumed Extinct in CA; **1B** = Rare or Endangered (R/E) in CA and elsewhere; **2** = R/E in CA and more common elsewhere; **3** = Need more information; **4** = Plants of limited distribution.

CNPS List Decimal Extensions: .1 = Seriously endangered in California (over 80% of occurrences threatened / high degree and immediacy of threat); **.2** = Fairly endangered in CA (20-80% of occurrences threatened); **.3 =** Not very endangered in CA (< 20% of occurrences threatened or no current threats known).

Species 14 and 15 usually begin blooming in April (CNPS Inventory 2010). However, some collections of species 14 have been made in March. Because the botanical surveys were conducted in late March, species 14 and 15 would have been detected in bloom and/or growing, if present. Additional discussion on the reasons why the 15 species listed in Data Request #72 are not expected to occur in the project study area are described in Table DR72-1.

Summary—None of the 15 species listed in Data Request #72 were observed in the project site area during the rare plant surveys conducted between March 23 and 27, 2009. This survey took place within the applicable blooming times for these species. Therefore, additional surveys are not necessary.

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Utah cynanchum and Wiggins cholla

73. *Please indicate locations of these two species' occurrences on project site maps (as shown for Harwood's milk-vetch and chaparral sand verbena on Fig. 5.2-4) and describe and evaluate potential project impacts to both species.*

Utah cynanchum (*Cynanchum utahense*)—The wildlife survey team noted the presence of Utah cynanchum within the project area. The wildlife survey, however, was not a focused survey for rare plants and also covered some areas not required for the rare plant survey. In addition, the wildlife survey did not record locations of plants noted during the survey. The wildlife survey report includes a list of plant species in a table in the wildlife report (AFC Appendix 5.2C, Table 2).

The rare plant survey did not identify Utah cynanchum within the project site or along the transmission line, but did identify trailing townula (*Sarcostemma hirtellum)* (AFC Appendix 5.2B, Appendix E, Plant Species Observed). These two species are very similar in that their stems closely resemble one another, although the flower inflorescences are distinct. Sycamore Environmental reexamined photographs and voucher specimens collected during the botanic surveys to determine whether the species previously identified as trailing townula might be Utah cynanchum. This re-analysis confirms conclusively that what Sycamore Environmental observed on the project site was trailing townula and not Utah cynanchum.

It is possible that the specimen conclusively identified by Sycamore as trailing townula is the same specimen identified during the wildlife surveys as Utah cynanchum or a different example of trailing townula. It is also possible that the wildlife surveyor identified a specimen of Utah cynanchum not identified during the rare plant survey or outside of the rare plant survey area. Please note that the wildlife survey protocol involves surveys in desert tortoise zone-of-influence transects that are outside of the project site area and generator tie-line corridor that the rare plant survey covers. For example, the desert tortoise survey zone of influence transects include bands located 100, 300, 600, 1200, and 2,400 feet, and 0.75 mile and 1.0 mile beyond the outside boundary of the 2,560-acre main project area and additional zone of influence transects located 100, 300, 600, 1200, and 2,400 feet beyond the outside edge of the generator tie-line corridor. The rare plant survey protocols do not include these zone of influence transects. Because the wildlife survey did not document the locations of the plant or plants identified as Utah cynanchum and did not collect reference specimens for herbarium identification, it is not possible to conclusively determine whether this species is present without a resurvey of the entire property. From all the information currently available, however, *Cynanchum utahense* does not occur on the project site and mitigation is not required for this species.

Wiggin's cholla (*Opuntia wigginsii*)—The wildlife survey team also noted the presence of Wiggin's cholla. The wildlife survey report includes this species in a table of species noted during the surveys (AFC Appendix 5.2C, Table 2). In the first edition of The Jepson Manual, Wiggin's cholla was treated as a synonym of *Opuntia ramosissima* Engelm. The text states, "is probably O. *ramosissima* x *O. echinocarpa*." The Desert Tortoise Survey Report references the first edition of The Jepson Manual (1993).

In the online edition of the second edition of The Jepson Manual, Wiggin's cholla (*Opuntia wigginsii*) is synonymized under *Cylindropuntia echinocarpa* (Engelm. & J. M. Bigelow) F. M. Knuth. *Cylindropuntia echinocarpa* was formerly treated as *Opuntia echinocarpa*, a species common in California deserts. Sycamore Environmental (August 20, 2009) reported *Opuntia echinocarpa* from the main project site and the transmission line and *O. ramosissima* from the transmission line only.

The current CNPS Inventory lists Wiggin's cholla as List 3.3. (3 = Plants in need of more information; .3 = Not very endangered in California.)

Wiggin's cholla has not been treated as a distinct species in California since at least 1993. Wiggin's cholla is treated in the second edition of *The Jepson Manual* by taxonomists that specialize in cactus taxonomy, as a synonym of *Cylindropuntia echinocarpa*. Thus, all currently available data suggests that this taxon is not rare and should not be treated as such. No impact will occur and no mitigation is necessary.

Special-status Plant Mitigation

74. *Please provide an expanded discussion of potential special status plant mitigation measures, including the strategies below. Please limit the discussion to feasible measures with documented successful implementation in comparable projects and involving plants of comparable ecological and life history characteristics.*

    a. *A strategy to minimize or avoid adverse impacts to special status plants on-site.*

Response*:*

***Abronia villosa* var. *aurita* (Chaparral sand verbena)**—This species is an annual herb found in sandy substrates in chaparral, coastal scrub, and desert dunes. Its seeds are wind dispersed. *Abronia villosa* var. *aurita* is known from southern California, Arizona, and Baja California (CNPS, 2010). Collections recorded in CCH (2010) and SEI-Net (2010) are concentrated in western Riverside County. There are 65 presumed extant occurrences in CNDDB, including one from dune habitats adjacent to Blythe-Rice Road (also known as Midland Road).

Reconnaissance surveys west and south of the project site indicate that most populations of *Abronia villosa* var. *aurita* in Rice Valley are in areas where there is aeolian sand deposition. Only two small plants were found onsite in March 2009. At the time of the onsite March surveys, Sycamore Environmental observed a large population consisting of thousands of plants in the sand dunes about 2.4 miles west of the project site on the east and west sides of Blythe-Rice Road. In February 2010, Sycamore Environmental observed dozens of plants in semi-stabilized dunes about 0.66 mile south of the project site.

The project avoids impacts to *Abronia villosa* var. *aurita* because no sand dunes are located in the main plant site nor in the generator tie-line corridor. Because the project does not affect any sand dune habitat, the long-term survival of *Abronia villosa* var. *aurita* will not be adversely affected. The known populations in Rice Valley west and south of the project will be avoided. It is likely that additional populations of this species occur on other sand dunes in Rice Valley and would be detected with additional surveys. Based on observed populations and inferred from the presence of other suitable habitat in the Rice Valley, this species has a large regional base here. Therefore, the potential loss of a few individual plants will not result in a significant impact. Thus, no mitigation is necessary for *Abronia villosa* var. *aurita*.

***Astragalus insularis* var. *harwoodii* (Harwood's milkvetch)**—This is an annual species found in desert dunes and sandy or gravelly Mojavean desert scrub in southeastern California, Arizona, and the Mexican state of Sonora (CNPS, 2010). There are 21 presumed extant occurrences in CNDDB, not including those from the study area.

In 2009, 30 to 40 individual plants were observed in five locations in the generator tie-line corridor, but none was found in the RSEP heliostat field site. Soils and other conditions in the generator tie-line corridor are suitable for the germination, growth, and reproduction of this species (plants were observed with flowers and fruits). In February 2010, Sycamore Environmental observed several *Astragalus* seedlings in semi-stabilized dunes about 3,500 feet south of the RSEP site during a reconnaissance survey. The seedlings were too young for positive identification, but could have been *Astragalus insularis* var. *harwoodii* because sand dunes are one of its preferred habitats and the species is known from the nearby generator tie-line corridor.

The project avoids impacts to *Astragalus insularis* var. *harwoodii* because RSEP would not affect any dune habitats. Because this species is an annual, it could germinate anywhere in the generator tie-line corridor. To avoid potential impacts during construction of the access road and/or installation of the generator tie-line, it will be necessary to conduct a pre-construction survey to identify locations of *Astragalus* plants. Potential adverse impacts will be avoided and minimized with the following avoidance measures:

- A pre-construction survey of the generator tie-line corridor and access road will be conducted in March or April of the year that construction of the generator tie-line occurs. The survey will be conducted in the generator tie-line corridor identified in the AFC and in the tie-line access road.
- The tie-line access road will avoid and minimize impacts to individual *Astragalus insularis* var. *harwoodii* plants, to the extent practicable. The access road easement is sufficiently wide to allow flexibility in road alignment and thus the ability to avoid *Astragalus* plants.
- *Astragalus* plants found during the pre-construction survey of the generator tie-line and its access road will be delimited in an Environmentally Sensitive Area (ESA) for the duration of generator tie-line construction. The ESA shall be a minimum of 20 feet from avoided plants. Temporary, orange construction fencing will be used to identify the location of the ESA. The construction fencing will be installed such that it will not disrupt potential flows in ephemeral washes during storm events. The construction fencing will be removed within 30 days after construction.

The project will not have a substantial adverse effect on *Astragalus insularis* var. *harwoodii*. Other populations of this species likely occur in dune and other habitats in Rice Valley that are avoided by the RSEP. Because of the large regional base of this *Astragalus* species in Rice Valley, as indicated by observed local populations and inferred from the presence of other suitable habitat area, the potential loss of a few individual plants will not result in a significant impact.

The RSEP will not adversely affect the long-term survival of *Abronia villosa* var. *aurita* or *Astragalus insularis* var. *harwoodii*. Both species are annuals and have wind-dispersed seeds. The project does not affect sand dunes, the preferred habitat of the *Abronia* species and one of the preferred habitats of the *Astragalus*. The project will avoid impacts in the generator tie-line to most *Astragalus* plants. Because of the large regional base of these species occurs in Rice Valley, the potential loss of a few individual plants will not result in a significant impact.

b. *Discuss and evaluate project-specific suitability of any known experimental or proven techniques to relocate or propagate the special status species that would be affected by the proposed project.*

Response*: Abronia villosa* var. *aurita* and *Astragalus insularis* var. *harwoodii* are annual species that germinate naturally in the spring from seed (with sufficient rainfall). Typical methods used to propagate annual species involve collecting seed by hand at the appropriate time of year (Wiese, 1996), planting seeds in designated locations onsite or giving the seeds to an offsite nursery where they can be planted in a controlled environment. No references could be found that address experimental procedures involving propagation of seeds of these species in situ or in a nursery.

Because seeds of *Abronia villosa* are commercially available to the public (e.g., S&S Seeds, Carpenteria, CA), propagation of this species by seed in situ or in a nursery is not expected to be difficult, as long as sufficient moisture is available to the seed. Seeds of *Abronia villosa* var. *aurita* can be collected beginning in late March from plants that occur in the sand dunes west and south of the project site. However, because a significant impact to this species will not occur due to the absence of sand dune habitat onsite, a program to propagate this species by seed is not proposed.

Seeds of various *Astragalus* species are commercially available to the public, but no sources could be found for *Astragalus insularis* var. *harwoodii*. Between 30 and 40 individual plants of this species were observed in the generator tie-line corridor in 2009, during a year of less than average rainfall. The numbers of plants found in a narrow, 300-foot-wide corridor, suggest that a substantial number of plants could be present in areas east, south, and west of the main project site. The number of plants found in flower and fruit, in a year of low rainfall, suggest that soil and other conditions provide conditions suitable for germination, growth, and reproduction of this species.

Because most individual plants will be avoided during construction of the generator tie-line and access road, significant impacts to this species will not occur. Therefore, a program to propagate this species by seed is not proposed.

No information concerning the transplanting of desert annuals could be found (sources searched included the Desert Research Institute, the Sonoran Desert Research Station, the Chihuahuan Desert Research Center, and Melvyl catalog search engine through the

University of California library). Transplanting annual species started from seed in small containers is a proven technique widely used commercially for sale of ornamental flower and vegetable species. Similar techniques could be used for annual species adapted to arid environments (e.g., desert annuals). However, as previously mentioned, programs to propagate *Abronia* or *Astragalus* species from seed are not proposed for the RSEP.

The relocation (transplanting) of individual *Abronia* or *Astragalus* plants from onsite location(s) to another on- or offsite location(s) is one way to avoid impacts to individual plants. However, this technique would be experimental because no information could be found to demonstrate previous successful or unsuccessful attempts to relocate (transplant) desert annual species. For reasons similar to seeds, the relocation (or transplanting) of germinated *Abronia* or *Astragalus* plants is not proposed for the RSEP.

c. *Describe any known agency or private entity capable of accepting and managing an in lieu fee to mitigate project impacts to rare plants.*

Response: No public or private entities were identified that collect in-lieu fees for the conservation and management of *Abronia villosa* var. *aurita* or *Astragalus insularis* var. *harwoodii*. The Cajon Creek Habitat Conservation Management Area does not manage in-lieu fees nor has credits available for either *Abronia* or *Astragalus* (pers. comm., Mr. Doug Sprague, March 3, 2010). Mr. Sprague referred us to Ms. Mari Quillman because she is familiar with mitigation banks in southern California. She did not know of any mitigation banks that could manage an in-lieu fee or mitigate for impacts for either *Abronia* or *Astragalus* (pers. comm., Ms. Mari Quillman, March 3, 2010). Online resources were also checked for species with mitigation credits for these two species, but none were found (http://www.speciesbanking.com). In summary, none of the contacts indicated any available or planned credits for the two species.

References

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Wiese, K. 1996. Native seed collection. California Geology. July/August.

Noxious Weeds – Weed Management Plan

75. *Please prepare and submit a Draft Weed Management Plan that includes the herbicide compounds and formulations to be used in control methods, and describes specific methods for weed management under heliostat structures (e.g., pre-emergent herbicide or other methods).*

Response: The Weed Management Plan is under preparation and will be provided to CEC Staff by March 22.

Noxious Weeds – Mulch, Sediment Barriers, and Import Soils

76. Mulch, sediment barriers, and import soils. Please provide the following:

a. Details on the origin and composition of any mulch, sediment barriers, or soils to be used onsite or imported from off site; and

b. Measures that would be included in the Weed Management Plan to ensure that weed seeds are not introduced onto the site in soils or erosion control materials.

Response: These topics will be addressed in the Weed Management Plan (see response to Data Request #74).

Decommissioning

77. Please describe the likely components of a Decommissioning Plan (e.g., decommissioning methods, timing of any proposed habitat restoration, restoration performance criteria), and discuss each component relative to biological resources and specifically to desert tortoise and its habitat. Components should include, but should not be limited to:

a. The potential funding (e.g., a performance bond) and/or legal mechanisms for decommissioning and restoration of the project site that would be used at the end of operations; and in the event of bankruptcy or the untimely project closure for financial reasons.

b. A discussion of applicable facility and transmission line closure requirements of the BLM, Western, County of Riverside, USACE, USFWS, CDFG, and any other agency that may have closure requirements.

c. A conceptual Restoration Plan After Decommissioning. The plan should address:

i. The fate of the project site, including uplands, engineered channels, and any natural channels remaining within the decommissioned site;

ii. If the engineered channels would be filled, please provide a conceptual plan for filling and rehabilitating them to upland habitat, and for restoring drainages on the project site, including a description of a revegetation plan for restoring the function and values of the ephemeral drainages;

iii. A cost estimate, adjusted for inflation, for implementing the closure, including the revegetation component of the closure activities; and

iv. A conceptual plan and funding mechanism for monitoring and maintenance until existing functions are reestablished.

Response: RSE proposes to prepare this plan during the final project design phase and after required agency conditions and measures are known (that is, once biological resources permits have been issued). RSE would accept a Condition of Certification requiring the completion of such a plan after licensing and before operation begins. It is important to note that since the facility is located on private land and not BLM land (except for a portion of the transmission line) the federal regulations do not require a Decommissioning Plan. Therefore, RSE requests that the CEC Staff include the same standard condition regarding Decommissioning and Closure that it incorporates for natural-gas-fired projects.

Attachment DR60-1
Preliminary Jurisdictional Report

Preliminary
Jurisdictional Delineation Report
for
Rice Solar Energy Project

Riverside County, CA

5 March 2010

SYCAMORE
ENVIRONMENTAL CONSULTANTS, INC.

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Preliminary
Jurisdictional Delineation Report

for

Rice Solar Energy Project

Riverside County, CA

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5 March 2010

Preliminary Jurisdictional Delineation Report
for
Rice Solar Energy Project

Riverside County, CA

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I. INTRODUCTION

A. Purpose

As requested by Rice Solar Energy, LLC, Sycamore Environmental Consultants, Inc., under contract to CH2M Hill, conducted a jurisdictional delineation of the Rice Solar Energy Project (RSEP) study area in Riverside County. Rice Valley is a closed watershed with no hydrological connectivity to watersheds with connectivity with traditionally navigable waters (TNW). Ephemeral channels in the project study area (PSA) are isolated features. Project impacts and mitigation measures are not included in this report.

B. Project Location

The 2,897.97 ac PSA consists of two areas, the proposed plant site (2,559.52 ac) and a T-line corridor (338.45 ac) located in northeastern Riverside County, CA, approximately 30 mi northwest of the City of Blythe, CA and 29 mi west-southwest of Parker, AZ (Table 1 and Figure 1). The plant site is located on privately owned property and the majority of the T-line corridor occurs on land managed by the Palm Springs-South Coast Field Office of the Bureau of Land Management (BLM). The PSA is in the Southern Mojave watershed (hydrologic unit code 18100100), and its centroid is 35.0201° North, -118.1260° West (UTM: Zone 11 S, 702,759 m E, 3,771,557 m W). Figure 2 is a 1 January 1999 aerial photograph of the PSA.

Table 1. Project USGS quads.

USGS Quad Name	Portion of PSA located on USGS Quad	Township, Range, and Sections
Rice	Plant Site & T-Line Corridor	Plant Site: T1S, R21E, Sections 19, 20, 29, and 30 T-Line Corridor: T1S, R21E, Sections 28, 33, and 34
Grommet	T-Line Corridor	T1S, R21E, Section 35; T2S, R21E, Sections 1 and 2; T2S, R22E, Sections 6, 7, 8, and 17
Big Maria Mountains Northwest	T-Line Corridor	T2S, R22E, Sections 16, 21, and 22

C. Project Applicant

Applicant:
SolarReserve, LLC
2425 Olympic Blvd.
Suite 500 East
Santa Monica, CA 90404

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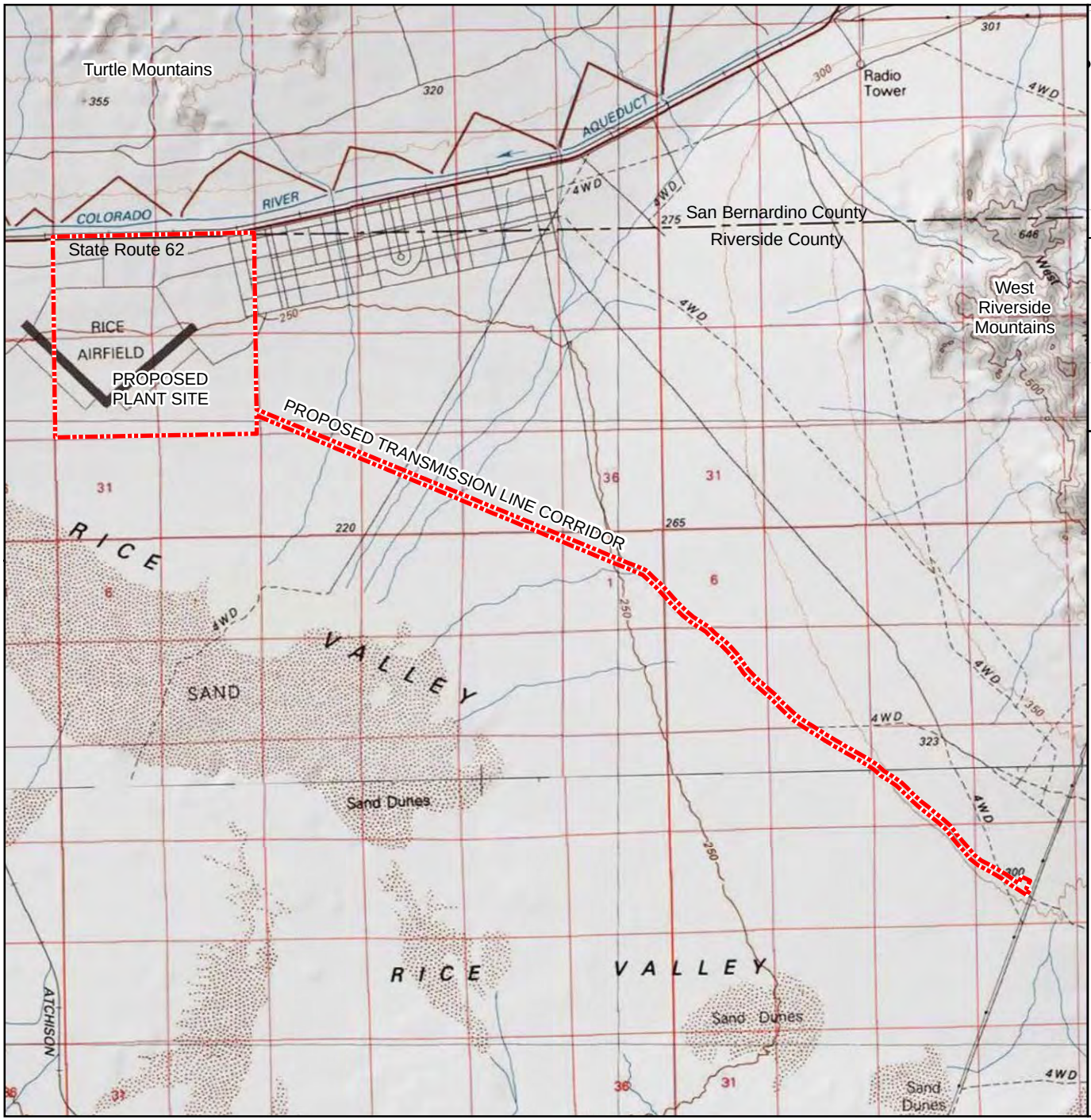

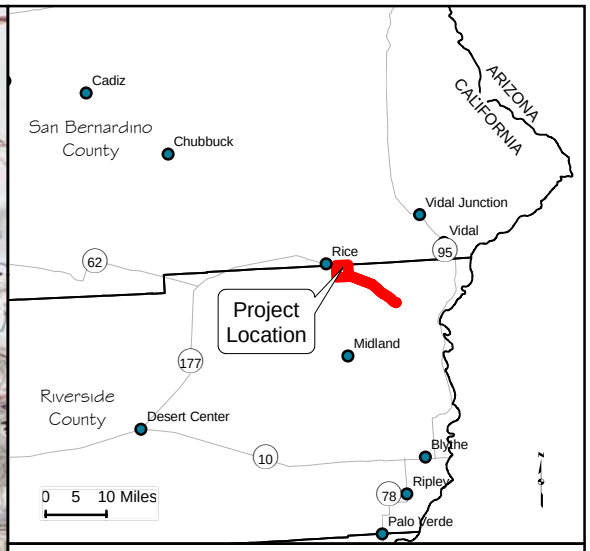

Rice Solar Energy Project
Riverside County, CA
5 March 2010

Figure 1. Location Map

Project Location

8,000 4,000 0 8,000 Feet N

Scale: 1 inch = 8,000 feet

Projection: UTM Zone 11N, NAD83 datum

SYCAMORE Environmental Consultants, Inc.

USGS 30 Minute by 60 Minute
1:100,000 Topographic Map
Parker, Arizona and Blythe, California
© 2007 National Geographic Society
ESRI ArcGIS Online Data Layer

08099RiceJD_Fig1LocationMap.mxd

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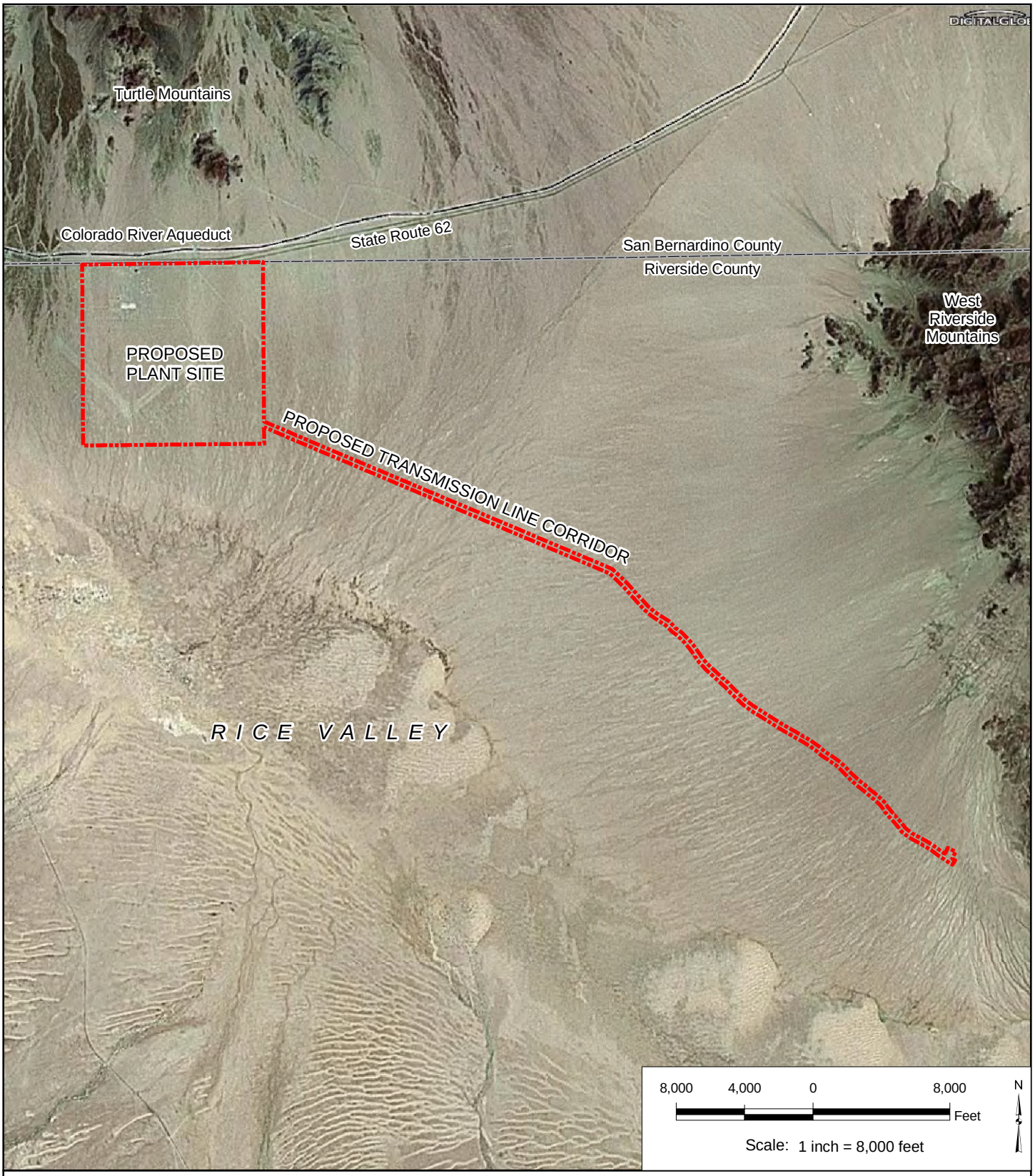

Rice Solar Energy Project
Riverside County, CA
5 March 2010

Project Location

SYCAMORE Environmental Consultants, Inc.

Aerial Photograph:
1 January 1999
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Figure 2. Aerial Photograph

08099RiceJD_Fig2AerialPhoto.mxd

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D. Project Description

Rice Solar Energy, LLC, (RSE), a wholly owned subsidiary of SolarReserve, LLC, proposes to construct, own, and operate the Rice Solar Energy Project (RSEP or project). The RSEP will be a solar generating facility located on a privately owned site in unincorporated eastern Riverside County, California. The project will be capable of producing approximately 450,000 megawatt hours (MWh) of renewable energy annually, with a nominal net generating capacity of 150 megawatts (MW).

The facility will use concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system. The RSEP's technology generates power from sunlight by focusing energy from a field of sun-tracking mirrors called heliostats onto a central receiver. Liquid salt[1], which has viscosity and appearance similar to water when melted, is circulated through tubes in the receiver, collecting the energy gathered from the sun. The heated salt is then routed to an insulated storage tank where it can be stored with minimal energy losses. When electricity is to be generated, the hot salt is routed to heat exchangers (or steam generation system). The steam is then used to generate electricity in a conventional steam turbine cycle. After exiting the steam generation system, the salt is sent to the cold salt thermal storage tank and the cycle is repeated. The salt storage technology was demonstrated successfully at the U.S. Department of Energy-sponsored 10-MW Solar Two project near Barstow, California, in the 1990s.

Project Components

The RSEP design incorporates the following principal elements:

- Heliostat field with up to 17,500 tracking heliostats, each approximately 24 feet tall by 28 feet wide, arranged in a circular array that will reflect and concentrate the sun's energy onto a tower-mounted receiver. A 1,410-acre project area will be fenced and will contain the administration area, heliostat field, administration area, and evaporation ponds.
- A concrete central tower approximately 540 feet tall, upon which is mounted a receiver approximately 100 feet tall topped with a small maintenance crane, for an overall structure height of 653 feet.
- A liquid salt storage system featuring insulated "hot" and "cold" salt storage tanks.
- A steam turbine generator system rated at 150 MW (net).
- A 20-cell ACC to provide water-free cooling and condensing of the steam turbine exhaust.

[1] The salt is a mixture of sodium nitrate, a common ingredient in fertilizer, and potassium nitrate, a fertilizer and food additive. These mineral products will be mixed on-site as received directly from mines in solid crystallized form and used without additives or further processing other than mixing and heating.

- A 10-mile, 230-kilovolt (kV) generator tie-line to connect the RSEP with the existing Western Area Power Administration (Western) Parker-Blythe transmission line. (The new tie-line has been routed along existing dirt roads for approximately 5.4 miles and will require minimal construction of approximately 4.6 miles of single-lane dirt access road for construction and inspection. A new interconnection substation [approximately 3 acres in size] for the tie-in to Western's system will be constructed adjacent to the existing transmission line. The generator tie-line will cross land managed by the Bureau of Land Management [BLM].)
- Extension of the existing low-voltage power distribution network spanning about 1 mile, including a span of less than 200 feet across BLM land, to supply ancillary facilities.
- Two on-site water wells to provide water for heliostat washing, steam cycle makeup and other process uses in an amount not expected to exceed 180 acre-feet per year.
- Three lined evaporation ponds of approximately 5 acres each to capture all process wastewater discharge from the project's water treatment system, process blowdown, and stormwater drainage from within equipment areas.
- Stormwater drainage features to channelize offsite stormwater flows from upstream of the project site, diverting offsite stormwater around the project site, and rejoining the natural flow channels to the south of the property.
- Two emergency diesel generators and associated equipment to supply emergency backup power for the safe shut-down and protection of vital equipment and facilities.
- On-site fire protection facilities, which consist of two sets of electric-motor-driven and diesel-engine-driven fire pumps and related fire detection and protection equipment.
- Various buildings for plant control room, administration offices, maintenance and storage, and crew comfort facilities.
- Physical security systems including fencing, closed-circuit television, and other means to protect against unwanted entry consistent with electric utility and Department of Homeland Security requirements.

Project Location

The RSEP site is a privately owned parcel located in eastern Riverside County. The site is adjacent to State Route (SR) 62, which parallels a portion of the Arizona-California Railroad and the Colorado River Aqueduct, near the junction of SR 62 and Blythe-Midland Road, and near the sparse remains of the abandoned town of Rice, California. The nearest occupied residence is approximately 15 miles northeast at the rural crossroads community of Vidal Junction, California. The nearest town is Parker, Arizona (population 3,181), approximately 32 miles east. A small permanent residential settlement is located at the Metropolitan Water District of Southern California's Iron Mountain Pumping Plant, approximately 17 miles west.

The RSEP is within a larger, privately owned holding that is 3,324 ac (the ownership property). Within this larger property, the RSEP is sited within a new square-shaped parcel (the project parcel) that will be created by merging what are currently four different assessor's parcels, each of them a discrete section (square mile) of land, resulting in a single 2,560-ac parcel. Within this project parcel will be the administration buildings area, heliostat field with power block, and evaporation pond areas, (collectively, the project site or facility site) totaling 1,410 ac, that will be surrounded by a security fence. Areas outside the facility site but within the project parcel will not be fenced or developed or disturbed as part of the RSEP.

Project Schedule

RSE is filing this Application for Certification (AFC) under the California Energy Commission's (CEC) standard certification process. Construction of the project is planned to begin in spring 2011, assuming all necessary permits have been received. Based upon an anticipated construction period of approximately 30 months, commercial operation is targeted for October 2013. RSE is presently in negotiations with California utilities for long-term purchase power agreements from the RSEP which, when executed, would require deliveries of power from the RSEP facility by this date.

II. STUDY METHODS

A. Literature Review

Standard taxonomic references include Abrams (1923-1960); Hickman (1993); Baldwin et al. (2002); and Munz (1959; 1974). Plant community references include Sawyer (2009). Hydrophytic classifications of plants were determined from the U.S. Fish and Wildlife Service national list of plant species that occur in wetlands (USFWS 1988).

B. Data Sources

Table 2 includes a list of data sources used to prepare this report.

Table 2. Data Sources.

Map References	Source
Maps, plans, plots or plat submitted by or on behalf of the applicant.	Boundary data and design SolarReserve LLC (via CH2M Hill).
Data sheets prepared/submitted by or on behalf of the applicant.	Appendix A: Wetland Data Sheets
Corps navigable waters' study.	N/A
U.S. Geological Survey Hydrologic Atlas. 1. USGS NHD data 2. USGS 8 and 12 digit HUC maps	USGS 8 digit HUC map
U.S. Geological Survey map(s).	See Table 1.
USDA Natural Resources Conservation Service Soil Survey.	NRCS 2006, 2009, and 2010a.
National wetlands inventory map(s).	USFWS NWI online mapper does not have digital data available for the Rice and Grommet quads (USFWS 2010).
State/Local wetland inventory map(s).	None known
FEMA/FIRM maps.	FIRM maps are not available for the area (FEMA 2010).
100-year Floodplain Elevation is: (e.g. National Geodetic Vertical Datum of 1929)	None known
Photographs: 1. Aerial (Name & Date): 2. Other (Name & Date):	Figure 2 and 3: ImageConnect Service (GlobeXplorer© 2007) image date 1 January 1999. Figure 4: Google Earth image date 5 April 2005.
Previous determination(s). File no. and date of response letter:	None known

C. Survey Dates and Personnel

Adam Forbes, M.S., Charles Hughes, M.S., and Michael Bower M.S, conducted fieldwork for the jurisdictional delineation on 19, 20, 21, and 22 February 2010. Adam Forbes, M.S. and Jeff Little conducted additional fieldwork on 4 March 2010.

D. Survey Methods

This jurisdictional delineation report has been prepared in accordance (where applicable) with the U.S. Army Corps of Engineers Wetland Delineation Manual (Corps 1987), Regulatory Guidance Letter 05-05 (Corps 2005), Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (the supplement; Corps 2006), and A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (Corps 2008).

A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (the field guide) describes a procedure for identifying the OHWM in low-gradient, alluvial ephemeral/intermittent channel forms in the Arid West (Corps 2008). The OHW zone in low-gradient, alluvial ephemeral/intermittent channel forms in the Arid West is the active floodplain which is defined by a 5 to 10 yr event (Corps 2008). The field guide states that "Alluvial fans present unique difficulties in identifying hydrogeomorphic floodplain units" (Corps 2008).

The OHWM identification procedure involves two stages: (1) a preliminary delineation is made based on aerial photos, gage data (if available), and any other supporting information (e.g., topographic, soil, vegetation, and geologic maps; false color IR images; and rainfall data) that might be available for the area, and (2) the limit of OHWM is identified in the field using OHWM indicators and verified based on the preliminary delineation results. Much of the preliminary delineation stage involves the acquisition and analysis of gage data. However, no gage data is available in the vicinity of the PSA.

Aerial photographs and the Rice, Grommet, and Big Maria Mountains Northwest USGS quads were reviewed to identify potential wetland and water resources in the PSA. The aerial photographs and USGS quads indicated that numerous north to south trending ephemeral channels occur throughout the project area. This was confirmed by observations made by Sycamore Environmental during rare plant surveys of the PSA conducted in March 2009. Given the size of the PSA and the number of features present, the characterization and mapping of these ephemeral channels was accomplished by a combination of field surveys and mapping using high-resolution aerial photographs. Corps regulatory staff in the Los Angeles District (CH2M Hill 2008) has approved this approach for other large scale desert solar projects.

The total area delineated was approximately 2,897.97 ac consisting of the proposed plant site (2,559.52 ac) + the T-line corridor (338.45 ac). A total of 12 linear transects perpendicular to the ephemeral channels (east-west orientation) were established approximately every 1,000 ft across the proposed plant site. A total of three linear transects were established approximately 500 ft apart along the proposed T-line corridor. Surveys were then conducted along each transect and data were recorded at each point where an ephemeral channel intersected the transect line.

The location of each ephemeral channel encountered along a transect was recorded using a Trimble® Geo-XT and or Trimble® Pro-XR sub-meter accurate global positioning system (GPS) and general characteristics of the ephemeral channel, including average channel width, evidence of flow, and general vegetation were noted. Field data were then incorporated into a geographic information system (GIS). Data points collected along the transect lines were then plotted on recent aerial photographs, with 2-foot resolution, and the ephemeral channels within the survey area were manually digitized using the field data for reference.

Based on the field data, each ephemeral channel was then assigned a size category class between 1 and 5 (Table 3).

Table 3. Channel Size Class Categories.

Category Name	Width Range (ft)
Category 1	1 to <5
Category 2	>5 to <10
Category 3	>10 to <20
Category 4	>20 to <35
Category 5	>35

E. Jurisdictional Data

The jurisdictional delineation was conducted using the Routine On-Site Determination Method for sites greater that five ac in size (Corps 1987). Jurisdictional data were recorded using the Wetland Determination Data Form for the Arid West Region (Corps 2006). Two wetland soils points were sampled (Appendix A). Soil, vegetation, and hydrology data were recorded at these data points. Plant species were identified by Adam Forbes, M.S., Charles Hughes, M.S., and Michael Bower M.S. Photographs are in Appendix B. Appendix C is a list of plant species recorded at data points as well as other species observed during the jurisdictional delineation field work in February 2010.

F. Mapping of Data and Calculation of Acreages

The location of each ephemeral channel encountered along a transect was recorded using a Trimble® Geo-XT and or Trimble® Pro-XR sub-meter accurate GPS. Based on the field data, each ephemeral channel was then assigned a size category class between 1 and 5 (Table

3). The approximate acreages on-site for categories 1, 2, 3, and 4 were calculated using the median width of the size class shown in Table 3. The approximate acreage for ephemeral channel category 5 was calculated using an average width for each individual channel, based on field data and the aerial photographs dated 5 April 2005.

G. Definitions

The U.S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency regulate the discharge of dredge and fill material into "waters of the United States" under Section 404 of the Clean Water Act (33 U.S.C. 1344). The Corps issues permits for certain dredge and fill activities in waters of the U.S. pursuant to the regulations in 33 CFR 320-330. The lateral limits of jurisdiction in those waters may be divided into three categories. The categories include the territorial seas, tidal waters, and non-tidal waters (see 33 CFR 328.4 (a), (b), and (c), respectively). The term "waters of the U.S." is defined at 33 CFR 328.3(a) as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
   i. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
   ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
   iii. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of waters identified in paragraphs (a)(1)-(4) of this section;
6. The territorial seas;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1)-(6) of this section.

The term "adjacent" is defined at 33 CFR 328.3(c):

> The term *adjacent* means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the like are ''adjacent wetlands.''

The limits of jurisdiction are identified in 33 CFR 328.4 as:

a. Territorial Seas. The limit of jurisdiction in the territorial seas is measured from the baseline in a seaward direction a distance of three nautical miles. (See 33 CFR 329.12)
b. Tidal Waters of the United States. The landward limits of jurisdiction in tidal waters:
   1. Extends to the high tide line, or
   2. When adjacent non-tidal waters of the United States are present, the jurisdiction extends to the limits identified in paragraph (c) of this section.
c. Non-Tidal Waters of the United States. The limits of jurisdiction in non-tidal waters:
   1. In the absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark, or
   2. When adjacent wetlands are present, the jurisdiction extends beyond the ordinary high water mark to the limit of the adjacent wetlands.
   3. When the water of the United States consists only of wetlands the jurisdiction extends to the limit of the wetland.

Wetlands, as defined by the Corps for regulatory purposes, are identified using a three-parameter test that considers whether hydrophytic vegetation, hydric soils, and hydrology are present (Corps 1987). Wetlands are "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3, 40 CFR 230.3). Wetlands also include less conspicuous wetland types such as vernal pools and other seasonal wetlands.

An ephemeral stream has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow. An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow (66 FR 42099).

III. SETTING

The PSA is located ± 30 miles north of the City of Blythe in northeast Riverside County. Land use surrounding the PSA consists of Highway 62 to the north and open desert to the east, south, and west. Some portions of the surrounding desert are used in spring months to graze sheep.

A. Topography

The PSA is located on a bajada on the north side of the Rice Valley. A bajada is a broad, gently inclined detrital surface extending from the base of mountain ranges out into an inland basin, formed by the lateral coalescence of a series of alluvial fans (Bates et al. 1984). Elevation in the PSA ranges from approximately 740 to 1,000 ft above sea level. Topography consists of generally flat to gently sloping terrain.

Rice Valley is a closed watershed with no hydrological connectivity to watersheds with connectivity with TNWs. The ephemeral streams, washes, and playas in Rice Valley are dry most of the year with surface water present only after storm events. There are no perennial surface water sources and there is no evidence that a lake ever formed in the valley during wetter climatic periods.

B. Weather and Climate Conditions

Fieldwork for the jurisdictional delineation was conducted on 19, 20, 21, and 22 February, and 4 March 2010. The historic (1908-present) average precipitation for the Blythe gauge from September through January is 1.71 inches (CDWR 2010). From September 2009 through January 2010 the Blythe gauge received 3.0 inches of rain (CDWR 2010), or

approximately 175% of the average accumulated precipitation. Hydrologic conditions were above normal during the jurisdictional delineation field work.

The Blythe gauge was used because it provides the only set of historic and current precipitation data relevant to the study area. The Blythe gauge is located approximately 32 air mi south of the PSA. The Big Santa Maria Mountains are located between the PSA and the Blythe gauge station. Although the Blythe gauge represents the best precipitation data available, it is unknown if this information accurately represents precipitation received in the PSA.

C. Vegetation

Biological communities are defined by species composition and relative abundance. After the botanical report was completed for the RSEP project (Sycamore Environmental 2009), the second edition of "A Manual of California Vegetation" (Sawyer et al. 2009) was published. The botanical report (Sycamore Environmental 2009) identified the entire PSA as Sonoran Creosote Bush Scrub. Biological community names were updated in Sawyer et al. 2009 for desert (and other communities). The majority of the vegetation in the PSA can now be categorized in two slightly different biological communities, both containing creosote bush as a common shrub. These include *Larrea tridentata - Ambrosia dumosa* Shrubland and *Ambrosia dumosa* Shrubland. Two small areas of smoke tree woodland communities (*Psorothamnus spinosus* Woodland) have also been identified and mapped.

The three biological communities present in the PSA are described below. Appendix C is a list of plant species recorded at data points as well as other species observed during the jurisdictional delineation field work in February 2010.

Larrea tridentata - Ambrosia dumosa Shrubland: This community, previously known as Creosote Bush Scrub, is dominated by creosote bush (Larrea tridentata) and white bursage (*Ambrosia dumosa*) and occupies approximately 2,571.49 ac in the PSA. In many areas in the PSA, white bursage has greater absolute cover than creosote bush, but not sufficient to be classified as *Ambrosia dumosa* Shrubland (see below). Other shrubs present at low abundance are burrobrush (*Hymenoclea salsola* var. *salsola*), brittlebush (*Encelia farinosa*), and white rhatany (*Krameria grayi*). Common species in the herb layer are white tackstem (*Calycoseris wrightii*), pebble pincushion (*Chaenactis carphoclinia* var. *carphoclinia*), desert dandelion (*Malacothrix glabrata*), devil's lettuce (*Amsinckia tessellata*), *Cryptantha nevadensis*, *Pectocarya platycarpa*, mustard (*Brassica tournefortii*), rattlesnake weed (*Chamaesyce albomarginata*), *Camissonia boothii* ssp. *condensata*, plantain (*Plantago ovata*), and Mediterranean grass (*Schismus barbatus*). There are no trees present.

Ambrosia dumosa Shrubland: This community is dominated by white bursage, although creosote bush is also common. This community type occupies 115.58 ac in the PSA. This community was separated from the *Larrea tridentata - Ambrosia dumosa* Shrubland on-site because white bursage plants had greater than twice the absolute cover of creosote scrub (Sawyer et al. 2009). Burrobrush is also present at low cover levels in the community. The herb layer is similar to the *Larrea tridentata - Ambrosia dumosa* Shrubland. There are no trees present.

Psorothamnus spinosus Woodland: This community occupies 5.17 acres in the PSA. This community is characterized by smoke tree (*Psorothamnus spinosus*), although smaller shrubs may have greater cover (Sawyer et al. 2009). In the PSA, burrobrush has approximately equal cover as smoke tree. In the PSA, palo verde (*Cercidium* sp.) is also present in the tree layer and white bursage and creosote bush are present in the shrub layer. The nonnative, invasive annual, *Brassica tournefortii* is common in the herb layer.

This community occurs in the PSA due to altered hydrology. Runoff from the Turtle Mountains and the bajada north of the plant site is directed to two areas across the Colorado Aqueduct and Highway 62 by long berms north of the Aqueduct (Figure 1). The concentrated runoff creates the localized conditions capable of supporting *Psorothamnus spinosus* Woodland. The community is typically associated with dessert washes (Sawyer 2009). This community was only associated with the two largest ephemeral channels (Category 5) at the two locations described above. *Psorothamnus spinosus* Woodland was not observed along any of the other channels in the PSA.

D. Existing Conditions

The proposed plant site is located on an airfield (Rice Airfield) that was abandoned between 1955 and 1958 (Freeman 2009). The abandoned airfield once consisted of two paved, 5,000-ft long runways and numerous dispersal pads extending beyond the runways to the south (Freeman 2009). Various dirt roads, an existing, 6.11 ac concrete pad, and portions of the old runways have been observed during surveys in the PSA. The proposed ± 10 mi long T-line corridor traverses relatively undisturbed terrain.

Hydrology of the proposed plant site has been altered by off-site activities including the construction of Highway 62, Colorado River Aqueduct, and the Arizona-California Railroad north of the PSA. On-site hydrology has been altered by the use of the site as an airfield.

Diversion dams were constructed north of the highway and aqueduct to avoid surface flows originating in the Turtle Mountains to the north (Figure 1) from damaging these features. The diversion dams north of the project area divert surface flows into two major washes. Water in these washes flows through culverts under Highway 62 onto the proposed plant site (Figure 1). At the locations where these two washes enter the proposed plant site south of Highway 62, berms were constructed to divert the flows in these channels around the airfield. After the

airfield was abandoned each of these berms have been breached (Figure 4) by the force of water flowing through the channels. It is presumed breaches occurred due to flow eroding the berm. The exact source of the breach is not known. Currently, as surface flows enter the proposed plant site at these two locations, water flows through the breaches and quickly fans out creating a distributary flow pattern characteristic of alluvial fans and bajadas.

E. Soils

A soil survey of eastern Riverside County has not yet been completed (NRCS 2009). The Digital General Soil Map of U.S. (GSM) does show the general soil association units present in the PSA (NRCS 2006). The GSM data set consists of general soil association units and was developed by the National Cooperative Soil Survey and supersedes the State Soil Geographic data set published in 1994. The GSM indicates that majority of the PSA is occupied by the Rositas-Carrizo soil association unit (NRCS 2006). The Rositas-Dune land-Carsitas soil association unit occurs at the extreme eastern tip the T-line corridor. The 'dune land' modifier in the Rositas-Dune land-Carsitas soil association unit is not a soils series. The term dune land may be referencing that the soils commonly occurs in areas with active dunes. The series descriptions below are from the NRCS official soil series descriptions (NRCS 2010a). Figure 3 is a soils map.

Rositas Series: The Rositas series consists of very deep, somewhat excessively drained soils formed in sandy eolian material. Rositas soils occur on dunes and sand sheets with slopes ranging from 0 to 30 percent with hummocky or dune micro relief. Mean annual precipitation is about 4 inches and the mean annual air temperature is about 72° F. Vegetation typically consists of creosote bush, white bursage, desert buckwheat and mesquite. This soil series is classified as a mixed, hyperthermic Typic Torripsamments (NRCS 2010a).

The Rositas series includes the Rositas fine sand, wet, 0 to 2 percent slopes and Rositas silty clay loam, wet, 0 to 2 percent slopes, soils mapping units as well as others. The Rositas fine sand, wet, 0 to 2 percent slopes and Rositas silty clay loam, wet, 0 to 2 percent slopes soils mapping units are listed as hydric soils (NRCS 2010b). Both of these soils are classified as hydric based on hydric criteria 2.b.iii (NRCS 2010b). Criteria 2.b.iii states that the soils is "…in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that are poorly drained or very poorly drained and have water table at less than or equal to 1.0 ft from the surface during the growing season if permeability is less than 6.0 in/h in any layer within 20 inches." (NRCS 2010c). The Rositas soils in the PSA are not poorly or very poorly drained and do not have a water table at less than or equal to 1.0 ft from the surface during the growing season. The Rositas soils in the PSA are not hydric.

Carrizo Series: The Carrizo series consists of very deep, excessively drained soils formed in mixed alluvium. Carrizo soils are on floodplains, alluvial fans, fan piedmonts and bolson floors. Slope ranges from 0 to 15 percent. The mean annual precipitation is about 5 inches

and the mean annual air temperature is 73º F. Vegetation typically consists of creosote bush, white bursage, cheese bush and rhatany. This soil series is classified as a sandy-skeletal, mixed, hyperthermic Typic Torriorthents (NRCS 2010a).

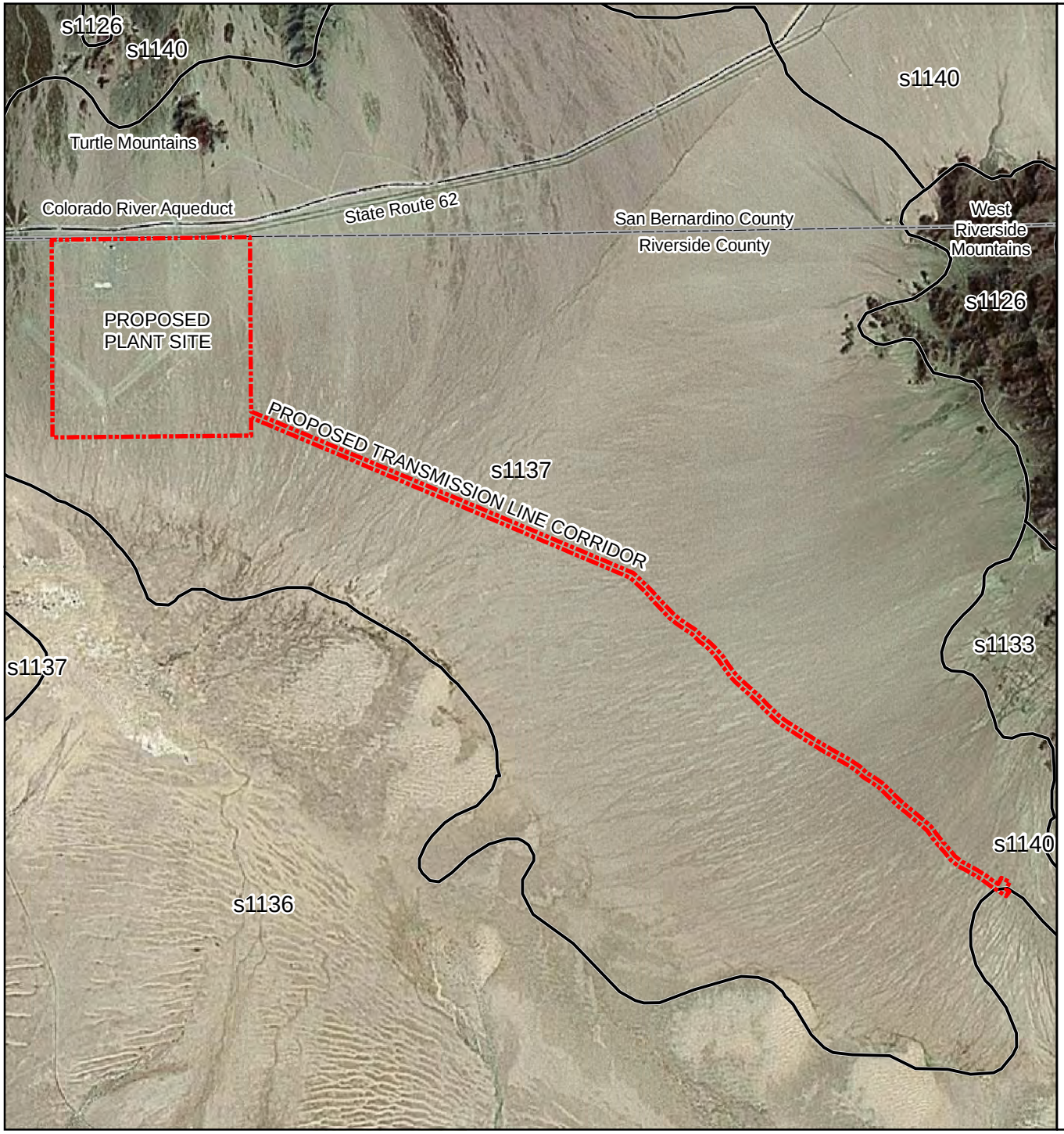
The Carrizo series includes the Carrizo very gravelly sand, 0 to 9 percent slope soil mapping unit, as well as others. The Carrizo very gravelly sand, 0 to 9 percent slopes soil mapping unit is listed as a hydric soil (NRCS 2010b). This soil is classified as hydric based on hydric criteria 4 (NRCS 2010b). Criteria 4 states "Soils that are frequently flooded for long duration or very long duration during the growing season" (NRCS 2010c). The Carrizo soils in the PSA are not frequently flooded for long duration or very long duration during the growing season. The Carrizo soils in the PSA are not hydric.

Carsitas Series: Carsitas soils are excessively drained, rapidly permeable, nearly level to strongly sloping and occur on alluvial fans, moderately steep valley fills and dissected remnants of alluvial fans. Average annual precipitation of less than 5 inches the average annual temperature is about 72 º F. This soil series is classified as a mixed, hyperthermic Typic Torripsamments (NRCS 2010a).

The Carsitas series includes the Carsitas gravelly sand, 0 to 9 percent slopes, Carsitas gravelly sand, 9 to 30 percent slopes, and Carsitas cobbly sand, 2 to 9 percent slopes soil mapping units, as well as others. The Carsitas gravelly sand, 0 to 9 percent slopes, Carsitas gravelly sand, 9 to 30 percent slopes, and Carsitas cobbly sand, 2 to 9 percent slopes soil mapping soil mapping units are listed as a hydric soils (NRCS 2010b). This soil is classified as hydric based on hydric criteria 4 (NRCS 2010b). Criteria 4 states "Soils that are frequently flooded for long duration or very long duration during the growing season" (NRCS 2010c). The Carsitas soils in the PSA are not frequently flooded for long duration or very long duration during the growing season. The Carsitas soils in the PSA are not hydric.

F. National Wetlands Inventory Map

USFWS NWI online mapper does not have digital data available for the Rice, Grommet and Big Maria Mountains Northwest quads (USFWS 2010).



Rice Solar Energy Project
Riverside County, CA
5 March 2010

Figure 3. Soils Map

Project Location
Soil Boundary

Map Unit	Description
s1137	Rositas-Carrizo unit

8,000 4,000 0 8,000 Feet
N
Scale: 1 inch = 8,000 feet

SYCAMORE Environmental Consultants, Inc.

Aerial Photograph:
1 January 1999
Copyright © 2009 GlobeXplorer,
A DigitalGlobe Company. All rights reserved.

Soils:
Digital General Soil Map of U.S. (GSM)
National Cooperative Soil Survey (NRCS 2006)

08099RiceJD_Fig3Soils.mxd

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IV. WETLANDS AND WATERS

This section describes the results of the jurisdictional delineation. Channel features are shown on Figure 4 and their acreages are in Table 5. No wetlands occur in the PSA.

On 5 June 2007, the Corps issued a memorandum providing guidance on implementation of the Supreme Court's decision in the consolidated cases Rapanos v. United States and Carabell v. United States (Corps 2007). An evaluation of channels relative to their potential jurisdiction under Section 404 of the Clean Water Act (33 U.S.C. 1344) in light of the June 2007 Rapanos guidance, is in Section V.

A. Wetlands

No wetlands occur in project area. Two wetland data points were sampled during the delineation fieldwork. No hydrophytic plant communities occur in the PSA. Of the species observed during the delineation only one facultative rated species was observed (screw bean, *Prosopis pubescens*).

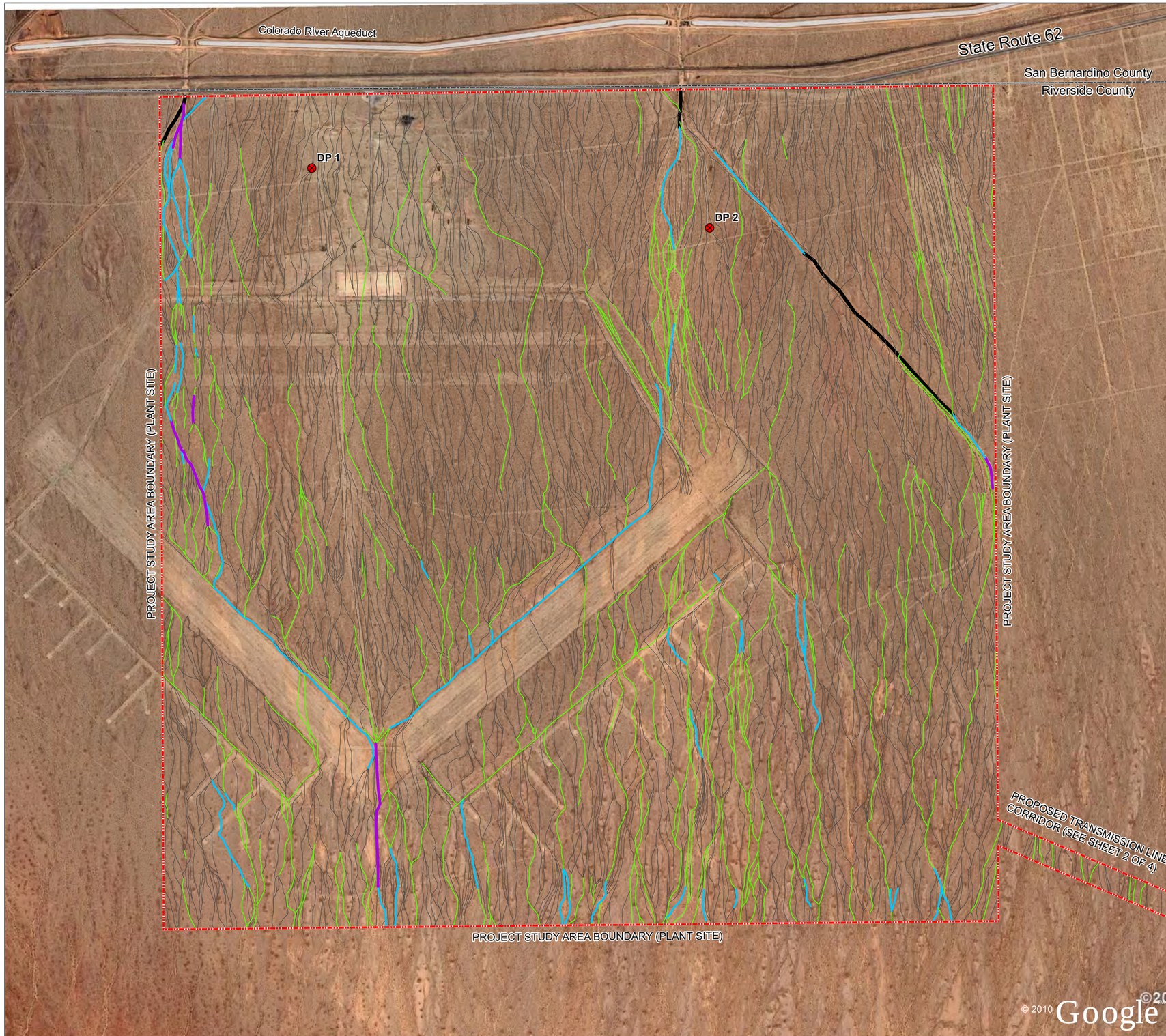
B. Waters

Numerous ephemeral channels occur in the proposed plant site and T-line corridor. Table 4 list the numbers of channel features per size class category recorded along each transect and the average number of channels features per size class category for all transects. These ephemeral channels range from small, weakly expressed features (Category 1) to wide, well-defined features (Category 5). The beds of all channels in the PSA are composed of a mix of sand, silt, and small diameter gravel (Appendix B, Photos 1-12).

The beds of most Category 1, 2, and 3 ephemeral channels are devoid of vegetation. Category 4 and 5 ephemeral channels typically contained scattered herbaceous and scrub species within the channel bed. Species typically observed in the low flow channel of Category 4 and 5 ephemeral channels includes creosote bush, bursage, burrobrush, and plantain. Two small areas (1.53 ac and 3.64 ac) of *Psorothamnus spinosus* Woodland associated with the two Category 5 ephemeral channels in the northern portion of the proposed plant site were identified during the delineation (Appendix B, Photos 10 and 11). Species present in the *Psorothamnus spinosus* Woodland community include smoke tree (*Psorothamnus spinosus*), palo verde (*Cercidium* sp.), creosote bush, bursage, and burrobrush.

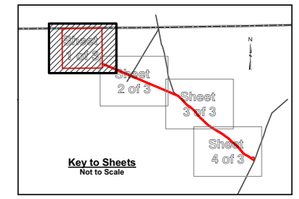
Table 4. Summary of ephemeral channels recorded along survey transects.

Transect (T)	Approximate Number of Features Per Category (Proposed Plant Site Only)				
	Category 1 (1 to <5 ft)	Category 2 (>5 to <10 ft)	Category 3 (>10 to <20 ft)	Category 4 (>20 to <35)	Category 5 (>35 ft)
A	141	8	1	--	2
B	188	11	7	1	--
C	166	33	2	1	--
D	184	30	2	1	--
E	184	28	5	1	--
F	187	28	2	1	--
G	162	35	3	--	--
H	166	24	8	--	--
I	135	39	4	--	--
J	132	28	3	2	--
K	178	44	12	--	--
L	123	48	4	--	--
Plant Site: Ave # of channels per Category.	**162.17**	**29.67**	**4.42**	**0.58**	**0.17**
	Approximate Number of Features Per Category (T-line Corridor Only)				
T-line A	691	287	50	5	3
T-line B	659	167	21	1	0
T-line B	556	206	57	6	2
T-line: Avg. # of channels per Category.	**635.33**	**220.00**	**42.67**	**4.00**	**1.67**



Rice Solar Energy Project
Riverside County, CA
5 March 2010

Figure 4.
Preliminary Jurisdictional Delineation Map
Plant Site - Sheet 1 of 4



Project Study Area Boundary
Data Point
Ephemeral Channel Size Class
Category 1 (1 to <5 ft)
Category 2 (>5 to <10 ft)
Category 3 (>10 to <20 ft)
Category 4 (>20 to <35 ft)
Category 5 (>35 ft)

Size Class	Avg. # of Channels	Length (ft)	Avg. Width (ft)	Acreage (ac)
Category 1 (1 to <5 ft)	3,428	1,389,983	2.5	79.774
Category 2 (>5 to <10 ft)	569	285,375	7.5	49.135
Category 3 (>10 to <20 ft)	75	38,772	15	13.351
Category 4 (>20 to <35 ft)	7	5,042	27.5	3.183
Category 5 (>35 ft)	3	3,968	33.9	3.088
Proposed Plant Site Totals:	**4,082**	**1,723,140**	**--**	**148.531**
T-Line Corridor				
Category 1 (1 to <5 ft)	987	214,268	2.5	12.297
Category 2 (>5 to <10 ft)	247	63,331	7.5	10.904
Category 3 (>10 to <20 ft)	40	7,383	15	2.542
Category 4 (>20 to <35 ft)	6	1,458	27.5	0.920
Category 5 (>35 ft)	4	803	35.6	0.656
T-Line Corridor Totals	**1,284**	**287,243**	**--**	**27.320**
Proposed Plant Site + T-Line Corridor (Total):	**5,366**	**2,010,383**	**--**	**175.852**

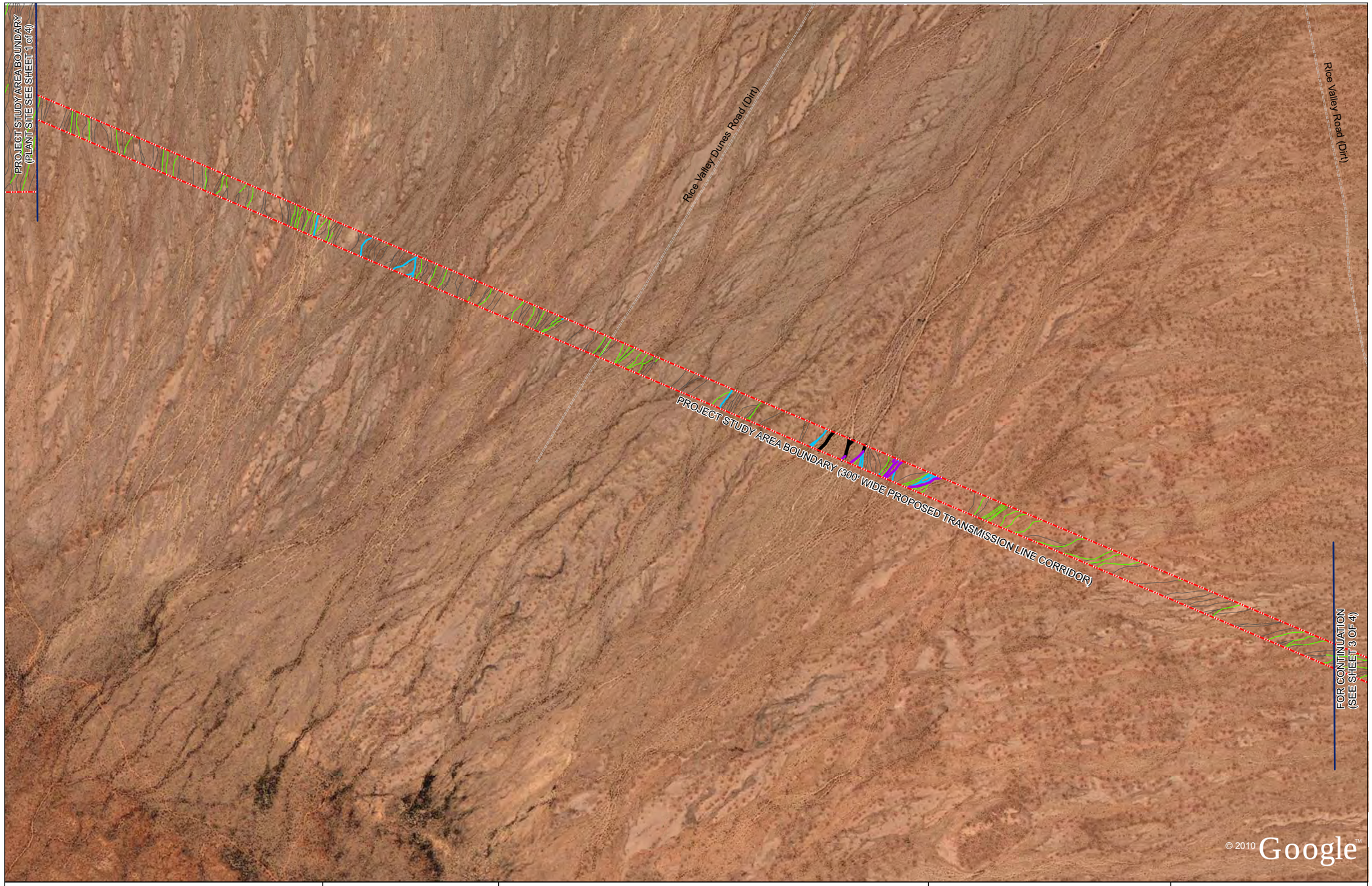
800 400 0 800 Feet
Scale: 1 inch = 800 feet
N

SYCAMORE Environmental Consultants, Inc.

Date	Submittal	Delineators
5 Mar 10	Original	ACF, CCH, MJB

Aerial Photograph: 5 April 2005
Image © 2010 DigitalGlobe
Google Earth Pro

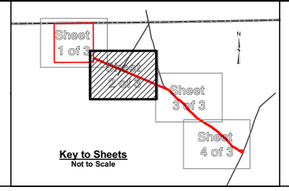
08099RiceJD_Fig4JDMap_MainSiteSht1of4.mxd



Rice Solar Energy Project
Riverside County, CA
5 March 2010

DRAFT

Figure 4. Preliminary Jurisdictional Delineation Map
Proposed Transmission Line Corridor
Sheet 2 of 4



Project Study Area Boundary

Ephemeral Channel Size Class

- Category 1 (1 to <5 ft)
- Category 2 (>5 to <10 ft)
- Category 3 (>10 to <20 ft)
- Category 4 (>20 to <35 ft)
- Category 5 (>35 ft)

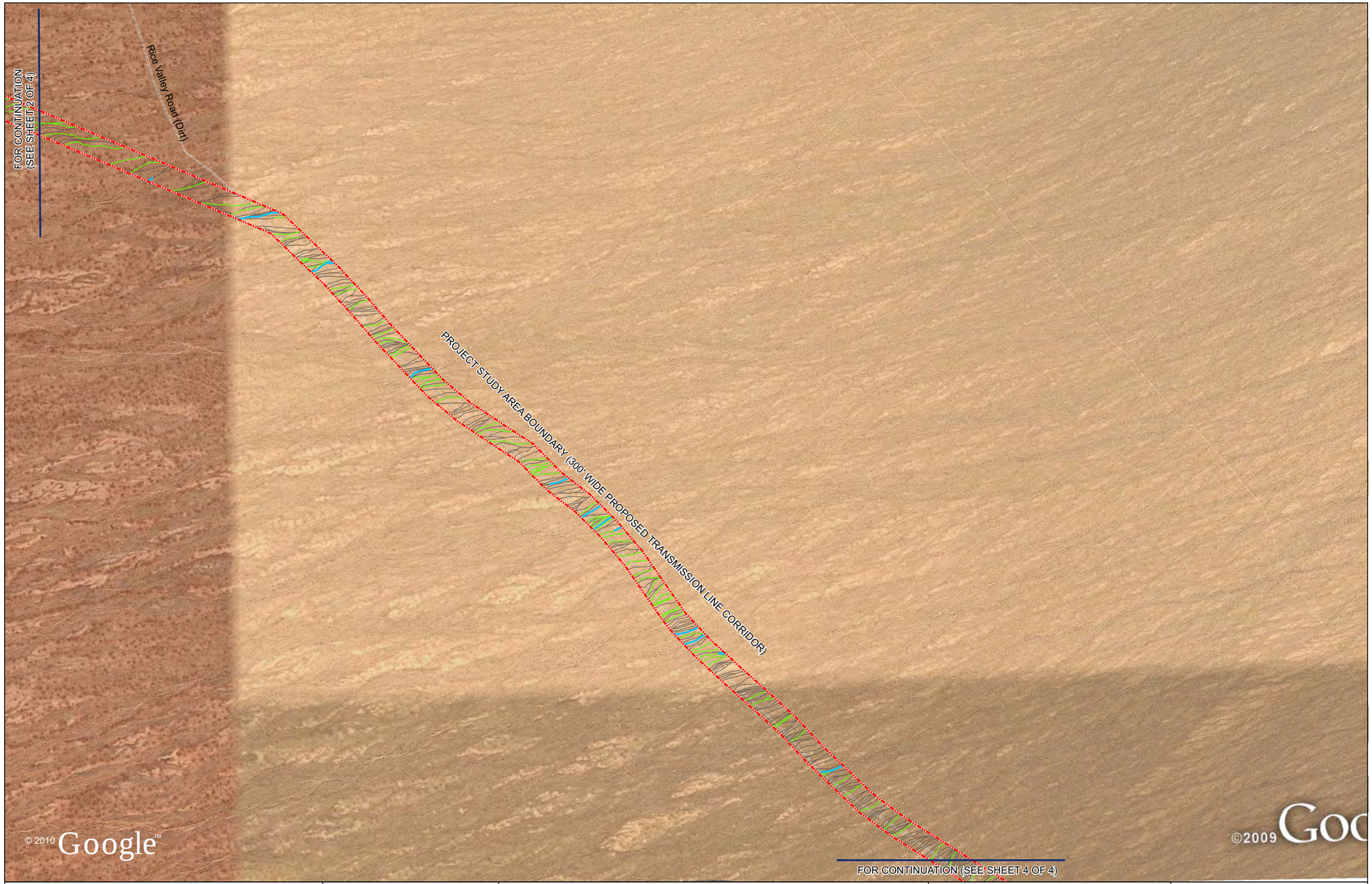
800 400 0 800 Feet
N
Scale: 1 inch = 800 feet

SYCAMORE Environmental Consultants, Inc.

Date	Submittal	Delineators
5 Mar 10	Original	ACF, CCH, MJB

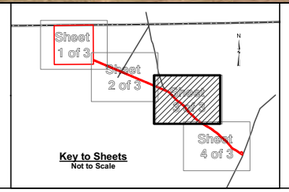
Aerial Photograph: 5 April 2005
Image © 2010 DigitalGlobe
Google Earth Pro

08099RiceJD_Fig4JDMap_T-LineSht2of4.mxd



Rice Solar Energy Project
Riverside County, CA
5 March 2010

Figure 4. Preliminary Jurisdictional Delineation Map
Proposed Transmission Line Corridor
Sheet 3 of 4



Project Study Area Boundary

Ephemeral Channel Size Class
- Category 1 (1 to <5 ft)
- Category 2 (>5 to <10 ft)
- Category 3 (>10 to <20 ft)
- Category 4 (>20 to <35 ft)
- Category 5 (>35 ft)

800 400 0 800 Feet
Scale: 1 inch = 800 feet
N

SYCAMORE Environmental Consultants, Inc.

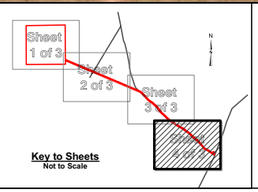
Date	Submittal	Delineators
5 Mar 10	Original	ACF, CCH, MJB

Aerial Photograph: 5 April 2005
Image © 2010 DigitalGlobe
Google Earth Pro

08099RiceJD_Fig4JDMap_T-LineSht3of4.mxd

Rice Solar Energy Project
Riverside County, CA
5 March 2010

Figure 4. Preliminary Jurisdictional Delineation Map
Proposed Transmission Line Corridor
Sheet 4 of 4



Project Study Area Boundary

Ephemeral Channel Size Class
- Category 1 (1 to <5 ft)
- Category 2 (>5 to <10 ft)
- Category 3 (>10 to <20 ft)
- Category 4 (>20 to <35 ft)
- Category 5 (>35 ft)

800 400 0 800 Feet
Scale: 1 inch = 800 feet
N

SYCAMORE Environmental Consultants, Inc.

Date	Submittal	Delineators
5 Mar 10	Original	ACF, CCH, MJB

Aerial Photograph: 5 April 2005
Image © 2010 DigitalGlobe
Google Earth Pro

08099RiceJD_Fig4JDMap_T-LineSht4of4.mxd

Table 5. Summary of Ephemeral Channels Identified in the PSA.

Size Class	Average # of Channels	Length (ft) [2]	Avg. Width (ft)	Acreage (ac) [1]
Proposed Plant Site				
Category 1 (1 to <5 ft)	3,428	1,389,983	2.5	79.774
Category 2 (>5 to <10 ft)	569	285,375	7.5	49.135
Category 3 (>10 to <20 ft)	75	38,772	15	13.351
Category 4 (>20 to <35 ft)	7	5,042	27.5	3.183
Category 5 (>35)	3	3,968	33.9	3.088
Total (Proposed Plant Site):	**4,082**	**1,723,140**	**--**	**148.531**
T-Line Corridor				
Category 1 (1 to <5 ft)	987	214,268	2.5	12.297
Category 2 (>5 to <10 ft)	247	63,331	7.5	10.904
Category 3 (>10 to <20 ft)	40	7,383	15	2.542
Category 4 (>20 to <35 ft)	6	1,458	27.5	0.920
Category 5 (>35)	4	803	35.6	0.656
Total (T-Line Corridor):	**1,284**	**287,243**	**--**	**27.320**

[1] Acreages were calculated with AutoCAD® functions.
[2] The length of channels per size class category is cumulative.

V. REGULATORY ANALYSIS AND DISCUSSION

On 5 June 2007, the Corps issued a memorandum providing guidance on implementation of the Supreme Court's decision in the consolidated cases Rapanos v. United States and Carabell v. United States (Corps 2007). The guidance distinguishes among traditional navigable waters (TNW), relatively permanent waters (RPW), and non-relatively permanent waters (non-RPW). The Corps will routinely exercise jurisdiction over traditional navigable waters, relatively permanent waters, and wetlands adjacent to those waters. The jurisdictional determination for non-relatively permanent waters and their adjacent wetlands (if any) will be based on whether there exists a significant nexus with a traditional navigable water. Factors evaluated by the Corps during the significant nexus evaluation will include ecology, hydrology, and the influence of the water on the "chemical, physical, and biological integrity of downstream traditional navigable waters" (Corps 2007). The Corps may exert jurisdiction if the findings of the significant nexus evaluation indicate that "the tributary and its adjacent wetlands are likely to have an effect [on downstream traditional navigable waters] that is more than speculative or insubstantial" (Corps 2007).

The Rapanos memorandum (Corps 2007) does not affect the Court's decision in Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178 (January, 2001) ("SWANCC") which involved statutory and constitutional challenges to the assertion of CWA jurisdiction over isolated, non-navigable, intrastate waters used as habitat by migratory birds. Isolated wetlands and waters are not subject to Clean Water Act jurisdiction. Table 5 applies the Rapanos status of wetlands and waters in the PSA.

Wetland and or channel features not subject to the Corps' jurisdiction may come under the jurisdiction of DFG and/or the RWQCB. For example, "isolated" wetlands not subject to Section 404 in accordance with the Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178 (January 2001; referred to as the SWANCC decision), are subject to regulation by the RWQCB.

A. TNWs and Adjacent Wetlands

No TNWs or wetlands adjacent to TNWs occur in the PSA.

B. RPWs that flow directly or indirectly into TNWs

No RPWs occur in the project area.

C. Non-RPWs that flow directly or indirectly into TNWs

No Non-RPWs that flow directly or indirectly into TNWs occur in the PSA.

D. Wetlands directly abutting RPWs that flow directly or indirectly into TNWs

No wetlands occur in the project area.

E. Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs

No wetlands occur in the project area.

F. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs

No wetlands occur in the project area.

G. Impoundments of waters

No impoundments of waters occur in the PSA.

H. Isolated (interstate or intrastate) waters, including isolated wetlands

Rice Valley is a closed watershed with no hydrological connectivity to watersheds with connectivity with TNWs. The ephemeral streams, washes, and playas in Rice Valley are dry most of the year with surface water present only after storm events. There are no perennial surface water sources and there is no evidence that a lake forms in the valley during wetter climatic periods. All channels observed in the RSEP site and crossed by the new transmission line corridor are ephemeral.

U.S. Geological Survey (USGS) maps of the project area show four unnamed blue-line channels in the project area. The USGS mapping also shows that Rice Valley is an isolated drainage basin, with no outlet to adjacent drainage basins.

None of the ephemeral drainages in the PSA are tributary to a TNW, are or could be used by interstate or foreign travelers for recreational or other purposes, support fish or shellfish that are or could be taken and sold in interstate or foreign commerce, or are or could be used for industrial purposes by industries in interstate commerce. The ephemeral drainages do not cross state lines or Tribal lands. Drainage features that traverse and originate on the RSEP project site, as well as those crossed by the transmission line corridor, are isolated intrastate waters with no apparent interstate or foreign commerce connection. As such, these features would not be subject to jurisdiction under the Clean Water Act. No wetlands occur in the PSA.

Table 6. Rapanos Guidance Correlation of Wetlands and Waters.

Size Class	Rapanos Guidance Correlation	Significant Nexus	Jurisdictional Acreage	Non-Jurisdictional Acreage
Category 1 (1 to <5 ft)	Isolated	N/A	0	92.071
Category 2 (>5 to <10 ft)	Isolated	N/A	0	60.039
Category 3 (>10 to <20 ft)	Isolated	N/A	0	15.894
Category 4 (>20 to <35 ft)	Isolated	N/A	0	4.104
Category 5 (>35)	Isolated	N/A	0	3.744
		Total:	**0.00**	**175.852**

I. Non-jurisdictional waters, including wetlands

See the discussion under Section V.H above.

J. Summary of Jurisdictional Acreages

The drainage features that traverse and originate on the RSEP project site, as well as those crossed by the T-line corridor, are isolated intrastate waters with no apparent interstate or foreign commerce connection. As such, these features would not be subject to jurisdiction under the Clean Water Act.

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VII. REPORT PREPARERS

R. John Little, Ph.D., Botany, Claremont Graduate School, Claremont, CA. Over 25 years experience managing and conducting environmental projects involving impact assessment and preparation of numerous NEPA/CEQA compliance documents, Biological Assessments, and Caltrans Natural Environmental Studies. Experience includes conducting special-status plant and wildlife species surveys, jurisdictional wetland delineations, general biological surveys, permitting and biological report preparation. Dr. Little is a trained wetland delineator, an ISA Certified Arborist (WE-1057A), holds a Fish and Wildlife Service recovery permit for vernal pool crustaceans (TE799564-2), and holds a California Department of Fish and Game Scientific Collecting Permit (#801073-04), and DFG Rare, Threatened and Endangered Plant Voucher Collecting Permit (#2081(a)-10-19-V).
Responsibilities: Project Manager, senior technical lead, and report preparation.

Adam C. Forbes, M.S., Range Science (emphasis on plant systematics), New Mexico State University, Las Cruces, NM. Over nine years experience conducting biological studies for the public and private sector. As a botanist/ biologist with Sycamore Environmental, Mr. Forbes conducts plant and wildlife surveys, prepares and edits reports, serves as assistant project manager, and conducts informal consultations with regulatory agency personnel. Responsibilities also include assisting with proposal preparation and marketing activities. Provides technical support for wetland delineations, biological resource evaluations, mitigation plans, and other documents used in the CEQA/NEPA process. He holds a California Department of Fish and Game Rare, Threatened and Endangered Plant Voucher Collecting Permit (#10021), and a DFG Scientific Collecting Permit (#802085-01).
Responsibilities: Wetland delineation and report preparation.

Chuck Hughes, M.S., Plant Biology, Michigan State University, East Lansing, MI. Prepares biological/botanical resource evaluations, jurisdictional delineations, arborist reports, impact analyses, and mitigation and restoration plans. Serves as assistant project manager. He is an ISA Certified Arborist (WE-6885A) and is listed on a Fish and Wildlife Service recovery permit for vernal pool crustaceans (TE799564-2). He holds a California Department of Fish and Game Rare, Threatened and Endangered Plant Voucher Collecting Permit (#08053.1), and a DFG Scientific Collecting Permit (#801265-05).
Responsibilities: Wetland delineation.

Michael Bower, M.S., Ecology, University of California, Davis, CA. Conducts plant and wildlife surveys, provides technical support for wetland delineations, biological resource evaluations, mitigation plans, and other documents used in the CEQA/NEPA process, queries the California Natural Diversity Database (CNDDB/ RareFind), and researches special-status species for projects. He holds a California Department of Fish and Game Rare, Threatened and Endangered Plant Voucher Collecting Permit (#2081(a)-09-14-V).
Responsibilities: Wetland delineation.

Jeffery Little, A.A., Sacramento City College, Sacramento, CA. Sixteen years experience with preparation of NES, BA, and NEPA/CEQA compliance documents, impact analysis, agency formal and informal consultations and permitting. Project management, conducts special-status species surveys, jurisdictional delineations, and prepares mitigation and monitoring plans. CAD/ GIS Manager responsible for data collection, map creation, impact analyses, and report preparation. He holds a California Department of Fish and Game Scientific Collecting Permit (#801073-03), and a DFG Rare, Threatened and Endangered Plant Voucher Collecting Permit (#08018.1).
Responsibilities: Wetland delineation, report, and figure preparation.

Aramis Respall, Over fifteen years experience in drafting and design for public and private projects using Autodesk land development and ESRI ArcGIS geospatial programs. Primary experience evolved from conventional surveying and civil engineering practices to advanced GPS and GIS based technology. Past project experience include CAD/GIS support for road and highway designs, facilities management, highway and airport master planning, noise studies, power transmission line alignments, and various private development projects such as subdivision layouts and golf courses. Prepares figures for biological and permitting documents such as project location maps, aerial photographs, biological resource maps, CNDDB proximity maps, waters and wetland delineation, proposed project impacts, tree location maps and other supporting graphics. Provides geospatial analysis and support for projects involving geodesy, hydrology, watershed studies, project impact analysis, CNDDB species, critical habitat and mitigation.
Responsibilities: Figure preparation and acreage calculations.

Cynthia Little, Principal, Sycamore Environmental.
Responsibilities: Senior editor, quality control.

Appendix A.

Wetland Data Sheets

Rice Solar Energy Project
Riverside County, CA

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WETLAND DETERMINATION DATA FORM – Arid West Region
Routine Wetland Determination
(September 2008 V2.0 COE Arid West Wetlands Delineation Manual)

Project/Site: Rice Solar Energy Project City/County: Riverside County Sampling Date: 20 Feb 2010
Applicant/Owner: Solar Reserve LLC. State: CA Sampling Point: **1**
Investigator(s): Chuck Hughes, M.S., Mike Bower, M.S. Section, Township, Range: See Report
Landform (hillslope, terrace, etc.): Bajada Local relief (concave, convex, none): Linear-concave Slope (%): <1
Subregion (LRR): D Lat: Long: Datum:
Soil Map Unit Name: Rositas-Carrizo NWI classification: None
Are climatic/hydrologic conditions on the site typical for this time of the year? Yes ☒ No ☐ (If no, explain in remarks.)
Are Vegetation ☐ Soil ☐, Or Hydrology ☒ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐ Soil ☐, Or Hydrology ☐ Naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒			
Hydric Soil Present?	Yes ☐	No ☒	Is the Sampled Area within a Wetland?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☒	No ☐			

Remarks:

VEGETATION

Tree Stratum: ((Plot size:_____)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		

Sapling/Shrub Stratum: (Plot size:__2m_)

1. *Ambrosia dumosa*	3	D	--
2. *Larrea tridentata*	1	D	--
3.			
4.			
5.			
Total Cover:	4		

Herb Stratum: (Plot size:__2m_)

1. *Plantago ovata*	3	D	FACU
2. *Camissonia boothii*	<1		--
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	3		

Woody Vine Stratum: (Plot size:_____)

1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 97 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL Species:		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of Hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: **1**

Profile Description: (Describe the depth needed to document the Indicator or confirm the absence of Indicators.)

Depth	Matrix		Redox Features					
Inches	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/3	100	--				Fine sandy loam	
2-8	10YR 5/4	100	--				Gravelly fine sandy loam	Weakly cemented
8-12	10YR 5/4	100	--				Gravelly fine sandy loam	--

[1]Type : C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR C)**
- ☐ 1 cm Muck (A9) **(LRR D)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks: Increasing large gravel below 12 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface water (A1)
- ☐ High water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☒ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible-Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
Water Table Present? Yes ☐ No ☒ Depth (inches): _____
Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ☒ **No** ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, if available:

Remarks: Water ponds briefly behind old, abandoned road berm, creating one of the wetter areas in the PSA. Enough hydrology to crack soil crust but not enough to have algae, aquatic invertebrates, hydric soils, or hydrophytic vegetation.

WETLAND DETERMINATION DATA FORM – Arid West Region
Routine Wetland Determination
(September 2008 V2.0 COE Arid West Wetlands Delineation Manual)

Project/Site: Rice Solar Energy Project City/County: Riverside County Sampling Date: 20 Feb 2010
Applicant/Owner: Solar Reserve LLC. State: CA Sampling Point: **2**
Investigator(s): Adam Forbes, M.S., Mike Bower, M.S. Section, Township, Range: See Report
Landform (hillslope, terrace, etc.): Bajada Local relief (concave, convex, none): Linear-concave Slope (%): 1
Subregion (LRR): D Lat: Long: Datum:
Soil Map Unit Name: Rositas-Carrizo NWI classification: None
Are climatic/hydrologic conditions on the site typical for this time of the year? Yes ☒ No ☐ (If no, explain in remarks.)
Are Vegetation ☐ Soil ☐, Or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐
Are Vegetation ☐ Soil ☐, Or Hydrology ☐ Naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☒			
Hydric Soil Present?	Yes ☐	No ☒	Is the Sampled Area within a Wetland?	Yes ☐	No ☒
Wetland Hydrology Present?	Yes ☐	No ☒			

Remarks:

VEGETATION

Tree Stratum: ((Plot size:_____)

	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		

Sapling/Shrub Stratum: (Plot size:__2m_)

1. *Larrea tridentata*	2	D	--
2. *Ambrosia dumosa*	1	D	--
3.			
4.			
5.			
Total Cover:	3		

Herb Stratum: (Plot size:__2m_)

1. *Chaenactis* sp.	2	D	--
2. *Plantago ovata*	<1		FACU
3. *Cryptantha* sp.	<1		--
4. *Brassica tournefortii*	1	D	--
5.			
6.			
7.			
8.			
Total Cover:	3		

Woody Vine Stratum: (Plot size:_____)

1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 97 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL Species:		x 1 =
FACW Species		x 2 =
FAC Species		x 3 =
FACU Species		x 4 =
UPL Species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
- ☐ Dominance Test is >50%
- ☐ Prevalence Index is ≤3.0[1]
- ☐ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ☐ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of Hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ☐ No ☒

Remarks:

SOIL

Sampling Point: **2**

Profile Description: (Describe the depth needed to document the Indicator or confirm the absence of Indicators.)

Depth	Matrix		Redox Features					
Inches	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 4/4	100	--				Sand	Stratified layers
5-7	10YR 4/4	100	--				Gravelly fine sandy loam	Thin layers of black sand
7-20	7.5YR 4/6	100	--				Gravelly fine sandy loam	

[1]Type : C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) **(LRR C)**
- ☐ 1 cm Muck (A9) **(LRR D)**
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric Soil Present? **Yes** ☐ **No** ☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface water (A1)
- ☐ High water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible-Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches): _____
Water Table Present? Yes ☐ No ☒ Depth (inches): _____
Saturation Present? Yes ☐ No ☒ Depth (inches): _____
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ☐ **No** ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections, if available:

Remarks:

Appendix B.

Photographs

Rice Solar Energy Project
Riverside County, CA

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Photo 1. View toward south at typical Category 1 ephemeral channel in the northern portion of the proposed plant site. 19 February 2010.

Photo 2. View toward southeast at typical Category 1 ephemeral channel in the northern portion of the proposed plant site. 20 February 2010. West Riverside Mtns. in background.

Photo 3. View toward south at typical Category 1 ephemeral channel in the northern portion of the proposed plant site. 20 February 2010.

Photo 4. View toward south at typical Category 1 ephemeral channel in the northern portion of the proposed plant site. 20 February 2010. Big and Little Maria Mtns. in background.

Photo 5. View toward south at typical Category 2 ephemeral channel in the northern portion of the proposed plant site. 20 February 2010. Big and Little Maria Mtns. in background.

Photo 6. View toward southwest at typical Category 2 ephemeral channel in the T-line corridor. 21 February 2010.

Photo 7. View toward south at typical Category 3 ephemeral channel in the northern portion of the proposed plant site. 20 February 2010. Big and Little Maria Mtns. in background.

Photo 8. View toward northeast at typical Category 3 ephemeral channel in the T-line corridor. 21 February 2010. West Riverside Mtns. in background.

Photo 9. View toward southwest at typical Category 4 ephemeral channel in the T-line corridor. 21 February 2010.

Photo 10. View toward south at typical Category 5 ephemeral channel in the northwest portion of the proposed plant site. 19 February 2010. Big and Little Maria Mtns. in background. Note *Psorothamnus spinosus* Woodland associated with channel.

Photo 11. View toward north at typical Category 5 ephemeral channel in the northwest portion of the proposed plant site. 19 February 2010. Turtle Mtns. in background. Note *Psorothamnus spinosus* Woodland associated with channel. Highway 62 in background

Photo 12. View toward southeast at typical Category 5 ephemeral channel in the T-line corridor. 21 February 2010. Big and Little Maria Mtns. in background.

Appendix C.

Plant Species Observed
During Jurisdictional Delineation Field Work
February 2010
Rice Solar Energy Project
Riverside County, CA

FAMILY	SCIENTIFIC NAME	COMMON NAME	N/I [1]	CORPS INDICATOR STATUS [2]
GYMNOSPERMS				
Ephedraceae	*Ephedra trifurca*	Ephedra	N	--
DICOTS				
Asclepiadaceae	*Sarcostemma hirtellum*	Trailing townula	N	--
Asteraceae	*Ambrosia dumosa*	Burro-weed	N	--
	Chaenactis sp.	Pincushion	N	--
	Encelia farinosa	Brittlebush	N	--
	Hymenoclea salsola var. *salsola*	Burrobrush	N	--
	Stephanomeria sp.			--
Boraginaceae	*Amsinckia* sp	Fiddleneck	N	--
	Cryptantha sp.		N	--
Brassicaceae	*Brassica tournefortii*	Mustard	I	--
	Lepidium lasiocarpum var. *lasiocarpum*	Peppergrass	N	--
Cactaceae	*Ferocactus cylindraceus* var. *cylindraceus*	California barrel cactus	N	--
	Opuntia basilaris var. *basilaris*	Beavertail cactus	N	--
	Opuntia bigelovii	Teddy-bear cholla	N	--
	Opuntia echinocarpa	Silver cholla	N	--
	Opuntia ramosissima	Pencil cactus	N	--
Euphorbiaceae	*Chamaesyce polycarpa* var. *hirtella*	Small seeded spurge	N	--
Fabaceae	*Cercidium* sp.	Palo verde	N	--
	Lotus sp.		--	--
	Lupinus sp.	Lupine	N	--
	Prosopis pubescens	Screw bean	N	FAC
	Psorothamnus spinosus	Smoke tree	N	--
Hydrophyllaceae	*Phacelia* sp.		N	--
Krameriaceae	*Krameria grayi*	White rhatany	N	--
Onagraceae	*Camissonia boothii* ssp. *condensata*	Booth's evening primrose	N	--
Plantaginaceae	*Plantago ovata*	Plantain	N	FACU
Polygonaceae	*Chorizanthe rigida*	Spiny-herb	N	--
	Eriogonum sp.		N	--
Zygophyllaceae	*Larrea tridentata*	Creosote bush	N	--
MONOCOTS				
Liliaceae	*Hesperocallis undulata*	Desert lily	N	--
Poaceae	*Pleuraphis rigida*	Galleta grass	N	--
	Schismus sp.	Mediterranean grass	I	--

[1] H = herb, S = shrub

[2] Indicator status from USFWS 1988.

Attachment DR67-1
Drainage Calculations

WorleyParsons
resources & energy

CALCULATION COVER SHEET

CLIENT	Solar Reserve, LLC		
PROJECT	Rice Solar Energy Project		
SUBJECT	Drainage Calculations for CEC Data Requests		
JOB NUMBER	52006711	WBS NUMBER	024
CALCULATION NO.:	SRRC-0-DC-024-C-001	PAGE 1 OF	5

DESCRIPTION/PURPOSE

The purpose of this calculation is to address some of the data requests that were sent on February 16, 2010 in reference to the conceptual drainage study. Some data requests required additional information; therefore, these are addressed in this calculation as an amendment to the Conceptual Drainage Study, dated October 9th 2009.

METHOD OF ANALYSIS

Flowmaster is used to design the channels and Pondpack is used to design the detention basin and the outlet structure.

CODES AND STANDARDS

None applicable.

INFORMATION SOURCES

1. Worleyparsons, Drainage, Erosion and Sediment Control Plan, October 9, 2009.
2. U.S. Department of Agriculture, Natural Resources Conservation Service, SSURGO – Soil Survey Geographic Data Base.
3. "Precipitation-Frequency Atlas of the United States" NOAA Atlas 14, Volume 1, Version 4.

Software Used

Title	Version	Validated (Yes/No/NA)
Flowmaster	08.01.066.00	Yes
Pondpack	10.1	Yes

ASSUMPTIONS

Contained in the body of the calculation.

RESULTS AND CONCLUSIONS

Additional information, required by some data requests is contained in the body of the calculation.

REV	DATE	DESCRIPTION	PAGES REVISED	PAGES ADDED	PAGES DELETED	BY/DATE	REV/DATE	LDE/DATE
D								
C								
B								
A	3-1-10	ORIGINAL ISSUE	NA	NA	NA	D. Sheth	B. Anders	B. Anders

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1.1 Introduction....3
1.2 Site Information....3
1.3 Data Requests (DR)....3

Attachments

A. Flowmaster Worksheet for Existing Drainage Wash (NE Corner)
B. Pondpack Summary Report
C. Flowmaster Summary Report for Diversion Channels

1.1 Introduction

Rice Solar Energy, LLC, an affiliate of Solar Reserve, LLC, proposes to construct, own, and operate a solar electrical generating plant on a 3,324 acre parcel of land in an unincorporated area of eastern Riverside County, California, situated immediately south of State Route (SR) 62 at milepost 109. The Rice Solar Energy Project will occupy approximately 1,410 acres of the Property, with solar thermal power generating technology which includes solar tracking heliostats that reflect solar energy to a central receiver, mounted on a tower.

The purpose of this calculation is to address some of the data requests that were sent on February 16, 2010 in reference to the conceptual drainage study. Some data requests required additional information; therefore, these are addressed in this calculation as an amendment to the Conceptual Drainage Study, dated October 9th 2009 (Reference 1).

1.2 Site Information

The Property is situated south of the Turtle Mountains within the broad Rice Valley and has a very slight slope (less than 2% overall). The RSEP site is located at approximately 750 to 920 feet above mean sea level (msl) and has gently sloping southerly facing slope on the lower portions of alluvial fans that emanate from the Turtle Mountains.

A. Soils

From References 1 and 2, the soil on site is classified as typical durorthids, loamy-skeletal mixed, hyperthermic and shallow, and typical torripsamments, mixed, hyperthermic.

B. Rainfall

From References 1 and 3, the rainfall for a 100-year, 24-hour event is 3.32 inches. Based on the Site location, the (NRCS/SCS) Type II rainfall distribution was used when performing calculations.

1.3 Data Requests (DR)

A. DR 67

With the exception of the offsite drainage wash starting from the northeast corner of the site and flowing south, the only other source of water for the project site is the localized rainfall. The existing drainage broadens out to numerous small little drainages and since they are interconnected, an average width is taken across that drainage wash to calculate the onsite depths and velocities of stormwater flows. The fan width assumed is about 1000 feet, the slope is about 1.5%, and the flow is approximately 659 cfs (Reference 1). The calculated onsite flow depth and velocity is 0.22 ft and 3.0 fps, respectively for the 100 year flow, across a flow width of 1000 feet. A Flowmaster worksheet is given in Attachment A.

B. DRs 110 and 111

The detention basin is conservatively sized to handle the difference in volume between the pre-development and post-development conditions. This volume is approximately 30 acre-ft, as stated in Reference 1. In Attachment B of this calculation, a Pondpack analysis is given to show how the onsite detention pond can contain runoff and retain appropriate pond freeboard during the design event.

The area of the heliostat field will be graded slightly and will mimic the existing slopes. The detention basin will be located at the south end of the heliostat field. The perimeter access road will be elevated, and act as a berm. Along the south end of a project, this road will be elevated to a minimum height of three feet. Therefore, the pond is designed so that the bottom elevation is approximately 750' and the top of the pond is 753'. See elevation-volume storage calculation in Attachment B. The 30-acre foot onsite detention pond is modeled in the Pondpack software and the 100-yr post-development flow will be discharged through nine (9) 18" culverts, which will be located at an elevation of 750'. The size of the culverts was limited since the berm height in the location of the pond discharge is 3 ft and adequate cover will be required above the 18" culverts. The pond is designed so that it discharges at a rate of 91 cfs, which is less than the pre-development rate of 96 cfs and there is nearly one foot of freeboard in the pond [= 753' – 752.09' (water surface elevation in pond) = 0.91' of freeboard]. If it required that the pond requires only 6 inches of freeboard, then the height of the adjacent road/berm can be reduced. A Pondpack Summary Report is given in Attachment B.

C. DRs 114 and 115

Channels were designed using open channel flow criteria. The largest storm flow occurs in the channel located along the north east section of the heliostat field. Drainage sheds 2, 5, 6, and 8 will drain to the East Diversion Channel and drainage shed 7 will drain to the West Diversion Channel, both located outside the perimeter of the heliostat field (see Reference 1, Appendix D). The total flow to the East Diversion Channel and the West Diversion Channel is 659 CFS and 16 CFS, respectively. The channel plan and sections are shown in drawings SRRC-0-SK-112-735-004 through 008. The channels are designed to flow at a full depth, however, at the discharge points, the channel widths will be widened to reduce the velocities and flow depths to restore the flows to natural sheet flow depth to the extent possible. For example, the East Diversion Channel will be widened to 600 feet at the discharge point so that the flow is less than 6 inches and the velocities are at or below permissible velocities for bare soil. For both channels, the flow capacities, flow depths, and velocities are given for various widths and slopes in Table 1 below based on the respective flows. The channel calculations were done using the Flowmaster software, which uses the Manning's equation as given below. A Flowmaster Summary Report is given in Attachment C.

$$Q = (1.49/n)*A*R^{2/3}*S_o^{1/2}$$

Where:

n = roughness coefficient (0.020)

A = Area

R = A/P (with P being the "wetted perimeter")

S_o = channel slope

TABLE 1

Channel Bottom Width	Flow (cfs)	Velocity (fps)	Depth (ft)	Flow (cfs)	Velocity (fps)	Depth (ft)	Flow (cfs)	Velocity (fps)	Depth (ft)
East Diversion Channel	*S = 0.25%*			*S = 0.5%*			*S = 1%*		
30 feet	379	5.27	2	536	7.45	2	758	10.53	2
45 feet	555	5.43	2	784	7.69	2	1109	10.87	2
60 feet	730	5.53	2	1033	7.82	2	1460	11.06	2
600 feet	N/A						659	3.45	0.32
Channel Bottom Width	Flow (cfs)	Velocity (fps)	Depth (ft)	Flow (cfs)	Velocity (fps)	Depth (ft)	Flow (cfs)	Velocity (fps)	Depth (ft)
West Diversion Channel	*S = 0.25%*			*S = 0.5%*			*S = 1%*		
5 feet	24	2.95	1	33	4.17	1	47	5.89	1
15 feet	N/A						16	3.19	0.30

D. DR 116

The permissible shear stress is calculated using the following equation:

Td = γ_{water} x flow depth x channel slope (ft/ft),

Where, γ_{water} = 62.4 pcf

For the East Diversion Channel, the maximum calculated shear stress is 1.24 psf for a channel bottom width of 30 ft, depth of 2 ft, and slope of 1%. This is the worst-case scenario since the actual flow is less than the calculated capacity.

For the West Diversion Channel, the maximum calculated shear stress is 0.624 psf for a channel bottom width of 5 ft, depth of 1 ft, and slope of 1%. This is the worst-case scenario since the actual flow is less than the calculated capacity.

It is expected that the East Diversion Channel will be excavated down to the top or into the caliche-laden soils and during recent field visits; it was observed that areas with caliche-laden soils do not erode significantly after storm events. However, the soil stabilization method will be based on the permissible shear stresses and velocities of the respective soil stabilizing material. The West Diversion Channel may not be excavated into caliche-laden soils, however the flow is only about 16 cfs in the 100 year storm event. Therefore, and the channel will have the minimum width required for a permissible velocity and shear stress for bare soil with minimum stabilization methods.

ATTACHMENT A

Worksheet for Existing Drainage Wash NE Corner

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.022	
Channel Slope	0.01500	ft/ft
Left Side Slope	10.00	ft/ft (H:V)
Right Side Slope	10.00	ft/ft (H:V)
Bottom Width	1000.00	ft
Discharge	659.00	ft^3/s

Results

Normal Depth	0.22	ft
Flow Area	219.55	ft^2
Wetted Perimeter	1004.40	ft
Top Width	1004.38	ft
Critical Depth	0.24	ft
Critical Slope	0.01139	ft/ft
Velocity	3.00	ft/s
Velocity Head	0.14	ft
Specific Energy	0.36	ft
Froude Number	1.13	
Flow Type	Supercritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.22	ft
Critical Depth	0.24	ft
Channel Slope	0.01500	ft/ft
Critical Slope	0.01139	ft/ft

ATTACHMENT B

==========
JOB TITLE
==========

Project Date: 2/25/2010
Project Engineer: Dipti Sheth
Project Title: Rice Pond Results
Project Comments:
Model of Project Rice in Riverside County, CA

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********** MASTER SUMMARY **********

Watershed..... Master Network Summary 1.01

********** DESIGN STORMS SUMMARY **********

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MyStorms..... Dev100
Design Storms 2.02

********** RAINFALL DATA **********

TypeII 24hr.... Dev100
Synthetic Curve 3.01

********** TC CALCULATIONS **********

SUBAREA 9..... Tc Calcs 4.01

********** CN CALCULATIONS **********

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********** POND VOLUMES **********

POND 9..... Vol: Elev-Area 6.01

Table of Contents (continued)

********** OUTLET STRUCTURES **********

Outlet 1..... Outlet Input Data 7.01

MASTER DESIGN STORM SUMMARY

Network Storm Collection: MyStorms

Return Event	Total Depth in	Rainfall Type	RNF ID
Dev100	3.3200	Synthetic Curve	TypeII 24hr

MASTER NETWORK SUMMARY
SCS Unit Hydrograph Method

(*Node=Outfall; +Node=Diversion;)
(Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Node ID		Type	Return Event	HYG Vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft	Max Pond Storage ac-ft
*OUT 9		JCT	100	65.489		14.2000	91.96		
POND 9	IN	POND	100	65.494		12.7500	284.52		
POND 9	OUT	POND	100	65.489		14.2000	91.96	752.09	21.355
SUBAREA 9		AREA	100	65.494		12.7500	284.52		

Title... Project Date: 2/25/2010
Project Engineer: Dipti Sheth
Project Title: Rice Pond Results
Project Comments:
Model of Project Rice in Riverside County, CA

DESIGN STORMS SUMMARY

Design Storm File,ID = MyStorms

Storm Tag Name = Dev100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 3.3200 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

DESIGN STORMS SUMMARY

Design Storm File,ID = MyStorms

Storm Tag Name = Dev100

Data Type, File, ID = Synthetic Storm TypeII 24hr
Storm Frequency = 100 yr
Total Rainfall Depth= 3.3200 in
Duration Multiplier = 1
Resulting Duration = 24.0000 hrs
Resulting Start Time= .0000 hrs Step= .1000 hrs End= 24.0000 hrs

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
.0000	.000	.001	.002	.003	.004
.5000	.005	.006	.007	.008	.009
1.0000	.011	.012	.013	.014	.015
1.5000	.016	.017	.018	.020	.021
2.0000	.022	.023	.024	.026	.027
2.5000	.028	.029	.031	.032	.033
3.0000	.035	.036	.037	.038	.040
3.5000	.041	.042	.044	.045	.047
4.0000	.048	.049	.051	.052	.054
4.5000	.055	.057	.058	.060	.061
5.0000	.063	.065	.066	.068	.070
5.5000	.071	.073	.075	.076	.078
6.0000	.080	.082	.084	.085	.087
6.5000	.089	.091	.093	.095	.097
7.0000	.099	.101	.103	.105	.107
7.5000	.109	.111	.113	.116	.118
8.0000	.120	.122	.125	.127	.130
8.5000	.132	.135	.138	.141	.144
9.0000	.147	.150	.153	.157	.160
9.5000	.163	.166	.170	.173	.177
10.0000	.181	.185	.189	.194	.199
10.5000	.204	.209	.215	.221	.228
11.0000	.235	.243	.251	.261	.271
11.5000	.283	.307	.354	.431	.568
12.0000	.663	.682	.699	.713	.725
12.5000	.735	.743	.751	.759	.766
13.0000	.772	.778	.784	.789	.794
13.5000	.799	.804	.808	.812	.816
14.0000	.820	.824	.827	.831	.834
14.5000	.838	.841	.844	.847	.850
15.0000	.854	.856	.859	.862	.865
15.5000	.868	.870	.873	.875	.878
16.0000	.880	.882	.885	.887	.889
16.5000	.891	.893	.895	.898	.900
17.0000	.902	.904	.906	.908	.910
17.5000	.912	.914	.915	.917	.919
18.0000	.921	.923	.925	.926	.928
18.5000	.930	.931	.933	.935	.936
19.0000	.938	.939	.941	.942	.944
19.5000	.945	.947	.948	.949	.951
20.0000	.952	.953	.955	.956	.957
20.5000	.958	.960	.961	.962	.964
21.0000	.965	.966	.967	.968	.970
21.5000	.971	.972	.973	.975	.976

CUMULATIVE RAINFALL FRACTIONS
Output Time increment = .1000 hrs
Time on left represents time for first value in each row.

Time hrs					
22.0000	.977	.978	.979	.981	.982
22.5000	.983	.984	.985	.986	.988
23.0000	.989	.990	.991	.992	.993
23.5000	.994	.996	.997	.998	.999
24.0000	1.000				

```
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
TIME OF CONCENTRATION CALCULATOR
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::


-----------------------------------------------------------------------


Segment #1:  Tc: TR-55 Shallow

Hydraulic Length  8714.00 ft
Slope             .019500 ft/ft
Unpaved

Avg.Velocity         2.25 ft/sec

                                          Segment #1 Time:    1.0743 hrs
-----------------------------------------------------------------------

                                                 ==========================
                                                  Total Tc:    1.0743 hrs
                                                 ==========================
```

```
 ----------------------------------------------------------------------
 Tc Equations used...
 ----------------------------------------------------------------------


 ==== SCS TR-55 Shallow Concentrated Flow ================================

      Unpaved surface:
      V  = 16.1345 * (Sf**0.5)

      Paved surface:
      V  = 20.3282 * (Sf**0.5)

      Tc = (Lf / V) / (3600sec/hr)

      Where:  V  = Velocity, ft/sec
              Sf = Slope, ft/ft
              Tc = Time of concentration, hrs
              Lf = Flow length, ft
```

RUNOFF CURVE NUMBER DATA
::::::

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
750.00	-----	5.0680	.0000	.000	.000
751.00	-----	9.8640	22.0024	7.334	7.334
752.00	-----	15.5970	37.8646	12.622	19.956
753.00	-----	22.1190	56.2899	18.763	38.719

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 750.00 ft
Increment = .10 ft
Max. Elev.= 753.00 ft

```
*********************************************
                OUTLET CONNECTIVITY
*********************************************

 ---> Forward Flow Only (UpStream to DnStream)
<---  Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed
```

Structure	No.		Outfall	E1, ft	E2, ft
Culvert-Circular	CV	--->	TW	750.000	753.000
TW SETUP, DS Channel					

OUTLET STRUCTURE INPUT DATA

```
Structure ID      = CV
Structure Type    = Culvert-Circular
-----------------------------------
No. Barrels       =         9
Barrel Diameter   =    1.5000 ft
Upstream Invert   =    750.00 ft
Dnstream Invert   =    749.50 ft
Horiz. Length     =     50.00 ft
Barrel Length     =     50.00 ft
Barrel Slope      =    .01000 ft/ft

OUTLET CONTROL DATA...
Mannings n        =     .0120
Ke                =     .2000  (forward entrance loss)
Kb                =   .015519  (per ft of full flow)
Kr                =     .2000  (reverse entrance loss)
HW Convergence    =      .001  +/- ft

INLET CONTROL DATA...
Equation form     =         1
Inlet Control K   =     .0045
Inlet Control M   =    2.0000
Inlet Control c   =    .03170
Inlet Control Y   =     .6900
T1 ratio (HW/D)   =     1.090
T2 ratio (HW/D)   =     1.192
Slope Factor      =     -.500

Use unsubmerged inlet control Form 1 equ. below T1 elev.
Use   submerged inlet control Form 1 equ. above T2 elev.

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...
At T1 Elev =    751.64 ft  --->  Flow =      7.58 cfs
At T2 Elev =    751.79 ft  --->  Flow =      8.66 cfs
```

OUTLET STRUCTURE INPUT DATA

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

ATTACHMENT C

Trapezoidal Channel (Rice - CEC DRs.fm8) Report

Label	Solve For	Friction Method	Roughness Coefficient
East Trapezoidal Channel - 30 ft S = 0.25%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 45 ft S = 0.25%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 60 ft S = 0.25%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 30 ft S = 0.50%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 45 ft S = 0.50%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 60 ft S = 0.50%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 30 ft S = 1%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 45 ft S = 1%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 60 ft S = 1%	Discharge	Manning Formula	0.020
East Trapezoidal Channel - 600 ft S = 1 %	Normal Depth	Manning Formula	0.020
West Trapezoidal Channel - 5 ft S = 0.25%	Discharge	Manning Formula	0.020
West Trapezoidal Channel - 5 ft S = 0.50%	Discharge	Manning Formula	0.020
West Trapezoidal Channel - 5 ft S = 1%	Discharge	Manning Formula	0.020
West Trapezoidal Channel - 15 ft S = 1%	Normal Depth	Manning Formula	0.020

Normal Depth (ft)	Channel Slope (ft/ft)	Left Side Slope (ft/ft (H:V))	Right Side Slope (ft/ft (H:V))
2.00	0.00250	3.00	3.00
2.00	0.00250	3.00	3.00
2.00	0.00250	3.00	3.00
2.00	0.00500	3.00	3.00
2.00	0.00500	3.00	3.00
2.00	0.00500	3.00	3.00
2.00	0.01000	3.00	3.00
2.00	0.01000	3.00	3.00
2.00	0.01000	3.00	3.00
0.32	0.01000	3.00	3.00
1.00	0.00250	3.00	3.00
1.00	0.00500	3.00	3.00

Trapezoidal Channel (Rice - CEC DRs.fm8) Report

Normal Depth (ft)	Channel Slope (ft/ft)	Left Side Slope (ft/ft (H:V))	Right Side Slope (ft/ft (H:V))
1.00	0.01000	3.00	3.00
0.31	0.01000	3.00	3.00

Bottom Width (ft)	Discharge (ft^3/s)	Flow Area (ft^2)	Top Width (ft)
30.00	379.21	72.00	42.00
45.00	554.29	102.00	57.00
60.00	730.14	132.00	72.00
30.00	536.29	72.00	42.00
45.00	783.89	102.00	57.00
60.00	1032.57	132.00	72.00
30.00	758.43	72.00	42.00
45.00	1108.59	102.00	57.00
60.00	1460.28	132.00	72.00
600.00	659.00	190.81	601.91
5.00	23.57	8.00	11.00
5.00	33.34	8.00	11.00
5.00	47.14	8.00	11.00
15.00	16.00	4.92	16.85

Critical Depth (ft)	Critical Slope (ft/ft)	Velocity (ft/s)	Flow Type
1.61	0.00528	5.27	Subcritical
1.62	0.00519	5.43	Subcritical
1.62	0.00514	5.53	Subcritical
2.00	0.00497	7.45	Supercritical
2.02	0.00486	7.69	Supercritical
2.02	0.00480	7.82	Supercritical

Trapezoidal Channel (Rice - CEC DRs.fm8) Report

Critical Depth (ft)	Critical Slope (ft/ft)	Velocity (ft/s)	Flow Type
2.48	0.00468	10.53	Supercritical
2.51	0.00457	10.87	Supercritical
2.53	0.00450	11.06	Supercritical
0.33	0.00840	3.45	Supercritical
0.75	0.00725	2.95	Subcritical
0.92	0.00689	4.17	Subcritical
1.12	0.00655	5.89	Supercritical
0.32	0.00875	3.25	Supercritical

Attachment DR68-1
Drainage Design Drawings

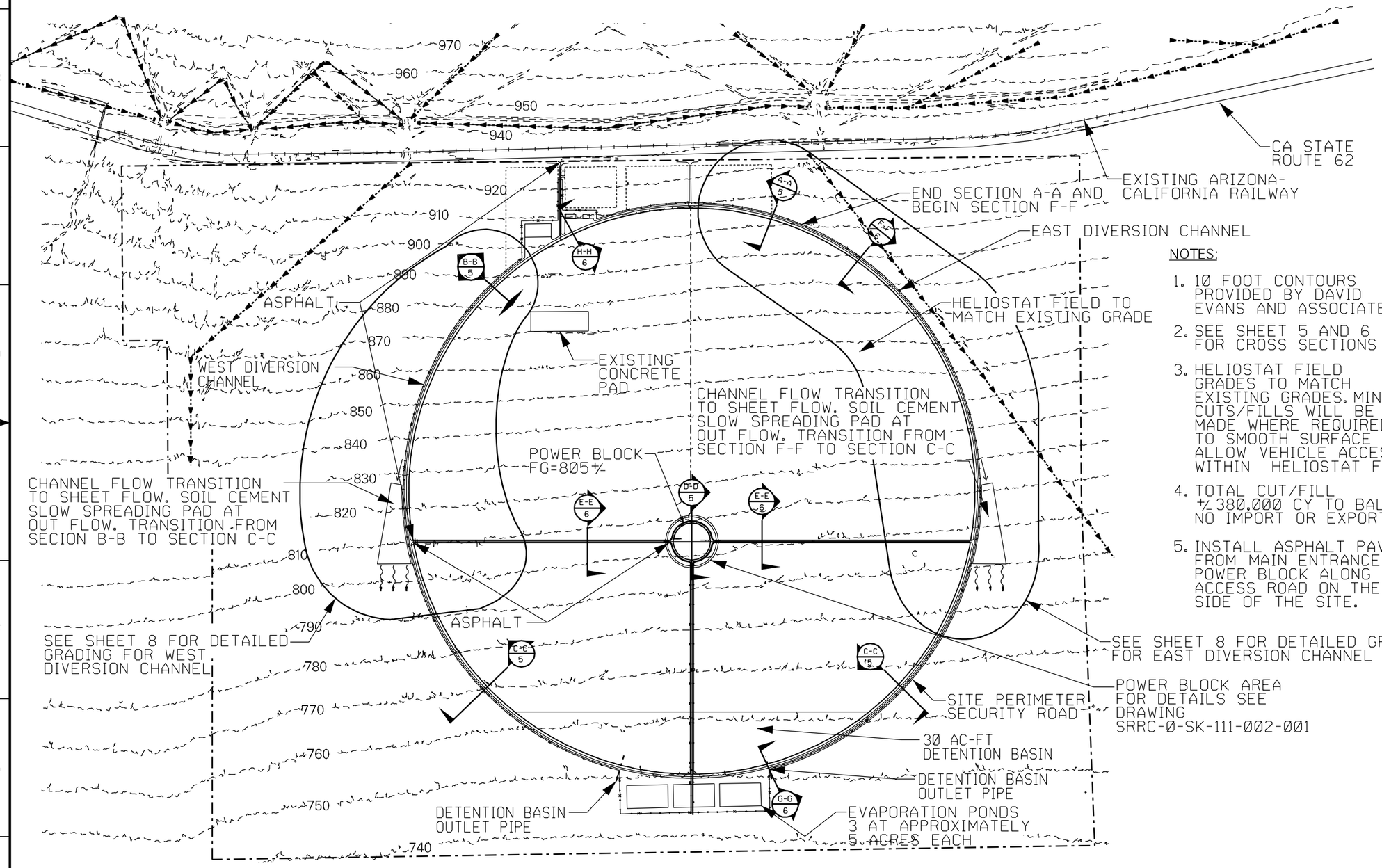
LEGEND:

- PROPERTY BOUNDARY
- 492 EXISTING CONTOUR
- EXISTING BERM

N

0 1600 3200

1" = 1600 FT



NOTES:

1. 10 FOOT CONTOURS PROVIDED BY DAVID EVANS AND ASSOCIATES
2. SEE SHEET 5 AND 6 FOR CROSS SECTIONS
3. HELIOSTAT FIELD GRADES TO MATCH EXISTING GRADES. MINOR CUTS/FILLS WILL BE MADE WHERE REQUIRED TO SMOOTH SURFACE TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
4. TOTAL CUT/FILL +/- 380,000 CY TO BALANCE. NO IMPORT OR EXPORT.
5. INSTALL ASPHALT PAVEMENT FROM MAIN ENTRANCE TO POWER BLOCK ALONG THE ACCESS ROAD ON THE WEST SIDE OF THE SITE.

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	ENGINEER	PROJECT ENGR.	PROJECT MANAGER
E	02/25/10	UPDATE DETAILS AND SECTIONS	LC	JD	JD	JD	JD	BA	BA
D	12/08/09	UPDATE DETAILS AND SECTIONS	AP	JD	JD	JD	JD	BA	BA
C	08/27/09	UPDATE EVAPORATION POND	JD	JD	JD	JD	JD	BA	BA
B	08/04/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	JD	BA	BA
A	07/31/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	JD	BA	BA

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.
LDE

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN, ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
LDE

ORIGINATING PERSONNEL

DRAWN BY: C. MAHER
CHECKED BY: J. DAHLGREN
LEAD DESIGNER: C. MAHER
ENGINEER/TECH SPECIALIST: J. DAHLGREN
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

PROFESSIONAL ENGINEER'S SEAL

Zero Harm — Leadership, No Incidents, Safe Behavior

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: STATE:
LIC. NO.: DATE:

WorleyParsons — resources & energy

SolarReserve

CLIENT/PROJECT TITLE

RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN

SCALE 1"=1600' — DRAWING SIZE 11"x17"

WORLEYPARSONS DWG. NO. SRRC-0-SK-112-735-004 — REV E

PRELIMINARY NOT FOR CONSTRUCTION

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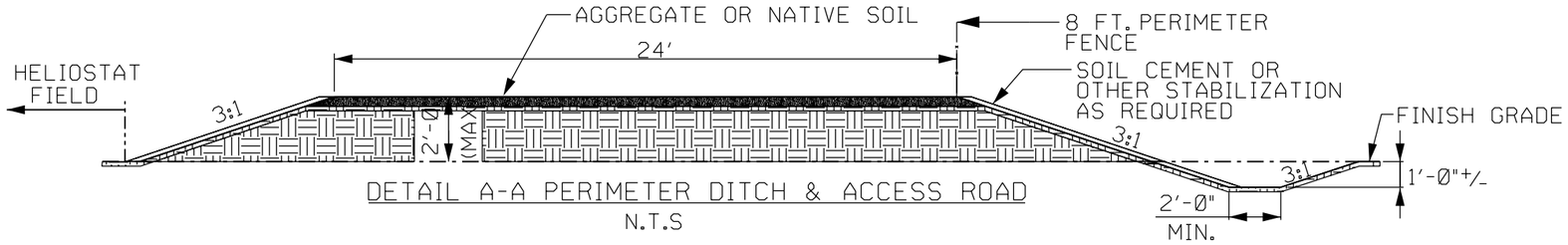
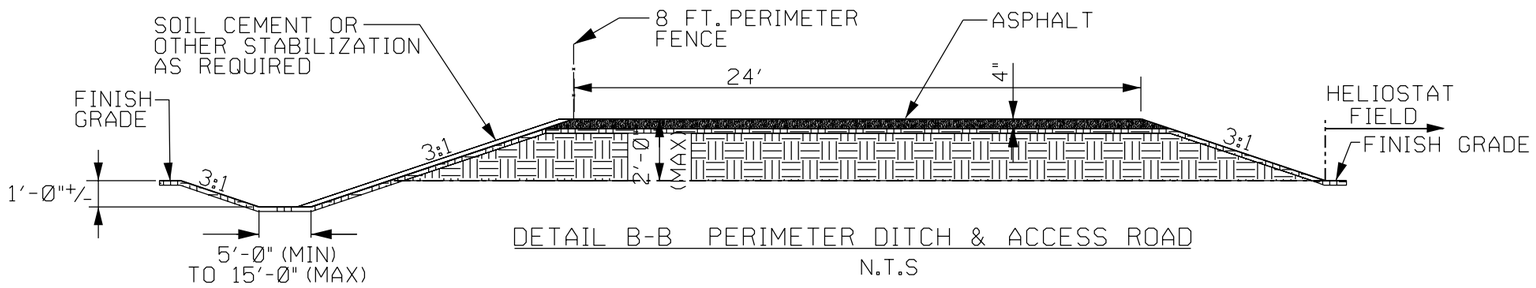


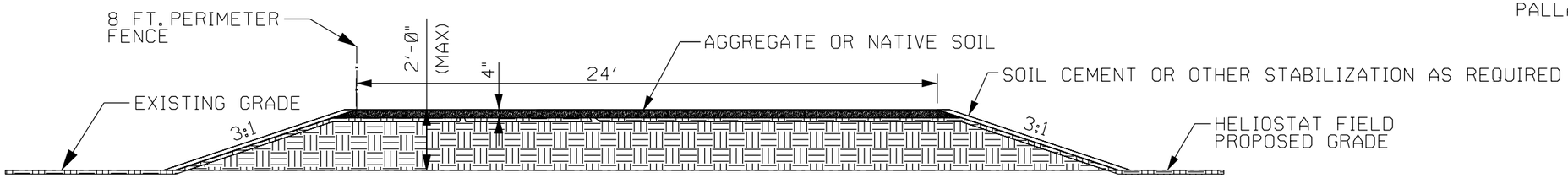
DETAIL A-A PERIMETER DITCH & ACCESS ROAD

N.T.S



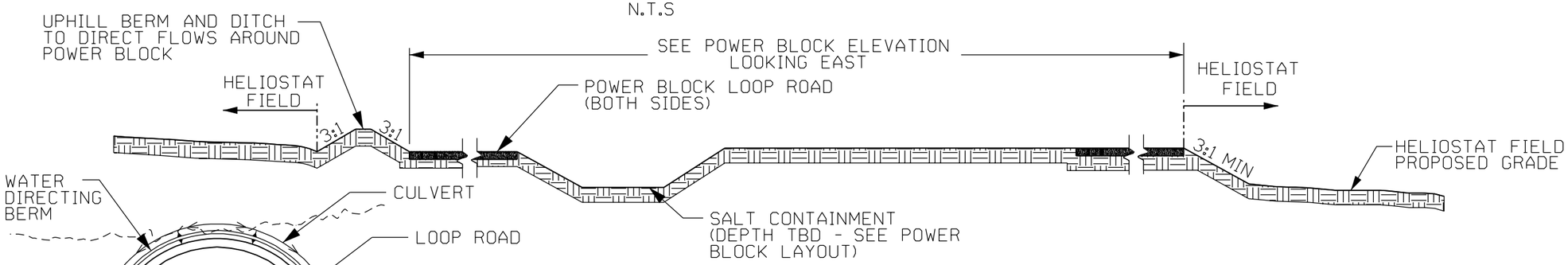
DETAIL B-B PERIMETER DITCH & ACCESS ROAD

N.T.S



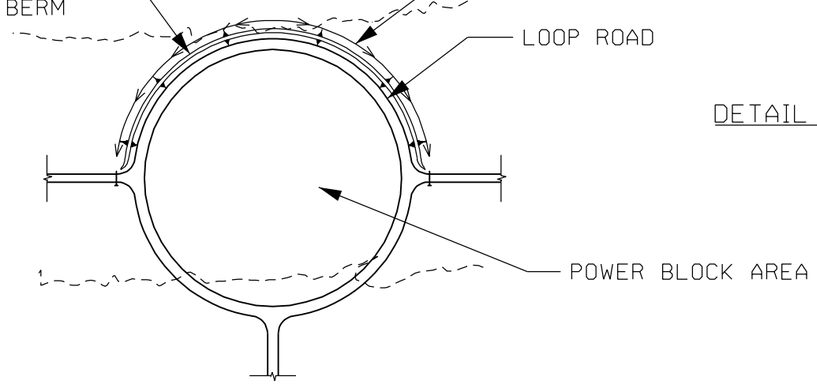
DETAIL C-C SOLAR FIELD AGGREGATE OR NATIVE SOIL ROAD WITHOUT DITCH

N.T.S



DETAIL D-D POWER BLOCK CROSS SECTION

N.T.S



POWER BLOCK DRAINAGE PLAN VIEW

N.T.S

NOTES:

1. "HELIOSTAT FIELD PROPOSED GRADE" IS AT EXISTING SURFACE GRADE, EXCEPT WHERE MINOR RUTS / DEPRESSIONS MUST BE GRADED TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
2. DROP STRUCTURES MAY BE INSTALLED IN DITCHES TO LIMIT DITCH SLOPE AND VELOCITY WITHIN THE PERIMETER DITCHES. SEE DROP STRUCTURE DETAIL ON SHEET SRRC-0-SK-112-735-007.
3. IF ACCESS ROADS ARE TO BE CONSTRUCTED WITH NATIVE SOILS, THEN THEY WILL BE TREATED WITH DUST PALLATIVES.

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	LEAD ENGINEER	PROJECT ENGINEER	PROJECT MANAGER
E	02/25/18	UPDATE DETAILS AND SECTIONS	LC	JD	JD	JD	JD	BA	BA
D	12/30/09	UPDATED SECTIONS AND DETAILS	AP	JD	JD	JD	BA	BA	BA
C	08/24/09	ISSUED FOR REVISION	CM	JD	CM	JD	BA	BA	BA
B	08/05/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA	BA
A	07/10/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA	BA

PRELIMINARY STATUS — DATE — LDE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.

APPROVED STATUS — DATE — LDE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.

ORIGINATING PERSONNEL

DRAWN BY: C. MAHER
CHECKED BY: J. DAHLGREN
LEAD DESIGNER: C. MAHER
ENGINEER/TECH SPECIALIST: J. DAHLGREN
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

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PE: ____ STATE: ____
LIC. NO.: ____ DATE: ____

WorleyParsons resources & energy

SolarReserve

CLIENT/PROJECT TITLE: RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN CROSS SECTIONS

SCALE: 1"=1000' — DRAWING SIZE: 11"×17"

WORLEYPARSONS DWG. NO.: SRRC-0-SK-112-735-005 — REV: E

PRELIMINARY NOT FOR CONSTRUCTION

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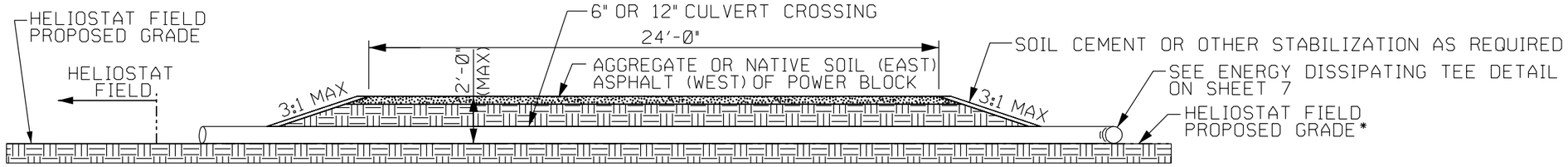


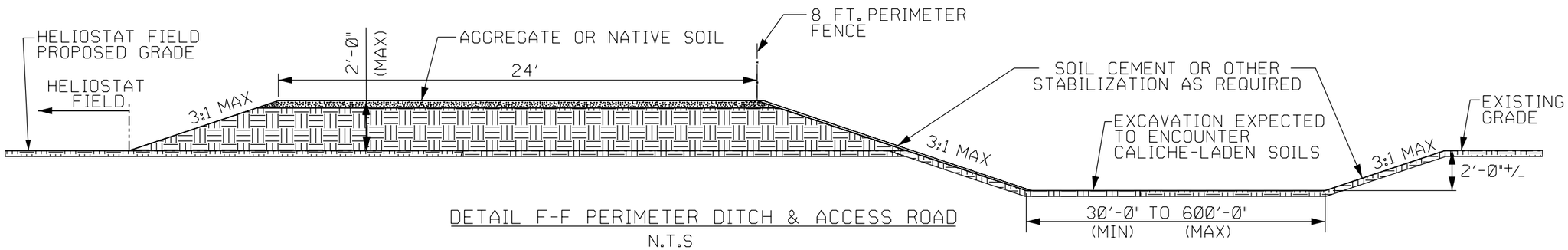
NOTE: PROVIDE 6" CULVERT CROSSINGS IN EAST-WEST ROAD AT ESTIMATED 100' INTERVALS, OR AS REQUIRED.

DETAIL E-E SOLAR FIELD AGGREGATE BASE ACCESS ROAD WITHOUT DITCH

N.T.S

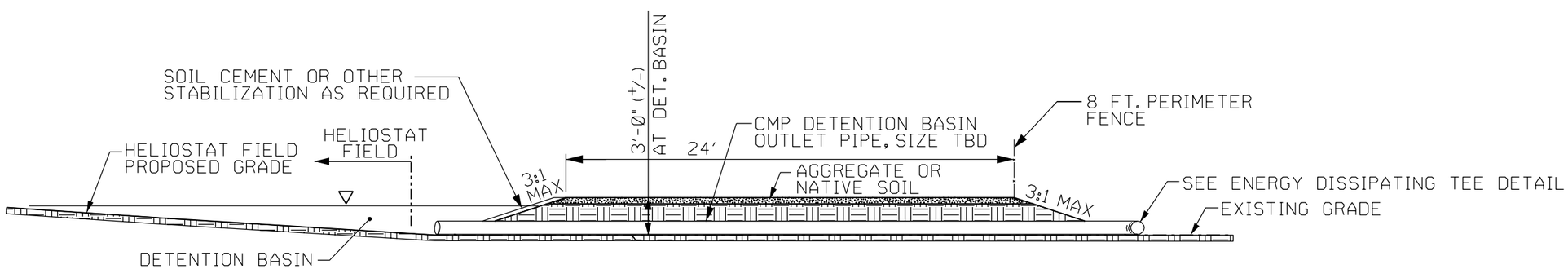
NOTES:

1. *"HELIOSTAT FIELD PROPOSED GRADE" IS AT EXISTING SURFACE GRADE, EXCEPT WHERE MINOR RUTS / DEPRESSIONS MUST BE GRADED TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
2. DROP STRUCTURES MAY BE INSTALLED IN DITCHES (SECTION B-B AND F-F) TO LIMIT DITCH SLOPE AND VELOCITY WITHIN THE PERIMETER DITCHES. SEE DROP STRUCTURE DETAIL ON SHEET SRRC-0-SK-112-735-007.
3. IF ACCESS ROADS ARE TO BE CONSTRUCTED WITH NATIVE SOILS, THEN THEY WILL BE TREATED WITH DUST PALLATIVES.



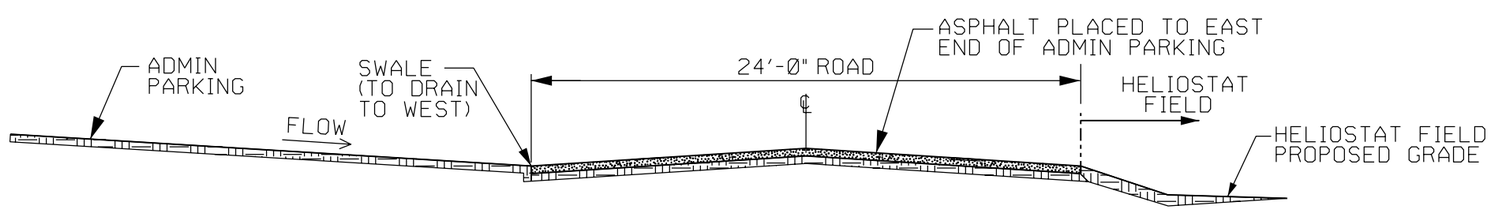
DETAIL F-F PERIMETER DITCH & ACCESS ROAD

N.T.S



DETAIL G-G DETENTION BASIN & ACCESS ROAD

N.T.S



DETAIL H-H ACCESS ROAD

N.T.S

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	LEAD ENGINEER	PROJ. ENGR. MGR.	PROJECT MANAGER
B	02/26/18	UPDATE DETAILS AND SECTIONS	LC	JD	JD	JD	JD	BA	BA	BA
A	12/30/201	ADDED SECTIONS	AP	JD	JD	JD	JD	BA	BA	BA

PRELIMINARY STATUS — DATE — LDE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.

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ORIGINATING PERSONNEL

DRAWN BY: A. PRATT
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LEAD DESIGNER: J. DAHLGREN
ENGINEER/TECH SPECIALIST: J. DAHLGREN
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

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ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: _____ STATE: _____
LIC. NO.: _____ DATE: _____

WorleyParsons resources & energy

SolarReserve

CLIENT/PROJECT TITLE

RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN CROSS SECTIONS

SCALE 1"=1000' | DRAWING SIZE 11"x17"

WORLEYPARSONS DWG. NO. SRRC-0-SK-112-735-006 | REV B

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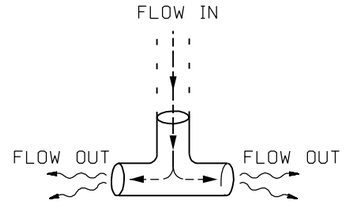
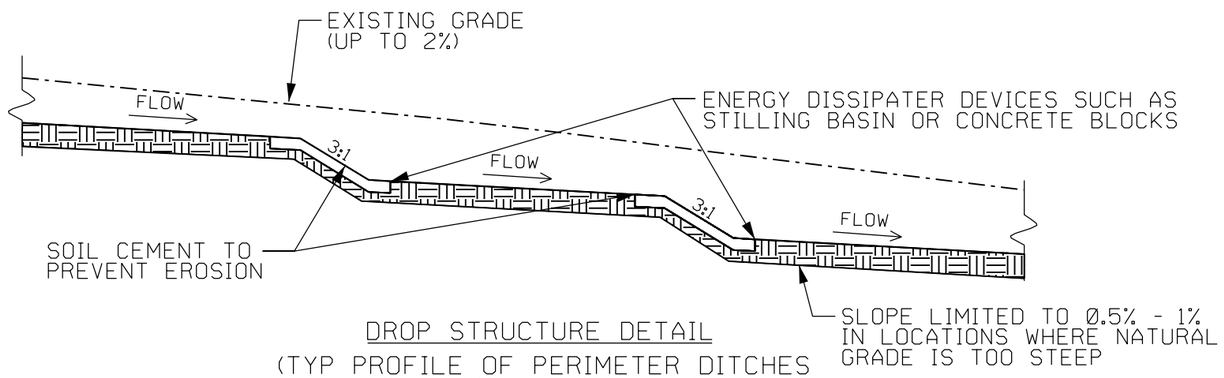


ENERGY DISSIPATING TEE DETAIL

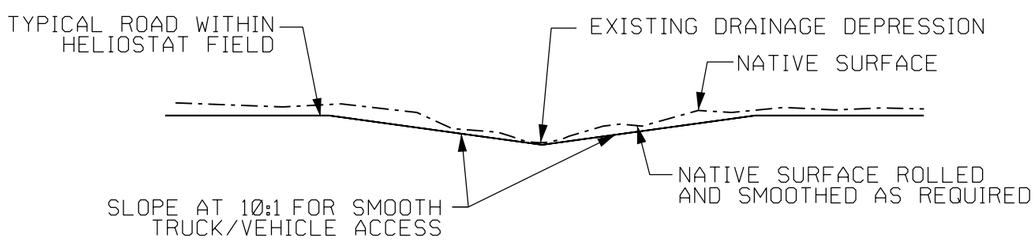
N.T.S



DROP STRUCTURE DETAIL

(TYP PROFILE OF PERIMETER DITCHES
SECTION B-B AND F-F)

N.T.S



ROAD CROSSINGS OF MINOR DEPRESSIONS

(TYP SECTION OF ROAD CROSSINGS OF MINOR
DEPRESSION WITHIN HELIOSTAT FIELD)

N.T.S

NOTES:

1. "HELIOSTAT FIELD PROPOSED GRADE" IS AT EXISTING SURFACE GRADE, EXCEPT WHERE MINOR RUTS / DEPRESSIONS MUST BE GRADED TO ALLOW VEHICLE ACCESS WITHIN HELIOSTAT FIELD.
2. DROP STRUCTURES MAY BE INSTALLED IN DITCHES (SECTION B-B AND F-F) TO LIMIT DITCH SLOPE AND VELOCITY WITHIN THE PERIMETER DITCHES. SEE DROP STRUCTURE DETAIL ON SHEET SRRC-0-SK-112-735-007.
3. IF ACCESS ROADS ARE TO BE CONSTRUCTED WITH NATIVE SOILS, THEN THEY WILL BE TREATED WITH DUST PALLATIVES.

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	ENGINEER/ TECH. SPEC.	PROJECT ENGINEER	PROJECT MANAGER
E	02/25/18	UPDATE DETAILS AND SECTIONS	LC	JD	JD	JD	BA	BA	BA
D	12/29/09	ISSUED FOR REVISION	AP	JD	JD	JD	BA	BA	BA
C	08/24/09	ISSUED FOR REVISION	CM	JD	CM	JD	BA	BA	BA
B	06/05/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA	BA
A	02/10/09	ISSUED FOR PERMITTING	CM	JD	CM	JD	BA	BA	BA

PRELIMINARY STATUS — DATE — LDE
REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED.

APPROVED STATUS — DATE — LDE
REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.

ORIGINATING PERSONNEL

DRAWN BY: C. MAHER
CHECKED BY: J. DAHLGREN
LEAD DESIGNER: C. MAHER
ENGINEER/TECH SPECIALIST: J. DAHLGREN
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

Zero Harm — Leadership, No Incidents, Safe Behavior

PROFESSIONAL ENGINEER'S SEAL

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: _____ STATE: _____
LIC. NO.: _____ DATE: _____

WorleyParsons
resources & energy

SolarReserve

CLIENT/PROJECT TITLE

RICE SOLAR ENERGY PROJECT

CONCEPTUAL GRADING AND DRAINAGE PLAN DETAILS

SCALE: 1"=1000'
DRAWING SIZE: 11"×17"
WORLEYPARSONS DWG. NO.: SRRC-0-SK-112-735-007
REV: E

PRELIMINARY
NOT FOR CONSTRUCTION

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2/25/2018 4:25:18 PM

NOTES:

1. DROP STRUCTURE DETAIL IS SHOWN ON SHEET 007. THE DISTANCE BETWEEN EACH DROP STRUCTURE SHALL BE APPROXIMATELY 500 FT, WITH A DROP OF 5 FT. THEREFORE, THE SLOPE OF THE CHANNEL WILL BE APPROXIMATELY 1.0%

LEGEND:

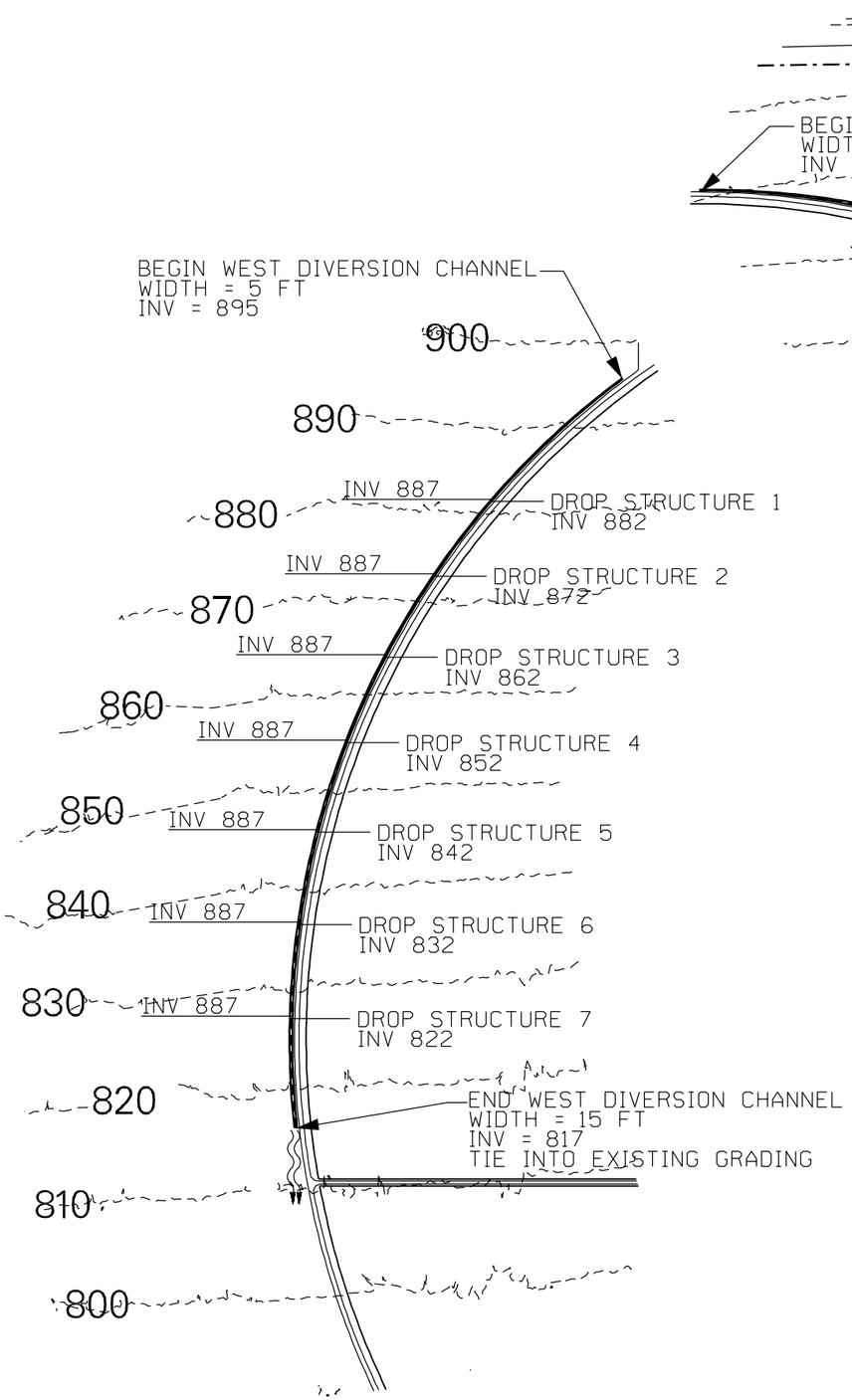
- - 492 - - EXISTING CONTOUR

- - - - CHANNEL CENTERLINE

N

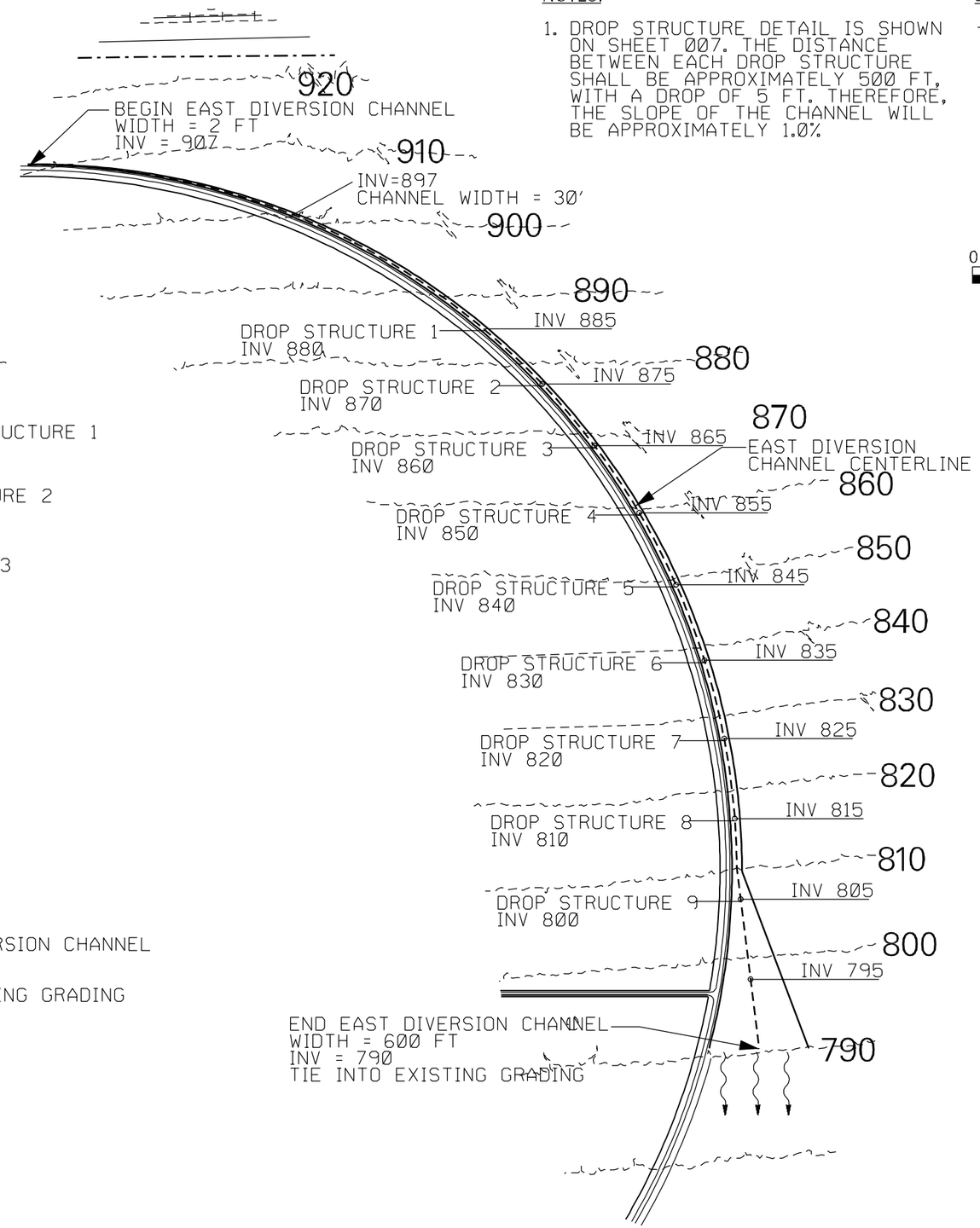
0 800 1600

1" = 800 FT



CONCEPTUAL GRADING FOR WEST DIVERSION CHANNEL

1" = 800'



CONCEPTUAL GRADING FOR EAST DIVERSION CHANNEL

1" = 800'

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRAWN	CHECKED	LEAD DESIGNER	TECHNICAL SPEC. ENGINEER	PROJECT ENGINEER	PROJECT MANAGER
A	02-25-10	ADDED DETAILS	LC	DS	CM	DS	BA	BA

PRELIMINARY STATUS — DATE — REPRESENTS GENERAL DESIGN CONCEPTS BASED ON ASSUMPTIONS. REVIEWED NOT CHECKED. — LDE

APPROVED STATUS — DATE — REPRESENTS REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS. — LDE

ORIGINATING PERSONNEL

DRAWN BY: L. CATALANO
CHECKED BY: D. SHETH
LEAD DESIGNER: C. MAHER
ENGINEER/TECH SPECIALIST: D. SHETH
PROJECT ENGINEERING MANAGER: B. ANDERS
PROJECT MANAGER: B. ANDERS

Zero Harm — Leadership, No Incidents, Safe Behavior

PROFESSIONAL ENGINEER'S SEAL

ORIGINALLY PREPARED UNDER THE RESPONSIBLE SUPERVISION OF
PE: _____ STATE: _____
LIC. NO.: _____ DATE: _____

WorleyParsons
resources & energy

SolarReserve

CLIENT/PROJECT TITLE

RICE SOLAR ENERGY PROJECT

CONCEPTUAL
GRADING AND
DRAINAGE PLAN

SCALE: 1"=800'
DRAWING SIZE: 11"x17"
WORLEYPARSONS DWG. NO.: SRRC-0-SK-112-735-008
REV: A

7:\SRRC-0-SK-112-735-008.dgn
2/25/2010 5:04:23 PM

Attachment DR70-1
Rapid Assessment Field Forms, RSEP Project

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
1		20 Feb 2010	Chuck Hughes, Mike Bower

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 701490 ___ ___ ___ ___ **UTMN** 3772834 ___ ___ ___ ___ ___ **GPS Error: ±** 1.4 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s:**

Geology code: SAAL **Soil Texture code:** MESA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 1 **Sm rock:** 2 **Bare/Fine:** 93 **Litter:** 2 **BA Stems:** 2 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres** X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Former military airstrip. Natural alluvial flow along ephemeral washes altered by CO aqueduct and Highway 62.

Type/ Level of disturbance codes: 02 / L 14 / L 28 / M ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.:_____

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** <1 **Total % Veg cover:** 15

% Cover -Overstory Tree Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 14 **Herbaceous:** 1

Height Class - Overstory Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Larrea tridentata*	1				
S	*Ambrosia dumosa*	13				
S	*Hymenoclea salsola* var. *salsola*	<1				
H	*Plantago ovata*	1				
H	*Brassica tournefortii*	<1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: *Larrea tridentata - Ambrosia dumosa* Shrubland / _____ _____

Confidence in alliance identification: L M H Explain: Few species present, *Ambrosia dumosa* clearly higher cover.

Other identification problems: Very subtle change from adjacent alliance with slightly more *Larrea tridentata*.

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
2		20 Feb 2010	Chuck Hughes

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 703027 ___ ___ ___ ___ **UTMN** 3772616 ___ ___ ___ ___ ___ **GPS Error: ±** 2.5 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s:**

Geology code: SAAL **Soil Texture code:** MESA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 0 **Sm rock:** 2 **Bare/Fine:** 95 **Litter:** 1 **BA Stems:** 2 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres** X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Former military airstrip. Natural alluvial flow along ephemeral washes altered by CO aqueduct and Highway 62.

Type/ Level of disturbance codes: 02 / L 14 / L 28 / M ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.:_____

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** <1 **Total % Veg cover:** 14

% Cover -Overstory Tree Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 13 **Herbaceous:** 1

Height Class - Overstory Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Larrea tridentata*	5				
S	*Ambrosia dumosa*	8				
H	*Plantago ovata*	1				
H	*Brassica tournefortii*	<1				

Unusual species: Single *Ferocactus cylindraceus* var. *cylindraceus* nearby.

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Larrea tridentata - Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: *Ambrosia dumosa* Shrubland ____ _____ / _____ _____

Confidence in alliance identification: L M H Explain: Few species present.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
3		21 Feb 2010	Chuck Hughes

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 707604 ___ ___ ___ ___ **UTMN** 3769218 ___ ___ ___ ___ ___ **GPS Error: ±** 1.4 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s:**

Geology code: SAAL **Soil Texture code:** MESN | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 0 **Sm rock:** 1 **Bare/Fine:** 97 **Litter:** 1 **BA Stems:** 1 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres** X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Mature Palo verde trees. Nonnative Brassica tournefortii is a common herb. Polygon is in a relatively large wash for the area.

Type/ Level of disturbance codes: 05 / L ____/____ ____/____ ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.: *Cercidium sp.*

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** 0 **Total % Veg cover:** 13

% Cover -Overstory Tree Conifer/Hardwood: ____/ 1 **Understory tree-Tall shrub:** ____ **Shrub:** 10 **Herbaceous:** 2

Height Class - Overstory Conifer/Hardwood: ____/ 04 **Understory tree-Tall shrub:** ____ **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
O	*Cercidium* sp.	1				
S	*Larrea tridentata*	4				
S	*Ambrosia dumosa*	6				
H	*Brassica tournefortii*	1				
H	*Cryptantha* sp.	1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Larrea tridentata - Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: _____ _____ / _____ _____

Confidence in alliance identification: L M H Explain: Palo verde present, but not at sufficient cover to categorize as Palo verde woodland.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
4		21 Feb 2010	Mike Bower, Chuck Hughes, Adam Forbes

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 703718 ___ ___ ___ ___ **UTMN** 3770665 ___ ___ ___ ___ **GPS Error: ±** 2.1 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s:**

Geology code: MIAL **Soil Texture code:** MESA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 0 **Sm rock:** 2 **Bare/Fine:** 95 **Litter:** 1 **BA Stems:** 2 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres** X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Former military airstrip. Natural alluvial flow along ephemeral washes altered by CO aqueduct and Highway 62.

Type/ Level of disturbance codes: 02 / L 14 / L 28 / M ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.:_____

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** <1 **Total % Veg cover:** 10

% Cover -Overstory Tree Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 8 **Herbaceous:** 2

Height Class - Overstory Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Larrea tridentata*	4				
S	*Ambrosia dumosa*	4				
S	*Opuntia bigelovii*	<1				
H	*Plantago ovata*	2				
H	*Brassica tournefortii*	<1				
H	*Chaenactis* sp.	<1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Larrea tridentata - Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: *Ambrosia dumosa* Shrubland _____ / _____ _____

Confidence in alliance identification: L M H Explain: Few species present.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
5		21 Feb 2010	Chuck Hughes, Mike Bower, Adam Forbes

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 701597 ___ ___ ___ ___ **UTMN** 3771148 ___ ___ ___ ___ **GPS Error:** ± 1.9 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s**:

Geology code: MIAL **Soil Texture code:** MESA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 0 **Sm rock:** 2 **Bare/Fine:** 96 **Litter:** 1 **BA Stems:** 1 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres** X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Former military airstrip. Natural alluvial flow along ephemeral washes altered by CO aqueduct and Highway 62.

Type/ Level of disturbance codes: 02 / L 14 / L 28 / M ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.:_____

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** <1 **Total % Veg cover:** 5

% Cover -Overstory Tree Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 3 **Herbaceous:** 2

Height Class - Overstory Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 03 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Larrea tridentata*	2				
S	*Ambrosia dumosa*	1				
S	*Opuntia basilaris*	<1				
H	*Plantago ovata*	1				
H	*Chaenactis* sp.	1				
H	*Brassica tournefortii*	<1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Larrea tridentata - Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: *Ambrosia dumosa* Shrubland _____ / _____ _____

Confidence in alliance identification: L M H Explain: Few species present.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
6		21 Feb 2010	Chuck Hughes, Mike Bower

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 700991 ___ ___ ___ ___ **UTMN** 3773092 ___ ___ ___ ___ ___ **GPS Error: ±** 2.1 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s:**

Geology code: MIAL **Soil Texture code:** COSA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 1 **Sm rock:** 1 **Bare/Fine:** 96 **Litter:** 1 **BA Stems:** 1 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres**___ **Plot Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Ephemeral wash channeled under County aqueduct and Highway 62. Constrained in artificially constructed berms.

Type/ Level of disturbance codes: 33 / S 02 / L 05 / L ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.: *Cercidium* sp. , *Psorothamnus spinosus - S*

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** 0 **Total % Veg cover:** 5

% Cover -Overstory Tree Conifer/Hardwood: ____/ <1 **Understory tree-Tall shrub:** 2 **Shrub:** 2 **Herbaceous:** 1

Height Class - Overstory Conifer/Hardwood: ____/ 05 **Understory tree-Tall shrub:** 03 **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
O	*Cercidium* sp.	<1				
U	*Psorothamnus spinosus*	2				
S	*Hymenoclea salsola* var. *salsola*	2				
S	*Ambrosia dumosa*	<1				
S	*Larrea tridentata*	<1				
H	*Brassica tournefortii*	1				
H	*Cryptantha* sp.	<1				
H	*Plantago ovata*	<1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Psorothamnus spinosus* Woodland

Field-assessed association name (optional): _____

Adjacent alliances: *Larrea tridentata - Ambrosia dumosa* Shrubland _____ _____

Confidence in alliance identification: L M H Explain: Few species present.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

Attachment DR71-1
Rapid Assessment Field Forms, South of Project Site

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
7		22 Feb 2010	Chuck Hughes, Mike Bower, Adam Forbes

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 701898 ___ ___ ___ ___ **UTMN** 3768819 ___ ___ ___ ___ ___ **GPS Error:** ± 2.0 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____(in meters) and bearing _____(degrees)

Elevation: **ft / m Photograph #'s:**

Geology code: SAAI **Soil Texture code:** MESA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 0 **Sm rock:** 1 **Bare/Fine:** 95 **Litter:** 2 **BA Stems:** 2 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ 1-5 acres___ >5 acres X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Near bottom of Rice Valley, but outside of dunes.

Type/ Level of disturbance codes: 05 / M ____/____ ____/____ ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.:_____

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** <1 **Total % Veg cover:** 10

% Cover -Overstory Tree Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 6 **Herbaceous:** 4

Height Class - Overstory Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Larrea tridentata*	2				
S	*Ambrosia dumosa*	4				
S	*Ephedra trifurca*	<1				
H	*Brassica tournefortii*	3				
H	*Cryptantha* sp.	1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Larrea tridentata - Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: _____ _____ / _____ _____

Confidence in alliance identification: L M H Explain: Few species present.

Other identification problems: _____

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

CALIFORNIA NATIVE PLANT SOCIETY - VEGETATION RAPID ASSESSMENT FIELD FORM

(Desert Version Revised Feb 21, 2007)

For Office Use:	Final database #:	Final vegetation type name:	Alliance_____ Association_____

I. LOCATIONAL/ENVIRONMENTAL DESCRIPTION

Polygon/Stand #:	Air photo #:	Date:	Name(s) of surveyors:
8		22 Feb 2010	Chuck Hughes, Mike Bower, Adam Forbes

GPS waypoint #: _____ **GPS name:** _____ **GPS datum: (e.g. NAD 83)** WGS84 **Zone: 10S / 10T / 11S** (circle one)

UTM field reading: UTME 702951 ___ ___ ___ ___ **UTMN** 3768393 ___ ___ ___ ___ **GPS Error:** ± 1.6 **ft / m**

Is GPS within stand? Yes / No If No, cite from GPS point to stand, the distance _____**(in meters) and bearing** _____**(degrees)**

Elevation: **ft / m Photograph #'s:**

Geology code: SAAL **Soil Texture code:** MESA | **Upland or Wetland/Riparian** (circle one)

Topography: Macro: top upper mid lower bottom | Micro: convex flat concave undulating (circle one)

% Surface cover: Lg rock: 0 **Sm rock:** 0 **Bare/Fine:** 94 **Litter:** 4 **BA Stems:** 2 **Water:** 0 **=sums to100%**
(>25 cm diam) (2mm-25 cm diam) (<2 mm, Incl sand, mud)

Slope exposure, Actual °: _____ **General: NE NW SE SW Flat Variable /All** (circle one)

Slope steepness, Actual °: _____ **General: 0° 1-5° 5-25° > 25°** (circle one)

Size of stand: <1 acre___ **1-5 acres**___ **>5 acres** X **Plot: Yes / No If yes, denote size: 100 m² / 400m² / 1000 m² / Other**

Site history, stand age, and comments: Near bottom of Rice Valley, but outside of dunes.

Type/ Level of disturbance codes: 05 / M ____/____ ____/____ ____/____ ____/____ **"Other"**

II. HABITAT AND VEGETATION DESCRIPTION

Tree DBH : T1 (<1" dbh), **T2** (1-6" dbh), **T3** (6-11" dbh), **T4** (11-24" dbh), **T5** (>24" dbh), **T6** (multi-layered) (circle one)

If Tree, list 1-3 dominant overstory spp.:_____

Shrub: S1 seedling (<3 yr. old), **S2** young (<1% dead), **S3** mature (1-25% dead), **S4** decadent (>25% dead)

Herbaceous: H1 (<12" plant ht.), **H2** (>12" ht.) **Desert Riparian Tree/Shrub: 1** (<2ft. stem ht.), **2** (2-10ft. ht.), **3** (10-20ft. ht.), **4** (>20ft. ht.)

Desert Palm/Joshua Tree: 1 (<1.5" base diameter), **2** (1.5-6" diam.), **3** (>6" diam.) **% NonVasc cover:** 0 **Total % Veg cover:** 8

% Cover -Overstory Tree Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 5 **Herbaceous:** 3

Height Class - Overstory Conifer/Hardwood: ____/____ **Understory tree-Tall shrub:** ____ **Shrub:** 02 **Herbaceous:** 01

Height classes: 01=<1/2m 02=1/2-1m 03=1-2m 04=2-5m 05=5-10m 06=10-15m 07=15-20m 08=20-35m 09=35-50m 10=>50m

Species (List up to 20 major species), Stratum, and Approximate % cover: Stratum categories: T= Overstory tree, U= Understory tree S = Shrub, H= Herb, N= Non-vascular. *% cover intervals for reference*: <1%, 1-5%, >5-15%, >15-25%, >25-50%, >50-75%, >75%

Strata	Species	% cover		Strata	Species	% cover
S	*Ephedra trifurca*	1				
S	*Larrea tridentata*	<1				
S	*Ambrosia dumosa*	3				
S	*Pleuraphis rigida*	1				
H	*Brassica tournefortii*	3				
H	*Cryptantha* sp.	<1				
H	*Chaenactis* sp.	<1				
H	*Hesperocallis undulata*	<1				

Unusual species: _____

III. INTERPRETATION OF STAND

Field-assessed vegetation alliance name: *Ambrosia dumosa* Shrubland

Field-assessed association name (optional): _____

Adjacent alliances: _____ _____ / _____ _____

Confidence in alliance identification: L M H Explain: *Ephedra trifurca and Pleuraphis rigida* patchy at smaller scales.

Other identification problems: *Pleuraphis rigida* counted in shrub layer as it is perennial & taller than *Ambrosia dumosa*.

Has the vegetation changed since air photo taken? Yes / No If Yes, What has changed?

Polygon is more than one type: (Yes, No) _____ **(Note:** type with greatest coverage in polygon should be entered in above section)

Other types: _____ _____

Cultural Resources (78–88)

National Register Criterion A/California Register Criterion 1

78. Please provide a justification for recommending Camp Rice and Rice AAF as eligible for the NRHP under Criterion A and CRHR under Criterion 2.

Response: Rice Army Air Field (Rice AAF) and Camp Rice are both important components to a National Register-eligible cultural landscape district. The Desert Training Center/California-Arizona Maneuver Area (DTC/CAMA) is a historically significant resource at the national level, and was recommended for listing in the NRHP in 2000, as well as in a follow-up report in 2009 (Bischoff). These reports found both sites to be contributing elements to the NRHP-eligible DTC/CAMA. When viewed as integral components of the whole, Rice AAF and Camp Rice played important roles in the functioning of the DTC/CAMA, and both help to convey the scale, character, and significance of the facility. Furthermore, Rice AAF and Camp Rice appear to be eligible for listing on the NRHP under Criterion A and C, and the CRHP under Criterion 1 and 3, as contributing resources to a cultural landscape district.

A draft multiple property submission for this district has been submitted to the BLM by Statistical Research, Inc., and is under review. As outlined in the multiple property form, as well as the above mentioned reports, the DTC/CAMA comprises numerous property types, including divisional camps, air facilities, maneuver areas, depots, bivouacs, ranges, among many others. Within the context of the multiple property submission, associated properties can be eligible either individually or as districts. Properties can also be eligible under any of the NRHP Criteria. As a part of previous investigations, Camps Iron Mountain and Ibis were nominated to the NRHP.

As mentioned above, the issue of National Register eligibility requires assessment of the "significance" or scientific importance of the resource in question. To evaluate a resource's significance, one must first establish appropriate "historic contexts," which are defined as a body of information about historic properties organized by its basic elements–theme, place, and time. More specifically, historic contexts are those patterns or trends in history by which a specific occurrence, property, or site is understood and its meaning (and ultimately its significance) within history or prehistory is made clear (National Park Service, 1995). A comprehensive historic context is provided in Bischoff 2000 and 2009, and as highlighted in section 3, the DTC/CAMA is particularly relevant to several broad, important themes in American history, outlined below (drawn from Bischoff, 2009).

U.S. Preparation for World War II— The DTC/C-AMA was the largest training maneuver area in U.S. military history (Gish 1985). Encompassing more than 18,000 square miles, the DTC/C-AMA provided critical training for 23 out of the total 85 army divisions that served in World War II (Pew 1985). Over 1 million men were trained at the facility, roughly 10 percent of all U.S. servicemen who served in World War II. The sheer scale of the facility reflects America's commitment to winning the war. The massive undertaking is an indication of the scale of America's home-front preparations for the war. The DTC/C-AMA

consisted of far more than simply desert maneuvers; it included an incredible amount of material and huge numbers of men and women, all housed in a vast, largely undeveloped territory. Divisional camps spread out over a huge territory are complimented by the incredible diversity of sites that make up the facility, including railroad sidings, airfields, hospitals, depots, maneuver areas, ranges, and others (Bischoff, 2009)

U.S. Military Training—The DTC/CAMA was the U.S. Army's first attempt at desert-warfare training. Although originally designed to train soldiers for the North Africa campaign, the facility proved unique in a variety of other ways. The vast expanses of the desert allowed troops to move across long distances, in realistic preparation for what they would have to face overseas. Because of the isolation of the area, their movements were unencumbered by towns or large numbers of civilians. Live-fire exercises could be conducted without fear of harming nearby citizens. The nature of the DTC/CAMA was dependent upon the territory in which it existed. Without the desert, the facility could not have been as successful as it was (Bischoff, 2009)

The training center remains unprecedented in U.S. military history. Never before had the army attempted training on such a large scale, with such varied units. The DTC/CAMA operated as a theater of operations under combat situations, the first time the army ever attempted such a feat. It not only encompassed a huge expanse of territory, it included every type of unit that would be required in an actual theater of war. Along with the combat units themselves, countless service units took part in the operations. The commanding general of the army, Lt. General Leslie J. McNair (1943), expressed the overall concept:

> *An underlying idea is to make your organization and experience a guide or yardstick in connections with our many overseas establishments which appear at this distance to involve a tremendous and unwarranted overhead.*

The soldiers were taught how to survive the elements, which often were their worst enemies in combat, and several commanders remarked at the top physical condition that the men at the DTC/C-AMA were in. The DTC/CAMA also provided unparalleled experience for the top commanders. Almost all of the commanding officers of the facility went on to lead either armies or corps in the European Theater. General Patton maintained that, except for his World War I experience that in the DTC/CAMA was unsurpassed. General Walker stated that his experience at the DTC/CAMA was the best he ever received (Bischoff 2009).

During the operation of the DTC/CAMA a keen eye was kept on the fighting in North Africa. Lessons learned there were applied to training in the deserts of Arizona and California. Even after the Germans were driven completely out of North Africa in 1943, tactical and strategic lessons learned from the desert war were applied to the DTC/CAMA. These lessons were particularly applied in the conduct of the large-scale maneuvers (Bischoff 2000). The DTC/CAMA reflected Patton's ideals for tough, realistic training. The facility was built so rapidly that there was little time to construct permanent buildings. Moreover, the Army, particularly Patton, wanted soldiers to be trained in the most realistic conditions and be "hardened" as quickly as possible. Most camp structures were temporary in nature, and consisted of wooden frames. The ephemeral nature was partly based on the limited time the Army had to establish the facility, but also due to the realities of warfare in North Africa (Bischoff, 2009).

As outlined above, the DTC/CAMA is certainly "associated with events that have made a significant contribution to the broad patterns of our history" (NRHP Criterion A and CRHR Criterion 1). The DTC/CAMA was the largest training facility and the only one of its kind in American military history. The massive undertaking illustrates America's huge efforts and commitment to win the war. The tactical, strategic, and logistical doctrines developed and refined during the facility's life were applied overseas and undoubtedly helped to win World War II. The training that these men received in the desert left a lasting impression on them and undoubtedly contributed to the fighting capabilities of American soldiers in World War II (Bischoff, 2009).

The DTC/CAMA is also "associated with the lives of persons significant in our past" (NRHP Criterion B and CRHR Criterion 2). Several preeminent figures in the American army served there and helped mold the facility. General George S. Patton, perhaps one of the best known military figures of the twentieth century, was instrumental in the development of the training center. His recognition of the need for the facility was critical in its establishment. His vision for a facility that would train troops in the toughest of environments, with only the most essential improvements formed the basis for the design of the divisional camps and other installations. He lived at the camps with his men for extended periods of time, and personally took part in training exercises. Though he was present in the center for a matter of months, his mark was clearly upon the concept, design, and flavor of the entire DTC/CAMA.

The DTC/CAMA also embodies distinctive characteristics of a type, period, and method of construction (NRHP Criterion C and CRHR Criterion 3), that of World War II temporary mobilization. The urgency of the war effort, coupled with the need to train troops in a realistic environment all are clearly evident in the design and construction of the DTC/CAMA as a whole, as well as most of the individual camps and facilities. The nature of this mobilization and the exigencies of tough, realistic training are remarkably visible in the remaining resources of the DTC/CAMA.

As discussed above, several property types make up the DTC/C-AMA, two of which are present in the current project: airfields and divisional camps.

Airfields—Because aircraft played a critical role in the training and operation of the DTC/C-AMA, the associated air facilities are important in reflecting the overall significance of the facility. These air facilities also represent a critical transition time in the growth of the Army Air Forces, from that of small branch of the Army, into arguably the most powerful and lethal organization on earth. Airfields in the DTC/CAMA were rather more permanent in their construction than the division camps, and they (the airfields) often contained permanent buildings with concrete foundations. Today, many of these facilities have been turned over to private use, altered for other uses, or have been dismantled altogether. In order to be considered potentially eligible for listing in the NRHP, an airfield must have been an integral part of the DTC/CAMA operation (association). In addition, it must be able to convey this association. This would generally be accomplished through clear patterns on the site, including discernible runways, aircraft utility areas, as well as troop living areas.

In the case of Rice Army Airfield, the historic context reports (Bischoff, 2000 and 2009) have recommended it as eligible for listing in the NRHP, as a contributing resource to the DTC/CAMA. Rice AAF played an important role in the training of several air units while

they were stationed at the DTC/CAMA. These include the 312th, 339th, 85th, as well as other smaller units. The air units were able to fly extensive missions, largely unencumbered by weather or air traffic. This training proved invaluable in combat overseas. The importance of the field also extended to the support of the many ground units in training in the DTC/CAMA. Close coordination between air and ground units, as well as the creation of a realistic training environment were critical to the success of the DTC/CAMA. Rice played an integral role in this. It was a multifaceted facility, containing many important interrelated elements. Today, Rice AAF remains a good example of a DTC/CAMA airfield. It contains elaborate, improved-surface runways that are clearly visible, along with an extensive apron and several airplane parking, taxiways, and dispersal pads. In addition, the airfield contained numerous permanent buildings. Although the buildings are gone today, their foundations remain. Furthermore, spatial patterns are remarkably intact. Individual unit areas, with the remains of their associated barracks, showers, latrines, and offices are clear. Rock-lined walkways delineating these areas, along with rocks outlining plants and former unit symbols are also in place.

Divisional Camps—Divisional camps form some of the most lasting resources from the DTC/CAMA. The camps were extensive in size, and were the locations of the most intensive activities during the life of the training facility. Camps were laid out in orderly, rectangular shapes, generally 3 miles long and 1 mile wide. Roads were bulldozed, and often lined with rocks. Individual unit areas were organized and decorated, with their numbers or symbols often spelled out with rocks. Open air theaters, water supply reservoirs and systems, post-exchanges, latrines, warehouses, and thousands of tents were installed. Relief maps were constructed in at least three of the camps (Iron Mountain, Coxcomb, Rice), and were designed to be a scale representation of the entire training facility. These features contained mounds of earth formed to represent mountain ranges, labeled with small wooden signs. Each map's surface was generally lined with a protectant to keep out the elements. Although the map at Camp Rice has deteriorated, it can still be found today.

Camp Rice, though not occupied as long as some other divisional camps, nevertheless played a key role in the operation of the DTC/C-AMA. Several large units, including two full armored divisions, were stationed there while conducting training and participating in large-scale maneuvers. Corps-level maneuvers were also apparently planned and coordinated from the camp, as evidenced by the existence of a relief map there. Though certainly more Spartan and less developed than other camps in the facility, Camp Rice was an integral part of the training of ground troops in the DTC/CAMA.

According to the historic context (Bischoff, 2000; 2009), to be considered eligible for listing in the NRHP, divisional camps must convey their historical associations. More specifically, the basic outlines of the camp should be discernable. This means that rock-lined roads and walkways should still be in existence, along with outlines for tents or other specific activity areas. Some idea of the size of these camps must also be discernible in order for them to truly convey their significance. Integrity considerations must keep in mind the original design of the camps, which was ephemeral. Much of Camp Rice is still visible today. Many of the camp's streets remain, as do rock-lined walkways and features. The camp is quite clear from the air, and many details can be picked out on the ground. Although short-lived compared to other divisional camps, Camp Rice still represents an important aspect of the DTC/CAMA.

Both facilities appear to also be contributors under Criterion C for the NRHP and Criterion 3 for the CRHR, reflecting a distinctive type, period, and method of construction. Each reflects the rapid mobilization to meet the urgency of World War II. They were constructed along standard plans, developed for the DTC/CAMA, as well as the U.S. Army in general. The sites still clearly illustrate the design of World War II era military training facilities, particularly as they relate to the DTC/CAMA. Taken together, these two camps located immediately adjacent to each other are a critical aspect of the DTC/CAMA. It is indeed unusual in the facility to have a full divisional camp and an airfield next to each other. Located immediately adjacent to the Santa Fe Railroad line, the road to Parker (later to become the Parker Highway and State Route 62), the Colorado River Aqueduct, and the small railroad settlement of Rice, Camp Rice, and Rice AAF were located along a strategic transportation route through the center. This was also the location where numerous units got off the train for the first time in the DTC/CAMA, creating lasting first impressions upon many of the soldiers who trained there.

References

Bischoff, Matt C. 2000. The Desert Training Center/California-Arizona Maneuver Area, 1942-1944: Historical and Archaeological Contexts. Statistical Research, Inc. Technical Series 75.

Bischoff, Matt C. 2009. The Desert Training Center/California-Arizona Maneuver Area, 1942-1944: Historical and Archaeological Contexts, Volume II: Arizona. Statistical Research, Inc. Technical Series 75.

Gish, Vincent. 1985. V-E Day Plus Forty: Super Sixers Return to Patton's Desert Camp. *The Super Sixer*. Sixth Armored Division Association, Louisville, Kentucky.

McNair, Lesley J. 1943. Letter to Major General W. H. Walker, U.S.A., Headquarters Desert Training Center. March 9. Headquarters Army Ground Forces, Office of the Commanding General, Army War College, Washington, D.C. On file, General Patton Memorial Museum, Chiriaco Summit, California.

National Park Service, 1995. *How to Apply the National Register Criteria for Evaluation*. National Register Bulletin No. 15. Interagency Resources Division, USDI National Park Service, Washington, D.C.

Pew, Thomas W., Jr. 1985. On the Way to War: With Patton and GIs on the Western Desert. *American West Magazine* November–December:21–31.

Archaeological Deposit Evaluation

79. *Please have a historical archaeologist who meets the U.S. Secretary of Interior's Professional Qualifications Standards for historical archaeology provide a letter report which evaluates the potential eligibility of the archaeological deposits at Rice AAF and Camp Rice for inclusion in the NRHP and CRHR under Criterion D (Criterion 4). Please include a resume that demonstrates the required qualifications have been met by the author of the report.*

Response: Most property types associated with the DTC/CAMA exist today as archaeological resources (e.g., refuse deposits, the "footprints" of runways and landing strips, tank tracks, barracks foundations, foxholes, and bivouacs), many of which have

artifactual components. These resources have the potential to be considered significant under any or all of the four criteria. In many cases they will be eligible under Criterion D (CRHR Criterion 4) for their ability to yield information important in history. There is a large quantity of historic debris (39 artifact concentrations) dating from the period of significance for Rice AAF (1942–1944). In only the small portion of Camp Rice that is within the RSEP parcel boundary, there are 59 artifact concentrations. In the case of Rice AAF and that portion of Camp Rice within the project area, however, the information potential of the sites appears to have been diminished through the deliberate removal and burning of remains, looting over the ensuing 60 years, and general erosion. In addition, research questions that could be posed to the sites could largely be answered through additional, intensive-level survey and analysis in conjunction with archival research and oral history information The research potential of the sites it is argued, can be exhausted through a comprehensive plan of additional analysis, recordation, documentation, and archival research. It appears, therefore, on the basis of information already gathered and reported in the AFC, that Rice AAF and Camp Rice are not eligible for listing on the NRHP under Criterion D or the CRHR under Criterion 4. This response is in lieu of a separate report.

Historical Archaeologist Matt Bischoff meets the Secretary of the Interior's Professional Qualifications Standards for historical archaeology and participated in the developing the historical context statement for Rice Army Airfield for this project and also participated in the field recording effort. Mr. Bischoff's resume is found in AFC Appendix 5.3D.

National Register Criterion B/California Register Criterion 2

80. Please provide a justification for recommending Camp Rice and Rice AAF as eligible for the NRHP under Criterion B and CRHR Criterion 2. Please refer to National Register Bulletin 32 "Guidelines for Evaluating and Documenting Properties Associated with Significant Persons," when preparing the justification for significance under Criterion B (Criteria 2) for Rice AAF and Camp Rice.

Response: Although the DTC/CAMA as a whole is eligible to the NRHP under Criterion B and the CRHR under Criterion 2, there does not appear to be a strong enough linkage between General Patton and Rice AAF and Camp Rice. Though Patton designed the facility, and his designs for realistic training and tough living environments pervade the remaining resources, he was not in the center when the two facilities were established, nor did he spend any time at either of them. Therefore Rice AAF and Camp Rice are not eligible for listing on the NRHP under Criterion B and the CRHR under Criterion 2.

Field Methods

81. The letter report should describe for staff the field methods used and a description of the historical archaeological deposits present, and make recommendations for the sites as eligible/ineligible for the CRHR.

Response: See the response to Data Request #79.

Subsurface Testing Plans

82. If the historical archaeologist cannot reach conclusions on the CRHR eligibility of the sites, please request that they draft and submit for staff approval testing plans for the sites to determine

if any subsurface deposits are present at these sites and to acquire sufficient data to make recommendations of eligibility for the CRHR for these sites, with the potential of the recovered data evaluated according to its applicability to the research questions posed in the confidential cultural resources technical report.

Response: Please see the response to Data Request #79.

Subsurface Test Results

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

Response: Please see the response to Data Request #79.

Integrity of Camp Rice and Rice AAF

84. *Please provide a discussion of the integrity of Camp Rice and Rice AAF and how the resources maintain sufficient integrity to convey their significance.*

Response: The DTC/CAMA was deactivated April 30, 1944. With its deactivation, the War Department dismantled the camps, gathered supplies, materials and equipment and shipped them to other military depots. Currently there are no buildings remaining on any of the training camps, headquarters or airfields. Many features, structures, roads, and other traces remain, however.

When the U.S. Army abandoned the Rice Army Airfield and Camp Rice, they removed all salvageable buildings and materials. They then burned or buried anything that was not able to be moved or re-used elsewhere. There are numerous indications of the burning of materials on site, both the burning of trash and the burning of construction materials. According to local sources, much of the area has been picked over by treasure hunters hoping to dig up and find materials buried by the Army. The looting of the site is obvious with indications of modern digging across both Camp Rice and the Rice Army Airfield. Modern aluminum cans are frequently found in pits that also include historic debris, a likely indication that the pits are a result of modern digging.

Despite the modern disturbance and the erosion and deposition taking place through natural processes, Rice AAF and Camp Rice both retain the ability to reflect their significance. Aerial photographs of both sites clearly show the major features on the site, as well as their spatial extent and design. Features are clearly visible from the air, and numerous small details can be seen on the ground. Despite the lack of architecture on the sites, there remains sufficient integrity to reflect the nature of the Army occupation of the desert in WWII. Though integrity of workmanship and materials is diminished somewhat by this lack of buildings, the integrity of location, design, setting, feeling, and association are still able to convey the significance of both sites.

Clearly, the setting and location of Rice AAF and Camp Rice remain strong. Virtually no modern improvements or developments have been constructed since the closure of both facilities. The environment that greeted the soldiers and airmen who served at Rice remains largely unchanged. The stark desert, with unobstructed views, together with virtual absence of civilization leaves the setting the same as it was in the 1940s. The feelings of being in an

isolated, foreboding location, far from the comforts of civilization remains. The feeling and sense of a large military presence is also overwhelming once the true extents of the sites are grasped. The design of the airfield and camp are also clearly discernible, particularly in the runways, taxiways, dispersal pads, apron, camp roads, and living areas. These become much clearer from the air, though details can be clearly picked out on the ground. Unit areas, likely representing the base housekeeping units as well as individual squadrons are also clear in the form of collections of the foundations of barracks, showers, latrines, and offices. Rock-lined walkways delineating these areas, along with rocks outlining plants and former unit symbols are also in place. Similarly, roads and rock-lined walkways are also clear in the remains of Camp Rice, though the project area only encompasses a small part of the original camp. These elements help to provide a feeling of a military base. The remaining features, together with the largely untouched setting convey a sense of the properties during the period of significance. The sites retain integrity of association, as these were both important component sites in the DTC/CAMA, clearly associated with the activities of this larger entity.

When viewing the extant resources, it is important to keep in mind that, despite its size, the training complex was designed to be temporary. Furthermore, the DTC/CAMA was designed to emulate actual battle conditions and to harden troops to the rigors of combat; being "temporary" was part of its design. Camps as well as other facilities contained only those improvements that were absolutely necessary. In the case of the divisional camps, few buildings were constructed, and most of those were deliberately made for short-term use. The DTC/CAMA was not to be like a regular military post, but instead was to act as a realistic theater of operations. Even Rice AAF, with its many buildings was described as bare-bones by the troops who served there. The ephemeral nature of the DTC/CAMA, therefore, was planned by the commanders. These factors must be borne in mind when evaluating DTC/CAMA resources. One cannot use standards applied to typical military installations. Each resource must be evaluated with regard to its historical significance in relationship to the entire facility.

California Historic Landmark #985

85. *Please confirm that Camp Rice is included in CHL #985, and please provide a copy of the records or documentation of CHL #985 on file with the State Office of Historic Preservation.*

Response: None of the available citations to CHL #985 appear to explicitly name Camp Rice. However, CHL #985 is cited as "Desert Training Center" and Camp Rice was an element of the Desert Training Center. Camp Rice also does not appear on some standard maps of Desert Training Center. Attachment DR85-1 is an electronic copy of the CHL #985 documentation. This attachment is being provided to CEC Staff under separate cover because of the document's size (442 pages).

DTC/CAMA Cultural Landscape District Nomination

86. *Please provide a copy, with any completed edits, of the draft multiple-property nomination for the DTC/CAMA cultural landscape district.*

A draft multiple property form for DTC/CAMA as a cultural landscape district has been submitted by Statistical Research, Inc. to the BLM, and is under review by BLM. This form will be provided to CEC Staff when it is has been finalized.

Cultural Landscape District Nomination Status

87. Please identify to whom the draft was submitted and an update on its status.

Response: Statistical Research, Inc. has provided this document to the BLM and it is under BLM review.

Background Materials

88. Please provide a copy of the following references for staff's review:

Bischoff, Matt. C. 2000. The Desert Training Center/California-Arizona Maneuver Area, 1942-1944: Historical and Archaeological Contexts. Statistical Research, Inc. Technical Series 75.

Bureau of Land Management. 1998. Desert Training Center: California-Arizona Maneuver Area Interpretive Plan. Patton Camps: World War II Desert Training Center California Maneuver Area. April 24. Unpublished material on the Bureau of Land Management, Needles District Website.

Response: Attachments Copies of these documents are provided in Attachments DR88-1 and DR88-2, which have been provided in electronic format to CEC Staff under separate cover.

Hazardous Materials Management (89–93)

BLEVE Model—Propane Storage Tank

89. Please provide results from a blast effects model of such a BLEVE of one of the full storage tanks indicating how far from the tank any blast effects would occur.

Response: The RSEP will use propane for the initial melting and heating of the salt. Propane will be stored in two tanker trucks, with one in service and one on stand-by. After the salt has been conditioned, the heating equipment and propane storage facilities will be permanently removed. The maximum expected quantity of propane storage is 25,000 gallons, in two 12,500 gallon tank-trailers. In the event of an uncontrolled accidental fire near the propane storage tanks, it is possible for a boiling liquid expanding vapor explosion (BLEVE) of the tanks to occur. In order to assess the potential hazard of a BLEVE, the ALOHA Model (Version 5.4.1.2) was used to estimate the extent of a BLEVE fireball and the distance to a thermal impact of 5 kW/sq. mi, which is the endpoint suggested by the CalARP Program (CCR 19.2.4.5) for the assessment of impacts for flammable materials.

In order to conservatively estimate potential impacts, RSE assumed that both tanker-trucks are filled to capacity (12,500 gallons each) and are subject to a BLEVE simultaneously. The modeling parameters were selected based on the guidance suggested in the CalARP Offsite Consequence Analysis (OCA) guidance for flammable materials. A summary of the modeling parameters can be found in Table DR89-1.

TABLE DR89-1
Modeling Parameters for BLEVE Analysis

Chemical Stored	Propane
Maximum Amount On Site (gallons water capacity)	25,000
Ambient Air Temperature[a] (ºF)	123
Ground Surface Roughness[b] (cm)	0.64
Atmospheric Stability Class	F
Wind Speed (m/s)	1.5

[a]The temperature represents the highest temperature recorded over the past three years.
[b]The surface roughness suggested in the model to represent flat terrain with sparse low-level plants.

The result of the modeling show that a resultant fireball from a BLEVE would extend to a radius of approximately 130 feet, with burn duration of 13 seconds. This would result in thermal impacts of 5 kW/sq. mi to a radius of 1,935 feet from the point of the explosion. These distances are both within the fenceline of the RSEP, as shown in Figure DR89-1. The ALOHA model output is included here in Attachment DR89-1.

BLEVE Model Results Map

90. Show on a site map whether, and how far, blast effects would extend beyond the project's boundaries.

Response: Figure DR89-1 depicts the results of the BLEVE modeling.

Maximum Quantity of Solid Chemical Salts

91. Please describe the maximum amount of the solid chemical salts that may present at any one time during the melting-conditioning process.

Response: Page 2-41 of the AFC states:

Dry solid crystalline salt (in powder or prill form) is delivered to an onsite storage and staging location that is covered and secure. The salt is delivered in 1.2 metric ton (MT) sacks of woven polypropylene known as flexible intermediate bulk containers (FIBC), which are designed for ease of handling, shipping, and storing of dry, flowable products.

The salt melting equipment will be capable of processing up to 960,000 pounds of salt per (24 hour) day. The 1.2 MT "super sacks" come in standard sizes based on the volume of the material. In this case, 1.2 MT is equal to 2,640 pounds and based on the volume of salt equal to this weight, a "super sack" of 35 x 35 inches at the base, by 45 inches tall when filled will be supplied.

At the stated processing rate, 363 "super sacks" can be processed daily. Three days of salt inventory will be stored on-site to preclude an interruption in freight deliveries to site from disrupting the salt processing activity. A three day inventory is equal to 1,089 "super sacks" in storage.

In the event, however, there is an interruption in the salt melting process, salt deliveries to site will continue for up to two additional days. Therefore the temporary salt storage area on-site will be capable of containing five days of salt inventory, or 1,815 "super sacks".

The "super sacks" can be stacked, but for purposes of stability and ease of handling, they should not be stacked more than 2 high. Given the number of "super sacks" capable of being stockpiled, an area of 8,350 ft^2 is designated for temporary salt storage.

Contamination Prevention

92. Please describe what measures will be taken to prevent contamination of the unmelted salts by significant amounts of combustible materials, ensuring their ability to be handled safely.

Response: The salt will be stored in a temporary fabric building, segregated from any combustible materials. The salt is classified as a mild oxidizing agent due to the fact that it liberates oxygen when it decomposes at high temperatures. Demonstrations have proven the salt remains inert even when exposed to a direct flame. The purity of the salt is a significant performance parameter and so the salt will be kept in plastic woven super sack bags on top of a plastic liner. This will not only minimize caking (as the salt is hydrophilic) but will also minimize the potential for contamination. The salt will remain segregated inside the fabric building in the super sacks until the bags are cut open from the bottom over the process hopper.

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

FIGURE DR89-1
RSEP BLEVE ANALYSIS
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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Theft Prevention

93. *Please describe the measures that will be taken to prevent the theft of significant amounts of either of the salts, while they are in transit to the facility and while being stored on site, prior to melting.*

Response: The salt supplier will be responsible for the safety and security of the salt from the point of origin through delivery to the onsite temporary storage building. Delivery will be accomplished through the use of licensed hazardous material truck drivers.

A Site Security Plan (SSP) will be submitted to the U.S. Department of Homeland Security (DHS) to comply with the applicable provisions of the Chemical Facility Anti-Terrorism Standards (CFATS). The approved SSP will be implemented prior to the arrival of first salt shipment. The site security fence will be installed prior to the arrival of salt shipments and function as the primary barrier to site access. Security checks and surveillances by a full-time guard will be implemented and in-force for all assets existing onsite prior to the salt arrival.

DHS will subsequently assign a final risk tier rating corresponding to the security risks presented in the assessment filed by the project. Any additional security measures needed to satisfy the risk-based performance standards for the project will be specified by DHS.

The salt will originate with a supplier who will prepare and manage all transportation permits required to deliver the full complement of salt for the project from point of origin the site. The salt will likely ship to a large U.S. port, be transferred from the ship directly onto over-the-road transport trucks, and delivered to an intermediate warehouse, under the control of the supplier.

The dry solid salt is transported as hazardous material to the site once the facility is ready to accept shipments. Federal and State Department of Transportation regulations for the shipment of hazardous materials will be followed to ensure the salt is handled and arrives safely to the project site.

Attachment DR89-1
BLEVE Model Results

```
SITE DATA:
  Location: RICE, CALIFORNIA
  Building Air Exchanges Per Hour: 0.59 (unsheltered single storied)
  Time: February 23, 2010  0930 hours PST (user specified)

CHEMICAL DATA:
  Chemical Name: PROPANE                 Molecular Weight: 44.10 g/mol
  TEEL-1: 5500 ppm   TEEL-2: 17000 ppm   TEEL-3: 33000 ppm
  IDLH: 2100 ppm     LEL: 20000 ppm      UEL: 95000 ppm
  Ambient Boiling Point: -44.9° F
  Vapor Pressure at Ambient Temperature: greater than 1 atm
  Ambient Saturation Concentration: 1,000,000 ppm or 100.0%

ATMOSPHERIC DATA: (MANUAL INPUT OF DATA)
  Wind: 1.5 meters/second from W at 10 meters
  Ground Roughness: 0.64 centimeters     Cloud Cover: 5 tenths
  Air Temperature: 123° F
  Stability Class: F (user override)
  No Inversion Height                    Relative Humidity: 50%

SOURCE STRENGTH:
  BLEVE of flammable liquid in horizontal cylindrical tank
  Tank Diameter: 9.95 feet               Tank Length: 43 feet
  Tank Volume: 25000 gallons
  Tank contains liquid
  Internal Storage Temperature: 123° F
  Chemical Mass in Tank: 46.5 tons       Tank is 100% full
  Percentage of Tank Mass in Fireball: 100%
  Fireball Diameter: 221 yards           Burn Duration: 13 seconds

THREAT ZONE:
  Threat Modeled: Thermal radiation from fireball
  Red   : 645 yards --- (5.0 kW/(sq m) = 2nd degree burns within 60 sec)
```

Land Use (94–99)

Figure Buffer

94. *Please identify the intent of the delineated "buffer" on project description and land use figures in the AFC.*

Response: The "buffer" label on several of the figures in the AFC Land Use section simply indicates a distance of one mile surrounding the RSEP project site. The CEC Data Adequacy Regulations require figures at a scale of 1:24,000 that depict existing land uses, General Plan Land Use Designations, and Zoning District Designations within one mile of the project site.

Project Area Boundary

95. *If the buffer does not represent the boundaries of the project study area, please discuss how buffer areas relate to the actual proposed project area, rights-of-way requested from the Bureau of Land Management (BLM), and easements from private property owners along the transmission line corridor.*

Response: Please see the response to Data Request #94. The buffer areas delineate a study area "buffer" around the actual project site boundary and do not relate specifically to BLM rights-of-way or easements from private land owners.

San Bernardino County

96. *If area defined by the buffer boundaries expands the actual project site to include lands within San Bernardino County, please provide additional analysis to address the effect(s) of such land use for that county, including any permitting requirements or restrictions to development.*

Response: The project site does not include any lands within San Bernardino County.

Privately Held Parcels

97. *Please provide a figure identifying the location (boundaries), parcel identifier (e.g., County APN), and name of owner for all privately held parcels within and immediately adjacent to the project footprint, including transmission line corridor and substation locations.*

Response: Figure DR97-1 depicts land owner information regarding and the location of privately held parcels adjacent to the project site, generator tie-line corridor, and substation.

Development Impact Fees

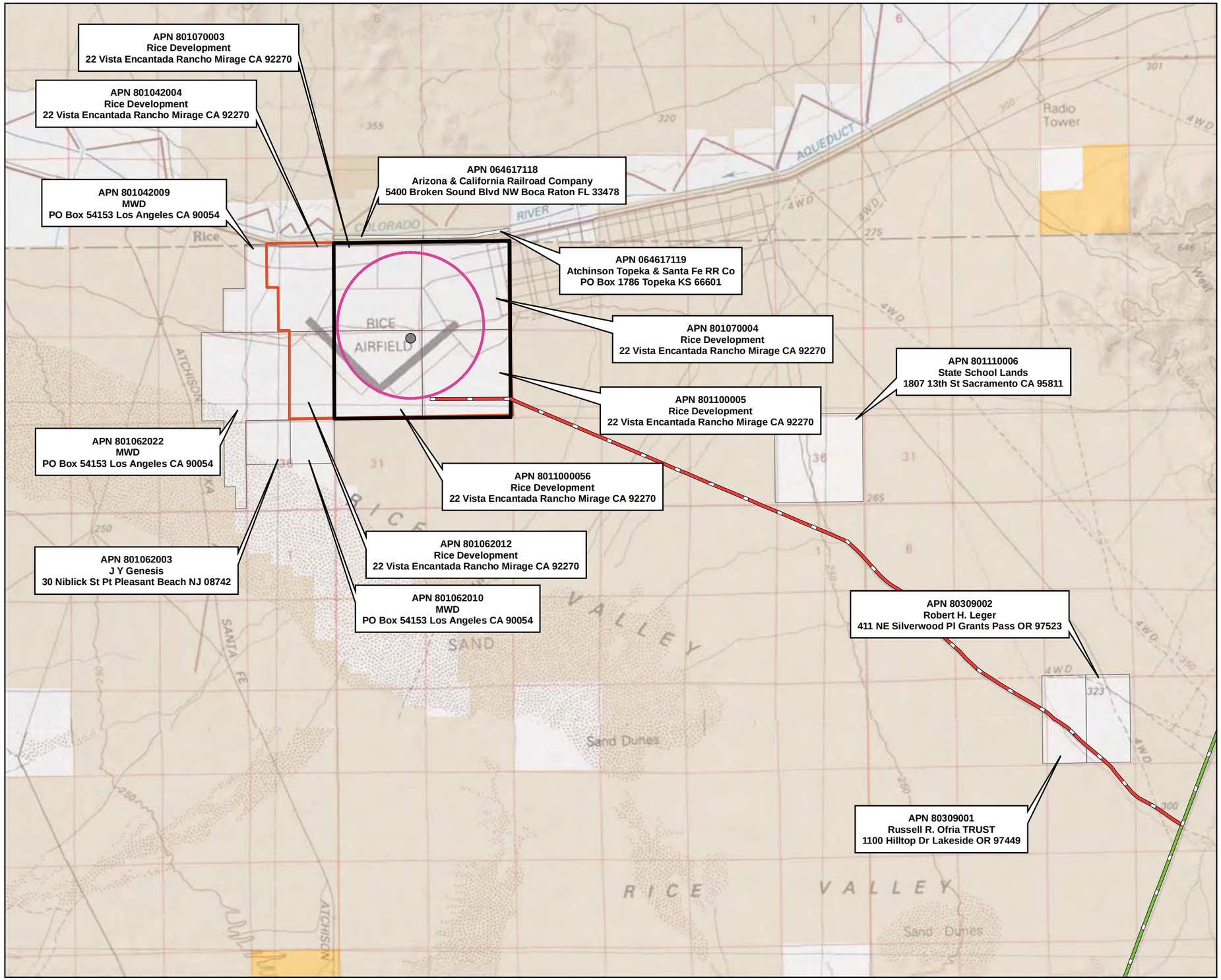
98. *Please provide a discussion of the proposed project's compliance with Riverside County Ordinance 659-659.7, amending Ordinance 659 and Chapter 4.60 of the Riverside County Code, establishing development impact fees.*

Response: RSE is in discussions with the County of Riverside regarding the development impact fees and their applicability to solar energy projects.

Fiscal Impact

99. Please provide calculations to support conclusions regarding the fiscal impact of this ordinance on the proposed project.

Response: See the response to Data Request #98.



LEGEND

- PARKER-BLYTHE 161kV EXISTING T-LINE
- RSEP GENERATION T-LINE
- PRIVATELY OWNED PARCELS
- HELIOSTAT FIELD
- PARCEL BOUNDARY
- POWER BLOCK/RECEIVER
- PROPERTY BOUNDARY
- PRIVATELY OWNED PARCELS

PUBLIC AND CONSERVATION LANDS

- BUREAU OF LAND MANAGEMENT
- STATE LANDS COMMISSION

Sources: County of Riverside Assessor-Clerk-Recorder, Parcels Riverside County TLMA-GIS, 2010.

San Bernardino County ISD-GIS, 2009.

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 3,000 6,000
Feet

FIGURE DR 97-1
PRIVATE PARCELS ADJACENT TO PROJECT SITE AND TRANSMISSION LINE
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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Project Description (100–107)

Heliostat Field Routes

100. Please describe the planned routes, frequencies and purposes of vehicular traffic within the heliostat field, and the type of vehicles and equipment that would be used during:

a. Construction; and

b. Operations.

Response:

a. Construction: There are no planned routes or frequencies for vehicular traffic within the heliostat field during construction. The primary construction activity within the heliostat field will be for installation of the heliostats and includes drilling of a foundation for the heliostat, setting of rebar and anchor bolts within the foundation, pouring of concrete/grout for the foundation, mounting the heliostat pedestal on the foundation, installation of the heliostat panels, installing wiring (power and communication) to each heliostat, creating smooth paths of travel for vehicles, and commissioning of each heliostat.

The foundations will be drilled using a large hydraulically driven auger that will be mounted on an excavator, drill rig, or other mobile equipment. Flat bed or other types of trucks will deliver rebar and other supplies. Cranes, forklifts, boom trucks, loaders, or other types of equipment will be used to lift and place the rebar in place. Concrete trucks will deliver concrete to each foundation. Flat bed or other types of trucks will deliver the heliostat parts including the pedestal and panels. Small trenching equipment and backhoes will be used to install conduit. Loaders, small dozers, motor graders, water trucks, and compactors will be used to backfill trenches and create smooth roads. Water trucks will apply water for dust suppression and for moisture conditioning of the soils. Pickup trucks and crew trucks will transport men, small tools, and miscellaneous material throughout the heliostat field during the construction and commissioning process.

b. Operation: The planned routes of travel have not been determined for operation within the heliostat field. The primary vehicle traffic during operation will be a water truck for mirror washing. Additional vehicles will include pickup trucks and crew vehicles for maintenance and inspection. Also, mobile cranes or other types of equipment will be used to lift heliostat panels/parts as necessary for maintenance.

Heliostat Row Spacing

101. Please describe the planned spacing between rows of heliostats and the width of any maintenance roads that would be used during project operation such as for mirror washing.

Response: Heliostat spacing will vary through the field. The spacing will be tighter in the center of the field near the power block and central tower. The wider heliostat spacing at the outer portions of the field is to minimize shadowing because these heliostats will be more horizontal while tracking compared to the internal heliostats. Heliostat spacing at the first

row (closest to the tower) will average approximately 30 feet between heliostats within the row and approximately 27 feet between the first and second rows (from foundation center to foundation center). Because the field is not symmetrical, the final outer spacing at the south side of the field will be different than that at the north side of the field. The outermost rows on the south side of the field will have an average spacing of approximately 57 feet between heliostats within a row and approximately 67 feet between rows. The outermost rows on the north side of the field will have an average spacing of approximately 60 feet between heliostats within a row and approximately 88 feet between rows.

Access for mirror washing will be primarily between the rows, because the concentric circles will make consistent cleaning easier than driving lengthwise through the field (center to outer edge). These access roadways will consist of unimproved native surface soils with dust palliatives added as needed, and will not be paved or graveled.

Road Surface Stabilization

102. *Please describe any surface stabilization and dust control measures planned for the primary access roads and maintenance roads within the heliostat field.*

Response: Asphalt surfacing will be limited to the primary access road from State Route 62 to the power block and the roads within the power block. The asphalt surfacing will control dust along this route. It is expected that the remainder of the roads will maintain a native soil surface, treated with dust palliatives, or may be surfaced with gravel. Travel paths within the heliostat area will also be treated with dust palliatives as needed.

Road Plans and Profiles

103. *Please provide a figure showing typical plans and profiles representative of any road crossings of dry washes, including ingress and egress and stabilization measures for the road and channel for crossings through the channel, and use of any bridges or drainage structures for crossings over a channel.*

Response: RSE does not proposed to install any road crossings of dry washes. The only significant offsite stormwater flow is from the drainage feature that crosses State Route 62 in the northeastern area of the project. In this location, the heliostat perimeter road will act as a permanent berm to help direct these flows around the project perimeter. The access road, roads to the power block, and the heliostat maintenance roads will cross very small areas where water flows during some storm events. These features are typically 6 to 12 inches deep at the maximum and several feet wide on average. Crossings of these features will not require bridges or constructed or culverts crossings. The only roads planned to include culverts are the access road to the power block from the west side of the heliostat circle (where this road is elevated and paved for primary access to the power block) and the heliostat perimeter road where culverts are used for detention pond outlets.

Within the heliostat field, road crossings of minor depressions will be at grade, meaning that any flow in the small channel will flow over the access road. In some instances, it may be more advantageous to include a small (12-inch) culvert where the heliostat maintenance road crosses a more larger channel. See Detail E-E on Attachment DR68-1c (SRRC-0-SK-112-735-006) and typical detail of Road Crossings of Minor Depressions on Attachment DR68-1d (SRRC-0-SK-112-735-007). Stabilization measures may include the addition of aggregate,

small rip-rap, or soil cement as required to prevent erosion. Additionally, stone check dams can be used within the small channels to help slow the water and capture sediment.

Heliostat Spacing

104. Please describe the range of spacing between heliostats, both side by side and between concentric rows of heliostats, and the variation that may occur between rows closest to and farthest from the solar power tower.

Response: See response to Data Request #101.

Heliostat Foundations

105. Please describe the dimensions of the proposed post or pier foundation, and the depth below ground for the following:

a. Posts that would be located outside of dry washes; and

b. Posts that would be located within dry washes.

Response: The heliostat foundations will be approximately 33 inches in diameter and 10 to 12 feet deep for all heliostats.

Heliostat Installation Methods

106. Please describe the planned installation method(s) and if drilling/auguring may be needed, include the following:

a. An estimate of the volume of spoil for each heliostat and in total for all heliostats; and

b. The proposed location for placement of spoils, and any BMPs that would be applicable for spoil stabilization.

Response: The planned heliostat installation method is drilling/auguring. The estimated volume of spoil for each heliostat will be 2.4 cubic yards (based on a 33-inch-diameter and 11-foot-deep excavation). There will be approximately 42,000 cubic yards of spoil for 17,500 heliostats. The proposed location of spoil for each foundation is at/near the foundation, where the spoil will be spread and compacted. The BMPs proposed address the larger areas of disturbance and cover numerous heliostats and are listed in the Draft Stormwater Pollution Prevention Plan (Appendix 5.15D of the AFC).

Construction and Testing Schedules

107. Please provide an estimate of start and completion months for construction and testing of the primary project components as listed above in terms of Month 1, Month 2, etc. through Month 30.

Response: Major milestones are listed in Table DR107-1.

TABLE DR107-1
Project Schedule Major Milestones

Activity	Month
Construction Start	0
Begin Site Mobilization	0
Begin Site Grading & Roads	1
Begin Transmission Line & Substation	2
Begin Receiver Tower Erection	2
Begin Major Buildings	6
Erect Heliostat Assembly Building	8
Begin Install Heliostats	10
Field Erect Salt Tanks	12
Install Water Treatment Plant	14
Erect Air Cooled Condenser	15
Raise and Install Receiver	16
Energize GSU & HV Switchyard	17
Install Steam Turbine & Generator	18
Salt Melting and Conditioning	19
Initiate Switchyard Backfeed	20
Begin Plant Commissioning	24
Steam Blows	26
Initial Generator Synchronization	27
Performance Test	28
Substantial Completion	29
Commercial Operation	30

Socioeconomics (108–109)

School District Revenue

108. Please provide a discussion of the following as applicable for the District:

a. The District's revenue limit;

Response: The District's revenue limit is $370,000 for 2009–10 and was $390,000 in 2008–09.

b. The existing and/or previous year's revenue from property taxes and/or state revenue funds; and

Response: The school's revenue is mostly from property taxes. In 2009, the District received total of $396,190, of which $344,156 was from property taxes and the rest came from miscellaneous local taxes. In 2010, projected total revenues are $376,489 of which $323,783 is from property taxes and the rest is from miscellaneous local taxes, such as homeowner exemption.

c. If the district was allowed to keep extra money or if the state met the difference through categorical funding (for the previous school year).

Response: The District is allowed to keep the extra revenue in a school general fund. For the past two years, the state has met the difference, as revenue was short by approximately $8,000. The shortage was met by the Consolidated Application fund. This fund is a compilation of state and federal funds (e.g., Economic Impact Aid). The Consolidated Application fund went to the school library under an application process that is decided annually.

Closed Mining Area

109. Please provide a definition of a "closed mining area" and why the District does not collect developer fees because it is located within a closed mining area (AFC. Appendix 5.10, RSEP, 2009).

The Kaiser Steel Eagle Mountain Mine closed in 1983. After the mine closed, three of the four schools of the Desert Center Unified School District were closed. The high school was converted to the current K-8th grade school.

The school does not receive developer fees because it is not in an Area of Growth; the closest population center of approximately 500 people is located 40 miles away.

The school is classified as a Basic Aid school. Because of the decline in student enrollment (20 students in February 2010); the total revenue limit (based on student enrollment) also declines. Therefore, school funding is not determined based on student enrollment or ADA (average daily attendance). Instead, the school has guaranteed a revenue allotment that is collected from local property taxes. The Basic Aid designation is determined annually. Also, because of the property tax fluctuations, school revenue changes accordingly and may exceed or fall short of the revenue limit.

Soil and Water Resources (110–146)

Detention Pond

110. Please provide preliminary calculations demonstrating that the proposed 30 acre-foot onsite detention pond can contain runoff and retain appropriate pond freeboard during the design event.

Response: Calculations are provided in Attachment DR67-1 (SRRC-0-DC-024-C-001). The area of the heliostat field will not be graded and will mimic the existing slopes. Only in areas of truck access, where the existing surface will not afford smooth access will there be grading or smoothing of native surface. The detention basin will be located at the south end of the heliostat field. Since the perimeter road will be elevated above the heliostat field, a 3-foot berm (consisting of the elevated perimeter road) will be required at the south end of the field. Therefore, the pond is designed so that the bottom elevation is approximately 750 feet and the top of the pond is 753 feet. The 30-acre-foot onsite detention pond is modeled in the Pondpack software and the post-development flow is routed through culverts. The pond is designed so that it discharges at a rate of 91 cfs, which is less than the pre-development rate of 96 cfs, and there is close to 1 foot of freeboard in the pond. If it determined that the pond requires only 6 inches of freeboard, then the elevation of the loop road can be reduced.

Detention Basin Design

111. Please explain how the basin has been designed to perform during the design event.

Response: Please see Attachment DR67-1 (SRRC-0-DC-024-C-001). During the 100-year storm event (design event), all the flow will be collected in the basin and discharged through nine 18-inch culverts, which will be constructed at an invert elevation of 750 feet amsl. The inflow into the detention pond area will exceed the allowable discharge during the 100-year event. Therefore, water will begin to pond in the detention pond area, and will be released through the culverts at a discharge rate of 91 cfs. The size of the culverts was limited since the berm height in the location of the pond discharge is only 3 feet and adequate cover will be required above the 18-inch culverts.

Onsite Spill Containment

112. If the pond relies on discharge for drawdown for all low flows, please explain how the project would ensure that onsite spills are not discharged offsite.

Response: The pond will discharge for all flows, including low flows. There will be no prolonged storage of water in the pond. In accordance with NPDES and 40 CFR regulations, the project will ensure that all spills will be contained onsite and will not be discharged offsite. Compliance with these regulations, which include requirements for spill containment facilities, will ensure that onsite spills are not discharged offsite. The detention basin will not serve as a spill containment device for the project.

Infiltration Vectors

113. If the pond relies on infiltration, please explain whether or not vectors are a concern and how potential vectors would be managed.

Response: The detention pond does not rely on infiltration.

Diverted Flows

114. Please explain in more detail how diverted flows would be returned to their natural sheet flow condition at the discharge point(s).

Response: At the discharge points, the bottom width and slope of the proposed channels would be wide enough that the normal depth in the channel would be less than 6 inches. Please see Attachment DR67-1 (SRRC-0-DC-024-C-001) for further detail. The velocities will also be decreased due to the widening of the channel, and therefore reduce potential erosion. Drainage design drawings included in the AFC SRRC-0-SK-112-735-004 through -007 (Attachments DR68-1a through DR68-1d) have been updated to reflect this and an additional drawing SRRC-0-SK-112-735-008 (Attachment DR68-1e) has been added to show more detailed grading at the discharge points.

Natural Sheet Flow

115. Please explain what, if any, devices other than rip-rap are proposed to restore the natural sheet flow depth and distribution of flow into the ephemeral drainages.

Response: As stated in the response to Data Request #114, the channels will be widened such that the velocities are significantly reduced at the discharge points. Please see Attachment DR67-1 (SRRC-0-DC-024-C-001) for further detail. If rip-rap is used at the discharge points, then it will be grouted or will be small enough in diameter so it will not trap wildlife (juvenile tortoises). Other types of energy dissipation devices can also be used, such as concrete blocks. Refer to Drawings SRRC-0-SK-112-735-004 through -008 (Attachments DR68-1a through DR68-1e)

Channel Stabilization

116. Please discuss what channel stabilization methods, other than rip-rap on one side of the diversion channel, will be utilized on the channel bottom and on the non-rip-rap side.

Response: Soil cement or other proper soil stabilization methods will be used on the side slopes (see Attachments DR68-1a through DR68-1d). The diversion channel to be located on the east side of the RSEP site will be excavated down to the top of or into the caliche-laden soils. Based on the channel calculations given in SRRC-0-DC-024-C-001 (Attachment DR67-1), the maximum calculated shear stress is for the East Diversion Channel is 1.24 psf for a channel bottom width of 30 feet, depth of 2 feet, and slope of 1 percent. The maximum calculated velocity is approximately 10.4 fps. The soil stabilization method will be based on the permissible shear stresses and velocities of the respective soil stabilizing material. However, it should be noted that, during field visits, it was observed that areas with caliche-laden soils do not erode significantly after storm events. The flow draining to the West Diversion Channel is only about 16 cfs; therefore, the channel will have the minimum width

required for a permissible velocity and shear stress for bare soil with minimum soil stabilization methods.

Maintenance Activities

117. Please provide additional information on any maintenance activities that may be the responsibility of another entity or other actions that can be undertaken by the applicant to help ensure that offsite storm water management structures operate properly to prevent unanticipated storm water run-on to the project site.

Response: Upgradient of the site, the storm flows are captured by a series of existing berms and channels. As described in the response to Data Request #67, these flows are concentrated and pass over the aqueduct, under the railroad, and over State Route 62. Based on a review of aerial photographs and site observations, there are two sets of berms and dikes that channel the water. The secondary set of berms and dikes were built to protect the railroad. The primary set of berms and dikes were built to protect the Colorado River Aqueduct. Field observations indicate the primary set of berms and channels have functioned with little to no maintenance for over 60 years. No actions are necessary by the project to prevent unanticipated storm water run-on to the project site.

The channels constructed along the perimeter of the heliostat circle will be maintained to ensure they contain the 100-year, 24-hour storm event run off and then transition to sheet flow. RSE will prepare a Channel Maintenance Plan for channels under its control prior to operation of the site. The offsite channel inspection and maintenance activities will include:

Routine inspection of:

- Erosion/sedimentation within the channel;
- Debris accumulation within the channel;
- Condition of the berms;
- Condition of the outlet energy dissipaters; and
- Condition of vegetation / weed management.

Regular maintenance, guided by the outcomes of the routine inspection; and keeping a record summarizing the inspections, maintenance activities and any corrective actions taken, including emergency repairs.

Soil Characterization

118. Please provide additional information characterizing the soils at the project site as follows:

a. General characterization of the extent of caliche-laden soil at the project site in terms of its expanse and range of depth;

Response: According to the site geotechnical report (Terracon, August 2009), "The underlying near surface and subsurface soils generally consisted of silty sand, poorly graded sand and poorly graded gravel with a significant amount of caliche cementation. The soils are moderately to strongly cemented with caliche in several locations across the site." The report bore logs also describe caliche at various depths and consistencies in bore logs B1, B2, B6, B7, B8, B9, B10, B12, B13, B15, B17, B18, B20, B21, B22 and B24. Therefore, caliche can be generally characterized as occurring throughout most of the site, although not

consistently throughout, and at depths from 2 feet to 40 feet. The caliche encountered was described as weakly, moderately, and strongly cemented, as well as caliche nodes were encountered.

b. *General characterization of the extent of cryptobiotic soil crusts on the project site, as well as the extent of the project's potential effects on degrading the soil crust;*

Response: Field observations have determined that small and isolated pockets of cryptobiotic soil crusts exist on site. Areas observed are small (less than 4 square feet) and thin (up to several inches). This will be unlikely to cause a significant erosional hazard due to the loss of crustal protection, because of the limited extent of these soils on site.

c. *Effects of (a) and (b) above on site soil permeability, runoff potential, and potential for wind and water erosion.*

Response: The RSEP will not affect the permeability of the onsite surface soil. Runoff potential is expected to increase slightly and this has been accounted for in the drainage design and will be mitigated through the use of a detention pond. Given the previously disturbed nature of the site and the fact that a majority of the site will remain in its current state (i.e., will not be graded), the potential effect of the project on wind and water erosion is expected to be insignificant.

Caliche-laden Soils

119. *Please provide information on how the project would mitigate potential increased storm water run-off or soil erosion in areas with caliche-laden soils.*

Response: The majority of the site will not be graded and, therefore, the majority of the site will not be cut down to the caliche-laden soils. The site after construction will thus not be any steeper than under existing conditions. As stated in the response for Data Request #67, most of the site will experience runoff only from rainfall that falls on the site itself. The existing drainage that passes through part of the site will be diverted around the site. Therefore, there would be no major increase in the soil erosion for this site. The caliche-laden soils will most likely be encountered for the construction of the East Diversion Channel, see Attachments DR68-1a through DR68-1e (drawings SRRC-0-SK-112-735-004 through -008). As stated in the response to Data Request #68, however, the slope of this channel will be limited to 1 percent, which is less than the existing natural slope. Additionally, during recent field visits, it was observed that areas on site with caliche-laden soils are not experiencing significant erosion.

Cryptobiotic Soil Crusts Mitigation

120. *Please provide information on how the project would mitigate for the loss of cryptobiotic soil crusts through Best Management Practices (BMPs) such as by application of non-toxic soil stabilizers or soil weighting agents during construction after initial grading and during project operation.*

Response: As stated in the response to Data Request #118, cryptobiotic soils are present on site, but are restricted to a few small areas. For this reason, it will not be necessary to apply BMPs specifically to address cryptobiotic soil crusts. Soil palliatives will be applied as needed to minimize fugitive dust during construction and operation.

Draft Drainage, Erosion and Sediment Control Plan

121. *Please provide a draft DESCP that contains elements "A" through "I" below outlining the site management activities and erosion/sediment control Best Management Practices (BMPs) to be implemented during site mobilization, grading, construction, and operation of the proposed project. Please provide all preliminary erosion control information for both the construction and operation phases, or provide a statement identifying when such information will be available. Note: The content and level of detail presented in the draft DESCP should be consistent with any site drainage or erosion-related information to be provided in response to the data requests above and the Biology section data requests.*

    a. *Vicinity Map – Provide a map(s) at a minimum scale 1"=100' indicating the location of all project elements, including depictions of all significant geographic features including swales, storm drains, and sensitive areas.*

    b. *Site Delineation – Identify all areas subject to soil disturbance (i.e., project site, lay down areas, all linear facilities, water pick-up areas, landscaping areas, and any other project elements) and show boundary lines of all construction/demolition areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.*

    c. *Watercourses and Critical Areas – Show the location of all nearby watercourses including swales, storm drains, and drainage ditches. Indicate the proximity of those features to the project construction, laydown, and landscape areas, and all transmission and pipeline construction corridors.*

    d. *Drainage Map – Provide a topographic site map(s) at a minimum scale 1"=100' showing all existing, interim and proposed drainage systems and drainage area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours should be extended off-site for a minimum distance of 100 feet in flat terrain.*

    e. *Narrative Discussion of Project Site Drainage – Include a narrative discussion of the drainage management measures to be taken to protect the site and downstream facilities. The narrative should include the summary pages from the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative should state the watershed size(s) (in acres) that was used in the calculation of drainage control measures, and include discussions justifying selection of the control measures to be used. Information from the hydraulic analysis should also be provided to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the project construction and laydown area, as well as post-construction and operation areas.*

    f. *Clearing and Grading Plans – Identify all areas to be cleared of vegetation and areas to be preserved. Provide elevations, slopes, locations, and extent of all proposed grading using contours, cross sections or other means and include locations of any disposal areas, fills, or other special features. Illustrate existing and proposed topography tying in proposed contours with existing topography.*

    g. *Clearing and Grading Narrative – Include a table that identifies all of the following: all project elements where material will be excavated or fill added; the type and quantities of material to be excavated or filled for each element; whether the excavation or fill is temporary or permanent; and the amount of material to be imported or exported.*

h. *Construction Best Management Practices Plan – Identify on the topographic site map(s) the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Any treatment BMPs used during construction should also address testing of storm water runoff, or storm water that comes in contact with equipment, if necessary, prior to onsite discharge or offsite disposal.*

i. *Operation Best Management Practices Plan – Identify on a separate topographic site map(s) the location of the site-specific BMPs to be employed during operation of the facility. Any treatment BMPs to be used during facility operation should also address testing of storm water runoff, or storm water that comes in contact with equipment, if necessary, prior to onsite discharge or offsite disposal.*

j. *Soil Wind and Water Erosion Control – The plan shall address exposed soil treatments to be used during construction and operation of the proposed project for both road and non-road surfaces including specifically identifying all chemical based dust palliatives, soil bonding, and weighting agents appropriate for use at the proposed project site that would not cause adverse effects to vegetation; BMPs shall include measures designed to prevent wind and water erosion including application of chemical dust palliatives after rough grading to limit water use.*

k. *BMP Narrative – Provide a narrative discussion on the selection, location, timing, and maintenance schedule for all erosion and sediment control BMPs to be used prior to initial grading, during project element excavation and construction, at final grading/stabilization, and for post-construction/operation. A narrative discussion with supporting calculations should also be included addressing any project specific BMPs. Separate BMP implementation schedules should be provided for each project element for each phase of construction. The maintenance schedule should include post-construction and operation maintenance of structural control BMPs, or a statement when such information will be available. All erosion control measures identified in the DESCP should be consistent with any revised biological impact mitigation measures proposed in response to Biology data requests for avoidance of impacts to desert tortoises and burrowing owls, and for maintenance of aeolian sand habitat.*

Response: The DESCP is under preparation and will be provided by March 26.

DESCP Elements

122. *Consistent with the Biology Data Request in the "Avoiding Impacts to Desert Washes" section, please provide revised DESCP elements, as appropriate, to address any project footprint changes or LID storm water management practices that may be necessary to maintain biological integrity of the desert washes and wildlife corridors within the project site.*

Response: Please see the response to Data Request #67. There will be no changes to the project footprint.

Stormwater Calculations

123. *Please provide revised calculations for any drainage facilities or structures that would be necessary for implementation of an LID storm water management approach.*

Response: Please see the response to Data Request #67. There will be no changes to the project footprint or to stormwater or drainage facilities.

Sedimentation and Erosion Potential

124. *Please provide an evaluation of the sedimentation and erosion potential for the project area that would take into account any changes in flows that might result from implementation of an LID storm water management approach.*

Response: Please see the response to Data Request #67. There will be no changes to the project footprint or to stormwater or drainage facilities or the sedimentation or erosion potential.

Heliostat Installation

125. *Please provide additional information on methods of heliostat installation that would be used in areas where drilling may be impeded by cemented soils or other difficult drilling/boring conditions.*

Response: The foundation installation method will be similar for both "typical soils" and for cemented soils and other difficult drilling/boring conditions. More powerful drilling equipment and augers with cutting teeth may be required where cemented soils and caliche-laden soils are encountered.

Cemented Soils and Heliostat Foundation Drilling

126. *Please provide additional information about any potential impacts, increased grading requirements, or changes in storm water mitigation that may be necessary in areas where heliostat drilling requires extra effort due to cemented soil or difficult drilling conditions.*

Response: In areas where heliostat drilling requires extra effort due to cemented soil or difficult drilling conditions, it is not expected that there will be any change to the grading requirements or stormwater mitigation. This is because the foundation construction activities will be similar in all soil types.

Heliostat Placement

127. *Please describe how project heliostats would be placed and managed to mitigate adverse impacts from potential increased scour within site ephemeral washes, and monitored for stability over the life of the project.*

Response: Based on soil conditions, slope, and field observations to date, scour is unlikely to be a threat to heliostat stability. Scour will continue be assessed as part of the detailed design phase, however, and the assessment of scour threats changes, mitigation including increased foundation depth or allowance for heliostat re-alignment (the heliostat tilting due to scour or foundation movement) will occur at that time.

Construction Water Use

128. *Please provide additional detailed information on the activities that will require water during construction, the duration of those activities, and the estimated water demands associated with each activity. Please include daily use volumes in gallons and monthly use volumes in AF, along with estimates for total water use over the entire construction period.*

Response: Water use was estimated for each of the three major tasks: (1) earthmoving, (2) dust control, and (3) backfill operations. Each task is described further below.

Earthmoving—Water will be used during earthmoving to moisten the existing soil to an optimal moisture content of approximately 9 percent. Optimal moisture level is required for proper soil compaction. Earthmoving is anticipated to take place during the first 40 weeks (9 to 10 months) of the project and will use approximately 312 acre-feet of water. Water usage will average approximately 32 acre-feet per month and 510,000 gallons per day.

Dust Control—Dust control during construction will be accomplished by spraying water over the field working area. The trucks will not cover the entire solar field at once but will spray over the working segments only. Dust control is anticipated to occur throughout the construction period of 27 to 30 months and will use approximately 424 acre-feet of water. Water usage will average approximately 16 acre-feet per month and 236,000 gallons per day.

Backfilling of Ditches and Trenches—Water is required for backfilling to moisten the soil as with earthmoving. Backfilling will occur over a 104-week period as necessary and will use approximately 44 acre-feet of water. Water usage will average approximately 2 acre-feet per month and 28,000 gallons per day.

Construction Water Use Calculation

129. Please provide detailed information and discussion on how the project water use during construction was calculated, including all assumptions made in developing the water use estimates and associated calculations.

Responses: Water use was estimated separately for the three major tasks of earthmoving, dust control, and backfill operations, as discussed in the response to Data Request #128. Attachment DR129-1 shows how the projected water use during construction was calculated.

Earthmoving water use was calculated based on estimating the water required to increase the existing soil content from its current content (4 percent, based on the geotechnical report) to the optimal moisture content of 8.5 percent. The dry soil density was assumed to be 120 lb/ft^3. A loss factor of 50 percent was used. The loss factor is the percentage of water usage that does not contribute to the moistening the soil and is lost due to runoff, evaporation and ground seepage. Earthmoving is anticipated to take approximately 40 weeks (9 to 10 months) and will use approximately 312 acre-feet of water.

Dust control water use was estimated based on using four trucks to spray water during construction hours. Working hours were assumed to be 10 hours/day and 6 days/week. Each truck will hold 4,000 gallons of water and will take 1 hour to load, discharge throughout the field and then refill (each truck will make 10 trips per day). Dust control is anticipated to occur throughout the construction period of 27 to 30 months and will use approximately 424 acre-feet of water.

Backfilling of ditches and trenches water use was estimated by the same method as the earthmoving task. Backfilling is anticipated to take approximately 104 weeks (24 months) and will use approximately 44 acre-feet of water.

Well Drilling

130. Please provide detailed information on the proposed well drilling, reconstruction (if necessary), development, and abandonment activities to be undertaken for the wells associated with the Rice Solar Energy Project including the following:

a. Please be sure to include draft well completion diagrams as well as a site map showing existing and proposed well locations; and

b. Please provide documentation of consultation with Riverside County and describe how the wells will conform to County Ordinance No. 682 for the Construction, Reconstruction, Abandonment and Destruction of Wells.

Response: RSE will file the response to this Data Request on March 15, 2010.

Water Treatment System

131. Please clarify what the proposed water treatment system would consist of during operations.

Response: The proposed makeup water treatment system will consist of a two-pass reverse osmosis (RO) unit followed by an electro-deionization (EDI) unit for makeup of high-purity water for the steam cycle and mirror washing, etc. Deep wells will be the source of the makeup water for the site. Deep wells typically exhibit low silt density index (SDI) values (e.g., SDI<3), while surface waters often have an SDI>6. The SDI is used to characterize the fouling potential of a water stream. A Multimedia Filter (MMF) system will not be required since the SDI of the deep well water is expected to be <3.

Water Balance

132. If the proposed treatment system would include the MMF, please update the following for the proposed project:

a. Water Balance Diagram for the Annual Average scenario including instantaneous flow rate (gallons per minute); and

b, Estimate of annual volume (acre-feet) for the Annual Average scenario.

Response: The treatment system will not contain a multimedia filter (MMF). AFC Figures 2.2-5A (Summer Peak) and 2.2-5B (Annual Average) show the proposed arrangement of treatment equipment without a MMF.

Alternative Water Sources

133. Please provide additional information and analysis demonstrating that alternative water sources (such as treated process wastewater, or high TDS groundwater) for the proposed WetSAC process are infeasible.

Response: Alternative water sources such as treated process wastewater were not considered because they do not exist in the local area. The nearest cities of Blythe and Needles are more than 30 miles away from the site. The total volume of water needed for makeup to the RSEP is approximately 137 afy. Additional potable water is required and would be supplied from an onsite well. An order of magnitude cost analysis has determined the cost to construct a 30- to 40-mile pipeline to provide recycled water to the RSEP would

be approximately $24,000,000 to $32,000,000. This cost is based on a similar project and scaled to adjust for the water needs at the RSEP. The cost does not include any upgrade to the local municipal wastewater treatment facility. That cost and scope of work required is currently unknown. Also, this cost does not include the actual cost of the water, or the O&M cost, nor does it address any potential impacts associated with constructing a 30- to 40-mile pipeline to indigenous flora or fauna. These costs, in addition to the pipeline cost, render the use of treated process wastewater and/or high TDS groundwater infeasible.

Mechanical Chillers

134. *Please provide an analysis considering implementation of mechanical chillers as an alternative to use of the proposed WetSAC for the turbine lubricating oil cooling system. Please include the following:*

    a. *Address technical feasibility, environmental and economic (capital and operating cost) considerations.*

    b. *Estimate the makeup water conservation that would be achieved expressed in both instantaneous flow rate (gallons per minute) and annual volume (acre-feet) for the Annual Average scenario.*

    c. *If the applicant determines mechanical chilling is feasible, provide a Water Balance Diagram for the Annual Average scenario.*

Response: Mechanical chillers can be provided in both wet- and air-cooled designs. A wet-cooled unit uses a small cooling tower to cool the chiller and would therefore have similar water usage as the wet surface air cooler (WSAC) and would also have additional capital and operations and maintenance costs, and was therefore not evaluated further. An air-cooled chiller will reduce the overall water consumption by an annual average of 31 gpm (34 gpm peak), which is approximately 9.1 afy based on 1,600 hours of annual operation. The air-cooled chiller will have a substantially higher capital cost of approximately $3.5M as compared to approximately $420K for the WSAC. Chiller cost was scaled based on budgetary estimates from other projects. The chiller would also require a substantially higher parasitic electrical load, estimated at approximately 2 MW, compared to less than 0.5 MW for the WSAC system.

Onsite Wastewater Treatment and Disposal

135. *Please provide all the information necessary for compliance with the CRBRWQCB requirements for onsite wastewater treatment and disposal systems (i.e., septic tanks and leach fields). The information provided should include copies of any ROWDs and Engineering Reports required by the CRBRWQCB. (For more on information requirements, see CRBRWQCB guidance: Contents of a Proposed On-site Wastewater Treatment System – Engineer's Report, http://www.waterboards.ca.gov/coloradoriver/water_issues/available_documents/docs/wts_engineers_rpt3.pdf.)*

Response: Under the Colorado River Basin Regional Water Quality Control Board (CRBRWQCB) Guidelines for sewage disposal from land developments proposed commercial or industrial source, this project will be exempt from filing a Report of Waste Discharge for the onsite septic tanks and leach fields. This is because the system would process less than 5,000 gpd of domestic sewage on any single day (CRBRWQCB undated).

In addition, distance between the RSEP ground surface and high groundwater level is approximately 285 feet, much greater than the minimum depth of 10 feet, at which there would be a potential violation of water quality standards, impairment of present or future beneficial uses of water, or unreasonable degradation of the quality of waters of the state (CRBRWQCB undated).

The Riverside County Department of Environmental Health (RCDEH) regulates the approval and installation of on-site septic system and leach fields. RCDEH requirements include that the disposal leach field be located a minimum distance of 100 feet from water supply wells and drainage piping be located a minimum distance of 25 feet from water supply wells. The base of the leach lines will be located in an area that achieves the applicable percolation rate requirements. By complying with the laws, ordinances, regulations and standards (LORS) established for septic system design, construction, operation and maintenance, this system will have no adverse effects on water quality.

References

Colorado River Basin Regional Water Quality Control Board (CRBRWQCB). n.d. http://www.waterboards.ca.gov/coloradoriver/publications_forms/publications/index.shtml. Accessed February 18, 2010).

ROWD and Engineering Report

136. *Please submit the required ROWD and Engineering Report for the project's proposed onsite wastewater treatment and disposal systems to the CRBRWQCB, along with all appropriate fees necessary for document review and compliance assessment/determination.*

Response: Please see the response to Data Requests #135. A ROWD will not be required for the sanitary waste system.

Wastewater Evaporation Ponds

137. *Please confirm that the ROWD for the project's proposed wastewater evaporation ponds has been submitted to the CRBRWQCB, along with all appropriate fees necessary for document review and compliance assessment/determination.*

Response: An electronic copy of the ROWD was mailed to the CRBRWQCB on October 28, 2009. The CRBRWQB has indicated that no fee would be required for the submission of the ROWD documentation (personal communication, Cliff Raley, CRBRWQB, September 1, 2009). The CRBRWQCB has requested to review the ROWD to have an understanding of the waste quality and quantity being discharged before a final fee determination is made. The CRBRWQCB will provide a letter to RSE outlining the required "application fee" which will be accounted for in the first annual year fee.

Storm Water Detention Basin

138. *Please provide additional information confirming that the location and operation of the proposed storm water detention basin would not negatively impact the integrity of the wastewater disposal ponds.*

Response: An access perimeter road will be located between the stormwater detention basin area and wastewater evaporation ponds (minimum separation of approximately 160 feet).

The perimeter access road will act as the detention basin embankment, and will have two outlet pipes, releasing stormwater at the pre-developed flow rate and directing water away from the wastewater evaporation ponds (refer to ROWD, Figure 15A). The detention basin will be graded so that the stormwater will be directed toward the outlet pipes. Detailed design of the embankment will be undertaken with the final drainage design. The embankment, however, will have structural integrity and be constructed with compacted native earth and stabilized with rip-rap. The evaporation ponds are downstream of the access perimeter road and will not be impacted by the stormwater accumulated within the detention basin, which will drain during or shortly after a rain event and will not hold water for an extended period of time. Additionally, the evaporation ponds will be contained by berms and the elevation of the bottom of the evaporation pond will not be greater than two feet below the existing grade. Therefore, the evaporation ponds' design features will protect them from detention pond water.

Rice Valley Basin Recharge

139. *Please provide more detailed or different analysis of Rice Valley basin recharge (or adjacent valleys if necessary) using methods such as Maxey-Eakin (1949) or modified methods such as Donovan and Katzer (2002).*

Response: RSE will file the response to this Data Request on March 15, 2010.

Adjacent Groundwater Basins

140. *Please provide an analysis of impacts to the Rice Valley basin and users in adjacent groundwater basins based on any new estimates that may be developed from further analysis of basin recharge.*

Response: RSE will file the response to this Data Request on March 15, 2010.

Water Level Monitoring

141. *Please discuss whether the applicant proposes to implement a water level monitoring program during project development and operation given the challenges in estimating basin recharge and safe yield of the groundwater basin.*

Response: RSE will file the response to this Data Request on March 15, 2010.

THWELLS Program Modeling

142. *Please provide a copy of the THWELLS program, documentation, and modeling files developed for analysis of the project.*

Response: RSE is providing this information to CEC Staff in electronic format under separate cover as Attachment DR142-1.

Aquifer Characteristics

143. *Please provide further analysis of aquifer characteristics, basin storage, and drawdown impacts that could result in significant subsidence.*

Response: RSE will file the response to this Data Request on March 15, 2010.

Basin Subsidence Monitoring

144. Please discuss whether the applicant proposes to implement a monitoring program to evaluate whether project pumping is causing basin subsidence.

Response: RSE will file the response to this Data Request on March 15, 2010.

Zero Liquid Discharge

145. Please provide an analysis to consider implementing zero-liquid discharge (ZLD) for treatment and recovery of wastewater during project operations including the following:

a. Address technical feasibility, environmental and economic (capital and operating cost) considerations.

b. Estimate the makeup water conservation that would be achieved expressed in both instantaneous flow rate (gallons per minute) and annual volume (acre-feet) for the Annual Average scenario.

c. Provide a Water Balance Diagram for the Annual Average scenario.

Response:

Technical Feasibility—A mechanical Zero Liquid Discharge (ZLD) system is a capital-intensive technology for recovery of wastewater, adding an additional $7-$9M to the capital cost to build the plant. The "full ZLD" would include a brine concentrator and a crystallizer, along with other ancillary equipment and chemicals. The ZLD concentrates the wastewater stream to produce a dry solid waste product for periodic transport off site by truck to an appropriately permitted disposal facility and requires an external heat source (e.g., steam or electricity) to evaporate the water.

A ZLD system would not be cost-effective or technically feasible for the proposed concentrating solar plant which is dry cooled and has daily on/off cycles of operation. Experience with ZLD systems in existing operating facilities has demonstrated that ZLD systems are difficult to start up and shut down and only work when in thermal balance. Therefore, to work effectively, a ZLD system for the RSEP would need to be operated continuously, including during periods when the plant is not in operation. The system would therefore require a continuous source of electricity from the power grid (and/or plant, when in operation). The mechanical ZLD would require approximately 5.5 MW-hr/day (3.9 MW-hr/day for the brine concentrator and 1.6 MW-hr/day for the crystallizer). In addition, ZLD systems are highly manpower intensive, and require at least one operator on-shift at all times with approximately 8 hours of additional maintenance/I&C work on day shift (a total of 32 man-hours per day.) Finally, "full ZLD" systems are prone to break down and tend to be difficult to operate and maintain. Any failure of the ZLD system would require plant shutdown or alternate means of wastewater disposal.

RSEP has implemented a dry-cooling profile for the project and incurred the operating impacts associated with dry-cooling technology. The result is a net reduction to plant output during peak summer demand periods and a stated overall reduction in plant operating efficiency. Adding a ZLD system would result in even higher annual operating costs. Annual operating costs for the mechanical ZLD system are estimated to be approximately

$640,000, without including sludge removal. Including all of the factors identified, the RSEP variable annual operating costs would more than double, primarily due to the significant increases in labor and insurance costs that would be necessary. Thus, the annual operating costs for the ZLD increase total annual operations and maintenance expenditures for the RSEP by more than 10 percent.

Environmental Impacts—Air emissions and potential traffic impacts from the offsite truck transport of residual solids would be greater with a ZLD than with evaporation ponds. The annual average frequency of offsite shipments of solids would be approximately one truck per week, with higher-than-average disposal in the summer, resulting in air quality and traffic impacts. The potential for groundwater impacts and for wildlife exposure with evaporation ponds would not exist for a crystallizer and, thus, there would be no need for groundwater monitoring or wildlife protection measures. The crystallizer also would require less land than evaporation ponds.

Makeup Water Conservation—The project as proposed, with dry cooling, uses limited water. In a further effort to minimize water use, RSEP has revised the project's water balance. The changes include using RO reject in the WSAC (rather than blow down) and re-using the blow down, rather than sending some of this to the evaporation ponds. This update would reduce the annual makeup water flow by approximately 53 gpm. Under annual average conditions, the revised water treatment process would reduce the makeup flow rate from 223 gpm to 170 gpm, and reduce the makeup volume from 135 afy to 103 afy, a reduction of 32 afy. Figure DR145-1 is a revised annual average water balance diagram for this scenario.

The mechanical ZLD would require supplemental water treatment components to reduce annual makeup water flow by approximately 32 gpm. Under annual average conditions, the ZLD system would reduce the makeup flow rate from 170 gpm to 138 gpm, and reduce the makeup volume from 103 afy to 83 afy, a reduction of 21 afy. Figure DR145-2 is a water balance diagram for this scenario.

Alternatives to Zero Liquid Discharge

146. *Please provide an analysis to consider implementing any alternatives (if any) to zero-liquid discharge for treatment and recovery of wastewater that would accomplish recovery of a greater portion than currently proposed during project operations, but less than ZLD. Please provide the following:*

    a. *Address technical feasibility, environmental and economic (capital and operating cost) considerations.*

    b. *Estimate the makeup water conservation that would be achieved expressed in both instantaneous flow rate (gallons per minute) and annual volume (acre-feet) for the Annual Average scenario.*

    c. *Provide a Water Balance Diagram for the Annual Average scenario.*

Response:

Technical Feasibility—A "partial ZLD" system consisting of a brine concentrator and evaporation ponds would be a second, option for recovery of wastewater. This option

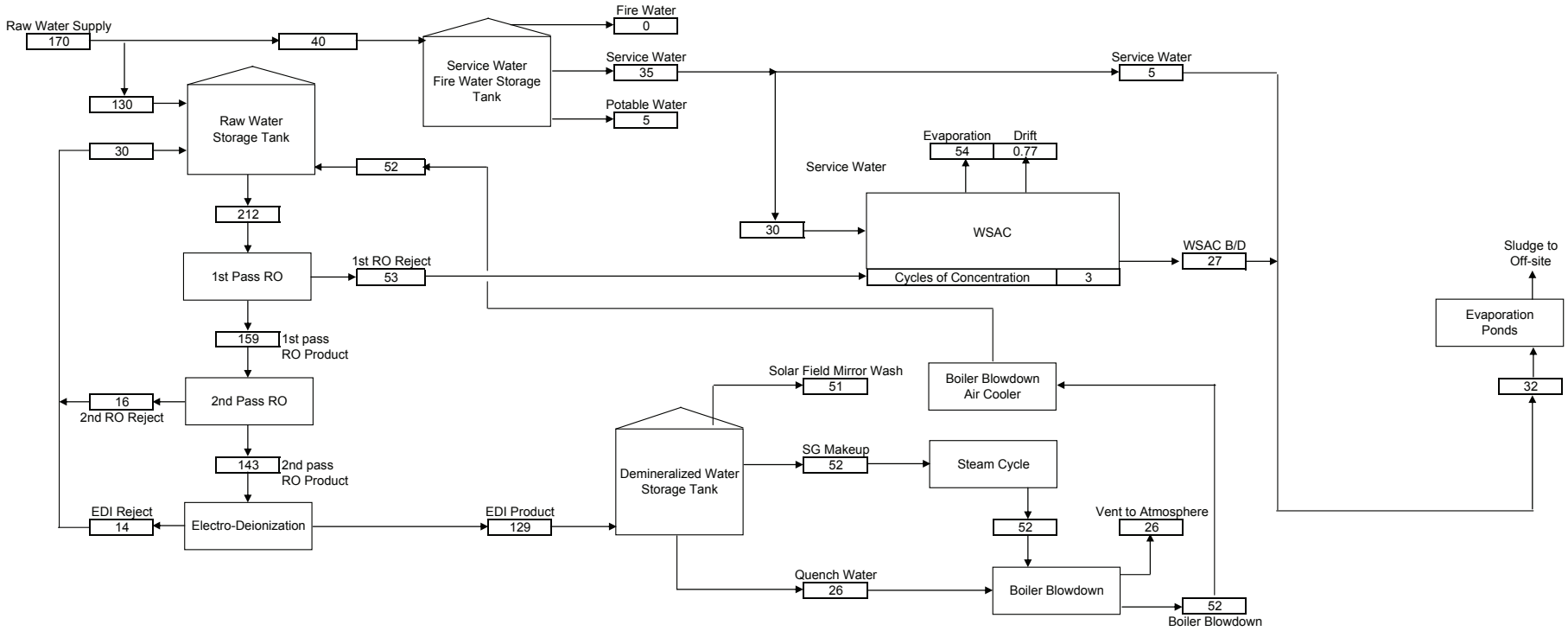
would also be capital intensive adding an estimated $4 to 6M to project costs. In the partial ZLD, the brine concentrator concentrates the wastewater stream to approximately 15 percent to 30 percent solids. This slurry would then be pumped to the evaporation ponds where evaporation would continue to produce a dry solid waste product for transport off site.

A partial ZLD system would also not be cost-effective or technically feasible for the RSEP. As with the "full" ZLD system, to work effectively, a partial ZLD system would need to be operated continuously, including during periods when the plant would not be in operation. The system would therefore require a continuous source of electricity from the power grid (and/or plant, when in operation). The mechanical ZLD would require approximately 3.9 MW-hr/day for the brine concentrator.

RSEP has implemented a dry cooling profile for the project and incurred the operating impacts associated with dry-cooling technology. The result is a net reduction to plant output during peak summer demand periods and a stated overall reduction in plant operating efficiency. Including a partial ZLD system would further increase the annual operating costs. Annual operating costs for the partial ZLD system are estimated to be approximately $270,000, not including sludge removal.

Environmental Impact—In the partial ZLD, evaporation ponds would be required for storing the effluent from the brine concentrator; however, these ponds would be smaller than the RSEP design. The ponds would be designed to allow for several years of operation before solids removal would be required. Solids in the ponds would be removed and disposed of periodically (e.g., every 5 to 10 years). While this option would eliminate the weekly truck trips to the site to haul away the sludge, it would also result in many truck trips during the intermittent disposal periods. This would result in air quality and traffic impacts during these periods. With evaporation ponds, the potential for groundwater impacts and for wildlife exposure exists, and would also require groundwater monitoring and wildlife protection measures.

Makeup Water Conservation—Under annual average conditions, the partial ZLD system would reduce the makeup flow rate from 170 gpm to 141 gpm, and reduce the makeup volume from 103 afy to 85 afy, a reduction of 18 Afy. Figure DR146-1 is a water balance diagram for this scenario.



Notes: **All flow rates are in gpm unless otherwise noted.**

Design Case:

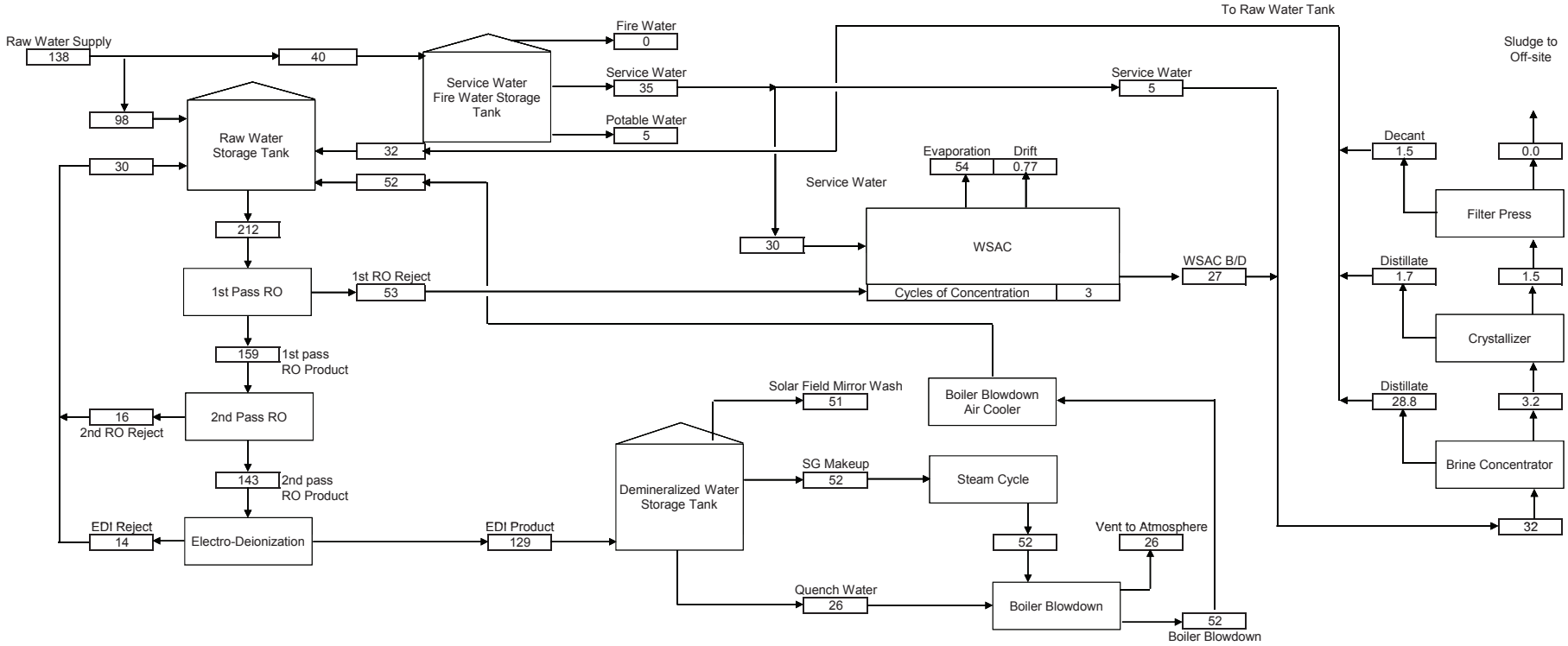
Configuration	Solar/Steam Cycle	
Dry bulb Temp	80.0	Deg F
Wet Bulb Temp	59.7	Deg F
Amb Pressure	14.7	psia

FIGURE DR145-1
WATER BALANCE - FULL ZLD, WATER USE REDUCTION

Rice Solar Energy Project

Riverside County, California

Source: WorleyParsons, LTD.



Notes: 1 **All flow rates are in gpm unless otherwise noted.**

Design Case:

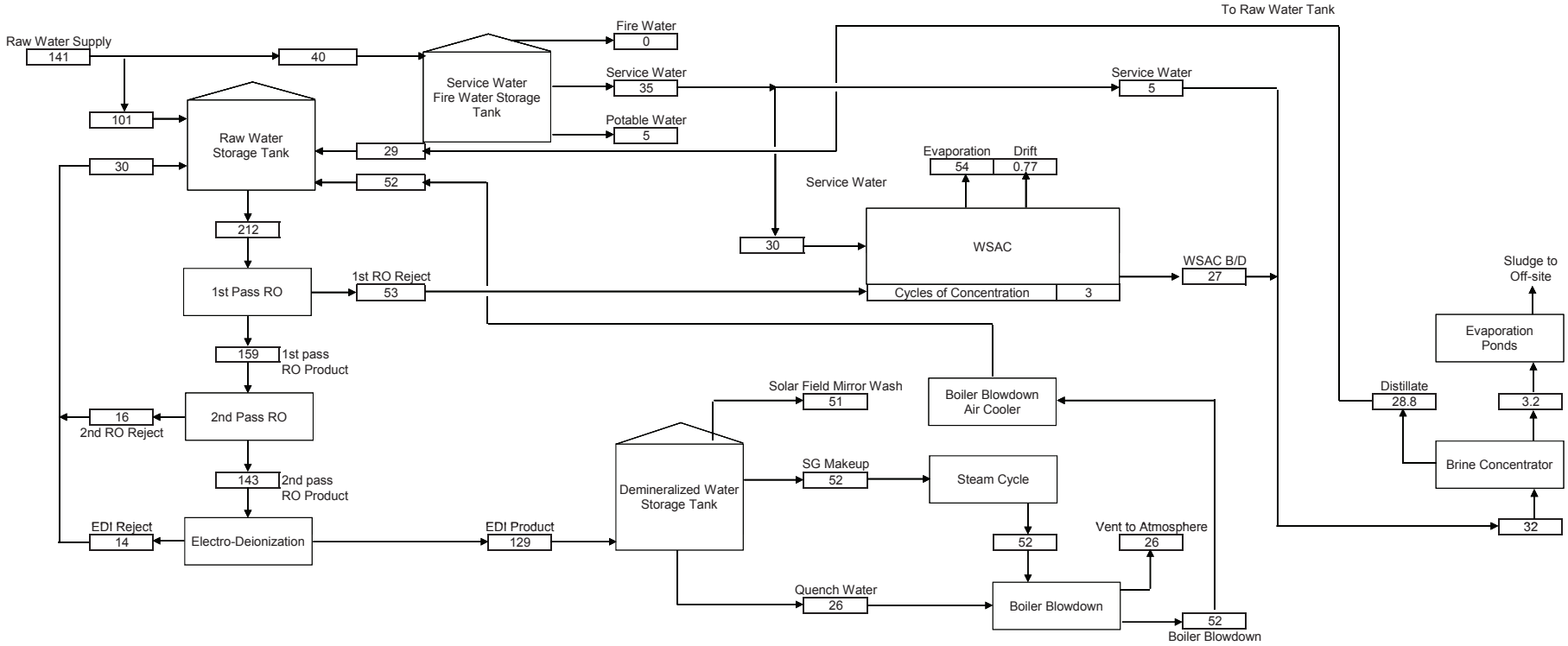
Configuration	Solar/Steam Cycle	
Dry bulb Temp	80.0	Deg F
Wet Bulb Temp	59.7	Deg F
Amb Pressure	14.7	psia

FIGURE DR145-2
WATER BALANCE – FULL ZERO LIQUID DISCHARGE

Rice Solar Energy Project

Riverside County, California

Source: WorleyParsons, LTD.



Notes: **All flow rates are in gpm unless otherwise noted.**

Design Case:

Configuration	Solar/Steam Cycle	
Dry bulb Temp	80.0	Deg F
Wet Bulb Temp	59.7	Deg F
Amb Pressure	14.7	psia

FIGURE DR146-1
WATER BALANCE – PARTIAL ZERO LIQUID DISCHARGE

Rice Solar Energy Project
Riverside County, California

Source: WorleyParsons, LTD.

CH2MHILL

Attachment DR129-1
Construction Water Calculations

WorleyParsons
resources & energy

Project Name:	Project Rice
Client Name:	Solar Reserve
Date	2/24/2010
Rev	DRAFT
Version	
Created By	B. Anders
Checked By	R.C. Antoline

Earthmoving

Estimated moisture content of existing soil	4%	From GeoTech Report (B-18)
Estimated Optimal Moiture Content	8.5%	From GeoTech Report (B-18)
Added Moisture for dust control	4%	
Increase in moisture - as-is to as used	8.5%	
Assumed maximum dry density of the soil	132	lbs/cf (B-18 Max from GeoTech Report)
Weight of water needed per cf	11.22	lbs water/cf of dirt
gallons of water (8.33 lbs/cf)	1.35	gallons/cf of dirt
Cubic Yards of Dirt to move (3)	1,057,000	cy
Gallons of Water Needed	38,440,286	gallons
Convert this to acre-feet	118.0	AF
Estimated "loss" factor for all the earthmoving	50%	
Total water required - Earthmoving	**235.9**	**AF**
Total water required - Earthmoving	**76,880,571**	**Gallons**
Hours of earthmoving per week	50.0	
Weeks of earthmoving	40.0	
Minutes of Earthmoving	120000.0	
Gallon per minute supply required	**640.7**	**GPM**
	Say 650 GPM	

WorleyParsons
resources & energy

Project Name:	Project Rice
Client Name:	Solar Reserve
Date	2/24/2010
Rev	DRAFT
Version	
Created By	B. Anders
Checked By	R.C. Antoline

Dust Control/Maintenance

Maintenance water trucks for duration of work	4	each
Capacity of each water truck	4,000	gallons
Time to load, discharge, and travel	1.0	hour
Hours of operation	10.0	hours/day
Days of operation per week	5.0	
Total water use per week	800,000	gallons
Total water use per year	**127.6**	**AF**
Total water use rate	**266.7**	**GPM**
Total Project Water Needs	**319.1**	**AF**

Ditch Backfill Operations

Trench Length	1,000,000	feet
trench width	2	feet
thrench depth	4	feet
Volume of Backfill	296,296	cubic yards
Water required	10,775,510	gallons
Water required for Backfill Operations	**33.1**	**AF**
TOTAL PROJECT CONSTRUCTION WATER	**588.1**	**AF**
ADD Contingency to this number (25%)	**735**	**AF**
	Say - 750 AF	

WorleyParsons
resources & energy

Project Name:	Project Rice
Client Name:	Solar Reserve
Date	2/24/2010
Rev	DRAFT
Version	
Created By	B. Anders
Checked By	R.C. Antoline

Notes:

1 For the AFC Write up, the figures of 35 AF per month is used for 12 months, and 20 AF per month after that (which = 780 AF)

780	AF used for constructiion of job
254,202,000	Gallons used on job
27	months of construction
22	days per month
12	hours per day
594	gallons per minute used

2 In HSR discussion of July 23, 2009, HSR mentioned that tank test water would be 6,000,000 gallons = 19 AF (covered by contingency)

3 The estimated total earthwork figure is based on moisture conditioning/touching 0.25' of soil over the entire area and moving 1' in depth over 10% of the facility
When walking the site, although not surveryed, moving 1' over 10% of the area is a conservative estimate
1400 acres x 0.25' = 565,000 CY.
1' x 1400 acres x 10% = 224,000 CY
The power block is conservatively 3 degrees of 360 degress x volume of sphere with radius of 450'
(it is conservative, as the actual volume is closer to 2 degrees, not 3)
(3/360) x (4/3)(pie)(450)(450)(450) = 120,000CY
Add for roads - 24' x 2' x 8800'xpie = 50,000 cy
Evap Ponds- 10 acres x 3' = 50,000 cy
Molten Salt Pit = 6 acres x 5' x 1600cy/AF = 48,000
Total = 1,057,000

This value can be used for earthwork for water, and to discuss the conservative dust generation, etc
The estimated actual cut/fill is 112k + 120k + 50k + 50k + 48K = 380,000 CY
The 112K in the above is 1/2 of the 224k listed above - as expected cuts/fills are really only 6"

Traffic and Transportation (147–153)

FAA Determination of No Hazard

147. Please provide information on the applicant's status of and completion of the FAA 7460 requirements and attainment of an FAA Determination of No Hazard to Navigable Airspace.

Response: SolarReserve has filed Form 7460 with the Federal Aviation Administration (FAA) requesting a Determination of No Hazard to Air Navigation and has received this determination, dated December 28, 2009 (FAA Aeronautical Study 2009-AWP-2050-OE). A copy of the FAA Determination letter is included as Attachment DR147-1.

Receiver Luminance

148. If the luminance of the receiver is the same as that of a 120 watt incandescent electric lamp, does this imply that this is the cumulative luminance or does it mean that any given point on the receiver will produce this luminance; that is, as if the 100 foot receiver were covered with 120 watt lamps?

Response: The comparison to a 120 watt incandescent electric lamp applies to the entire receiver (cumulatively), as viewed from a distance. To derive this luminance estimate, a log-based curve was derived to show the decrease in reflected solar flux (W/m^2) from the receiver as a function of viewer distance. The reflectance was calculated for a very high solar intensity day with the direct normal irradiance (DNI) at 1,000 W/m^2. Note that the design point for the receiver is 950 W/m^2 and that the maximum 8-year historical DNI for this location did not exceed 1,005 W/m^2. This curve shows that, at a distance of 1,600 meters, which is the distance from the nearest point on State Route 62 to the solar collector tower and nearly twice the distance from KOP-1, the reflected solar flux is 200 lux (or lumen/m^2). Since the luminance level of a 60 Watt incandescent lamp at 1 meter is approximately 100 lux, the receiver luminance was described to be comparable to a 120 watt incandescent lamp at 1 meter from the human eye.

Lamp Type

149. Staff finds that domestic lamp catalogues list only two types of 120 watt lamps; reflector lamps and parabolic aluminized reflector (PAR) lamps.

a. Which lamp type was used in the comparison?

b. What is lumen rating of the 120 watt incandescent electric lamp used in the comparison?

Response: Please see the response to Data Request #148. The luminance at 1,600 meters from the receiver is approximately 200 lux, or lumens/m^2. These measures of luminance are independent of the type of electric lamp.

Heliostat Movement

150. *Please describe the range of movement (beginning and ending positions) for the heliostats during normal and emergency operation modes and during malfunction including the following (and any others) as applicable:*

    a. *Night stowage position*

    b. *Morning startup*

    c. *Evening shutdown*

    d. *Load (power output) reduction*

    e. *Reducing solar input to avoid overheating the receiver*

    f. *Loss of AC Station Power*

    g. *Mirror washing*

Response: The range of vertical (elevation) motion is from 6 degrees past vertical through an arc of 94 degrees which ends 10 degrees past horizontal or at a position of 100 degrees (with 0 degrees as perfectly vertical and 90 degrees perfectly horizontal). The azimuth range of motion allows the heliostat to rotate fully 360 degrees around the pedestal. At the full horizontal position (90 degrees elevation), the heliostat mirror surface is approximately 14 feet above grade.

As with the operation at the Solar Two Project, the positions of the heliostats at various operating modes are as follow:

a. Stow position at night – at or near 90 degrees, mirrors face up

b. Morning startup – Heliostats are moved to their respective standby position relatively close to the tracking target located at the horizontal center plane elevation of the receiver and approximately 100 feet radially from the receiver surface.

c. Evening shutdown – Heliostats are slowly moving along predefined paths of motion in groups specified to minimize simultaneous power consumption. The heliostats rest at a near horizontal position face up.

d. Load (power output) reduction – The thermal energy collection process and the electric energy generation process are bifurcated for the proposed central receiver plant. Therefore, power output reduction will not impact the operation of the collector field.

e. Reducing solar input to avoid overheating the receiver – Pre-assigned groups of heliostats will be placed on standby position in order to off-point from the receiver.

f. Loss of AC station power – The onsite emergency backup generator(s) will automatically start and the entire collector field will begin an emergency defocus sequence where all the heliostats are commanded to point off of the receiver so that all concentrated solar flux is removed within 60 seconds.

g. Mirror washing – The heliostat will be placed in a position between 6 and 45 degrees with the azimuth angle facing toward the wash path between two alternate rows of heliostats.

Solar Radiation Exposure

151. Please address potential solar radiation exposure hazards (in terms of total reflected solar energy (kW/m^2) and the reflected luminance in lux) and mitigation measures for normal and emergency operation modes as applicable for both humans (including in aircraft, vehicles, and as pedestrians) and wildlife.

Response: Over the eight years for which NREL collected and published solar data for the RSEP site location, the direct normal irradiance (DNI) did not exceed 1,005 W/m^2. This level, furthermore, is generally only reached near mid-day at certain times of the year. At the maximum new-and-clean mirror reflectivity of 94 percent, the reflected beam would have a total reflected solar energy of no greater than 945 W/m^2. This does not account for atmospheric absorption due to moisture or dust in the air. This also assumes that there is a clear line of sight from the mirror to the receptor (human, wildlife, vehicle, aircraft, etc.) and where the angles of the beam incidence and reflection are such that the receptor is exposed. The receptor is therefore likely to be close to the heliostat and not at some great distance where the theoretical flux is more concentrated at the focal point.

Assuming that the target is receiving background solar irradiation directly from the sun (as opposed to being in a shaded location), the incremental exposure from one heliostat will expose the target body to something slightly less than two suns equivalent. (The sun at midday has a luminance of 1.6 x 10^9 candelas per square meter and is a standard measure of luminance. A common candle emits light with a luminous intensity of roughly one candela). It is unlikely for more than one heliostat to be targeting at a receptor unless more than one heliostat is specifically programmed and commanded to do so. At this worst-case condition (i.e., solar noon in the summer and luminance of approximately two suns), this exposure is 1.95 kW/m^2. For mobile receptors such as humans and animals, the exposure would be temporary, because the resulting heat discomfort would cause the receptor to move away from the line of exposure. Moving sources such as vehicles and aircraft would also only have temporary exposure since both the sun and the heliostats would be relatively stationary.

As the response to Data Request #153 explains, there would be little or no hazard to aircraft because multiple mirrors when in use are focused either on the receiver or on one of the target points that is located 100 feet away from the receiver and at the same height as the receiver. Above this point and at elevations at which aircraft are likely to be flying, the radiation from several mirrors would not combine and luminance from a single mirror or group of mirrors would be relatively low. When the mirrors are not in use, they are rotated to the stow position at which they face upward (see the response to Data Request #150). The mirrors are seldom in a position to direct the sun's rays to points near ground surface within or outside of the project fenceline. The risk to passing vehicles, pedestrians, and wildlife, is thus very low.

The hazard associated with such exposure would mainly come from the ultraviolet (UV) band of the light spectrum, more specifically the shorter wavelengths from 295 to 325 nm,

most of which is removed by the upper atmosphere's ozone layer. Of the total solar radiation that reaches the earth surface, only about 3 percent is in the UV spectral band. The incremental UV exposure would therefore be approximately 28 W/m^2 (0.03 x 945 W/m^2) for the highest DNI instance of the day.

Although OSHA has not published regulatory limits on UV exposure from the sun, the American Conference of Industrial Hygienists (ACGIH) has recommended the threshold limit values (TLV) that are depicted in Table DR151-1.

TABLE DR151-1
ACGIH Threshold Limit Values

Type	Wavelength (nm)	TLV (< 1000 sec)
UV-C	180	2500 W/m^2
UV-C	190	1600 W/m^2
UV-C	200	1000 W/m^2
UV-C	210	400 W/m^2
UV-C	220	250 W/m^2
UV-C	230	160 W/m^2
UV-C	240	100 W/m^2
UV-C	250	70 W/m^2
UV-C	254	60 W/m^2
UV-C	260	46 W/m^2
UV-C	270	30 W/m^2
UV-C	280	34 W/m^2
UV-B	290	47 W/m^2
UV-B	300	100 W/m^2
UV-B	305	500 W/m^2
UV-B	310	2000 W/m^2
UV-B	313	5000 W/m^2

As the table shows, the TLV varies widely across the UV band. The worst case incremental exposure likely to occur at the RSEP, of 28 W/m^2, is slightly below the most stringent TLV limit on this table for 270 nm, of 30 W/m^2.

As with all power plants, safety measures will be implemented and enforced strictly. Measures will include requiring staff to wear long-sleeved shirts and long pants, hard hats, and UV-protective shaded safety glasses during daylight hours.

The luminance of a one sun is approximately 1.2E5 lux. The apparent luminance is a function of the distance to the receptor. The relationship can generally be defined as the inverse of the distance squared (1/r^2).

Heliostat Controls

152. Please describe the control mechanisms, including availability of on-site maintenance personnel, which will avoid heliostat movements or malfunctions that may produce hazards to humans and wildlife.

Response: The facility will be manned continuously, 24 hours per day, 7 days per week. During solar collection periods, maintenance personnel will be available to ensure high availability of the collector field. The maintenance staff will also ensure that all off-normal operating conditions associated with the collector field are resolved quickly. Heliostat cleaning and maintenance will generally be performed during off-peak and non-collection hours to minimize lost energy opportunity during prime solar-collecting periods. As indicated in the response to Data Request #151, there is a very low probability that light would be reflected off of the RSEP site. If this were to happen, it is unlikely that humans or wildlife would be present to be affected.

Reflected Solar Energy

153. Please state the amount of reflected energy that will occur at each of the "four target points" which might impact a plane passing over the plant both in terms of total reflected solar energy (kW/m²) and the reflected luminance in lux.

Response: Solar energy at each of the four standby focal points adjacent to the tower will be approximately 4,300 suns. The amount of energy at each of the target points will vary with the solar irradiance available at each moment in time. At the maximum direct normal irradiance of 1,005 W/m2, the worst-case solar flux at these points, assuming there is an opaque object to intercept the beam, is 4.06 MW/m². This assumes a maximum mirror reflectivity of 94 percent, 100 percent cleanliness, and no atmospheric attenuation caused by moisture and dust in the air. In all cases, there is no threat to aircraft or distant structures because the standby target points, as previously discussed, are located at the horizontal center plane elevation of the receiver and approximately 100 feet radially away from the receiver surface. Above these "focal points" in space, the combined beams of the heliostats rapidly disperse and the resultant concentration poses no threat to aircraft or distant structures.

Reflectance in lux would depend on the distance of the receptor from the given source of light. In this case, the source of luminance would be an individual heliostat as viewed from a single aircraft passing by at a particular distance and elevation. The target points could not be seen from an aircraft except under rare conditions when humidity is relatively high. Under these circumstances, the reflected light from the heliostats illuminates droplets of water at or near the target points, causing a diffuse glow, as documented for the Solar Two project, where a "halo" effect was periodically observed during humid conditions.

Attachment DR147-1
FAA Determination of No Hazard to Air Navigation

Federal Aviation Administration
Air Traffic Airspace Branch, ASW-520
2601 Meacham Blvd.
Fort Worth, TX 76137-0520

Aeronautical Study No.
2009-AWP-2050-OE

Issued Date: 12/28/2009

Julie Way
SolarReserve, LLC
2425 Olympic Blvd.
Suite 500 East
Santa Monica, CA 90404

**** DETERMINATION OF NO HAZARD TO AIR NAVIGATION ****

The Federal Aviation Administration has conducted an aeronautical study under the provisions of 49 U.S.C., Section 44718 and if applicable Title 14 of the Code of Federal Regulations, part 77, concerning:

Structure:	Rice Solar Energy Tower
Location:	Rice, CA
Latitude:	34-03-49.27N NAD 83
Longitude:	114-48-27.40W
Heights:	653 feet above ground level (AGL) 1461 feet above mean sea level (AMSL)

This aeronautical study revealed that the structure would have no substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on the operation of air navigation facilities. Therefore, pursuant to the authority delegated to me, it is hereby determined that the structure would not be a hazard to air navigation provided the following condition(s) is(are) met:

As a condition to this Determination, the structure is marked and/or lighted in accordance with FAA Advisory circular 70/7460-1 K Change 2, Obstruction Marking and Lighting, 24-hr med-strobes - Chapters 4,6(MIWOL),&12.

It is required that FAA Form 7460-2, Notice of Actual Construction or Alteration, be completed and returned to this office any time the project is abandoned or:

__X__ At least 10 days prior to start of construction (7460-2, Part I)
__X__ Within 5 days after the construction reaches its greatest height (7460-2, Part II)

See attachment for additional condition(s) or information.

While the structure does not constitute a hazard to air navigation, it would be located within or near a military training area and/or route.

Any height exceeding 653 feet above ground level (1461 feet above mean sea level), will result in a substantial adverse effect and would warrant a Determination of Hazard to Air Navigation.

This determination expires on 06/28/2011 unless:

(a) extended, revised or terminated by the issuing office.

(b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for completion of construction, or the date the FCC denies the application.

NOTE: REQUEST FOR EXTENSION OF THE EFFECTIVE PERIOD OF THIS DETERMINATION MUST BE POSTMARKED OR DELIVERED TO THIS OFFICE AT LEAST 15 DAYS PRIOR TO THE EXPIRATION DATE.

This determination is subject to review if an interested party files a petition that is received by the FAA on or before January 27, 2010. In the event a petition for review is filed, it must contain a full statement of the basis upon which it is made and be submitted in triplicate to the Manager, Airspace and Rules Division - Room 423, Federal Aviation Administration, 800 Independence Ave., Washington, D.C. 20591.

This determination becomes final on February 06, 2010 unless a petition is timely filed. In which case, this determination will not become final pending disposition of the petition. Interested parties will be notified of the grant of any review. For any questions regarding your petition, please contact Office of Airspace and Rules via telephone -- 202-267-8783 - or facsimile 202-267-9328.

This determination is based, in part, on the foregoing description which includes specific coordinates, heights, frequency(ies) and power. Any changes in coordinates, heights, and frequencies or use of greater power will void this determination. Any future construction or alteration, including increase to heights, power, or the addition of other transmitters, requires separate notice to the FAA.

This determination does include temporary construction equipment such as cranes, derricks, etc., which may be used during actual construction of the structure. However, this equipment shall not exceed the overall heights as indicated above. Equipment which has a height greater than the studied structure requires separate notice to the FAA.

This determination concerns the effect of this structure on the safe and efficient use of navigable airspace by aircraft and does not relieve the sponsor of compliance responsibilities relating to any law, ordinance, or regulation of any Federal, State, or local government body.

This aeronautical study considered and analyzed the impact on existing and proposed arrival, departure, and en route procedures for aircraft operating under both visual flight rules and instrument flight rules; the impact on all existing and planned public-use airports, military airports and aeronautical facilities; and the cumulative impact resulting from the studied structure when combined with the impact of other existing or proposed structures. The study disclosed that the described structure would have no substantial adverse effect on air navigation.

An account of the study findings, aeronautical objections received by the FAA during the study (if any), and the basis for the FAA's decision in this matter can be found on the following page(s).

If we can be of further assistance, please contact Karen McDonald, at (310)725-6557. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2009-AWP-2050-OE.

Signature Control No: 631332-121100186 (DNH)
Sheri Edgett-Baron
Acting Manager, Obstruction Evaluation Service

Attachment(s)
Additional Information
Case Description
Map(s)

The proposal will construct a Molten Salt Solar Energy Tower near Rice, California, in a civilian corridor between the military Turtle MOA and the Quail MOA. There are no civilian public-use or military landing areas within 12 nautical miles (NM) of the site; however there are several military VR and IR routes in the vicinity.

The structure height exceeds the obstruction standards of Title 14 of the Code of Federal Regulations, Part 77 as follows:

Section 77.23(a)(1) by 153 feet - a height more than 500 feet above ground level (agl) at the site.

The proposal was circularized for public aeronautical comment. No objections or comments were received.

AERONAUTICAL STUDY FOR POSSIBLE EFFECT UPON THE OPERATION OF AN AIR NAVIGATION AID:

- None.

AERONAUTICAL STUDY FOR POSSIBLE INSTRUMENT FLIGHT RULES (IFR) EFFECT DISCLOSED THE FOLLOWING:

- The proposal would have no effect on any existing or proposed IFR arrival/departure routes, operations, or procedures.

- The proposal would have no effect on any existing or proposed IFR en route routes, operations, or procedures.

- The proposal would have no effect on any existing or proposed IFR minimum flight altitudes.

AERONAUTICAL STUDY FOR POSSIBLE VISUAL FLIGHT RULES (VFR) EFFECT DISCLOSED THE FOLLOWING:

- The proposal would have no effect on any existing or proposed VFR arrival or departure routes, operations or procedures.

- The proposal would not conflict with airspace required to conduct normal VFR traffic pattern operations at any known public use or military airports.

- The proposal would not penetrate those altitudes normally considered available to airmen for VFR en route flight; however a 24-hour medium intensity white strobe lighting system is recommended.

- The structure shall be appropriately obstruction lighted with a 24-hour medium intensity white strobe lighting installation; this recommendation is because of the abundance of military VR and IR routes in the area, and the expectation of civilian Visual Flight Rules (VFR) operations navigating in this corridor between the military Turtle MOA and the Quail MOA.

The cumulative impact of the proposed structure, when combined with other existing structures is not considered significant. Study did not disclose any adverse effect on existing or proposed public-use or military

airports or navigational facilities. Nor would the proposal affect the capacity of any known existing or planned civilian public-use or military airport.

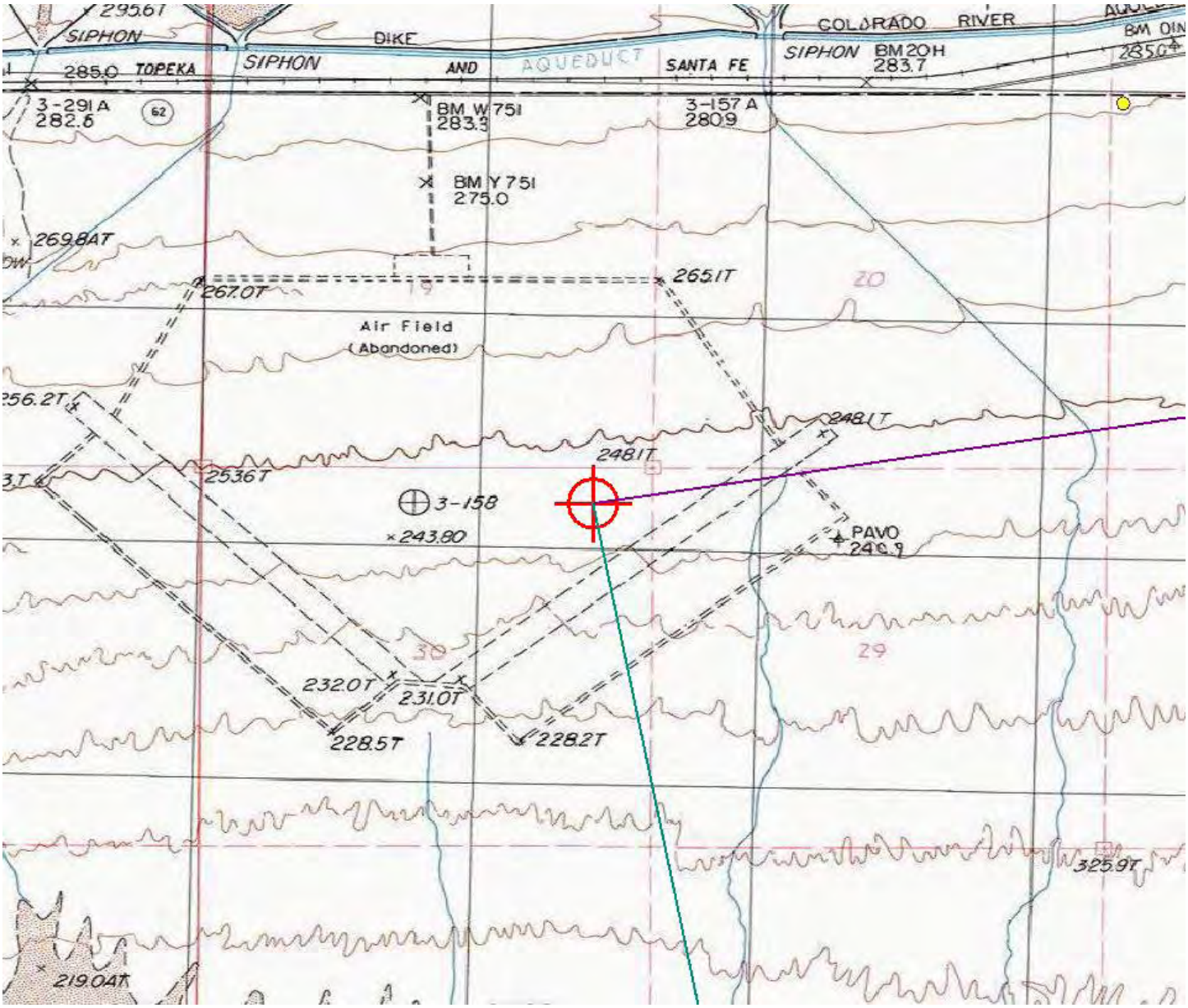
Therefore, it is determined that the proposed construction would not have a substantial adverse effect on the safe and efficient utilization of the navigable airspace by aircraft or on any air navigation facility and would not be a hazard to air navigation.

This determination, issued in accordance with Part 77, concerns the effect of the proposal on the safe and efficient use of the navigable airspace by aircraft and does not relieve the sponsor of any compliance responsibilities relating to laws, ordinances, or regulations of any Federal, state, or local governmental bodies.

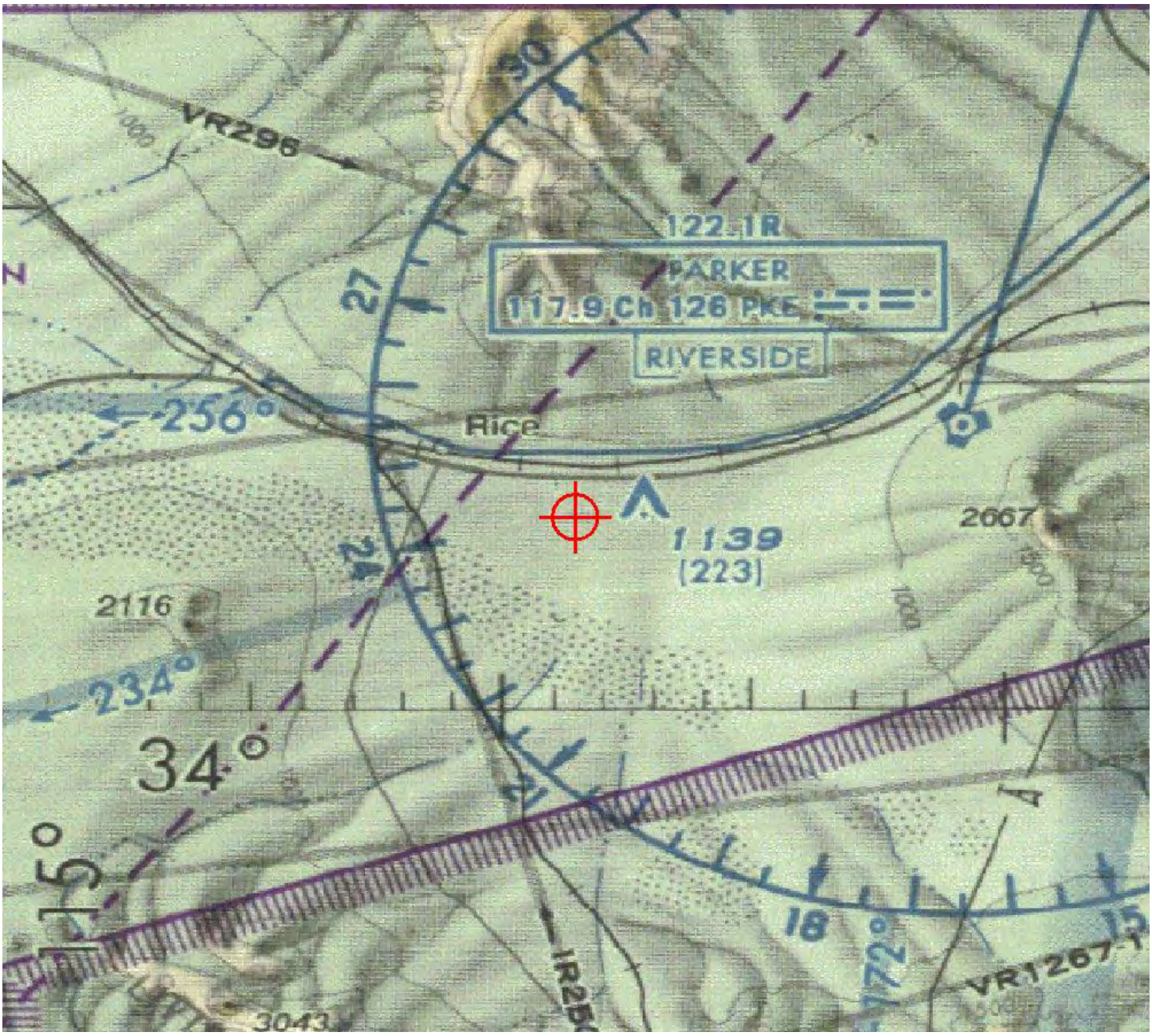
Determinations, which are issued in accordance with Part 77, do not supersede or override any state, county, or local laws, avigation easements, or ordinances, or local zoning maximum heights.

2C survey will be provided if needed.

Verified Map for ASN 2009-AWP-2050-OE



Sectional Map for ASN 2009-AWP-2050-OE



Transmission System Engineering (154–155)

System Impact Study Report

154. *Please provide the SIS report prepared by Western according to the current LGIP, which will assess the interconnection of the proposed RSEP new generation to Western's Parker-Blythe No. 1 161 kV line through a new 161/230 kV substation. The SIS Report should include the following:*

    a. *Power flow analysis for normal (N-0) system conditions with all facilities in service, and for Category B (N-1) and Category C (N-2 or more) contingencies;*

    b. *Mitigation plan for any identified reliability criteria violations in the Western grid or any adjacent systems;*

    c. *A list of contingencies studied and the study results of the analysis in a table format with pre- and post-project(s) data;*

    d. *A list of all major assumptions in the base case including major path flows, major generators including generation projects in the Western queue (as applicable) & hydroelectric generators and loads in the area systems;*

    e. *The reliability and planning criteria utilized to determine the reliability criteria violations;*

    f. *Power flow diagrams (units in MW, percentage loading and per unit voltage) with and without the RSEP and other queue project generators (as applicable) for the base cases;*

    g. *Power flow diagrams for all overloads or voltage criteria violations under normal system (N-0) or contingency (N-1 & N-2) conditions;*

    h. *Transient stability analysis for critical Category B (N-1) and Category C (N-2) contingencies of the Western (230 & 161 kV) transmission lines/transformers and for full load rejection of the proposed RSEP and outage of other generators including queue projects (as applicable) with monitoring of voltages, frequencies and generator rotor angles;*

    i. *Short circuit analysis for three line-to-ground faults; Analysis for single line-to-ground faults should be performed, if necessary data is available.*

    j. *Post-transient voltage analysis with governor power flow for selected single and double contingencies;*

    k. *Reactive power deficiency analysis with reactive MVAR output (if possible) for selected single and double contingencies;*

    l. *Electronic copies of *.sav, *.drw, *.dyd and *.swt GE PSLF files and EPCL contingency files in a CD, if available.*

Response: Western Area Power Administration is preparing the System Impact Study and indicates that it will be complete by May 30, 2010.

Facilities Study

155. Please provide the generator Facilities Study.

Response: Western Area Power Administration will prepare the generator Facilities Study subsequent to preparing the System Impact Study. We expect the Facilities Study to be started on or about July, 2010 and be complete by October, 2010.

Visual Resources (156-158)

Heliostats Plans and Elevations

156. Please provide scaled plans and elevations of individual proposed heliostat units.

Response: Figures DR156-1 and DR156-2 provide oblique and elevation views, respectively, of the proposed heliostat units.

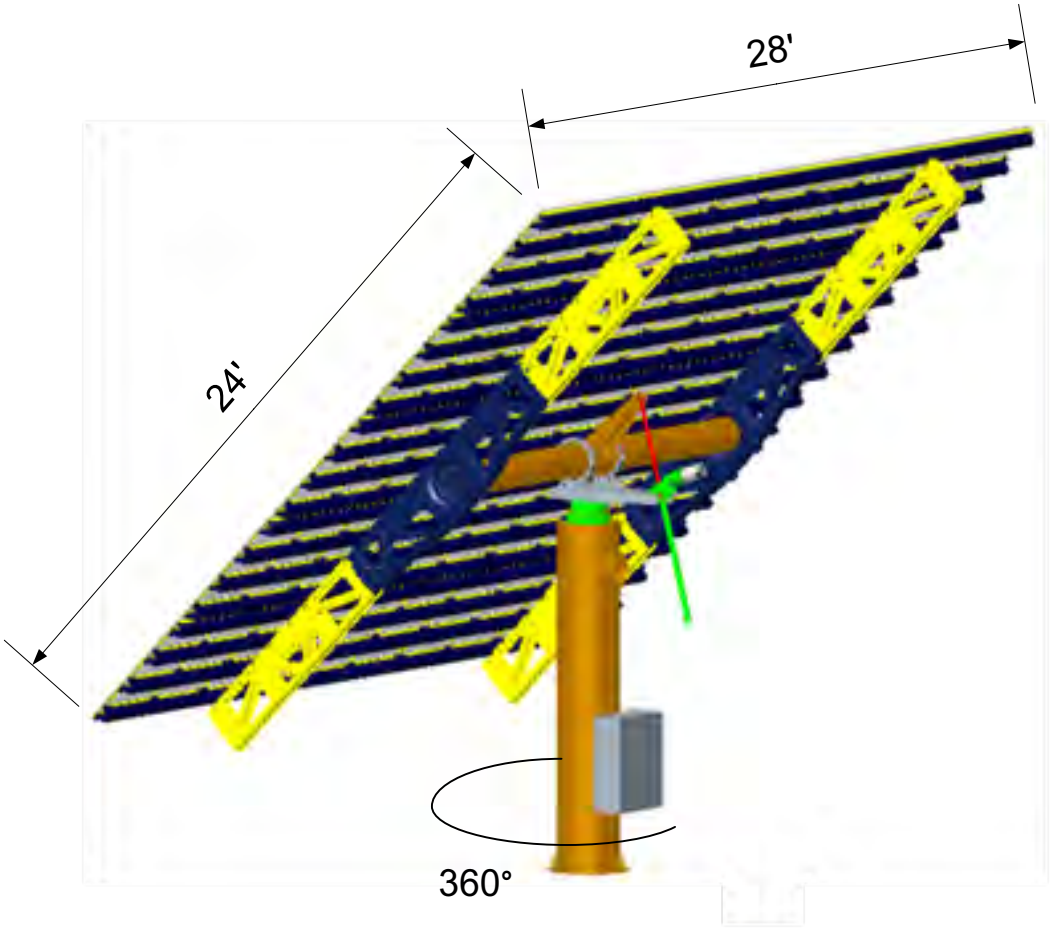


FIGURE DR156-1
Heliostat Oblique View, Deployed Position

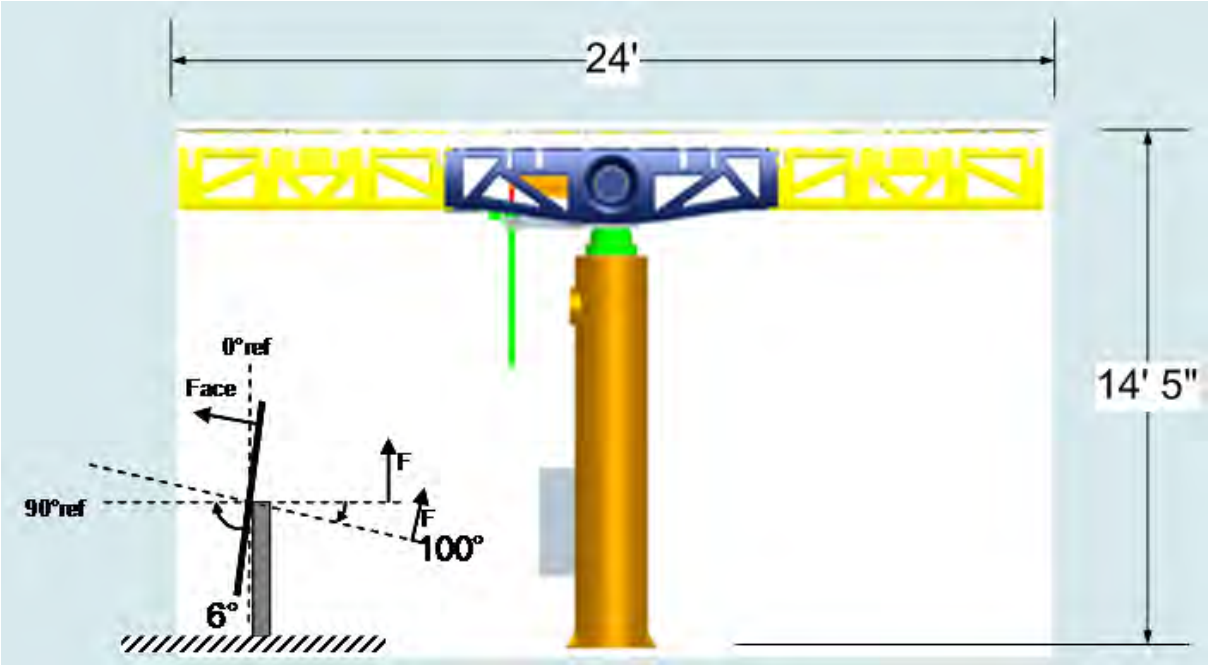


FIGURE DR156-2
Heliostat Elevation View, Stowed Position

Viewshed Map

157. *To allow staff to better understand the AFC simulations and the visual exposure conditions of the site, please prepare a second GIS viewshed map of the heliostat field as follows:*

    a. *Please prepare a composite viewshed map to at least 5 miles from the edge of the heliostat field, from a representative sample of projection points in the heliostat field, using USGS 10 meter DEM data. These should include, at a minimum, four cardinal points at the outer boundary of the field, and additional points near the center of the field. The object of the mapping is to provide some understanding of whether the heliostats could be visible off-site and, if so, which portions of the field, and from which locations. The projections should be made from the greatest anticipated height of the heliostats, as seen by viewers at typical motorist eye-level.*

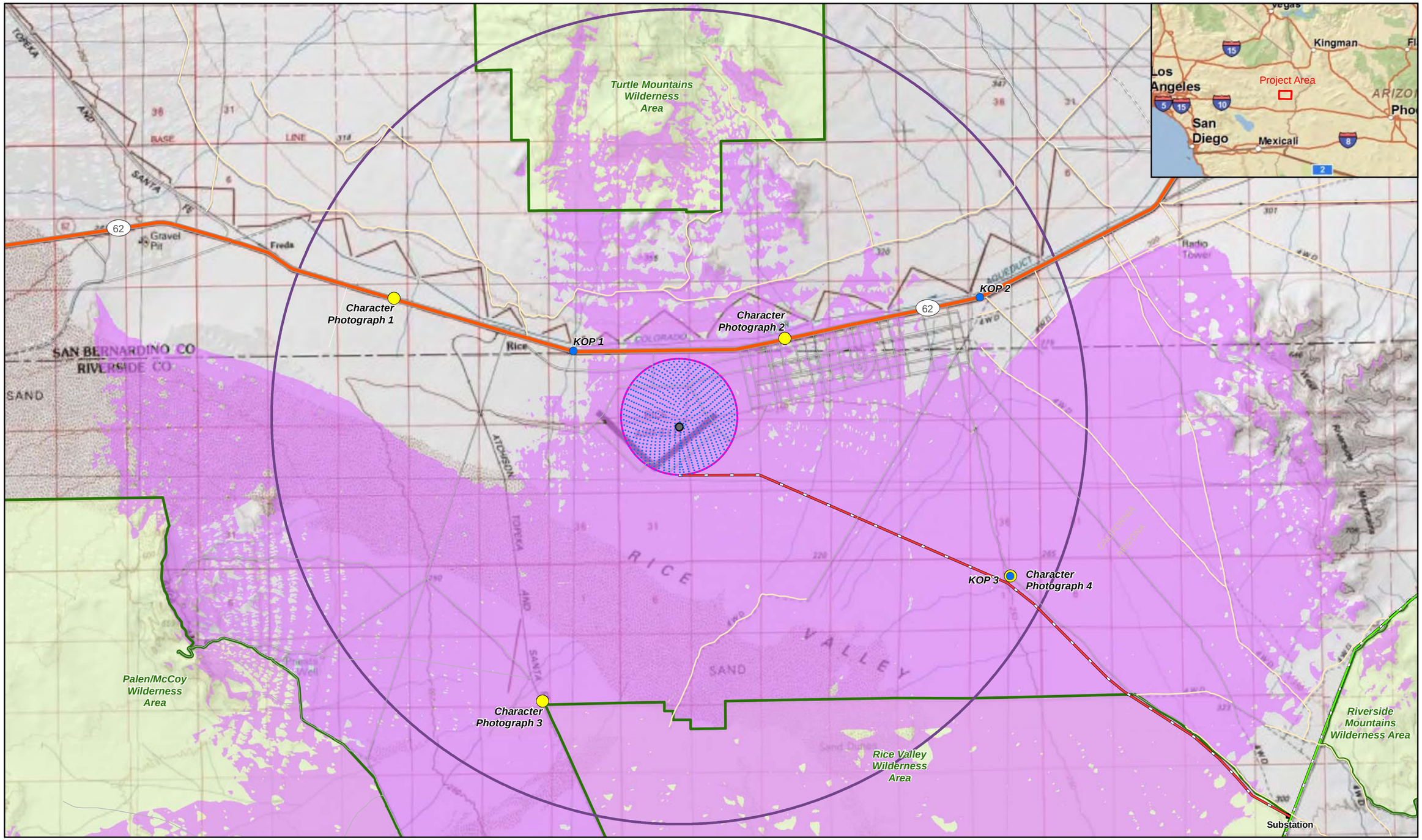
    b. *If the viewshed mapping indicates visibility of the mirror field from any portion of Highway 62, please prepare a simulation showing the mirror field from that highway segment using a 'normal' lens (roughly 40 degree horizontal angle of view).*

Response: Figure DR157-1 is a viewshed map that indicates areas from which the heliostat field can be seen. Figure DR157-2 is a photographic simulation of the RSEP as seen from the location of AFC character photograph #2 along State Route 62. The location and direction of the view in Figure DR157-2 (KOP-4) are indicated on Figure DR157-1. Character photograph #2 was taken with a normal photographic lens, as documented in the AFC.

High-Resolution Image Files

158. *Please provide high-resolution image files of individual photos in the AFC visual discussion, including simulations and character photos, in jpg or tif format. Please do not provide 'paired' before and after page layouts, but rather the individual photo image files at a resolution suitable for printing in ledger-size format.*

Response: Attachment DR158-1 provides high-resolution image files of the photos in the AFC, including both simulations and character photos; this attachment is being provided to CEC Staff in electronic format under separate cover.



LEGEND

- Heliostat Points
- Key Observation Point
- Character Photograph
- Power Block/Receiver
- Heliostat Field
- Substation
- 5 Miles From Heliostat Field
- RSEP Generation Transmission Line
- Parker-Blythe Transmission Line

Viewshed Analysis

- Heliostat Field Not Visible
- Heliostat Field Visible

Notes:
Analysis based on 798 points distributed across the heliostat array at a height of 28 feet, representing the the maximum height of the heliostat panels. Analysis takes topography into account, but does not account for the screening effects of the desert vegetation.

0 1 2 Miles

FIGURE DR157-1
VIEWSHED MAP

RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

CH2MHILL

\\MNBAOLXP322331\PROJECTS\RICE_SOLAR_ENERGY_PROJECT\MAPFILES\2010\RICE_VIEWSHED_FEB2010.MXD CARCHER 2/27/2010 18:08:24

a. Character Photo 2.

b. Simulation from Character Photo 2.

FIGURE DR157-2
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

CH2MHILL

EY082009001SCO385461.AP.DR.VR Rice_Solar.CHARAC.ai 3/10

Waste Management (159–168)

Construction and Demolition Waste Diversion Program

159. Please indicate whether the county of Riverside operates a Construction and Demolition Waste Diversion Program.

Response: Riverside County operates a Construction and Demolition (C&D) Waste Diversion Program. The jurisdictions in Riverside County that currently have an approved C&D ordinance are the Cites of Coachella, Indian Wells, and Rancho Mirage. Each jurisdiction contains a short description of the city's ordinance. Currently, the RSEP is not in a jurisdiction with an approved C&D ordinance, and thus the project is not accountable to a C&D waste diversion program.

Compliance with Riverside County Program

160. Please provide information on how the Rice Solar Energy Project (RSEP) will meet each of the requirements of the program cited in any Construction and Demolition Waste Diversion Program the county of Riverside may have.

Response: Currently, the RSEP is not in a jurisdiction with an approved C&D ordinance, and thus the project is not accountable to a C&D waste diversion program.

Top-Screen Process

161. Please explain what a Top-Screen consists of, the screening process, and estimated time period for review and approval of the screening document.

Response: In short, the Top-Screen is an electronic form required by the Department of Homeland Security (DHS). The intent is to gather information regarding the facility and whether it houses chemicals that could be used to cause harm to the general public, and how vulnerable those chemicals are to a variety of threats. Attachment DR161-1 provides additional information and clarification to the DHS security process and Chemical Security Assessment website, as well as links to further information and cautioning statements for management of Chemical-Terrorism Vulnerability Information (CVI).

There is no published time period for the DHS to review the facility's Top-Screen application and respond back.

Top-Screen Application Evaluation

162. Please discuss how the Top-Screen application will be evaluated and what agencies are responsible for review.

Response: The DHS's Chemical Facility Anti-Terrorism Standards (CFATS) regulatory program has responsibility for evaluating the Top-Screen application and other aspects of the CFATS program. The exact criteria for evaluation of the Top-Screen application are not published. The DHS states the following regarding the CFATS program:

The Department will base its determinations, in part, upon the information provided in the Top-Screen/Chemical Security Assessment Tool. The information provided in the Top-Screen/Chemical Security Assessment Tool will not, therefore, be the sole or definitive basis upon which the Department will categorize facilities as presenting a high level of security risk. The Department will use its best judgment and all available information in determining whether a facility presents a high level of security risk.

Additional information is provided in Attachment DR161-1.

Appropriate Documents for Filing

163. Please identify what documents (Vulnerability Assessments, Site Security Plans or Alternate Security Program) the applicant expects to file in accordance with and discuss why they are necessary.

Response: RSE anticipates using the DHS's Chemical Security Assessment Tool (CSAT), of which the Top-Screen application is a portion. Developing a Site Security Plan (SSP) or Alternate Security Plan (ASP) are dependent upon DHS's response to RSE's Top-Screen application. It is anticipated that if either evaluation is required, the least burdensome method would be employed. Additional information is provided in Attachment DR161-1.

Security Measures

164. Please describe if any additional security measures would be required around the thermal storage tank and the salt storage area as a result of these filings and program requirements.

Response: Additional security measures will be dependent upon DHS's response to RSEP's Top-Screen application and the results of any vulnerability assessment. Hardened fencing, electronic access control, detection, surveillance, and notification components could potentially be required, as well as coordination with local responders. Additional information is provided in Attachment DR161-1.

Rice Valley Sand Dunes

165. Please discuss the status of the cleanup for Rice Valley Sand Dunes, when it will be completed, and how it will affect the RSEP construction schedule.

Response: The Rice Valley Sand Dunes project had a Site Investigation performed by Parsons in September 2008 which is provided as Attachment DR165-1. This report describes munitions debris that was found during the site inspection performed in 2008 at the Rice Valley Dunes Range, which is located southwest of the RSEP and includes the southernmost 5 miles of the generator tie-line route. Therefore, there is potential presence for Munitions and Explosives of Concern (MEC) along the generator tie-line route. Based on the evidence of munitions debris and past use of the site, a Remedial Investigation/Feasibility Study (RI/FS) was recommended by Parsons. As identified in the Records of Conversation provided as Attachment DR165-2, as of December 2009, the Site Inspection Report is the most current reference for the ongoing UXO investigation work. At this time it is unknown when the cleanup will occur at the Rice Valley Sand Dunes project, and whether the cleanup activities can coincide with the RSEP construction schedule.

Documentation for Rice Valley Sand Dunes

166. Please provide copies of documentation on the process and/or procedures associated with the cleanup of the Rice Valley Sand Dunes site.

Response: Please see the response to Data Request #165, and Attachment DR165-1.

Map for Rice Valley Sand Dunes

167. Please provide a map and aerial photograph of the site showing the following features at a minimum. The map should be at a minimum scale of one inch equal to 500 to 1000 feet.

a. Rice Valley Sand Dunes;

b. Rice Valley Training Area;

c. Limits of the linears and the project site;

d. A soil mound that may have been used as a place where aircraft could taxi to test their nose and wing guns without taking off (AFC page 5.14-2);

e. A 20-acre workforce camp site (AFC page 2-14); and

f. Five miles of generator tie-in line in the Rice Valley Sand Dunes (Section 5.14.1.1).

Response: Figure DR167-1 identifies the requested features. A larger map at a scale of 1:500 or 1:1000 will be provided upon request.

Waste Management

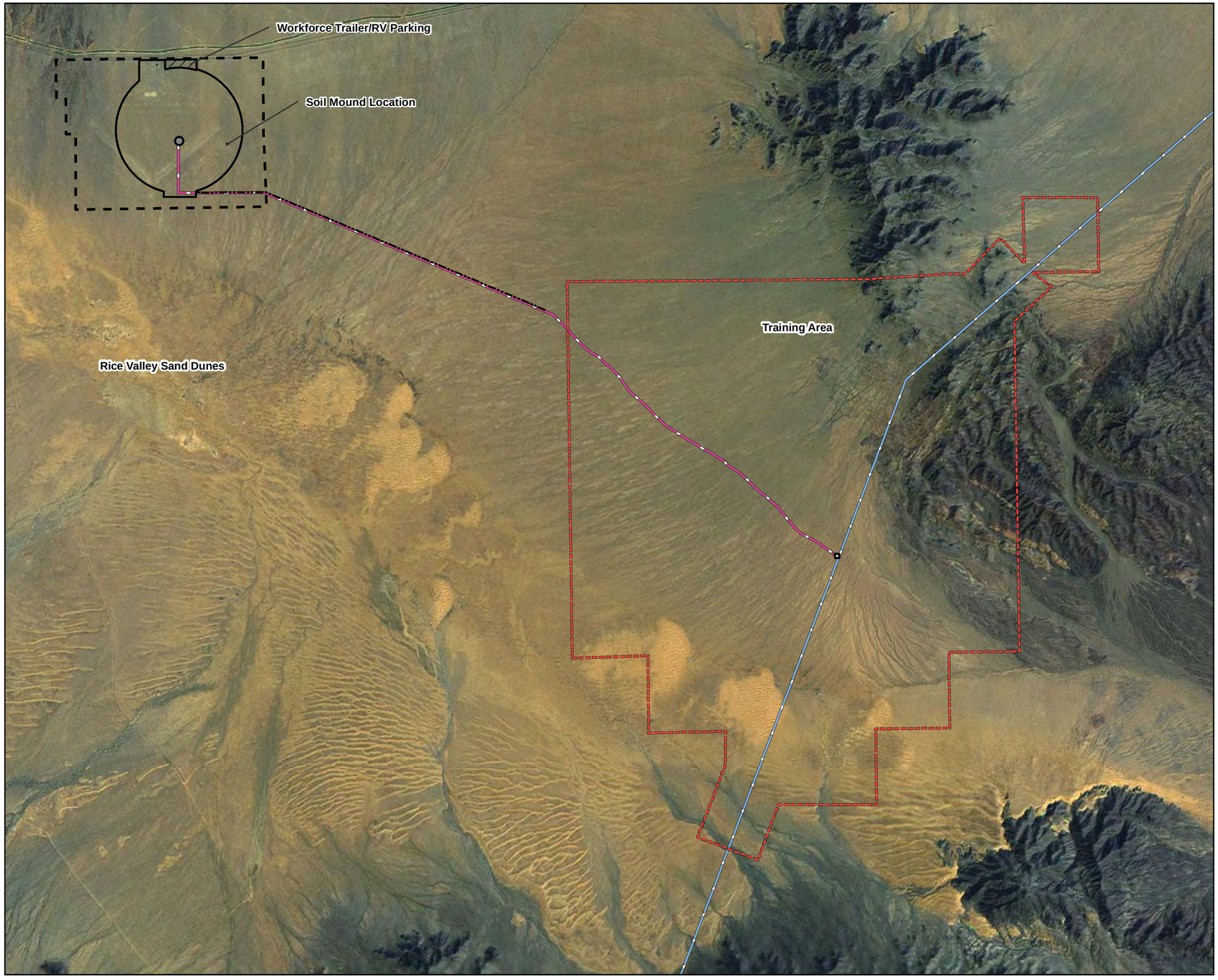
168. Please identify and discuss the arrangements the applicant would make, or has made, with Riverside County for solid and liquid waste management at the workforce camp.

Response: Recreational vehicles (RVs) using the workforce camp will have black water and grey water holding tanks. Black water holding tanks contain waste from the RV toilets, and the grey water holding tanks contain the wastewater from the sinks and showers. Dump stations are public locations where RV owners can safely dispose of raw sewage in their holding tanks into the sanitary system. There are six registered dump stations in Blythe, approximately 65 miles south east from the project site. Rather than require the workforce camp residence to unload in Blythe, RSE will implement one of the following two wastewater disposal options.

The first wastewater disposal option would be for RSE to apply to permit a temporary sewerage system facility (holding tank) on site for the construction period. Under Riverside County Ordinance No 650.5, "regulating the discharge of sewage in the unincorporated areas of the County of Riverside", the RCDEH may approve of a holding tank for a period not to exceed 2 years from the date of approval. Under this option, the workforce camp would unload the RV tanks into the holding tank. The holding tank's size would be based on the larger of a design flow of 5 days, or 1,000 gallons. RSE will engage a septic pumping company to remove sewage from the holding tank and dispose of it at an appropriate facility or into the permanent septic systems to be established for the control room in the power block and administration building.

The second wastewater disposal option would be for RSE to apply to construct a temporary septic system in the vicinity of workforce construction tank, which will include a dump station, where RVs could connect and unload their wastes. The wastewater from the dump station would flow by gravity into a septic tank and then into disposal leach fields. The leach field would either be removed or abandoned in place after construction of the project.

RSE will provide skips in the workforce camp for construction workers to use for solid waste disposal. RSE would engage a waste management company to remove solid wastes from the skip and dispose of them at an appropriate facility.



LEGEND

- TRANSMISSION LINE ACCESS ROAD
- RSEP PROPOSED TRANSMISSION LINE
- PARKER-BLYTHE TRANSMISSION LINE
- FUDS BOUNDARY (TRAINING AREA)
- OWNERSHIP PROPERTY
- PROJECT FENCELINE BOUNDARY
- PROPOSED SUBSTATION
- POWER BLOCK/RECEIVER
- WORKFORCE TRAILER/RV PARKING

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 3,500 7,000
Feet

FIGURE DR 167-1
PROJECT VICINITY AND LAYOUTS
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

CH2MHILL

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Attachment DR161-1
Excerpts from DHS Website and Chemical Security Assessment Websites

Excerpts from the Department of Homeland Security Website
(http://www.dhs.gov/files/programs/gc_1169501486179.shtm)

The Department of Homeland Security has issued Chemical Facility Anti-Terrorism Standards for any facility that manufactures, uses, stores, or distributes certain chemicals at or above a specified quantity. As stated in the Background statement above, the quantity of the nitrate salts at the project site will exceed threshold quantities as determined by Appendix A. Reference information for Appendix A is as follows:

DEPARTMENT OF HOMELAND SECURITY

6 CFR Part 27 [DHS–2006–0073] RIN 1601–AA41

Appendix to Chemical Facility Anti-Terrorism Standards

AGENCY: Department of Homeland Security

ACTION: Final Rule

Chemical Security Assessment Tool

(http://www.dhs.gov/files/programs/gc_1169501486197.shtm)

The Chemical Security Assessment Tool (CSAT) was developed to help the Department identify facilities that meet the criteria for high-risk chemical facilities. CSAT also provides the methodologies these facilities need to conduct a Top-Screen and a Security Vulnerability Assessment (SVA), and develop a Site Security Plan (SSP). CSAT is a secure web-based system. The CSAT tool can only be accessed by Chemical-Terrorism Vulnerability Information (CVI)-certified individuals (Authorized Users).

Sharing Chemical-Terrorism Vulnerability Information (CVI)

(http://www.dhs.gov/files/programs/gc_1185557490504.shtm)

Access to and/or disclosure of CVI is based on the following general principles:

Except in exigent or emergency circumstances, CVI may only be disclosed to CVI Authorized Users with a need to know.

A need to know should be assessed on a case-by-case basis (typically including an individualized assessment of the documents involved).

A covered person in possession of CVI should take reasonable steps to confirm that any individual seeking access to CVI is a CVI Authorized User and has a need to know.

DHS provides each CVI Authorized User with a unique identification number. Before sharing CVI, ask for this number. The CSAT Help Desk (866-323-2957) can be contacted to confirm a person's CVI Authorized User status.

CSAT Top-Screen

After receiving access to CSAT, facilities are provided access to the Top-Screen application, which enables the DHS to determine if the facility is initially considered a high-risk chemical facility covered by the Chemical Security Anti-Terrorism Standards (CFATS).

Any facility that manufactures, uses, stores or distributes certain chemicals above a specified quantity listed on Appendix A has 60 days to complete and submit a CSAT Top-Screen. The Department may also notify facilities, either directly or through a Federal Register notice, that they need to complete and submit a CSAT Top-Screen.

CSAT User Registration

User Guide

July 2008

Version 2.0.b

There are three user roles for which access is granted: "Preparer", "Submitter", and "Authorizer":

The Preparer is authorized to enter data into the CSAT on-line screening tool but is not authorized to formally submit the data on the company's behalf. This person is a qualified individual familiar with the facility in question.

The Submitter is certified by the company or corporation to formally submit the regulatory data to DHS. The Submitter must be an officer of the corporation (or equivalent) or be designated by an officer of the corporation, and domiciled in the United States.

To gain access, each Preparer and the Submitter require the signature of an Authorizer. On behalf of the company that owns the facility, the Authorizer verifies that the user account request for the Preparer and Submitter is valid.

CSAT Top-Screen Questions

November 2008

Version 2.7.a

General

The DHS will use the information provided in the Top-Screen/Chemical Security Assessment Tool to determine whether particular facilities present a high level of security risk. Provision of accurate information in the Top-Screen is critical to enabling the DHS to make well informed decisions designed to reduce the Nation's risk. The DHS will base its determinations, in part, upon the information provided in the Top-Screen/Chemical Security Assessment Tool. The information provided in the Top-Screen/Chemical Security Assessment Tool will not, therefore, be the sole or definitive basis upon which the DHS will categorize facilities as presenting a high level of security risk. The DHS will use its best judgment and all available information in determining whether a facility presents a high level of security risk.

Paperwork Burden Notice:

The public reporting burden for the Top-Screen form is estimated to be 30.3 hours. The burden estimate includes time for reviewing instructions, researching existing data sources, gathering and maintaining the needed data, and completing and submitting the form.

Chemical Security Assessment Tool Frequently Asked Questions (FAQs)

(http://csat-help.dhs.gov/pls/apex/f?p=100:1:1285797510222111)

FAQ 56. Who will be doing the security screens and reviewing the security site plans?

Security screening and plan approval will be done by the Chemical Security Compliance Division, Office of Infrastructure Protection.

FAQ 387. What if my facility will be adding a chemical of interest in the future?

If the facility plans to add chemicals on the list of chemicals of interest at or above the STQ in the future, this may constitute a material modification to an operation or a site and may trigger a need to notify the Department within 60 days of such a modification. In such instances, facilities must complete and submit a revised Top-Screen to the Department within 60 days of the notification in accordance with §27.210 (d). See the preamble to 6 CFR Part 27 for a more complete discussion of how to handle chemicals added to a site in the future.

FAQ 641. When does a facility need to submit a CSAT Top Screen?

A facility must complete and submit a Top-Screen in accordance with 6 CFR 27.200(b)(1) when:

1. The Assistant Secretary contacts a chemical company individually.

DHS contacted a very limited number of facilities that potentially represented highest risk facilities. These facilities were individually notified on or about the effective date of the rule, June 8th 2007.

2. DHS publishes a notice in the Federal Register.

DHS published the "chemical of interest list" (Appendix A to 6 CFR Part 27) on April 9th for a 30 day period. The comment period closed May 9th. DHS published the final Appendix A on November 20, 2007.

A CSAT Top Screen is due from facilities that possess or plan to possess a chemical on the DHS chemical of interest list at or above its STQ. Facilities that come into possession of any chemical of interest on the DHS chemical of interest list at or above the STQ have 60 calendar days from the date upon which they possess that amount of the chemical to complete a new Top Screen.

Additionally, all covered facilities must update their Top Screens periodically according to the schedule specified in 6 CFR 27.210. The submission schedule varies by tier. A new Top Screen is also due within 60 days of a facility making material modifications to its product portfolio, personnel, operations or site. DHS also requires covered facilities to conduct an annual audit of its compliance with its Site Security Plan (SSP).

FAQ 1177. When will DHS determine tier levels?

For more information on this topic, please reference page 6 of the Appendix to Chemical Facility Anti-Terrorism Standards; Final Rule

(http://www.dhs.gov/xlibrary/assets/chemsec_appendixafinalrule.pdf (PDF, 41 pages – 4.25 MB))

Referenced Text states:

Only after the Department gathers additional information through the Top-Screen process will the Department make a determination as to whether a facility presents a high level of security risk and therefore must comply with the substantive requirements in part 27. Accordingly, the presence or amount of a particular chemical is not the sole factor in determining whether a facility presents a high level of security risk; it is not the only indicator of a facility's coverage under part 27.

FAQ 1181. How do facilities know they must comply with CFATS?

For more information on this topic, please reference the Appendix to Chemical Facility Anti-Terrorism Standards; Final Rule
(http://www.dhs.gov/xlibrary/assets/chemsec_appendixafinalrule.pdf (PDF, 41 pages – 4.25 MB))

Referenced Text states:

Pursuant to § 27.210(a), the Department uses two methods to require facilities to undergo preliminary screening (i.e., complete and submit a Top-Screen). The first method, found in § 27.210(a)(1)(i), is linked to Appendix A. From the effective date of a final Appendix A (i.e., this final rule), facilities that possess any of the chemicals listed in Appendix A at or above the STQ for any applicable security issue will have 60 calendar days to complete and submit a Top-Screen to DHS. The second method, found in § 27.210(a)(1)(ii), allows the Department to contact facilities independently of Appendix A.

FAQ 1265. Is it possible to review a copy of the SVA or SSP template prior to CSAT registration?

For security reasons, only Authorized Users that have been assigned usernames and passwords through the CSAT User Registration process can have access to the Top Screen tool. After submitting the necessary information through Top Screen, DHS will notify those facilities that will need to complete a SVA. The SVA and SSP templates are not yet finalized but will also be restricted to access by registered CSAT users whose Top Screen results obliges their use of the tools.

FAQ 1439. Do I count chemicals I have stored in transportation containers toward the STQ amount?

In calculating STQ for a release-chemicals of interest (COIs), a facility must include release-COIs in transportation containers used for storage not incident to transportation, including transportation containers connected to equipment at a facility for loading or unloading and transportation containers detached from motive power that delivered the container to the facility. Examples of transportation containers with COI that facilities should count toward their STQ include:

a tank car containing COI that is attached to processing units;

a tank car containing COI that is detached from the locomotive that had delivered the tank car to the facility.

Referenced Text states:

Additional information on the treatment of transportation containers under CFATS can be found in the preamble to Appendix A of CFATS at 72 FR 65398.

FAQ 1468. What period of time do I need to consider when providing information on Chemicals of Interest (COI) for purposes of the Top-Screen?

Facility that possesses a COI in an amount at or above the applicable Screening Threshold Quantity (STQ) have 60 days to complete and submit a Top-Screen to DHS, using the CSAT Top-Screen tool.

FAQ 1485. What do I need to have available in order to complete Top Screen?

Prior to completing Top-Screen, DHS recommends that a facility read and review the following materials, all of which are available on the DHS website, located at www.dhs.gov/chemicalsecurity:

A copy of 6 CFR Part 27, CFATS Interim Final Rule

A copy of the 2007 DHS Chemicals of Interest with Screening Threshold Quantities (Appendix A to 6 CFR Part 27)

A copy of the downloadable PDF file with Top-Screen questions that may be used as a worksheet

A copy of the Chemical Vulnerability Information manual

In addition, before completing the Top-Screen, DHS recommends that a facility gather the following information:

North American Industrial Classification (NAICS) codes;

Data Universal Numbering System (DUNS) numbers, available at http://www.dnb.com;

Latitude and longitude from the center of the facility;

Parent Company name(s) and DUNS number(s);

Joint Venture name(s) and DUNS number(s);

Host/tenant facility name(s);

Environmental Protection Agency (EPA) Risk Management Plan (RMP) identifier numbers for the facility and host/tenant facilities (if applicable);

Number of employees and full-time resident contractors;

Chemical inventory information, including the names and quantities of all DHS COI that are manufactured, processed, used, stored, or distributed at the facility, and the location of the Area of Highest Quantity (a 170-foot radius around the area where the greatest amount of chemical with release concern is located);

The most recent EPA RMP submittal, including the EPA identifier number, covering processes, inventories of chemicals and offsite consequence and analyses. This information will be helpful in answering some of the questions related to toxic and flammable release;

A copy of RMP*Comp to calculate information required for chemicals with a toxic-release concern. This resource will be needed for information related to toxic-release chemicals regardless of whether the facility itself is subject to the EPA RMP regulation;

Records used to prepare the annual Tier 2 report under the Emergency Planning and Community Right-to-Know Act (EPCRA). These records will include inventory and storage locations for various chemicals at a facility;

Records used to comply with the Chemical Weapons Convention (CWC); and

Financial sales and marketing information that will be helpful in reporting production values, market share, capacity utilization rates, and product applications for economically critical and mission critical chemicals, if applicable. Census forms such as the Annual Survey of Manufacturers and the Survey of Plant Capacity Utilization also will be helpful if the company or facility has been asked to complete them previously.

FAQ 1555. I'm not sure how this whole CSAT thing works. Can you explain it in a few sentences?

A facility with Appendix A COI at or above the applicable STQ is required to use the CSAT system in order to complete and submit a Top-Screen. A facility covered by CFATS is also required to use the CSAT system, for example, to do the following:

Access the User Registration System

Identify, assign, and authorize the Authorizer, Submitter, and Preparer.

Send in the signed PDF form that is produced by the User Registration System to DHS.

Receive usernames and passwords from DHS.

Access the CSAT website to transfer accounts, if needed.

Access the CSAT website to add Reviewers, if needed.

Access the CSAT website to conduct the Top-Screen questionnaire, if needed.

Access the CSAT website to complete a Site Vulnerability Assessment, if required.

FAQ 1629. Can a facility still upload an Alternate Security Plan (ASP) if it answers "No" to any or all of the questions in Section 3.9.1 of the Site Security Plan (SSP) tool regarding the content of the ASP?

CFATS provides all high-risk facilities with the option of submitting an Alternate Security Plan (ASP) in place of the Site Security Plan (SSP). Before uploading an ASP, the user will be asked questions related to the factors (see 6 CFR §§ 27.225, 27.235) for submitting an ASP in lieu of an SSP or otherwise potentially related to the Department's evaluation of the ASP. If the user answers “No” to any of these questions, the user will be given the options of returning to the CSAT SSP or continuing with the ASP questions and the ASP uploading procedure.

FAQ 1640. When will I be notified if I have to complete a Security Vulnerability Assessment (SVA)?

Upon completion of a facility's Top-Screen review, facilities that are considered "high-risk" will be mailed a Preliminary Tier Determination letter that will notify the facility of its preliminary tier and deadline for completing a Security Vulnerability Assessment (SVA) that addresses the COI and security issue(s) identified by the Department. Facilities placed preliminary in Tier 4 will have the option of submitting an Alternative Security Program (ASP) to DHS in lieu of completing the CSAT SVA. Based on DHS's Top-Screen assessment, some facilities may be determined not to be high risk (tier out) and therefore not subject to the current CFATS requirements.

FAQ 1650. What happens after a facility submits its Site Security Plan (SSP)?

Once the SSP is received by DHS, a preliminary determination will be made as to whether it satisfies the requirements of 6 CFR 27.225 "Site Security Plans."

If DHS finds that the requirements appear to be satisfied, DHS will issue a Letter of Authorization to the covered facility. Following the issuance of this letter, the facility must implement the SSP and DHS will inspect the facility for compliance with its submitted SSP. After the inspection and review of the information gathered, if DHS approves the SSP, the facility will receive a Letter of Approval for the SSP.

If DHS finds that the requirements of 6 CFR 27.225 do not appear to have been met, the facility will receive a guidance letter that includes a clear explanation of deficiencies in the SSP. The facility will then enter into further consultation with DHS and receive a specified timeframe within which to revise the SSP and security measures to satisfy the requirements of 6 CFR 27.225 and then resubmit the SSP to DHS. In some circumstances, DHS may disapprove the SSP and will issue a letter detailing why and what to do next.

FAQ 1658. What is required of an Alternate Security Program (ASP) to be acceptable in lieu of a Site Security Plan (SSP)?

CFATS provides that any facility receiving a final determination that it is high-risk may submit an Alternate Security Program (ASP) in lieu of the CSAT Site Security Plan (SSP). In addition, a facility that receives a preliminary Tier 4 high-risk designation may submit an ASP in lieu of a Security Vulnerability Assessment (SVA). An ASP must meet all requirements of the CSAT SSP and provide an equivalent level of security to that established by the CSAT SSP.

An ASP may be uploaded through the CSAT SSP. The facility must complete the Facility Operations section of the CSAT SSP and answer a series of questions relating to the factors for submitting an ASP and to the Department's determination of whether to approve an ASP. It may be useful to review the SSP Instructions and Questions available at http://www.dhs.gov/chemicalsecurity.

Referenced Text states:

For more information on ASPs, please refer to 6 CFR § 27.235, as well as the discussion in the preamble to the rule, 72 Fed Reg 17692-3 (April 9, 2007).

Attachment DR165-1
Rice Valley Sand Dunes Site Investigation

FINAL

Site Inspection Report
Former Rice Valley Sand Dunes
Riverside County, California

U.S. Army Corps of Engineers
Southwest IMA Region

FUDS Project No. J09CA005001
Contract No. W912DY-04-D-0005
Task Order 0009

Prepared for

U.S. Army Corps of Engineers, Los Angeles District
915 Wilshire Blvd., Suite 15018
Los Angeles, California 90017-3401
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U.S. Army Corps of Engineers
South Pacific Division Range Support Center

Prepared by

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September 2008

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

PARSONS
1700 Broadway, Suite 900 • Denver, Colorado 80290 • (303) 831-8100 • Fax: (303) 831-8208 • www.parsons.com

September 23, 2008

U.S. Army Corps of Engineers, Los Angeles District
ATTN: CESPL-PM-M (Mr. Lloyd Godard)
915 Wilshire Blvd., Suite 15018
Los Angeles, CA 90017-3401
(213) 452-4014

Subject: Contract W912DY-04-D-0005, Delivery Order 0009
MMRP SI for SW IMA Region – Final Site Inspection Report
Former Rice Valley Sand Dunes, California

Dear Mr. Godard:

Parsons has prepared this Final Site Inspection Report for the former Rice Valley Sand Dunes site. Five copies have been provided for your internal files and distribution to the key TPP stakeholders. We have simultaneously forwarded copies to Jeff Waugh and the EM CX. Electronic copies have also been provided.

If you have any questions or comments, please contact me at (303) 764-1927 or the Program Manager (Mr. Don Silkebakken) at (678) 969-2384.

Sincerely,

PARSONS

Greg P. Van
SI Task Manager

cc: HQUSACE Jeff Waugh – 1 CD
SPD Lara Beasley – 1 CD
EM CX Bradford McCowan / Deborah Walker – 1 copy / 1 CD
EM CX Heidi Novotny – 1 CD
Laura Kelley (Parsons DPM – Project File 744653.84105)

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Parsons has completed the Final Site Inspection Report for the former Rice Valley Sand Dunes, California. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Quality Control Plan. The independent technical review verified compliance with established policy principles and procedures, using justified and valid assumptions. This included review of assumptions; methods, procedures, and material used in analyses; alternatives evaluated; appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing Corps policy.

Study/Design Team Leader	September 23, 2008 Date
Study/Design Team Members	September 23, 2008 Date
Study/Design Team Members	September 23, 2008 Date
Review Team	September 23, 2008 Date
Independent Technical Review Team Leader	September 23, 2008 Date

Significant concerns and the explanation of the resolution are as follows:

None

As noted above, all concerns resulting from independent technical review of the project have been considered.

Parsons Program Manager(s)	September 23, 2008 Date

U.S. Army Corps of Engineers
Southwest IMA Region

FINAL
Site Inspection Report
Former Rice Valley Sand Dunes
Riverside County, California

FUDS Project No. J09CA005001

September 2008

In Support of

FUDS MMRP Site Inspections Project

Prepared by

PARSONS
5390 Triangle Parkway, Suite 100
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Prepared for

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and

U.S. Army Corps of Engineers
South Pacific Division Range Support Center

Contract No. W912DY-04-D-0005
Task Order 0009
Project No. 744653

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

FINAL

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ACRONYMS AND ABBREVIATIONS

°F	degree Fahrenheit
ASR	archives search report
bgs	below ground surface
BLM	Bureau of Land Management
CAMA	California-Arizona Maneuver Area
CDF&G	California Department of Fish and Game
CDPH	California Department of Public Health
CDWR	California Department of Water Resources
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CHE	Chemical Warfare Materiel Hazard Evaluation
CRREL	Cold Regions Research and Engineering Laboratory
CNDDB	California Natural Diversity Data Base
CSEM	conceptual site exposure model
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DQO	data quality objective
DTSC	California Department of Toxic Substances Control
EcoSSL	ecological soil screening level
EHE	Explosive Hazard Evaluation
ER	Engineer Regulation
FUDS	Formerly Used Defense Site
GIS	Geographic Information System
GPS	global positioning system
HE	high explosive
HHE	Health Hazard Evaluation
HQ	hazard quotient
HRS	Hazard Ranking System
INPR	inventory project report
MC	munitions constituents
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MRS	munitions response site
MRSPP	Munitions Response Site Prioritization Protocol
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDDB	Natural Diversity Database
NGVD	National Geodetic Vertical Datum
OE	ordnance and explosives
OHP	Office of Historic Preservation
Parsons	Parsons Corporation
PRG	preliminary remediation goal

PSAP	programmatic sampling and analysis plan
PWP	programmatic work plan
QA	quality assurance
QC	quality control
QR	qualitative reconnaissance
RAC	risk assessment code
RI/FS	remedial investigation and feasibility study
SI	site inspection
SLERA	screening-level ecological risk assessment
SLRA	screening-level risk assessment
SS-WP	site-specific work plan
T&E	threatened and endangered
TestAmerica	TestAmerica Laboratories, Incorporated
TPP	technical project planning
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	*U.S. Cod*e
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordnance

GLOSSARY OF TERMS

inhabited structure	Permanent or temporary structures, other than military munitions-related structures, that are routinely occupied by one or more persons for any portion of a day.
military munitions	All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges; and devices and components thereof.
munitions and explosives of concern (MEC)	Military munitions that may pose unique explosives safety risks, including unexploded ordnance, discarded military munitions, or munitions constituents present in high enough concentrations to pose an explosive or other health hazard.
munitions constituents (MC)	Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.
munitions debris	Remnants of munitions (e.g., penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.
munitions response	Response actions, including investigation, removal actions, and remedial actions, to address the explosive safety, human health, or environmental risks presented by unexploded ordnance, discarded military munitions, or munitions constituents, or to support a determination that no removal or remedial action is required.
munitions response area	Any area on a defense site that is known or suspected to contain unexploded ordnance, discarded military munitions, or munitions constituents. Examples include former ranges and munitions burial areas. A munitions response area includes one or more munitions response sites.

munitions response site (MRS)	A discrete location within a munitions response area that is known to require a munitions response.
projectile	Object projected by an applied force and continuing in motion by its own inertia. This includes bullets, bombs, shells, grenades, guided missiles, and rockets.
unexploded ordnance (UXO)	Military munitions that have been primed, fuzed, armed, or otherwise prepared for action; that have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and that remain unexploded whether by malfunction, design, or any other cause.

EXECUTIVE SUMMARY

ES.1 The objective of this site inspection (SI) is to determine whether the former Rice Valley Sand Dunes in Riverside County, California, warrants further investigation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The former Rice Valley Sand Dunes site was part of the California-Arizona Maneuver Area (CAMA), a large area in southern California, southern Nevada, and western Arizona used for a variety of training purposes between 1942 and 1944. It may have been used during an Army - Air Force exercise in 1964 called Joint Exercise Desert Strike. The SI at the former Rice Valley Sand Dunes was performed to confirm the munitions response site (MRS) location and to evaluate evidence for the presence of munitions and explosives of concern (MEC) and munitions debris at the Formerly Used Defense Site (FUDS). To accomplish this objective, qualitative reconnaissance (QR) and munitions constituents (MC) sampling were performed at the single MRS within the FUDS (Rice Valley Training Area).

ES.2 Outcomes for the MRS could include MEC response actions or no Department of Defense action indicated (NDAI), among others. If NDAI status is recommended and approved after evaluation of the SI data, the process to close out the former Rice Valley Sand Dunes will be initiated. If an imminent threat is identified to the public or the environment, a time-critical removal action (TCRA) or non-time critical removal action (NTCRA) may be performed as an interim action, or a remedial investigation and feasibility study (RI/FS) may be initiated to evaluate feasible MEC response actions.

ES.3 The technical project planning (TPP) process determined that the collection of 13 surface soil samples and one groundwater/surface water samples would be sufficient to meet the SI project objectives. The 13 soil samples were collected as planned, although the proposed water sample was collected as a soil sample due to the lack of a water source in the FUDS. The additional soil sample was collected adjacent to munitions debris found during the SI.

ES.4 The SI evaluation included approximately 39 miles of QR and the collection of 14 surface soil samples. TestAmerica Laboratories, Incorporated in Arvada, Colorado, analyzed the soil samples for explosives and select metals. If detected analyte concentrations exceeded background concentrations and the analytes were identified as MC, the results from the soil sampling were evaluated in a screening-level risk assessment (SLRA).

ES.5 No explosive compounds were detected in any of the samples collected during the SI. Most metals for which an analysis was performed were detected in all of the soil samples. The exception was antimony, which was not detected in any of the samples. The only metals that exceed background concentrations and are considered potential MC are aluminum, barium, copper, lead, and zinc. The other metals detected are not potential MC or are essential nutrients that are not expected to pose a risk to receptors. Based on the metals exceedances, the soil exposure pathway was determined to be complete in the

Rice Valley Training Area MRS. Comparison of the detected MC concentrations with the screening criteria used in the SLRA indicated that human health risk due to MC was not expected in the MRS. However, comparison of the same detected MC concentrations with the screening criteria used in the ecological risk assessment indicated that there was potential ecological risk in the MRS.

ES.6 The site visit team found MEC and munitions debris during the QR. The MEC found consisted of a 60-round belt of 7.62-millimeter blank ammunition. All munitions debris found consisted of fragments from unidentifiable munitions. Table ES.1 and Figure ES.1 summarize the results of the SI.

TABLE ES.1
SUMMARY OF RESULTS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

MRS	Acreage	Surface MEC Found	Munitions Debris Found	MC Contamination
Rice Valley Training Area	24,276	Yes(1)	Yes	Yes

(1) Small arms only

ES.7 MEC and munitions debris were found during the SI. The only MEC found were small arms blanks, which pose little to no explosive risk to receptors. The munitions debris identified consisted of explosively derived metal fragments and practice bomb debris. None of the fragments were large enough to identify the source munitions, but all munitions that produce fragments have the potential to harm human receptors if they are contacted and are still functional. Therefore, the potential for a complete MEC exposure pathway exists at the Rice Valley Training Area MRS.

ES.8 An exposure pathway is not considered to be complete unless all four of the following elements are present (USEPA, 1989):

- A source and mechanism for chemical release;
- An environmental transport and/or exposure medium;
- A receptor exposure point; and
- A receptor and a likely route of exposure at the exposure point.

ES.9 Based on evidence from the SI, no indications of unacceptable human health risk due to MC have been identified in the Rice Valley Training Area MRS, although aluminum and lead concentrations in soil in the MRS may pose an unacceptable risk to ecological receptors.

ES.10 Based on the observation of MEC and munitions debris by the site visit team, the Rice Valley Training Area MRS is recommended to proceed to RI/FS. Although the soil sampling analysis results indicate that there is no human health risk due to MC in the Rice Valley Training Area MRS, additional sampling during the RI/FS may be warranted. The need for additional sampling should be evaluated at the time that the TPP

Team convenes for review of the RI/FS technical approach (when awarded). The Bureau of Land Management currently manages the site as multiple use public lands, and parts of the site are within two designated wilderness areas: the Rice Valley Wilderness and the Riverside Mountains Wilderness. However, a removal action is not warranted at this time due to the remote location of the site.

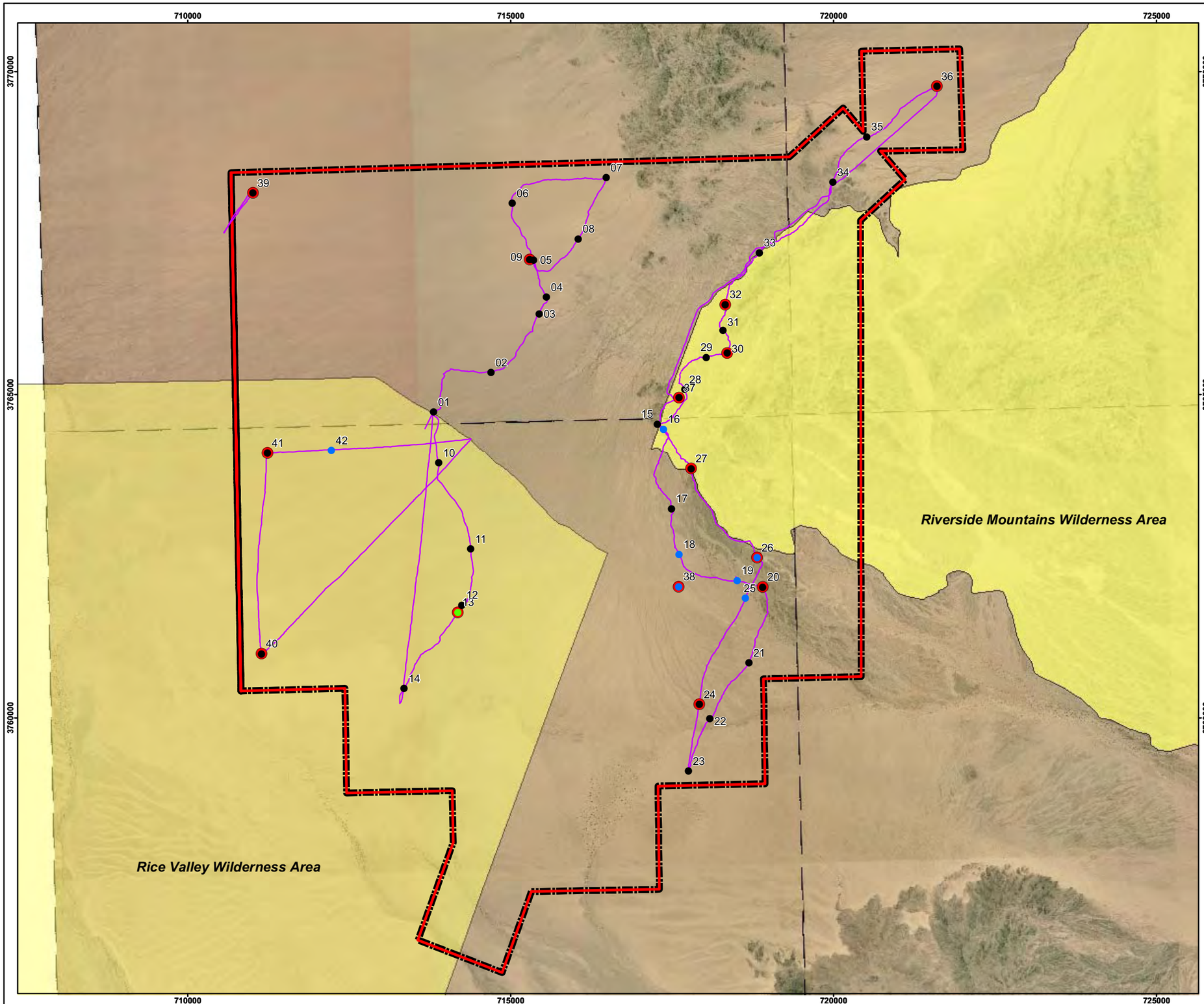


Figure ES.1

General Site Overview
Rice Valley Sand Dunes

FUDS Project No. J09CA005001

Riverside County, California

Legend

- 16 Munitions Debris Location
- 13 Small Arms Observation Location
- 12 Other Field Observation Location
- Soil Sample Location
- Training Area Boundary
- FUDS Boundary
- Qualitative Reconnaissance Track
- Wilderness Area

Site Location in California

N

Image: Orthophotos, 1999
Projection: UTM Zone 11 NAD83, Map Units in Meters

5,000 2,500 0 5,000 Feet

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER
DESIGNED BY: BT	General Site Overview
DRAWN BY: BT	
CHECKED BY: GV	SCALE: As Shown — PROJECT NUMBER: 744653.84105
SUBMITTED BY: DS	DATE: September 2008 — PAGE NUMBER: ES-4
	FILE: X:\GIS\Site_inspections_sw\Maps\ ricevalley_ca\ FigES_1.mxd

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

1.1.1 Parsons Corporation (Parsons) received Contract Number W912DY-04-D-0005, Task Order Number 0009, from the United States (U.S.) Army Corps of Engineers (USACE) Engineering and Support Center, Huntsville to perform a site inspection (SI) of the Rice Valley Sand Dunes Formerly Used Defense Site (FUDS), Project Number J09CA005001, Federal Facilities Identification CA9799F5258. The former Rice Valley Sand Dunes is in Riverside County in southeast California, approximately 75 miles east of Twentynine Palms, California. The coordinates for the subject FUDS are 33° 59' 38" N and 114° 39' 53" W (USACE, 1996 and 2004a). Figure 1.1 shows the site location.

1.1.2 The Department of Defense (DoD) established the Military Munitions Response Program (MMRP) to address DoD sites suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC). Under the MMRP, the USACE is conducting environmental response activities at FUDS for the Army, the DoD's executive agent for the FUDS program.

1.1.3 Pursuant to USACE Engineer Regulation (ER) 200-3-1 (USACE, 2004b) and the *Management Guidance for the Defense Environmental Restoration Program* (DERP) (Office of the Deputy Under Secretary of Defense [Installations and Environment], 2001), USACE is conducting FUDS response activities. All work is performed in accordance with the following:

- The DERP statute (10 *U.S. Code* [USC] 2701 *et seq.*);
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA; 42 USC 9601 *et seq.*);
- Executive Orders 12580 and 13016; and
- The National Oil and Hazardous Substances Pollution Contingency Plan (NCP; 40 *Code of Federal Regulations* [CFR] Part 300).

1.1.4 The USACE is conducting SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

1.1.5 While not all MEC or MC constitute CERCLA hazardous substances, pollutants, or contaminants, the DERP statute provides the DoD with the authority to respond to releases of MEC or MC. DoD policy states that such responses shall be conducted in accordance with CERCLA and the NCP.

1.1.6 This report summarizes the work performed during the SI and describes any MEC and MC contamination identified at the FUDS. The SI is limited exclusively to MEC and MC contamination issues and does not consider unrelated hazardous and toxic waste concerns that the FUDS may pose. Per ER 200-3-1 guidance for conducting an SI, "The SI is not intended as a full-scale study of the nature and extent of contamination or explosive hazards"; it only requires collection of sufficient and appropriate information as defined in the Technical Project Planning (TPP) Memorandum for this site (Appendix B).

1.2 PROJECT OBJECTIVES

1.2.1 The primary objective of the MMRP SI is to determine whether a FUDS project warrants further response action under CERCLA. The SI collects sufficient and appropriate information necessary to make this determination, as well as it

1) Determines the potential need for a removal action;

2) Collects or develops additional data, as appropriate, for Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA); and

3) Collects data, as appropriate, to characterize the release for effective and rapid initiation of the remedial investigation and feasibility study (RI/FS).

1.2.2 An additional objective of the MMRP SI is to collect the additional data necessary to complete the Munitions Response Site Prioritization Protocol (MRSPP).

1.3 PROJECT SCOPE

1.3.1 The primary project planning documents used to perform the SI include the Site-Specific Work Plan (SS-WP) Addendum for the former Rice Valley Sand Dunes (Parsons, 2008a), the South Pacific Division Range Support Center Programmatic Work Plan (PWP; Parsons, 2005), the Programmatic Sampling and Analysis Plan (PSAP; USACE, 2005), and the PSAP Addendum (Parsons, 2006). The performance work statement for this project is in Appendix A.

1.3.2 The USACE Los Angeles District facilitated a TPP meeting on December 20, 2007, that included representatives of the USACE, the Bureau of Land Management (BLM), Parsons, and the California Department of Toxic Substances Control (DTSC). The TPP Team unanimously concurred with the technical approach presented in the Final TPP Memorandum (Parsons, 2008b), including the collection of 13 soil samples (three of which were background ambient samples) and one groundwater/surface water sample, sampling methods, and laboratory analyses for explosives and select metals.

1.3.3 The TPP Team concurred that the following criteria would be used to provide screening levels for achieving the MC data quality objectives (DQOs):

- Human health risk (soil and sediment) – the more conservative of the USEPA Region 9 industrial preliminary remediation goals (PRGs) or Cal-Modified industrial PRGs

- Human health risk (groundwater and surface water) – the USEPA Region 9 PRGs for tap water

- Ecological risk – USEPA ecological soil screening levels (EcoSSLs) or values derived from other sources as listed in the PSAP.

1.3.4 Since the TPP meeting, the Department of Energy's Oak Ridge National Laboratory (ORNL) collaborated with USEPA Regions 3, 6, and 9 to establish a single set of risk-based screening levels (USEPA-ORNL, 2008). The new values were calculated using the latest toxicity values that the USEPA considers to be protective for humans (including sensitive groups) over a lifetime.

1.3.5 The team also concurred that the sample depth for each soil sample should be determined in the field by the field team leader based on observed site conditions. This requirement was included to ensure that samples would be collected from the residual soil profile rather than from surface sediment deposited after the site was used by the DoD.

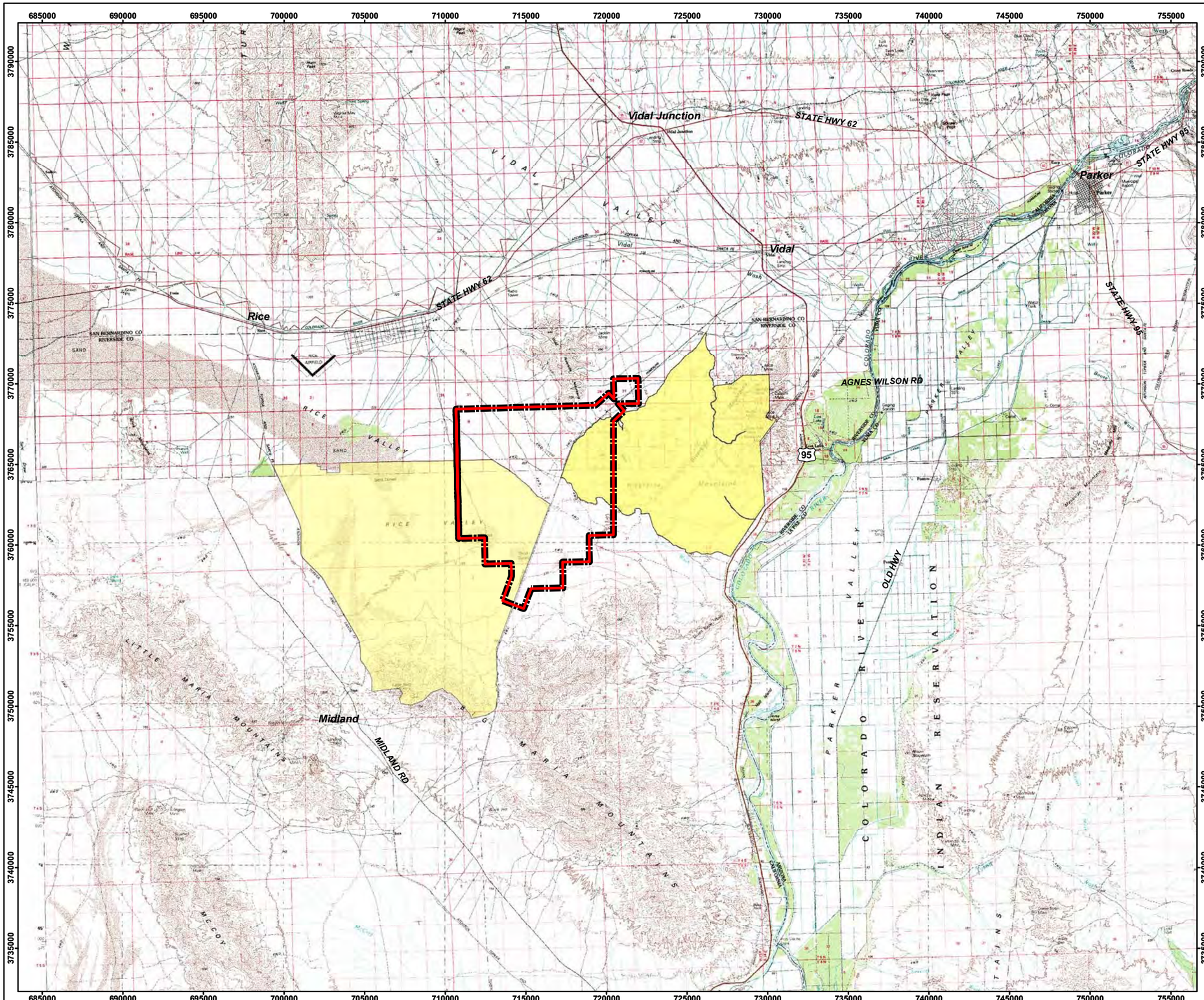


Figure 1.1

Site Location Map

Rice Valley Sand Dunes

FUDS Project No. J09CA005001

Riverside County, California

Legend

- Training Area Boundary
- FUDS Boundary
- Wilderness Area

Site Location in California

N

Image Source: USGS 7.5' Topo Quadrangles, 1991
Projection: UTM Zone 11 NAD83, Map Units in Meters

5 2.5 0 5 Miles

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER

DESIGNED BY: BT	Site Location		
DRAWN BY: BT			
CHECKED BY: GV	SCALE: As Shown	PROJECT NUMBER: 744653.84105	
SUBMITTED BY: DS	DATE: September 2008	PAGE NUMBER: 1-4	
	FILE: X:\GIS\Site_inspections_sw\Maps\ricevalley_ca\ Fig1_1.mxd		

CHAPTER 2

PROPERTY DESCRIPTION AND HISTORY

2.1 SITE DESCRIPTION

The former Rice Valley Sand Dunes is in Riverside County approximately 75 miles east of Twentynine Palms, California (Figure 1.1). Figure 2.1 shows the FUDS boundary, which is coincident with the Rice Valley Training Area munitions response site (MRS) boundary. The site was originally considered a FUDS based on information in a 1985 BLM document. The initial FUDS boundary, approximately 5,000 acres, included all land within 2,000 feet of a power line running northeast to southwest through the south end of Rice Valley. The FUDS was later expanded by 18,811 acres based on a 1956 USACE memo describing lands under the jurisdiction of the BLM that were possibly contaminated by ordnance, resulting in a 23,811 acre FUDS (USACE, 1996). The current FUDS boundary encompasses approximately 24,276 acres, based on the acreage listed in the ASR Supplement. It is unknown why the area was expanded past the 23,811 acres. No real estate records have been found indicating that the DoD ever officially controlled the site. The site is owned by the Department of the Interior and is managed by the BLM. Portions of the Rice Valley Wilderness and the Riverside Mountains Wilderness fall within the FUDS boundary, and the rest of the site is managed as multiple use public land.

2.2 SITE LOCATION AND SETTING

2.2.1 Topography and Vegetation

2.2.1.1 The former Rice Valley Sand Dunes is in the Mojave Section of the Basin and Range Physiographic Province (U.S. Geological Survey [USGS], 2002). The site is primarily west of the Riverside Mountains, although the east side of the FUDS contains some foothills of the range. The northeast corner of the site lies within a pass between the Riverside Mountains to the south and the West Riverside Mountains to the north. Figure 2.1 shows the site elevation, which ranges from a low of about 780 feet National Geodetic Vertical Datum (NGVD) in the valley to 1,835 feet NGVD in the West Riverside Mountains. The site generally slopes away from the mountains that border the site to the east, with local variation in relief in the foothills. There are no permanent surface water bodies within the FUDS, and it is assumed that water only flows across the site during significant precipitation. The site visit team crossed numerous dry washes while conducting qualitative reconnaissance (QR) in support of the SI.

2.2.1.2 The site is within the Palen-Riverside Mountains subsection of the Sonoran Desert Ecological Section of California. The predominant natural plant is the creosote bush, with brittlebush, white bursage, catclaw acacia, desert-holly, ocotillo, and teddy-bear cholla also present in shublands, which are expected to be the most prevalent ecosystem in the former Rice Valley Sand Dunes. Big galleta is predominant in grasslands within the Palen-Riverside subsection. Small, widely spaced shrubs were the predominant vegetation observed during the SI, as shown in site photographs taken March 25 through 27 and March 30, 2008 (Appendix E).

2.2.2 Soil

Soils in the area are often covered by desert pavement as a result of strong winds in the area. Underneath the pavement, the surface layer of soil is composed of a pale brown, gravelly silt loam that is generally less than 2 inches thick. Below the surface layer is a layer of light-brown, silty clay loam and gravelly clay loam that extends for approximately 14 inches. From 16 inches to a depth of 60 inches, a light-brown, very cobbly and gravelly fine sandy loam is present (USACE, 1996).

2.2.3 Climate

2.2.3.1 The nearest weather station to the former Rice Valley Sand Dunes is in Parker, Arizona, approximately 20 miles northeast of the FUDS. All climate data for the area are based on monthly or yearly averages derived from readings collected at this station. The hottest month is typically July, with an average maximum temperature of 108.3 degrees Fahrenheit (°F). The coldest month is typically January, with an average maximum temperature of 67.3°F. Yearly precipitation averages 4.76 inches. The wettest month is January, which averages 0.71 inches of rain, while May and June both average less than 0.1 inches (Western Regional Climate Center, 2007).

2.2.3.2 Winds in the Parker, Arizona area are highest in the spring, with an average speed slightly greater than 8 miles per hour. Sunshine is well above the U.S. average at 80 percent to 90 percent sunshine year round (City-Data.com, 2008).

2.2.4 Significant and Inhabited Structures

There are no paved road within the FUDS, although there are a few dirt tracks through the site that require four wheel drive to navigate. The nearest main road is State Highway 62, which is approximately 4 miles from the FUDS at its closest point. The team found no evidence of any inhabited structures within the MRS boundary, and there were none apparent within 2 miles of the site. Inhabited structures are permanent or temporary structures, other than military munitions-related structures, that are routinely occupied by one or more persons for any portion of a day.

2.2.5 Demographics

The former Rice Valley Sand Dunes is in Riverside and San Bernardino Counties approximately 75 miles east of the city of Twentynine Palms, California. According to

the 2000 U.S. census, the population density of Riverside County is 214.4 persons per square mile. The census data also indicate that five people potentially live within 4 miles of the former Rice Valley Sand Dunes, as shown in Table 2.1 and Figure 2.2. All five inhabitants live in a census block with a boundary within ¼ mile of the FUDS. However, the census block is over 16 miles long and reaches the outskirts of the city of Blythe, California. It is likely that the five people living in this census block live much closer to Blythe than they do to the former Rice Valley Sand Dunes. The site visit team observed no residences in this area during the QR, and concluded that no one lives within or near the FUDS boundary.

TABLE 2.1
POPULATION WITHIN 4-MILE BUFFER OF THE SITE
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Range	On Site	0 to ¼ Mile	¼ to ½ Mile	½ to 1 Mile	1 to 2 Miles	2 to 3 Miles	3 to 4 Miles	Total
Rice Valley Training Area	0	5	0	0	0	0	0	5
FUDS	0	5	0	0	0	0	0	5

Source: U.S. Census 2000 data. The population within the FUDS, MRSs, or any buffer area is determined using a conservative approach to calculate the population of an area by including the total number of people for any census block that falls within or overlaps the site boundary, MRS boundary, or buffer line.

2.2.6 Current and Future Land Use

The former Rice Valley Sand Dunes is owned by the Department of the Interior. The BLM manages the FUDS in part as two designated wilderness areas and in part as multi-use public land. No changes to site ownership or use are anticipated.

2.3 SITE OWNERSHIP AND HISTORY

2.3.1 Little is known about the history of the Rice Valley Sand Dunes site. Its inclusion in the FUDS program is based on its use as part of the CAMA Desert Training Center, a large area in southern California, southern Nevada, and western Arizona used for a variety of training purposes during World War II. The general goal of the 18,000-square mile CAMA was to condition troops to a desert environment and to test equipment for use in these harsh conditions (USACE, 1996). A September 1956 letter from the Los Angeles USACE to the BLM Los Angeles office manager discussed land used by the Army, mostly as part of the CAMA, and mentions the Rice Valley Sand Dunes site. The letter also included the Section/Township/Range information for the land as well as a color-coded map that separated it into one of three categories: land visually cleared but restricted to surface use; land given a more thorough clearance, free to be used for any purpose; and land never used as any sort of range that was also free to be used for any purpose. The quality of the reproduction of the map is such that the category given to the Rice Valley Sand Dunes site cannot be discerned.

2.3.2 In addition to the site's possible use as part of the CAMA, the former Rice Valley Sand Dunes may have been used for other training purposes. The site lies just

south of the former Rice Army Airfield and may have been used as a bombing and strafing range for this facility (USACE, 1994). Some of the land used for the CAMA was also used for Joint Exercise Desert Strike in 1964, a joint Army – Air Force exercise designed to familiarize troops with the principles of large-scale employment of conventional and tactical nuclear weapons. It is unknown how much, if any, live ordnance was used as part of this exercise or what portions of the former CAMA were used.

2.3.3 A portion of the Rice Valley Sand Dunes was transferred from the BLM to a power company in 1969 to construct a power line through the area. Based on the area's former use by the Army, a clearance operation was performed in support of the power line construction. The team performing the clearance found 250 rounds of small arms ammunition, two 37-millimeter (mm) shot rounds, a 75mm projectile determined to be inert, and a 105mm high explosive (HE) projectile that was destroyed on-site (USACE, 1996).

2.4 SITE OPERATIONS AND WASTE CHARACTERISTICS

2.4.1 Munitions Response Site-Specific Descriptions and Operations

The SI field work in March 2008 focused on the single MRS at the FUDS, Rice Valley Training Area, the boundaries of which are coincident with the FUDS boundary. The original FUDS boundary, first detailed in the Inventory Project Report (INPR) was based on a 2,000 foot buffer around a power-line running northeast to southwest through the south end of Rice Valley, with the resulting FUDS containing approximately 5,000 acres of land (USACE, 1994). The FUDS was later expanded by 18,811 acres based on a 1956 USACE memo describing lands under the jurisdiction of the BLM that were possibly contaminated by ordnance, resulting in a 23,811-acre FUDS (USACE, 1996). The site and MRS were expanded to their current 24,276 acres based on the acreage listed in the ASR Supplement, although the reason for the 465-acre expansion is unknown. It is assumed that training exercises in the MRS were designed to simulate combat conditions. Live ordnance was used, and no formal fields of fire were designated. Both the INPR and the ASR Supplement assigned a Risk Assessment Code (RAC) score of 4 to this FUDS (USACE, 1994 and 2004a).

2.4.2 Regulatory Compliance

The USACE is conducting the SI at the former Rice Valley Sand Dunes as part of FUDS response activities pursuant to and in accordance with the guidance, regulations, and legislation listed in Subchapter 1.1.

2.5 PREVIOUS INVESTIGATIONS

2.5.1 Parsons performed a document review for the former Rice Valley Sand Dunes, including the INPR (USACE, 1994), the ASR (USACE, 1996), and the ASR Supplement (USACE, 2004a).

2.5.2 Previous investigations determined that the former Rice Valley Sand Dunes was possibly used for training activities, which would have primarily included mechanized infantry training when it was part of the CAMA from 1942 through 1944. Portions of the former CAMA, possibly including the former Rice Valley Sand Dunes, were also used during Operation Desert Strike in 1964. The INPR identified the site as a FUDS, and the ASR included interviews, records reviews, and a field visit. The research performed in support of the ASR identified the types of ordnance potentially used at the FUDS.

2.5.1 1969 Clearance Action

The 77th Ordnance Detachment from Fort Irwin, California performed a clearance operation at the Rice Valley Sand Dunes in January 1969 prior to the construction of a power line through the south end of Rice Valley. A 4-foot radius around each of the planned pole locations was cleared using a metal detector, and the team visually searched the area 50 feet to either side of the proposed path of the line. No buried munitions were found using the metal detectors, but a 105mm HE projectile, a 75mm projectile, two 37mm projectiles, and 250 rounds of 7.62mm blank ammunition were found during the visual search.

2.5.2 1994 Inventory Project Report

By a memorandum dated August 1994, the USACE Los Angeles District conducted an INPR to determine whether the former Rice Valley Sand Dunes was eligible for the DERP FUDS program. The INPR concludes that the site was used by the DoD and that it was eligible for the FUDS program.

2.5.3 1996 Archives Search Report

The ASR, completed by the USACE St. Louis District, compiled information obtained through historical research at various archives and records-holding facilities, interviews with individuals associated with the FUDS or its operations, and a field visit. The field visit, conducted January 8 through 19, 1995, found no evidence of munitions in the single MRS at the FUDS. The investigation also found no evidence of the storage, use, or disposal of chemical warfare materiel. The ASR provides most of the historical information pertaining to site operations and identifies the key areas of focus for the SI.

2.5.4 2004 Archives Search Report Supplement

2.5.4.1 The ASR Supplement was completed in November 2004 by the USACE St. Louis District as a supplement to the 1996 ASR. No field visit was performed for the ASR Supplement. This document identifies the single MRS at the former Rice Valley Sand Dunes and the types of munitions potentially used in this MRS. The potential munitions associated with the Rice Valley Training Area MRS include general small arms ammunition, M54 37mm HE projectiles, M48 75mm HE howitzer projectiles, M38 105mm fixed-gun projectiles, and M8 practice anti-personnel mines. These munitions, with the exception of the M8 practice mine, are based on the items found during the

clearance operation in 1969. The reason for the inclusion of the practice mine is unknown other than the use of this mine at various locations in the CAMA.

2.5.4.2 The Rice Valley Training Area MRS received a RAC score of 4, a hazard severity of *critical,* and a hazard probability of *remote*. Table 2.2 shows the munitions potentially present in the MRS.

TABLE 2.2
SUSPECTED OR KNOWN MUNITIONS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

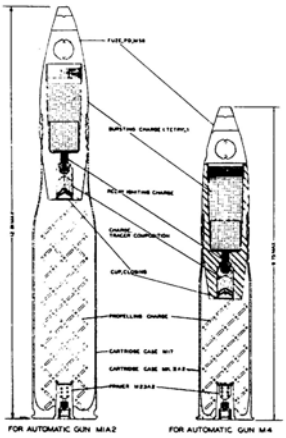
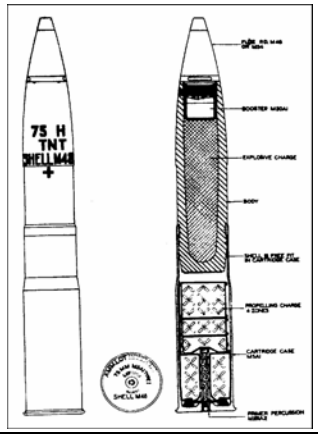
Munitions	Photograph/Diagram
Small Arms, General (7.62mm shown)	
Cartridge, 37mm, HE, Fixed-Gun, M54	
Shell, 75mm Howitzer, HE, M48	

TABLE 2.2 (Continued)
SUSPECTED OR KNOWN MUNITIONS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

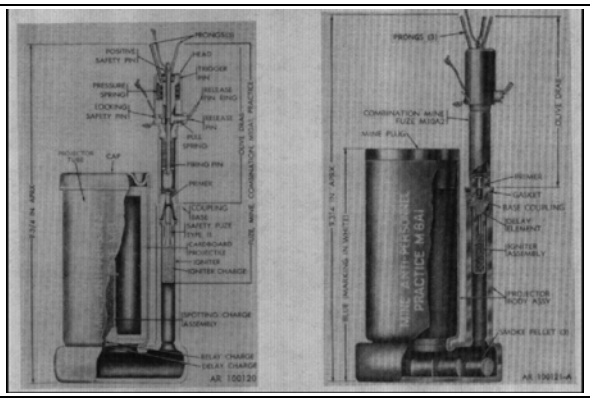
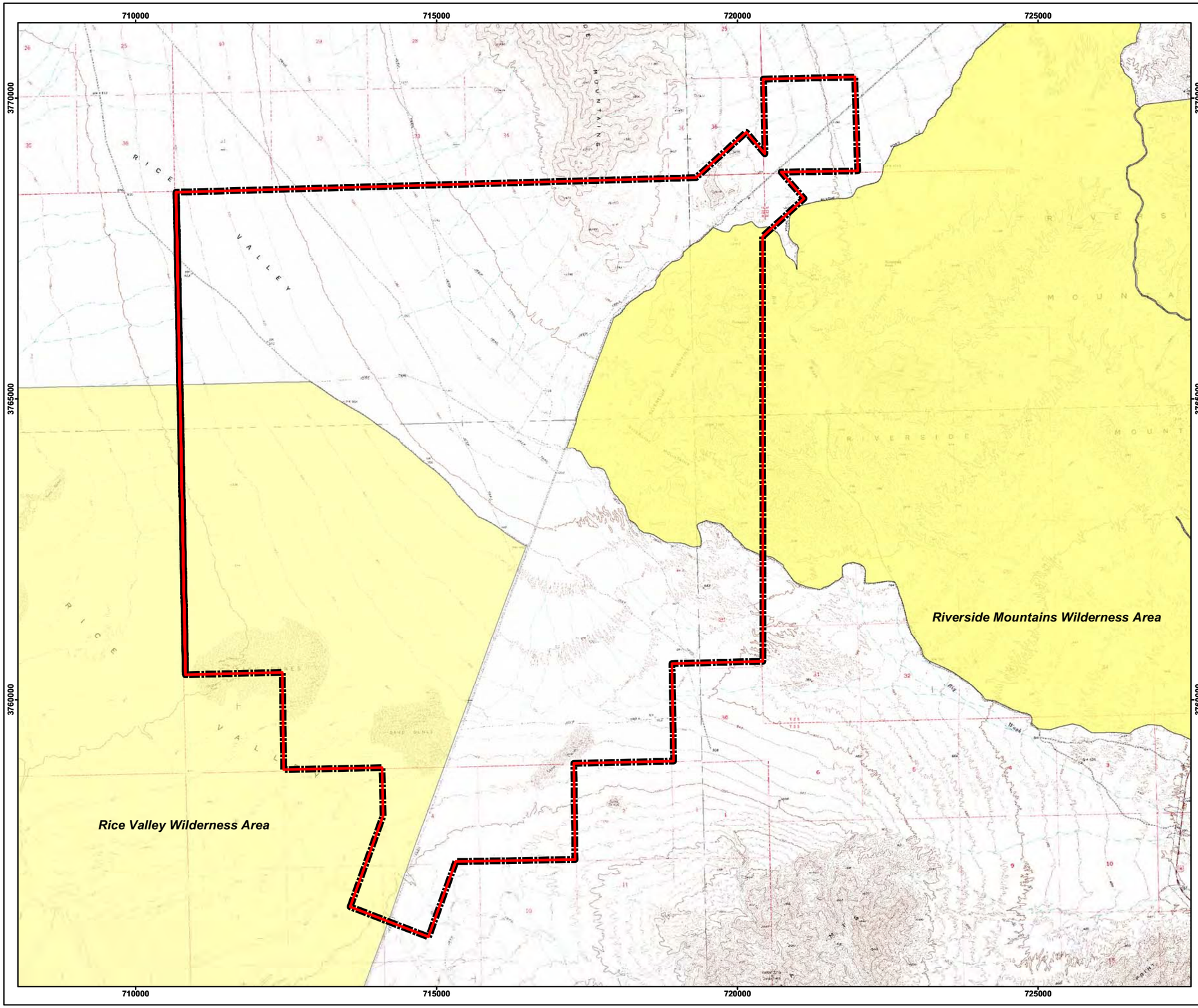
Munitions	Photograph/Diagram
Shell, 105mm, HE, Fixed-Gun, M38	No diagram available
Mine, Antipersonnel, Practice, M8	

Figure 2.1

Site Setting
Rice Valley Sand Dunes

FUDS Project No. J09CA005001

Riverside County, California



Legend

- Training Area Boundary
- FUDS Boundary
- Wilderness Area

Site Location in California

Image Source: USGS 7.5' Topo Quadrangles, 1991
Projection: UTM Zone 11 NAD83, Map Units in Meters

5,000 2,500 0 5,000 Feet

N

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER

DESIGNED BY: BT	**Site Setting**		
DRAWN BY: BT			
CHECKED BY: GV	SCALE: As Shown		PROJECT NUMBER: 744653.84105
SUBMITTED BY: DS	DATE: September 2008		PAGE NUMBER: 2-9
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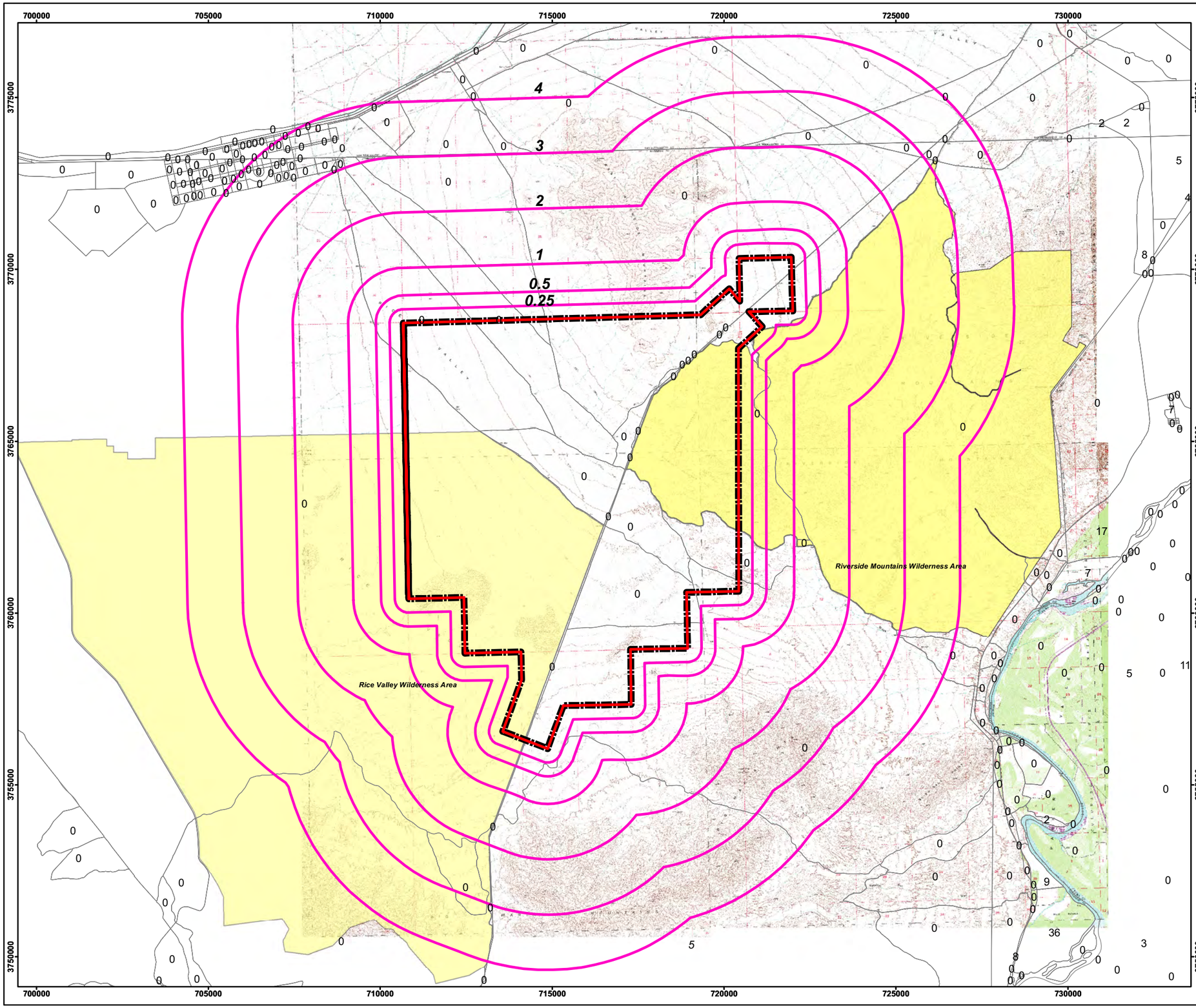
Figure 2.2

2000 Census Data
Rice Valley Sand Dunes

FUDS Project No. J09CA005001

Riverside County, California



Legend

- 1 — 2000 Census Block Boundary with Total Population
- Training Area Boundary
- FUDS Boundary
- Wilderness Area
- Buffer (Mile)

Site Location in California

Image Source: USGS 7.5' Topo Quadrangles, 1991
Projection: UTM Zone 11 NAD83, Map Units in Meters

N

Miles
2 1 0 2

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER

DESIGNED BY: BT	2000 Census Data		
DRAWN BY: BT			
CHECKED BY: GV	SCALE: As Shown	PROJECT NUMBER: 744653.84105	
SUBMITTED BY: DS	DATE: September 2008	PAGE NUMBER: 2-10	
	FILE: X:\GIS\Site_inspections_sw\Maps\ricevalley_ca\ Fig2_2.mxd		

CHAPTER 3

SITE INSPECTION TASKS

3.1 HISTORICAL RECORD REVIEW

Parsons performed a document review for the former Rice Valley Sand Dunes, including the INPR, the ASR, and the ASR Supplement.

3.2 TECHNICAL PROJECT PLANNING

The former Rice Valley Sand Dunes falls under the purview of the USACE Los Angeles District, which facilitated a TPP meeting on December 20, 2007 that included representatives of the USACE, the BLM, Parsons, and the DTSC. The TPP Team unanimously concurred with the technical approach presented in the Final TPP Memorandum (Parsons, 2008b; see Appendix B of this report). Key TPP findings and decisions are summarized below:

- The TPP Team concurred with the technical approach (developed to aid the presumed RI/FS outcome) as presented and revised at the TPP meeting on December 20, 2007, including the number, type, and location of samples as well as sampling methods and laboratory analyses.

- The DTSC requested that the groundwater sample proposed in the Advance Packet technical approach be collected as a soil sample in the northeast corner of the FUDS, and that the QR path be extended into this area. This sample could be collected either in the vicinity of observed munitions debris or target features or at a second depth interval at one of the other soil sample locations. During the SI field visit, the single proposed groundwater/surface water sample was collected as a soil sample because of the lack of water in the MRS.

- The TPP Team agreed that the placement of ambient samples on the west side of the FUDS, away from the assumed target locations, was acceptable as long as no munitions debris was observed in the vicinity of the samples. These ambient samples would be used to determine background values for comparison with metals concentrations detected in the soil samples collected in suspected target areas. The DTSC indicated that the maximum concentration of each metal detected in the ambient samples should be used for background comparison purposes.

- The depth intervals for the surface soil samples would be determined in the field by the field team leader based on observed geologic conditions. The intent was to sample the soil horizon comprising the ground surface during DoD use of the site. Samples would be collected from deeper intervals in areas exhibiting signs of high sedimentation rates and from shallower intervals in areas exhibiting signs of low sedimentation rates. The rationale for the sampling depth for each soil sample is documented in this SI Report.

- Parsons and the USACE indicated that the more conservative of the USEPA Region 9 industrial PRGs or the Cal-Modified industrial PRGs would be used to evaluate surface soil data with regard to human health risk. The USEPA Region 9 tap water PRGs would be used to evaluate water data if any water samples were collected during the SI. Since the TPP meeting, the Department of Energy's Oak Ridge National Laboratory (ORNL) collaborated with USEPA Regions 3, 6, and 9 to establish a single set of risk-based screening levels (USEPA-ORNL, 2008). Ecologic risk would be evaluated using either USEPA EcoSSLs or values derived from other sources, as listed in the PSAP Addendum.

- The TPP Team discussed the potential presence of threatened and endangered (T&E) species in Riverside County, California. The U.S. Fish and Wildlife Service (USFWS) and the State of California have indicated that listed species are present within the vicinity of the former Rice Valley Sand Dunes. There is also a possibility that there are cultural resources within the FUDS. Therefore, the site visit team would avoid sensitive areas, and the BLM would be informed of the whereabouts and nature of any cultural features identified. No cultural features were identified during the SI. The site visit team observed a desert tortoise and recorded the Global Positioning System (GPS) coordinates where it was spotted.

- The TPP Team agreed that if the site visit team identified MEC during the SI, they would record the GPS coordinates, notify the landowner and request that the landowner contact the local sheriff's office. The site visit team observed MEC in one location (a 60-round belt of 7.62mm blank ammunition) and notified the landowner.

3.3 NON-MEASUREMENT DATA COLLECTION

3.3.1 Well data is protected in California, so a request for well information was submitted through Banks Information Solutions, Inc, which contacted the appropriate authorities and collated the well information they received. According to the report issued by Banks, there are no groundwater wells within 4 miles of the former Rice Valley Sand Dunes. The California Department of Public Health (CDPH) provided information regarding state regulated public groundwater and surface water supplies in the area for Riverside County and San Bernardino County. The USEPA Region 9 Source Water Protection Program provided information regarding tribal drinking water supplies.

3.3.2 According to the National Register Information System, the National Historic Landmarks Program, the National Heritage Area Program, and California OHP, no cultural or archeological resources are listed within the former Rice Valley Sand Dunes. According to the California OHP Eastern Information Center there are no previously recorded historic or archeological sites within the site boundary. However, the Eastern Information Center indicates that no surveys have been conducted for the area and there may be resources present. According to information provided in the 1996 ASR, the FUDS boundary may lie within an area classified as a California Historic Landmark associated with the CAMA Desert Training Center, which was established by Major General George Patton Jr.

3.3.3 The following printed and electronic information sources were consulted for the former Rice Valley Sand Dunes:

- USGS – Topographic map
- USFWS, National Wetlands Inventory – Wetlands Online Mapper
- USFWS, Endangered Species Program – Threatened and Endangered Species System, http://ecos.fws.gov/tess_public/StateListing.do?state=all
- USFWS, National Wildlife Refuge System, http://www.fws.gov/refuges/profiles/bystate.cfm
- USFWS, Southwest Region Ecological Services,
- U.S. Department of Agriculture, Forest Service, http://www.fs.fed.us
- National Oceanic and Atmospheric Administration, Coastal Zone Management Program, http://coastalmanagement.noaa.gov
- BLM, Palm Springs Field Office, Palm Springs, California
- National Park Service, http://www.nps.gov/applications/parksearch/geosearch.cfm
- National Heritage Areas Program – List of National Heritage Areas, http://www.nps.gov/history/heritageareas/
- National Register Information System – National Register of Historic Places, Riverside County, http://www.nr.nps.gov/iwisapi/explorer.dll?IWS_SCHEMA= NRIS1&IWS_LOGIN=1&IWS_REPORT=100000066
- National Register Information System – National Register Historic Districts, http://www.historicdistricts.com/ca/Riverside/districts.html
- National Historic Landmarks Program – List of National Historic Landmarks (California), http://www.nps.gov/history/nhl/

- California OHP Database http://ohp.parks.ca.gov/?page_id=21755
- California OHP, Central Coastal Information Center, Department of Anthropology, University of California, Santa Barbara http://www.anth.ucsb.edu/ccic/index.php
- California Department of Fish and Game – BioGeographic Data Branch, California Natural Diversity Database, http://www.dfg.ca.gov/biogeodata/cnddb/quick_viewer_launch.asp
- Riverside County Parks
- ASR Findings for the former Rice Valley Sand Dunes, Riverside County, California

3.4 SITE-SPECIFIC WORK PLAN

3.4.1 The SS-WP augments the PWP and PSAP, as warranted, to present pertinent site-specific information and procedural adjustments that could not be readily captured in the programmatic documents or that resulted from TPP Team agreements that required modifying the preliminary SI technical approach. The PWP and PSAP are umbrella documents that set overall programmatic objectives and approaches, whereas the SS-WP provides site-specific details and action plans. The PWP, PSAP, and SS-WP accompanied the site visit team during SI field activities.

3.4.2 The SS-WP includes the project description, the field investigation plan, the sampling and analysis plan, the environmental protection plan, and the health and safety plan specific to the former Rice Valley Sand Dunes. The field investigation plan includes a technical approach to guide sample collection and analysis for MEC and MC to ensure that the results are sufficient to determine whether additional investigations or remedies are necessary for the FUDS. Key elements of the technical approach include the conceptual site model (CSM) to help determine types of samples and their locations, DQOs to ensure that the data acquired are sufficient to characterize MEC and MC at the FUDS, and QR to confirm known target locations and to evaluate the potential presence of MEC or MC in remote portions of the FUDS.

3.4.3 The sampling and analysis plan discusses procedures for soil sample acquisition from locations biased toward the highest potential for MEC contamination; quality control (QC) and quality assurance (QA) for the sampling process; sample shipment to an approved, independent laboratory; and laboratory analysis of the samples. The environmental protection plan presents procedures for avoiding, minimizing, and mitigating potential impacts on environmental and cultural resources during site field activities. The health and safety plan supplements the programmatic accident prevention plan with site-specific emergency contact information and directions to the nearest hospital.

3.5 DEPARTURES FROM PLANNING DOCUMENTS

As discussed at the TPP meeting, the single proposed groundwater/surface water sample was collected as a soil sample because of the lack of water in the MRS. It was collected as soil sample RVSD-MRS01-SS-06-14. Sedimentation rates at the site were not significant enough to require sampling of an additional depth interval at any of the sample locations, and the additional soil sample was collected at a new location adjacent to observed munitions debris.

CHAPTER 4

MUNITIONS AND EXPLOSIVES OF CONCERN FINDINGS

4.1 GENERAL INFORMATION

4.1.1 Qualitative Reconnaissance and Sample Locations

4.1.1.1 The primary task of the SI was to assess the presence of MEC, munitions debris, and MC. To assess the presence of MEC, the site visit team conducted QR by walking approximately 39 miles on March 25 through 27 and March 30, 2008.

4.1.1.2 The QR survey consisted of visual reconnaissance of the site surface to identify indicators of suspect areas, including earthen berms, distressed vegetation, stained soil, ground scars or craters, target remnants, and visible metallic debris. QR activities focused on the single MRS at the FUDS, which was judged the most likely location for MEC or MC contamination because the MRS boundary was coincident with the FUDS boundary. Table 4.1 presents the MEC (including potential chemical constituents) potentially present at the site based on the ASR, the ASR Supplement, and the SI QR. Appendix J includes the MEC CSM for the site.

4.1.1.3 Preliminary soil sample locations were chosen before the TPP meeting and were agreed to by the TPP Team. However, the intent of the identified locations was to indicate the general area in which each sample would be collected. The TPP Team goal was to collect each sample adjacent to munitions debris, target features, or other munitions-related features such as craters. Therefore, the field team leader chose the exact sample locations based on conditions observed during the QR. Samples were collected in the vicinity of identified MEC, munitions debris, or assumed firing points, or from dry washes downgradient from the mountains, which were the assumed targets for CAMA and Desert Strike training exercises. The unexploded ordnance (UXO) technician used a Schonstedt GA-72CX magnetic locator to screen each sample location prior to any digging. Per the PWP, the UXO technician performed QC and battery checks before use to confirm that the instrument was working properly.

TABLE 4.1
CHEMICAL COMPOSITION OF MUNITIONS AND EXPLOSIVES OF CONCERN AND POTENTIAL MUNITIONS CONSTITUENTS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, .30 Caliber	M2 Ball M1 Tracer M2 Armor piercing (AP) M1 Ball M16 Tracer	Brass, steel, aluminum	Lead antimony, single- or double-base powder, primer composition, tungsten chrome steel, tracer composition	Lead, antimony, copper, zinc, nitrocellulose, molybdenum, aluminum, strontium, magnesium, dinitrotoluene
Cartridge, 7.62mm	M59 Ball M61 AP M62 Tracer M80 Ball M82 Blank M118 Ball Special	Brass, steel, aluminum	Lead antimony, single- or double-base powder, primer composition, tungsten chrome steel, tracer composition	Aluminum, antimony , barium nitrate, copper, dibutylphthate , diphenylamine, dinitrotoluene , lead, magnesium, nitrocellulose, potassium sulfide, potassium sulfate, strontium, tetracene
Cartridge , 50 Caliber, Machine Gun	M2 Ball M2 AP M1 Tracer M10 Tracer M17 Tracer M21 Tracer M1 Incendiary M23 Incendiary M1 Blank	Brass, steel, aluminum	Lead antimony, tungsten chrome steel, tracer composition, incendiary composition, single based propellant, double based propellant, primer composition	Calcium, iron, strontium, lead, magnesium, molybdenum, antimony, potassium, perchlorate, nitrocellulose, diphenylamine
Cartridge, 37mm, APC-T	M59	N/A	N/A	N/A
Cartridge Case	M17	Brass	M1 propellant, primer mixture	Antimony sulfide, copper, dibutlyphalate, dinitrotoluene, diphenylamine, lead thiocyanate, nitrocellulose, potassium chlorate, TNT (trinitrotoluene), zinc,
Projectile, 37mm, APC-T	M59	Steel	Solid steel, tracer mixture	Aluminum alloy, iron, magnesium, strontium nitrate

TABLE 4.1 (Continued)
CHEMICAL COMPOSITION OF MUNITIONS AND EXPLOSIVES OF CONCERN AND POTENTIAL MUNITIONS CONSTITUENTS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Cartridge, 37mm, HE-T/SD (Self Destruct)	M54 and M54A1	N/A	N/A	N/A
Cartridge Case	M17 or M17B1	Brass or steel	M1, M2 propellant, primer	Antimony sulfide, barium nitrate, copper, dibutylphalate, diphenylamine, iron, lead thiocyanate, nitrocellulose, nitroglycerin, potassium chlorate, potassium nitrate, TNT, zinc
Fuze, Projectile, Point Detonating	M56	Aluminum alloy	Detonator, booster	Aluminum, antimony sulfide, carborundum, lead azide, potassium chlorate, tetryl, zinc
Projectile, 37mm, HE-T/SD	M54, M54A1	Steel	Tetryl or Comp A	Iron, tetryl or Iron, RDX (cyclotrimethylenetrinitramine)
Tracer / Self Destruct	N/A	N/A	Tracer compound, tetryl	Aluminum powder, magnesium powder, strontium nitrate, tetryl
Cartridge, 75-mm, HE	M48	N/A	N/A	N/A
Projectile, 75mm, HE	M48	Forged steel	TNT or 50/50 amatol	Iron, TNT or Iron, TNT, ammonium nitrate
Cartridge Case	M5	Brass	M1 propellant	Copper, dibutylphthalate, dinitrotoluene, diphenylamine, nitrocellulose, zinc
Fuze, Projectile, Point	M51	Steel	Tetryl, primer mix, TNT	Antimony sulfide, carborundum, iron, lead azide, potassium chlorate, tetryl, TNT

TABLE 4.1 (Continued)
CHEMICAL COMPOSITION OF MUNITIONS AND EXPLOSIVES OF CONCERN AND POTENTIAL MUNITIONS CONSTITUENTS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

General Munitions Type	Type/Model	Case Composition	Filler	Potential Constituent
Shell, 105mm, HE, Fixed-Gun	M38A1	N/A	N/A	N/A
Projectile, 105mm, HE	M38A1	Steel	TNT or 50/50 Amatol	Iron, TNT or Iron, TNT, ammonium nitrate
Cartridge Case	M5	Brass	M1 propellant	Copper, dibutylphthalate, dinitrotoluene, diphenylamine, nitrocellulose, zinc
Fuze, Mechanical, Time	M43	Steel	Black powder, tetryl	Iron, potassium nitrate, tetryl
Mine, Antipersonnel, Practice	M8	Steel	Black powder	Iron, potassium nitrate
Fuze, Mine, Combination	M10A1	Zinc alloy	Fuze powder, priming composition	Aluminum, nitrocellulose, potassium nitrate, zinc

4.1.1.4 Field observations were recorded at locations where the team saw significant munitions debris, at significant site features, or after approximately 15 minutes of walking with no variations since the previous observation. Figure 4.1 shows the QR route and observation locations. The observation location numbers correspond to the photo station numbers in the Photograph Documentation Log (Appendix E). The QR route generally followed the proposed path, but as discussed in the SS-WP, the site visit team had the flexibility to redirect the route based on visual observations and site features.

4.1.1.5 As shown in Appendix E (Photograph Documentation Log), the SI team noted 42 field observations throughout the SI, such as topography, soil color, drainage, and the presence of any barriers. Table 4.2 summarizes pertinent field observations. Appendix D includes related field forms.

TABLE 4.2
SUMMARY OF QUALITATIVE RECONNAISSANCE OBSERVATIONS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

MRS	MEC	Munitions Debris	Munitions-related Features
Rice Valley Training Area	Belt of 60 unfired 7.62mm blank rounds	Explosively derived fragments from unidentifiable munitions Practice bomb debris	Dug-out fighting positions - assumed to be for tanks. 105mm projectile container lid

4.1.2 Data Quality Objectives

4.1.2.1 Introduction

4.1.2.1.1 DQOs are qualitative and quantitative statements that clarify study objectives and specify the type and quality of the data necessary to support decisions. The development of DQOs for a specific site takes into account factors that determine whether the quality and quantity of data are adequate for project needs, such as data collection, uses, types, and needs. While developing these DQOs in accordance with the process presented in Chapter 3, paragraph 3.1.2, of the PWP, Parsons followed the *Guidance on Systematic Planning Using th e Data Quality Objectives Process* (USEPA, 2006).

4.1.2.1.2 The goal of the TPP process is to achieve stakeholder, USACE, and applicable state and federal regulatory concurrence with the DQOs for a given site. The TPP Team approved the Rice Valley Sand Dunes DQOs at the TPP meeting on December 20, 2007. Appendix B of this SI Report presents the TPP documentation, including the DQO worksheets agreed to at the meeting. The updated DQO worksheets for the Rice Valley Training Area MRS are included in this report as Tables 4.3, 4.4, 4.5 and 4.6.

TABLE 4.3
MEC DATA QUALITY OBJECTIVE WORKSHEET
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

DQO Element Number(1)	DQO Element Description(1)	Site-Specific DQO Statement	Objective Met?
Intended Data Use(s):			
1	Project Objective(s) Satisfied	Evaluate potential presence of munitions or explosives of concern (MEC)	Yes
Intended Need Requirements:			
2	Data User Perspective(s)	Risk, remedy	Yes
3	Contaminant or Characteristic of Interest	MEC, Munitions debris	Yes
4	Media of Interest	N/A	N/A
5	Required Locations or Areas	Rice Valley Training Area MRS	Yes
6	Number of Samples Required	N/A	N/A
7	Reference Concentration of Interest or Other Performance Criteria	Visual identification of MEC or munitions debris during qualitative reconnaissance (QR)	Yes
Appropriate Sampling and Analysis Methods:			
8	Sampling Method	QR with magnetometer (Schonstedt) for avoidance	Yes
9	Analytical Method	N/A	N/A

(1) Refer to EM 200-1-2, Paragraph 4.2.

4.1.2.1.3 As stated in Subchapter 1.2 of this SI Report, data must be sufficient to do the following: 1) determine whether a removal action is necessary; 2) enable HRS scoring by the USEPA; 3) characterize the release for RI/FS initiation; and 4) complete the MRSPP.

4.1.2.1.4 DQOs cover four project objectives that SI data must satisfy: 1) evaluate potential presence of MEC; 2) evaluate potential presence of MC; 3) collect data needed to complete MRSPP scoring sheets; and 4) collect information for HRS scoring.

4.1.2.2 Munitions and Explosives of Concern Data Quality Objective

The MEC DQO was achieved by evaluating potential presence of MEC within the Rice Valley Training Area MRS boundary. The site visit team searched for visual evidence of MEC and munitions debris along the QR transects. Both MEC and munitions debris were identified within the MRS boundary during the QR.

TABLE 4.4
MC DATA QUALITY OBJECTIVE WORKSHEET
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

DQO Element Number(1)	DQO Element Description(1)	Site-Specific DQO Statement	Objective Met?
Intended Data Use(s):			
1	Project Objective(s) Satisfied	Evaluate potential presence of MC	Yes
Intended Need Requirements:			
2	Data User Perspective(s)	Risk, remedy	Yes
3	Contaminant or Characteristic of Interest	See CSM and sampling rationale tables	Yes
4	Media of Interest	Surface soil	Yes
5	Required Sampling Locations or Areas and Depths	As determined by the TPP Team, see Figure 5.2. Depth determined by field team leader	Yes
6	Number of Samples Required	11 surface soil samples and associated QC samples (1 additional soil sample was collected in lieu of the proposed surface water/groundwater sample due to the absence of water on site)	Yes
7	Reference Concentration of Interest or Other Performance Criteria	USEPA Region 9 Industrial PRGs and CAL-Modified Industrial PRGs, now updated with USEPA-ORNL screening values for comparison with metals concentrations of ambient samples (#11, 12, 13). USEPA EcoSSLs	Yes
Appropriate Sampling and Analysis Methods:			
8	Sampling Method	Samples collected in accordance with the PSAP and PSAP Addendum	Yes
9	Analytical Method	Explosives: Method SW846-8321A; Metals: Methods SW846-6010B or 6020	Yes

(1) Refer to EM 200-1-2, Paragraph 4.2.

4.1.2.3 Munitions Constituents Data Quality Objective

The MC DQO was achieved by evaluating the potential presence of MC in the single MRS at the former Rice Valley Sand Dunes. Table 4.1 summarizes the MC associated with the ordnance potentially used at the former Rice Valley Sand Dunes. The TPP Team agreed on the list of analytes for sample analysis based on the munitions potentially used at the site. Chapter 5 presents the MC sampling and analysis results, which indicate that there is MC contamination present in the soil samples collected at the former Rice

Valley Sand Dunes. Appendix G presents the QA and QC reports generated during the data validation process. No concerns regarding data quality were noted.

TABLE 4.5
MRSPP DATA QUALITY OBJECTIVE WORKSHEET
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Module	MRSPP Table No.	Table Description	Known Data	Current Data Gap	Data Source
Explosive Hazard Evaluation (EHE)	1	Munitions Type	X		Historical records/findings
	2	Source of Hazard	X		Historical maps
	3	Location of Munitions	X		Historical or field findings
	4	Ease of Access	X		Field findings
	5	Status of Property	X		Historical records
	6	Population Density	X		U.S. Census Bureau
	7	Population Near Hazard	X		Field findings
	8	Types of Activities/Structures	X		Regional zoning
	9	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	10	Determining the EHE	X		Scores from Tables 1 through 9
Chemical Warfare Materiel (CWM) Hazard Evaluation (CHE)	11	CWM Configuration	X		Historical records/findings
	12	Sources of CWM	X		Historical records/findings
	13	Location of CWM	X		Historical records/findings
	14	Ease of Access	X		Field findings
	15	Status of Property	X		Historical records
	16	Population Density	X		U.S. Census Bureau
	17	Population Near Hazard	X		Field findings
	18	Types of Activities/Structures	X		Regional zoning
	19	Ecological and/or Cultural Resources	X		State Historic Preservation Office
	20	Determining the CHE	X		Scores from Tables 11 through 19
Health Hazard Evaluation (HHE)	21	Groundwater Data	X		NA
	22	Surface Water – Human Endpoint	X		NA
	23	Sediment – Human Endpoint	X		NA
	24	Surface Water – Ecological Endpoint	X		NA
	25	Sediment – Ecological Endpoint	X		NA
	26	Surface Soil	X		Surface soil sampling results
	27	Supplemental Contaminant Hazard Factor	X		All MC sampling results
	28	Determining the HHE	X		Scores from Tables 21 through 27
	29	MRS Priority	X		Scores from Tables 10, 20, and 28
	A	MRS Background Information	X		DoD databases

4.1.2.4 Munitions Response Site Prioritization Protocol Data Quality Objective

The MRSPP DQO was achieved by obtaining sufficient information to complete the MRSPP scoring sheets. Specific input data was collected, and the three modules for the MRSPP were populated as part of the SI. Appendix K includes the MRSPP scoring sheets.

TABLE 4.6
HRS DATA QUALITY OBJECTIVE WORKSHEET
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Data Description	Known Data	Current Data Gap	Data Source
Source Type	X		Historical records/findings
Estimated Volume or Area	X		NA
Hazardous Substance	X		Constituents of suspected munitions
Groundwater Sample Concentration	X		NA
Groundwater Use	X		Well records
Surface Water Sample Concentration	X		NA
Surface Water Pathways	X		Field findings
Soil Sample Concentration	X		Sample results
Soil Pathways	X		Field findings
Sensitive Environments	X		State Historic Preservation Office, U.S. Fish and Wildlife Service, various government agencies
Attractiveness/Accessibility	X		Field findings / land use records

4.1.2.5 Hazard Ranking System Data Quality Objective

The HRS DQO was achieved by including information in the SI report necessary for the USEPA to populate the HRS score sheets. Source documents for the HRS information include the INPR, the ASR, the ASR Supplement, the MC sampling results reported in Chapter 5 of this SI Report, and information from local and state agencies regarding population, groundwater well users, and drinking water use.

4.2 RICE VALLEY TRAINING AREA

4.2.1 Historical Munitions and Explosives of Concern

4.2.1.1 The Rice Valley Training Area MRS boundary is coincident with the FUDS boundary and includes 24,276 acres of land. No historic maps or photos of the site indicate the location of any ranges within the FUDS. Little is known about the types of training exercises were actually performed at the FUDS. The potential munitions list in the ASR Supplement is based on munitions found during a 1969 clearance operation, the site's inclusion on a map of the CAMA, and the fact that some CAMA areas were used for Operation Desert Strike in 1964. The ASR Supplement lists the potential munitions for the MRS as general small arms ammunition, M54 37mm HE projectiles, M48 75mm HE howitzer projectiles, M38 105mm fixed-gun projectiles, and M8 practice antipersonnel mines.

4.2.1.2 The USACE Los Angeles District conducted a one-day field visit in support of the 1994 INPR, which focused on the FUDS boundary as initially defined in the INPR: the area 2,000 feet to either side of the power line. The INPR field team found no evidence of MEC, munitions debris, or any other munitions-related features. A more thorough field visit conducted in support of the ASR between January 8 and January 19, 1995, covered portions of the area investigated during the INPR field visit as well as portions of the expanded FUDS as defined in the ASR. However, the ASR field team also failed to find any munitions, munitions debris, or munitions-related features.

4.2.2 Inspection Activities

To assess potential MEC contamination within the Rice Valley Training Area MRS, the site visit team conducted approximately 39 miles of QR (Figure 4.1). The team identified both MEC and munitions debris during the QR. The MEC identified by the team consisted of a linked belt of 60 7.62mm blank rounds located in the southwest quadrant of the MRS. The casings were stamped "LC 64," indicating that they were manufactured in 1964 and are most likely associated with Operation Desert Strike, which took place that year. Munitions debris identified within the MRS consisted of metal fragments generated by the detonation of HE munitions and practice munitions debris. None of the fragments found were large enough to determine the types of ordnance used at the site. The only indication of munitions type found during the SI was a lid to a 105mm howitzer round container. No target remnants were found during the SI, but the team found several dug-out fighting positions that are assumed to be firing positions for either tanks or howitzers. Based on the limited coverage of the MRS achieved during the SI, it appears that the range was aligned approximately north-northwest to south-southeast, with the firing positions in the north-central portion of the FUDS and the target area in the southeast. While conducting QR, the site visit team observed a desert tortoise and practiced avoidance.

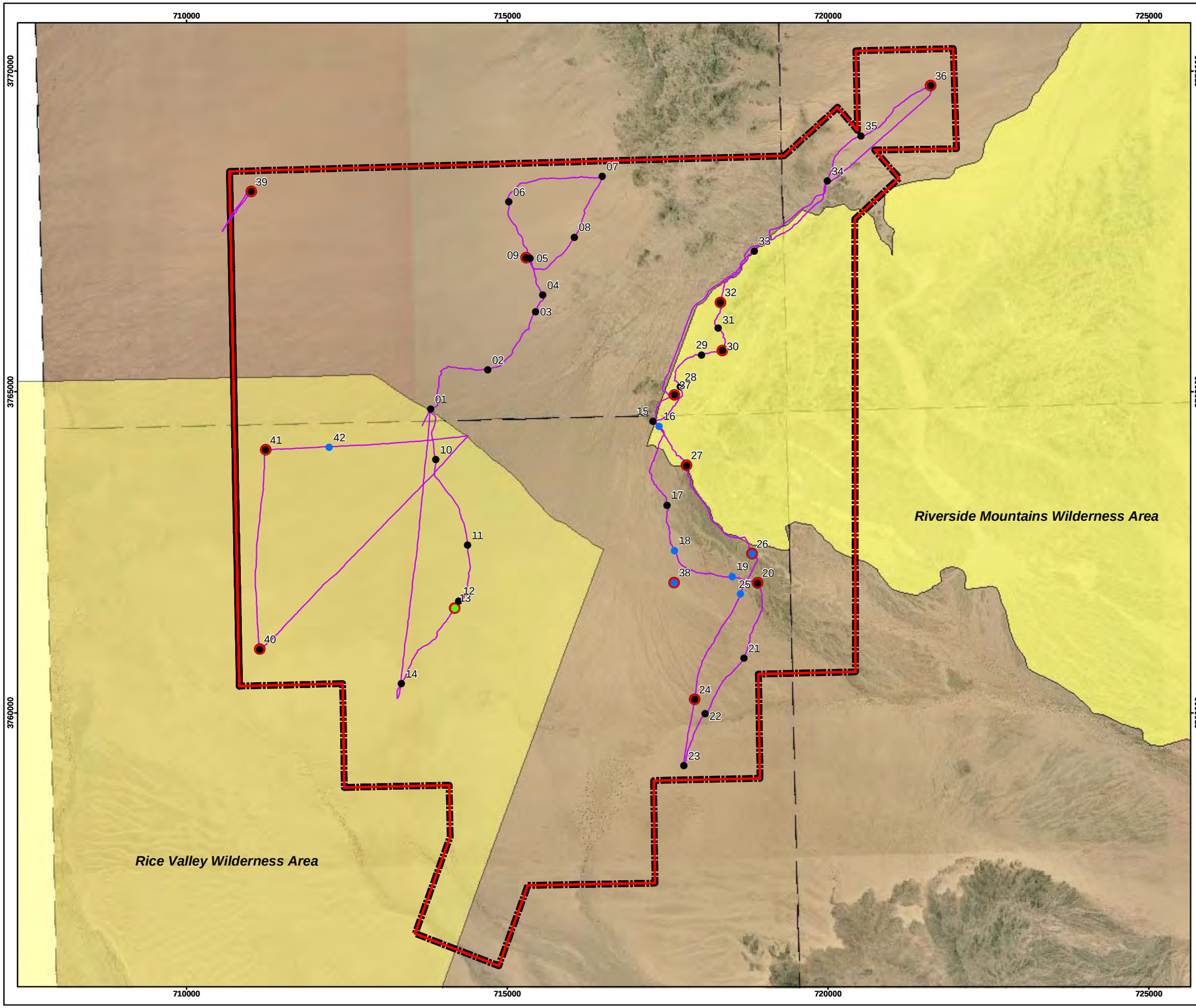


Figure 4.1

Qualitative Reconnaissance and Field Observation Locations Rice Valley Sand Dunes

FUDS Project No. J09CA005001

Riverside County, California

Legend

- 16 Munitions Debris Location
- 13 Small Arms Observation Location
- 12 Other Field Observation Location
- Soil Sample Location
- Training Area Boundary
- FUDS Boundary
- Qualitative Reconnaissance Track
- Wilderness Area

Site Location in California

N

Image: Orthophotos, 1999
Projection: UTM Zone 11 NAD83, Map Units in Meters

5,000 2,500 0 5,000 Feet

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER
DESIGNED BY: BT	Qualitative Reconnaissance and Field Observation Locations
DRAWN BY: BT	
CHECKED BY: GV	SCALE: As Shown — PROJECT NUMBER: 744653.84105
SUBMITTED BY: DS	DATE: September 2008 — PAGE NUMBER: 4-11
	FILE: X:\GIS\Site_inspections_sw\Maps\ ricevalley_ca\ Fig4_1.mxd

CHAPTER 5

MIGRATION/EXPOSURE PATHWAYS AND TARGETS

5.1 INTRODUCTION

5.1.1 This chapter of the SI Report evaluates the potential for release of MC to the environment, based on site-specific conditions. It is necessary to evaluate site-specific conditions and land use to assess risks posed to potential receptors under current and future land use scenarios. Exposure pathways for groundwater, surface water and sediment, soil, and air are evaluated. The conceptual site exposure model (CSEM) for the former Rice Valley Sand Dunes (Appendix J) summarizes which potential receptor exposure pathways are (or may be) complete and which are (and are likely to remain) incomplete. An exposure pathway is not considered to be complete unless all four of the following elements (in italics) are present (USEPA, 1989). An example regarding a hypothetical groundwater exposure pathway accompanies the elements.

- *A source of contamination*. For example, a site has known MEC from which MC have leached and contaminated surface soil.
- *An environmental transport and/or exposure medium*. The MC in soil at the site are mobile and can contaminate groundwater.
- *A point of exposure at which the contaminant can interact with a receptor*. A drinking water well drawing from the contaminated aquifer is at the site.
- *A receptor and a likely route of exposure at the exposure point*. An onsite resident uses groundwater as a source of drinking water.

5.1.2 In this hypothetical example, all four factors are present and, therefore, the groundwater exposure pathway is complete. If any single factor was not present (e.g., MC were not present in soil, or the resident used drinking water from another source), the pathway would be incomplete.

5.1.3 This chapter presents the information required to evaluate each pathway's potential for adverse affect on a receptor. It also addresses those constituents that require further consideration in a screening-level risk assessment (SLRA). Chapter 6 assesses the potential significance of complete pathways (i.e., whether there is an unacceptable risk).

5.2 GENERAL INFORMATION

General information regarding the geology, hydrogeology, and hydrology of the former Rice Valley Sand Dunes is presented in the following subchapters, followed by a discussion of MRS-specific characteristics and sampling results for the Rice Valley Training Area MRS.

5.2.1 Regional Geologic and Hydrogeologic Setting

5.2.1.1 The former Rice Valley Sand Dunes is in the Mojave Section of the Basin and Range Physiographic Province (USGS, 2002). The former Rice Valley Sand Dunes is at the southeastern end of Rice Valley in southeast California. The FUDS is bounded by the Big Maria Mountains to the south and southwest, the Riverside Mountains to the east, and the West Riverside Mountains to the north. Rice Valley extends to the northwest of the site. The valley is split by the sand dunes from which the FUDS derives its name, although the largest expanse of dunes starts approximately 2 miles west of the site and continues to the northwest.

5.2.1.2 The bedrock in the region is primarily composed of igneous rock from the late Paleozoic to early Mesozoic Eras. The major components of the Big Maria Mountains are granitic and gneissic plutonic rocks. The age of the gneisses has not been constrained any further than late Paleozoic or early Mesozoic, but the granites are generally Jurassic in age. These mountains also include some metasedimentary rocks from the early Jurassic to Triassic Periods. The Riverside Mountains are composed of similar rock, although Jurassic and Triassic metasedimentary rocks are more common in these mountains than in the Big Marias. The Riversides also include notable sequences of Tertiary Period rocks, which are composed of sedimentary breccias and slide blocks. These sequences are generally found on the edges of the range and can contain basal red sandstone up to 150 meters in thickness. The FUDS boundary includes the western slope of the Riversides.

5.2.1.3 Rice Valley is covered by two types of Quaternary sediments: alluvium transported from the nearby mountain ranges and aeolian sand dunes and sheets. The alluvium is more common within the FUDS boundary, but there are dunes in the southwestern corner of the site. Both landforms are generally composed of fine-grained sands; however, the alluvium may contain coarser material closer to the mountains (USGS, 2006).

5.2.1.4 The Basin and Range Province contains three distinct aquifer types: volcanic rock aquifers, carbonate rock aquifers, and basin fill aquifers. The basin fill aquifer system is the only type present in the vicinity of the former Rice Valley Sand Dunes. Most of the basin fill forming these aquifers is unconsolidated sediment washed down from the adjacent mountains during the Pliocene and Holocene. Groundwater flow systems in the basin fill aquifers are typically limited to individual basins, although rarely two or more basins can be hydraulically connected. Recharge to individual basin fill aquifers is typically via stream flow from the mountains into the coarse sediments of the

alluvial fans. Overland flow rapidly infiltrates the coarser sediment, which conducts the water toward the finer-grained sediments at the center of the basins. Very little water exits the basins via surface flow, and nearly all natural water loss is through evapotranspiration (USGS, 1996).

5.2.2 Regional Groundwater Use

5.2.2.1 The CDPH was contacted regarding state and county regulated public groundwater and surface water supplies in the area. The department indicated that there are no wellhead protection areas within 4 miles of the FUDS and no surface water intakes within 15 miles of the FUDS for Riverside and San Bernardino Counties. The USEPA was contacted regarding tribal drinking water supplies; the agency indicated that there are no tribal public water systems within 4 miles of the FUDS.

5.2.2.2 Well data is protected in California, so a request for well information was submitted through Banks Information Solutions, Inc, which contacted the appropriate authorities and collated the well information they received. According to the report issued by Banks, there are no groundwater wells within 4 miles of the former Rice Valley Sand Dunes.

5.2.2.3 The former Rice Valley Sand Dunes is managed by the BLM in part as two designated wilderness areas and in part as multi-use public lands. The SI team observed no residences within the FUDS boundary or within 2 miles of the boundary. Although census data (Table 2.1 and Figure 2.2) show five inhabitants potentially living within ¼ mile of the FUDS boundary, these people live in a census block that is over 16 miles long. Based on the site visit team's observations during the SI field work, it is unlikely that the residents live anywhere near the FUDS.

5.2.3 Regional Hydrologic Setting

5.2.3.1 There are no permanent water bodies within the Rice Valley Sand Dunes FUDS. Numerous intermittent streams run into the site from the northern and eastern mountains. The site visit team crossed many of these stream beds, all of which were dry. Given the arid nature of the region, it is likely that water only flows in these channels during significant precipitation. The stream beds crossed by the team were generally larger in the mountains and became smaller as they reached the valley floor. The lowest elevation in the area is in the southwest corner of the FUDS, and most of the intermittent streams starting in or entering the FUDS tend to end within the FUDS, with all of the water either infiltrating the basin fill aquifer or evaporating en route.

5.2.3.2 The Colorado River is approximately 10 miles east of the site at its closest point, on the other side of the Riverside Mountains. The Colorado River Aqueduct, which carries water between Parker Dam and communities on the west coast of southern California, runs east to west approximately 6 miles north of the FUDS. It is highly unlikely that surface water from the FUDS reaches these water bodies.

5.2.4 Regional Sensitive Environmental Resources

5.2.4.1 California supports 309 federally listed T&E species consisting of 130 animals and 179 plants. According to the Biogeographic Data Branch's California Natural Diversity Data Base (CNDDB), Riverside County supports 40 federally listed T&E species consisting of 23 animals and 17 plants. Riverside County is home to an additional 32 California-listed species that are considered threatened, endangered, or rare. The CNDDB lists the desert tortoise (*Gopherus agassizii*) as the only federal and state-listed species known to occur within the area of the former Rice Valley Sand Dunes site. According to the California Department of Fish and Game (CDF&G), the desert tortoise occurs throughout Riverside County. The habitat requirements of the tortoise may be found within the Rice Valley Sand Dunes FUDS boundary. The site visit team observed a desert tortoise while conducting the QR and practiced avoidance. Although the CNDBB does not list other species within this area, other T&E species could be on site, as stated in the ASR.

5.2.4.2 The USFWS (National Wetlands Inventory) Wetlands Online Mapper was used to identify the wetlands within the former Rice Valley Sand Dunes. No wetland data were identified for this site. The site visit team did not find any surface water during the QR performed in the FUDS.

5.2.4.3 Portions of the former Rice Valley Sand Dunes overlap wilderness areas managed by the BLM. The southwest portion of the site is located in the Rice Valley Wilderness Area. The plains of Rice Valley and the northwestern tip of the steep and rugged Big Maria Mountains lie within the borders of this wilderness. The valley is part of a massive sand sheet which extends from Cadiz Valley through Ward Valley, representing a part of one of the largest dune systems in the California Desert. The east-central portion of the site is located within the Riverside Mountains Wilderness Area. These wilderness areas are special places where the environment is essentially undisturbed; they retain a primeval character and generally appear to have been affected primarily by the forces of nature. These areas are managed by the BLM in part to provide primitive desert recreation activities. Based on this information, the observation of the desert tortoise, and a review of the Army Checklist for Important Ecological Places (USACE, 2006), the former Rice Valley Sand Dunes is considered an important ecological place. Therefore, ecological receptors are considered to be present at the site.

5.2.5 Sample Locations and Methods

5.2.5.1 Direct release of MC from munitions activities at the former Rice Valley Sand Dunes would have been to soil, with potential migration to surface water, sediment, groundwater, or air (through fugitive dust). The TPP Team agreed that 13 soil samples and one groundwater/surface water sample would be collected at the Rice Valley Sand Dunes FUDS. The proposed soil samples included three background (ambient) soil samples to be collected within the FUDS boundary away from the suspected range location.

5.2.5.2 As discussed in the TPP meeting, the exact locations of the soil samples were determined by the field team leader based on conditions observed during the QR. Samples were collected in the vicinity of identified MEC, munitions debris, or assumed firing points, or from dry washes downgradient from the mountains, which were the assumed targets for CAMA and Desert Strike training exercises. The proposed groundwater / surface water sample was collected as a soil sample due to the lack of water in the MRS and given the identification, RVSD-MRS01-SS-06-14. Sedimentation rates at the site were not significant enough to require sampling of an additional depth interval at any of the sample locations, so the additional soil sample was collected at a new location adjacent to observed munitions debris. Figure 5.1 shows the location of each sample, and Table 5.1 gives the rationale behind each location.

5.2.5.3 The UXO technician used a Schonstedt GA-72CX magnetic locator to screen each soil sample location before final location selection and sample collection. In accordance with the PSAP Addendum, the Cold Regions Research and Engineering Laboratory (CRREL) seven-point wheel sampling technique was employed for soil samples. Soil sample depth was determined by the field team leader based on estimated sedimentation rates at each sample location. Most munitions debris observed during the QR was lying directly on the ground surface and was generally not buried. It was assumed that sedimentation rates were negligible or that sediment was being eroded near the mountains and foothills. The majority of the samples were collected from 0 to 4 inches below ground surface (bgs). The exceptions were samples RVSD-MRS01-SS-06-01, -02, -03, -06, and -07, which were all collected from the soil deposited at the bottom of dry washes crossed by the site visit team. It was assumed that the target area for the FUDS was the Riverside Mountains on the southern and eastern sides of the site and that MC in the target area may have been mobilized by erosion. Given the much higher sedimentation rates within the dry stream beds, these samples were collected from 4 to 8 inches bgs. The coordinates for each sample location were recorded and updated in the Geographic Information System (GIS) database.

5.2.6 Background Concentrations

5.2.6.1 To assess the concentration of metals naturally present at the FUDS, three ambient samples (RVSD-A-SS-06-11, RVSD-A-SS-06-12, and RVSD-A-SS-06-13) were collected during the SI and analyzed for metals and explosives. The analytical results for these soil samples are presented in Table 5.2.

5.2.6.2 The ambient samples indicate the range of naturally occurring metals concentrations in the soil. Table 5.3 summarizes the maximum metals concentrations detected in the collected background (ambient) samples. These values are used to determine the background concentrations in soil for the site, and are one of the criteria used to evaluate whether a source of MC contamination is present (Subchapter 5.3.4.5). These background concentrations were then compared to the maximum detected metals concentrations found in the MC-biased location samples obtained within the MRS.

TABLE 5.1
SAMPLING RATIONALE
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Sample ID	Sample Coordinates		Media	Analysis	Potential Munitions	Rationale
	Longitude	Latitude				
RVSD-MRS01-SS-06-01	-114.6357001	34.01552125	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in dry wash in the Riverside Mountains, the assumed target for training fire at the FUDS. Most of the mountains were composed of bedrock or shaley eroded material too large for sampling.
RVSD-MRS01-SS-06-02	-114.6355281	34.00874415	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in dry wash in the Riverside Mountains, the assumed target for training fire at the FUDS. Most of the mountains were composed of bedrock or shaley eroded material too large for sampling.
RVSD-MRS01-SS-06-03	-114.6437726	34.00267055	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in dry wash in the Riverside Mountains, the assumed target for training fire at the FUDS. Most of the mountains were composed of bedrock or shaley eroded material too large for sampling.
RVSD-MRS01-SS-06-04	-114.642018	33.99277202	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected near the proposed location in the Riverside Mountains, the assumed target for training fire.
RVSD-MRS01-SS-06-05	-114.6313499	33.98013356	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected adjacent to observed munitions debris (unidentifiable frag).
RVSD-MRS01-SS-06-06	-114.6304849	33.9760155	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in dry wash downgradient from assumed target location.
RVSD-MRS01-SS-06-07	-114.641554	33.9598652	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in dry wash downgradient from assumed target location.
RVSD-MRS01-SS-06-08	-114.6682668	34.02246647	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in dug-out fighting position. Assumed to be firing point.
RVSD-MRS01-SS-06-09	-114.6816468	33.97347763	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected adjacent to observed MEC (belt of 60 unfired 7.62mm blanks).
RVSD-MRS01-SS-06-10	-114.5993651	34.04528946	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected at the proposed location in the valley east of the Riverside Mountains.
RVSD-A-SS-06-11	-114.7143708	34.03259547	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in an area not expected to have been affected by DoD activities. Ambient data for comparison.
RVSD-A-SS-06-12	-114.7129365	33.99628976	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in an area not expected to have been affected by DoD activities. Ambient data for comparison.
RVSD-A-SS-06-13	-114.7146553	33.96832075	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected in an area not expected to have been affected by DoD activities. Ambient data for comparison.
RVSD-MRS01-SS-06-14	-114.6445554	33.97632497	Soil	Explosives, metals	Small arms, general; Cartridge, 37mm, HE, fixed, M54; Shell, 75mm, howitzer, HE, M48; Shell, 105mm, fixed, HE, M38; Mine, antipersonnel, practice, M8	Collected adjacent to observed munitions debris (fuze piece and unidentifiable frag).

BR = bombing range
SS = surface soil
MC = munitions constituents
A = ambient

TABLE 5.2
SUMMARY OF SURFACE SOIL ANALYTICAL RESULTS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

SAMPLE ID:		RVSD-A-SS-06-11*		RVSD-A-SS-06-12*		RVSD-A-SS-06-13*		RVSD-A-SS-06-16**		RVSD-MRS01-SS-06-01		RVSD-MRS01-SS-06-02		RVSD-MRS01-SS-06-03		RVSD-MRS01-SS-06-04		RVSD-MRS01-SS-06-05		RVSD-MRS01-SS-06-15**		RVSD-MRS01-SS-06-06		RVSD-MRS01-SS-06-07		RVSD-MRS01-SS-06-08		RVSD-MRS01-SS-06-09		RVSD-MRS01-SS-06-10		RVSD-MRS01-SS-06-14	
DATE SAMPLED:		03/30/08		03/30/08		03/30/08		03/30/08		03/27/08		03/27/08		03/27/08		03/26/08		03/26/08		03/26/08		03/26/08		03/26/08		03/25/08		03/25/08		03/27/08		03/27/08	
LAB SAMPLE ID:		D8D010256001		D8D010256002		D8D010256003		D8D010256004		D8D010251001		D8D010251002		D8D010251003		D8C280312005		D8C280312001		D8C280312002		D8C280312003		D8C280312004		D8C270325001		D8C270325002		D8D010251004		D8D010251005	
	Units																																
Explosives - SW8321A																																	
1,3,5-Trinitrobenzene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
1,3-Dinitrobenzene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
2,4,6-Trinitrotoluene (TNT)	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
2,4-Dinitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
2,6-Dinitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
2-Amino-4,6-dinitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
2-Nitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
3-Nitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
4-Amino-2,6-dinitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
4-Nitrotoluene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	µg/kg	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U	180	U
Methyl-2,4,6-trinitrophenylnitramine (Tetryl	µg/kg	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U	300	U
Nitrobenzene	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
Nitroglycerin	µg/kg	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	µg/kg	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U	120	U
Pentaerythritol Tetranitrate (PETN)	µg/kg	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U	500	U
Metals - SW6010B/6020																																	
Aluminum	mg/kg	**5300**		**4700**		**2500**		**2800**		**6300**		**5300**		**5300**		**12000**		**7400**	J	**7400**		**6500**		**3900**		**6200**		**5800**		**8100**		**5400**	
Antimony	mg/kg	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.27	U	0.27	U	0.25	U	0.25	UJ	0.25	U	0.25	U	0.27	U	0.25	U	0.30	U	0.26	U	0.26	U
Barium	mg/kg	**57**		**56**		**32**		**30**		**230**		**140**		**120**		**150**		**110**	J	**100**		**110**		**96**		**100**		**72**		**130**		**260**	
Beryllium	mg/kg	**0.24**		**0.22**		**0.15**		**0.13**		**0.33**		**0.32**		**0.28**		**0.52**		**0.36**		**0.35**		**0.34**		**0.20**		**0.32**		**0.28**		**0.37**		**0.27**	
Cadmium	mg/kg	**0.19**		**0.19**		**0.13**		**0.12**		**0.36**		**0.42**		**0.29**		**0.36**		**0.25**		**0.26**		**0.28**		**0.23**		**0.22**		**0.23**		**0.29**		**0.31**	
Calcium	mg/kg	**3700**		**3600**		**1200**		**1400**		**14000**		**13000**		**18000**		**23000**		**46000**	J	**43000**		**18000**		**16000**		**13000**		**8300**		**20000**		**11000**	
Cobalt	mg/kg	**2.7**		**2.4**		**1.3**		**1.2**		**8.8**		**4.1**		**5.4**		**5.3**		**3.4**		**3.4**		**4.6**		**2.4**		**3.8**		**2.9**		**4.7**		**7.4**	
Copper	mg/kg	**5.2**		**5.0**		**3.1**		**2.8**		**22**		**8.8**		**14**		**10**		**4.7**		**4.5**		**7.6**		**4.6**		**5.5**		**6.5**		**6.0**		**5.3**	
Iron	mg/kg	**11000**		**9600**		**4600**		**5800**		**31000**		**22000**		**19000**		**18000**		**10000**	J	**10000**		**20000**		**16000**		**12000**		**11000**		**15000**		**10000**	
Lead	mg/kg	**4.0**		**4.1**		**2.4**		**2.2**		**49**		**9.6**		**8.6**		**7.0**		**5.2**	J	**4.8**		**7.3**		**6.7**		**5.8**		**5.9**		**6.1**		**6.9**	
Magnesium	mg/kg	**2700**		**2400**		**990**		**1200**		**4500**		**2900**		**3400**		**7300**		**3900**		**3900**		**4100**		**1900**		**4000**		**3200**		**5200**		**2800**	
Manganese	mg/kg	**180**		**160**		**88**		**84**		**720**	J	**400**	J	**440**	J	**350**		**160**	J	**160**		**390**		**180**		**310**		**200**		**340**	J	**860**	J
Nickel	mg/kg	**4.2**		**4.2**		**2.3**		**2.0**		**6.1**		**3.4**		**4.6**		**9.2**		**6.8**		**6.8**		**6.2**		**3.6**		**5.4**		**5.2**		**7.6**		**6.0**	
Potassium	mg/kg	**1700**		**1600**		**720**		**830**		**2600**		**3000**		**2300**		**4300**		**1800**		**1700**		**2500**		**1200**		**2200**		**1800**		**3100**		**1700**	
Selenium	mg/kg	**0.16**	J	**0.19**	J	**0.18**	J	**0.14**	J	0.50	U	**1.2**		0.62	U	**0.52**		**0.35**	J	**0.32**	J	**0.50**	J	**0.46**	J	**0.21**	J	**0.27**	J	0.53	U	0.53	U
Silver	mg/kg	**0.020**	J	**0.017**	J	0.10	U	0.10	U	**0.018**	J	0.11	U	0.11	U	**0.037**	J	**0.021**	J	**0.019**	J	**0.016**	J	0.11	U	**0.024**	J	**0.021**	J	**0.025**	J	**0.035**	J
Sodium	mg/kg	**86**	J	**85**	J	580	U	580	U	**95**	J	610	U	**72**	J	**130**	J	**79**	J	**77**	J	**75**	J	**65**	J	**94**	J	**96**	J	**93**	J	**73**	J
Thallium	mg/kg	**0.076**	J	**0.073**	J	**0.031**	J	**0.029**	J	**0.17**		**0.18**		**0.12**		**0.17**		**0.099**	J	**0.088**	J	**0.13**		**0.049**	J	**0.13**		**0.087**	J	**0.17**		**0.10**	J
Vanadium	mg/kg	**11**		**11**		**5.8**		**4.9**		**30**		**13**		**19**		**24**		**22**	J	**20**		**19**		**20**		**19**		**13**		**21**		**17**	
Zinc	mg/kg	**17**		**16**		**8.4**		**7.8**		**46**		**34**		**26**		**35**		**18**	J	**17**		**26**		**14**		**31**		**22**		**29**		**20**	

NOTES AND DATA QUALIFIERS:

(NO CODE) - Confirmed identification.
U - Analyte was analyzed for but not detected above the sample specific practical quantitation limit (PQL_sa).
UJ - Analyte not detected; reported PQL_sa may be inaccurate or imprecise.
J - Analyte detected; estimated concentration.
* - Ambient sample.
** - Field duplicate of sample on left.
Detections are bolded.

TABLE 5.3
BACKGROUND SOIL COMPARISON CONCENTRATIONS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Analyte	Maximum Ambient Concentration (mg/kg)(1)
Aluminum	5,300
Antimony	<0.25
Barium	57
Beryllium	0.24
Cadmium	0.19
Calcium	3,700
Cobalt	2.7
Copper	5.2
Iron	11,000
Lead	4.0
Magnesium	2,700
Manganese	180
Nickel	4.2
Potassium	1,700
Selenium	0.19
Silver	0.02
Sodium	86
Thallium	0.076
Vanadium	11
Zinc	17

(1) mg/kg = milligrams per kilogram.

5.2.7 Munitions Constituents Source Evaluation

5.2.7.1 Soil samples were analyzed for explosives (Method SW846-8321A) and metals (Methods SW846-6010 or 6020B) by TestAmerica Laboratories, Incorporated (TestAmerica) in Arvada, Colorado. The results of these analyses were evaluated to determine whether exposure pathways are considered complete at the Rice Valley Training Area MRS. An exposure pathway is not considered to be complete unless MC contamination is present. For an analyte to be considered as MC contamination related to a release from munitions-related activities at the FUDS, all of the following conditions must be met:

- The analyte is detected in the sample medium;
- The analyte is present above the selected background concentration (if applicable); and
- The analyte is a potential constituent of the munitions formerly used at the site (see Table 4.1).

5.2.7.2 There is no known potential source of explosives at the former Rice Valley Sand Dunes except for DoD use of the FUDS as a training area. Therefore, any detected explosives at the FUDS would be considered MC contamination and would be retained for the SLRA. Analytes that are considered essential nutrients (calcium, iron, magnesium, potassium, and sodium) are not expected to pose an unacceptable human health or ecological risk and are not retained for consideration in the SLRA.

5.3 RICE VALLEY TRAINING AREA

5.3.1 Historical Munitions Constituents Information

The Rice Valley Training Area MRS boundary is coincident with the FUDS boundary and includes 24,276 acres of land. Its location is based on a historic map of clearance status for CAMA property. No historic maps or photos of the site indicate the possible location of a range within the MRS, and little is known about what sorts of training exercises were actually performed in the MRS. No historical MC-related groundwater, surface water, soil, or air sampling has been documented at this MRS.

5.3.2 Groundwater Migration Pathway

Groundwater can serve as a contaminant transport mechanism that may affect surface water bodies, drinking water supplies, vegetation, and sensitive environments such as wetlands. The likelihood of exposure is influenced by such factors as the volume and concentration of contaminated soil at the ground surface that can be transported to the groundwater, site-specific geology, climate, and the expected future land use.

5.3.2.1 Geologic and Hydrogeologic Setting

There are no known differences between the geologic and hydrogeologic setting at the Rice Valley Training Area MRS and the setting described for the site in Subchapter 5.2.

5.3.2.2 Releases and Potential Releases to Groundwater

There are no identified releases of MC to groundwater at the Rice Valley Training Area MRS.

5.3.2.3 Groundwater Migration Pathway and Receptors

5.3.2.3.1 Well data is protected in California, so a request for well information was submitted through Banks Information Solutions, Inc, which contacted the appropriate authorities and collated the well information they received. According to the report issued by Banks, there are no groundwater wells within 4 miles of the former Rice Valley Sand Dunes. No wells were observed in the Rice Valley Training Area MRS during the SI field work.

5.3.2.3.2 As shown in Table 2.1, census data indicate that five people potentially live within a 4-mile radius of the Rice Valley Training Area MRS. However, none of them

live within the MRS boundary. Although the data indicate that these residents could live within ¼ mile of the MRS, the census block in which the residents live is over 16 miles long. It is more likely that the five residents live near Blythe, California, on the southern end of the census block. No residents live within the Rice Valley Training Area MRS; therefore, residents are not considered potential receptors at this site. Potential site users include BLM personnel and any visitors to the site. Therefore, potential groundwater receptors at this MRS include commercial/industrial workers (BLM personnel) and site visitors. Although ecological receptors are present at this MRS, it is not anticipated that they will access the groundwater. Therefore, the groundwater migration pathway for ecological receptors is incomplete.

5.3.2.4 Groundwater Sample Locations and Methods

One water sample, either groundwater or surface water, was planned for the SI if a source of water was identified in the MRS. However, all available data indicate that there are no water wells within 4 miles of the MRS. Therefore, groundwater samples were not collected during the SI.

5.3.2.5 Groundwater Migration Pathway Analytical Results

Groundwater samples were not collected during the SI at the Rice Valley Training Area MRS.

5.3.2.6 Groundwater Migration Pathway Conclusions

There are no groundwater wells within 4 miles of the MRS; therefore, it is not possible for human receptors to contact potentially contaminated groundwater. Additionally, groundwater is not directly accessible to most organisms except deeply rooted plants. Exposure for ecological receptors would be limited to secondary ingestion via ingestion of deeply rooted plants. Therefore, the groundwater migration pathway is considered incomplete for all receptors.

5.3.3 Surface Water and Sediment Migration Pathways

Surface water and sediment can serve as contaminant transport mechanisms that may affect surface water bodies, sediment, drinking water supplies, vegetation, and sensitive environments such as wetlands.

5.3.3.1 Hydrologic Setting

The MRS boundary is coincident with the FUDS boundary. Therefore, there are no differences between the hydrologic setting at the Rice Valley Training Area MRS and the setting described for the site in Subchapter 5.2.

5.3.3.2 Releases and Potential Releases to Surface Water and Sediment

There are no known releases of MC to surface water or sediment at the Rice Valley Training Area MRS.

5.3.3.3 Surface Water and Sediment Migration Pathway and Receptors

Surface water and sediment receptors include commercial/industrial workers (BLM personnel), site visitors, and ecological receptors.

5.3.3.4 Surface Water and Sediment Sample Locations and Methods

One water sample, either groundwater or surface water, was planned for the SI if a source of water was identified in the MRS. However, there was no surface water present during the SI field work. Also, all of the sediment was completely dry in the stream beds observed by the site visit team. While samples were collected from several intermittent stream beds, these were considered soil samples. No surface water or sediment samples were collected during the SI.

5.3.3.5 Surface Water and Sediment Migration Pathway Analytical Results

Surface water and sediment samples were not collected during the SI at the Rice Valley Training Area MRS.

5.3.3.6 Surface Water and Sediment Migration Pathway Conclusions

There are no permanent water bodies in the MRS, and the nearest surface water body, the Colorado River Aqueduct, is 6 miles from the former Rice Valley Sand Dunes. Therefore, despite the metals detections in soil (Subchapter 5.3.4) that exceeded background values, the surface water and sediment migration pathway is considered incomplete for all potential receptors.

5.3.4 Soil Exposure Pathway

Potential soil exposure pathways include incidental ingestion, dermal contact, and inhalation of resuspended particulates by human and ecological receptors. Contamination in soil can also leach to groundwater and be transferred to surface water and sediment via runoff and erosion. Subchapters 5.3.2 and 5.3.3 discuss the groundwater and surface water/sediment exposure pathways.

5.3.4.1 Physical Source Access Conditions

The northwest corner of the MRS is approximately 3.5 miles from California State Highway 62, and a few dirt roads allow access to the site. The site visit team found no barriers that would prevent anyone from accessing the property. Therefore, access to the Rice Valley Training Area MRS is unrestricted.

5.3.4.2 Actual or Potential Contamination Areas

There are no known MC contamination areas within the Rice Valley Training Area MRS.

5.3.4.3 Soil Exposure Pathways and Receptors

Human receptors may come into contact with MC in soil via dermal contact, incidental ingestion, or inhalation of fugitive dust. According to U.S. Census 2000 data (Table 2.1 and Figure 2.2), no residents live within the Rice Valley Training Area MRS. The MRS is on BLM land and is accessible to anyone wishing to enter, although the site visit team observed no evidence suggesting that the area is used regularly. However, commercial/industrial workers (BLM personnel), site visitors, and ecological receptors are still considered potential receptors at this MRS.

5.3.4.4 Soil Sample Locations and Methods

5.3.4.4.1 All 14 soil samples collected during the SI were collected within the Rice Valley Training Area MRS. Most were collected from locations adjacent to MEC, munitions debris, or firing points, or from dry stream beds that may contain MC transported from the assumed target locations. The exceptions were the three ambient samples, RVSD-A-SS-06-11, -12, and -13, which were collected away from suspected range locations, and biased samples RVSD-MRS01-SS-06-04 and -10. Sample -04 was collected near the proposed location in the Riverside Mountains, and sample -10 was collected at the proposed location on the east side of the mountains. No munitions debris was observed in the vicinity of either location.

5.3.4.4.2 As specified in the SS-WP (Parsons, 2008a) and Subchapter 5.2.5 of this report, the UXO technician used a Schonstedt GA-72CX magnetic locator to screen all soil sample locations before final location selection and sample collection. In accordance with the SS-WP, the CRREL seven-point wheel sampling technique was employed. The GPS coordinates for each sample location were recorded and updated in the GIS database.

5.3.4.5 Soil Migration Pathway Analytical Results

5.3.4.5.1 The soil samples collected in the Rice Valley Training Area MRS were analyzed for explosives and select metals by TestAmerica; the results are listed in Table 5.2. No explosives were detected in any of the collected samples. All of the metals for which an analysis was performed were detected except for antimony. Because metals naturally occur within sediments on site, detected metal concentrations in the biased samples were compared to background metal concentrations (Table 5.3). Table 5.4 shows this comparison and indicates whether a SLRA is necessary for each metal based on the criteria described in Subchapter 5.2.6.

TABLE 5.4
RICE VALLEY TRAINING AREA MRS SOIL SOURCE EVALUATION
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Analyte	Units	Maximum Detected Site Concentration	Maximum Background Concentration(1)	Exceeds Background Concentration?	Potential MC?(2)	SLRA/SLERA Required?	Primary reason for exclusion from SLRA
Aluminum	mg/kg	12,000	5,300	**Yes**	**Yes**	**Yes**	--
Antimony	mg/kg	<0.30	<0.25	No	**Yes**	No	Not detected in MRS
Barium	mg/kg	160	57	**Yes**	**Yes**	**Yes**	--
Beryllium	mg/kg	0.52	0.24	**Yes**	No	No	Not a potential MC
Cadmium	mg/kg	0.42	0.19	**Yes**	No	No	Not a potential MC
Calcium	mg/kg	46,000	3,700	**Yes**	**Yes**	No	Essential nutrient(3)
Cobalt	mg/kg	8.8	2.7	**Yes**	No	No	Not a potential MC
Copper	mg/kg	22	5.2	**Yes**	**Yes**	**Yes**	--
Iron	mg/kg	31,000	11,000	**Yes**	**Yes**	No	Essential nutrient(3)
Lead	mg/kg	49	4.0	**Yes**	**Yes**	**Yes**	--
Magnesium	mg/kg	73,000	2,700	**Yes**	**Yes**	No	Essential nutrient(3)
Manganese	mg/kg	720	180	**Yes**	No	No	Not a potential MC
Nickel	mg/kg	9.2	4.2	**Yes**	No	No	Not a potential MC
Potassium	mg/kg	4,300	1,700	**Yes**	**Yes**	No	Essential nutrient(3)
Selenium	mg/kg	1.2	0.19	**Yes**	No	No	Not a potential MC
Silver	mg/kg	0.037	0.02	**Yes**	No	No	Not a potential MC
Sodium	mg/kg	130	86	**Yes**	No	No	Not a potential MC
Thallium	mg/kg	0.18	0.076	**Yes**	No	No	Not a potential MC
Vanadium	mg/kg	30	11	**Yes**	No	No	Not a potential MC
Zinc	mg/kg	46	17	**Yes**	**Yes**	**Yes**	--

(1) Background concentration, as established in Table 5.3
(2) Potential MC, as listed in Table 4.1
(3) Calcium, iron, magnesium, and potassium are essential nutrients and are not expected to pose a risk to human or ecological receptors.

5.3.4.5.2 As shown in Table 5.4, every metal for which an analysis was performed exceeded the background levels with the exception of antimony, which was not detected at the site. However, most of the metals are not potential constituents of the munitions that may have been used at the former Rice Valley Sand Dunes, and four of the metals that are potential MC (calcium, iron, manganese, and potassium) are considered essential nutrients and are not expected to pose a risk to human or ecological receptors. The remaining MC that could pose a risk to receptors are aluminum, barium, copper, lead, and zinc. These will be retained for consideration in the SLRA in Chapter 6.

5.3.4.6 Soil Exposure Pathway Conclusions

Based on the background value exceedances of aluminum, barium, copper, lead, and zinc, the soil exposure pathway is complete in the Rice Valley Training Area MRS. Chapter 6 discusses the risk associated with the complete pathway.

5.3.5 Air Migration Pathway

The air migration pathway accounts for hazardous substance migration in gaseous or particulate form through the air. Airborne transport of contaminants can result in exposure of human and ecological receptors to MC.

5.3.5.1 Climate

Subchapter 2.2.3 discusses climate.

5.3.5.2 Releases and Potential Releases to Air

There are no known releases of MC to air at the Rice Valley Training Area MRS.

5.3.5.3 Air Migration Pathways and Receptors

The Rice Valley Training Area MRS is potentially used by BLM personnel and site visitors. There are no residents within this MRS, as indicated in Table 2.1 and on Figure 2.2. Therefore, potential receptors include commercial/industrial workers (BLM personnel), site visitors, and ecological receptors.

5.3.5.4 Air Sampling and Monitoring Locations and Methods

There is no historical record of air sampling at the former Rice Valley Sand Dunes. Air sampling was not conducted as part of the SI within the Rice Valley Training Area MRS.

5.3.5.5 Air Migration Pathway Analytical Results

Air sampling was not conducted as part of the SI at the Rice Valley Training Area MRS.

5.3.5.6 Air Migration Pathway Conclusions

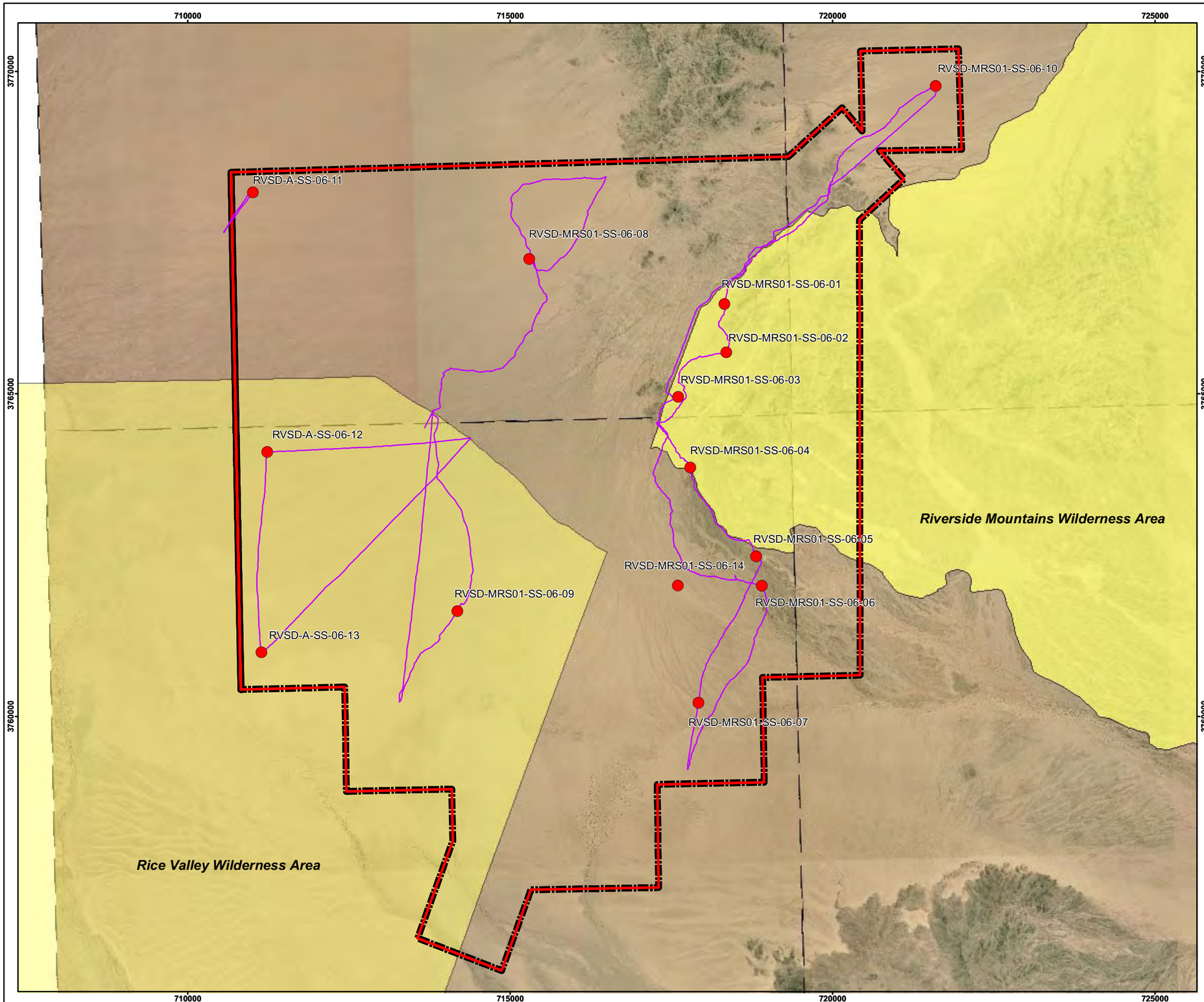
Although no air sampling was performed in the Rice Valley Training Area MRS, various metals exceeded the background criteria in the soil samples collected at the MRS (Subchapter 5.3.4). It is possible that the contaminants in the soil could mobilize into the air as fugitive dust. Therefore, based on these detections in soil, the air migration pathway is complete at the Rice Valley Training Area MRS. Chapter 6 discusses the risk associated with the complete air migration pathway.

Figure 5.1

Qualitative Reconnaissance and Sample Locations
Rice Valley Sand Dunes

FUDS Project No. J09CA005001

Riverside County, California



Legend

- Soil Sample Location
- Training Area Boundary
- FUDS Boundary
- Qualitative Reconnaissance Track
- Wilderness Area

Image: Orthophotos, 1999
Projection: UTM Zone 11 NAD83, Map Units in Meters

N

5,000 2,500 0 5,000 Feet

PARSONS	U.S. ARMY SOUTH PACIFIC DIVISION RANGE SUPPORT CENTER
DESIGNED BY: BT	Qualitative Reconnaissance and Sample Locations
DRAWN BY: BT	
CHECKED BY: GV	SCALE: As Shown — PROJECT NUMBER: 744653.84105
SUBMITTED BY: DS	DATE: September 2008 — PAGE NUMBER: 5-16
	FILE: X:\GIS\Site_inspections_sw\Maps\ ricevalley_ca\ Fig5_1.mxd

CHAPTER 6

SCREENING-LEVEL RISK ASSESSMENT

6.1 MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING-LEVEL RISK ASSESSMENT

6.1.1 Introduction

6.1.1.1 A qualitative risk evaluation assesses the potential explosive safety risk to the public at the former Rice Valley Sand Dunes and communicates whether a potential risk exists at the FUDS and the primary causes of such potential risk. The risk evaluation is based on historical information presented in prior studies (e.g., the ASR and the ASR Supplement) and on observations made during the SI QR.

6.1.1.2 An explosive safety risk exists if a person can come near or into contact with MEC and interact with MEC in a manner that results in a detonation. The potential for an explosive safety risk depends on the presence of three critical elements:

- A source (i.e., presence of MEC),
- A human receptor (i.e., a person), and
- The potential for interaction between the source and receptor (i.e., the possibility that the person might pick up or disturbed the MEC).

6.1.1.3 All three of these elements must be present for an explosive safety risk to exist; there is no risk if any one element is missing. Each of these three elements provides a basis for implementing effective risk management response actions.

6.1.2 Conceptual Site Model

The CSM for the former Rice Valley Sand Dunes, included in Appendix J, summarizes conditions at the FUDS that could result in human exposure to MEC. It describes the types of MEC potentially present in the Rice Valley Training Area MRS, past MEC and munitions debris findings, and current and projected future land use and receptors.

6.1.3 Qualitative Risk Evaluation

6.1.3.1 For the single MRS at the former Rice Valley Sand Dunes, the potential risk posed by MEC was characterized qualitatively by evaluating three primary risk factors, which are related to the three critical elements listed above:

1) MEC presence: whether there is potential for MEC at the MRS

2) MEC type: the types of MEC that might be at the MRS and the related potential explosive hazards

3) Site accessibility: how potential receptors at the MRS might interact with the MEC

6.1.3.2 The known or suspected presence of an explosive hazard at a given MRS and any potential human receptors at that MRS will typically be considered sufficient justification for RI/FS implementation at that MRS. The following paragraphs describe each of the primary risk factors.

6.1.3.3 **MEC presence** describes whether MEC have been confirmed or are suspected at the MRS, either at the surface or in the subsurface, based on historical information in prior studies (e.g., the INPR, the ASR, and the ASR Supplement) and observations made during the SI QR. If there is historical evidence of potential MEC presence at a site, lack of confirmation of MEC presence during the SI QR will not be considered as evidence of MEC absence for this qualitative risk evaluation. Table 6.1 describes the three possible categories of MEC presence for this evaluation.

TABLE 6.1
CATEGORIES OF MEC PRESENCE
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

MEC Presence	Description
Confirmed or suspected	There is physical or confirmed historical evidence of MEC presence at the MRS, or there is physical or historical evidence indicating that MEC may be present at the MRS.
Small arms only(1)	The presence of small arms ammunition is confirmed or suspected, and there is evidence that no other types of munitions were used or are present at the MRS.
Evidence of no munitions	Following investigation of the MRS, there is physical or historical evidence that there are no UXO or discarded military munitions present.

(1) Small arms ammunition is "ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller or for shotguns" (Department of the Army, 2005a).

6.1.3.4 **MEC type** determines whether the MEC potentially present at the MRS might be detonated, resulting in a minor injury or worse to one or more human receptors. If multiple MEC types are potentially present at the MRS, the type that poses the greatest risk to public health is selected for this qualitative risk evaluation. This determination is

based on historical information in prior studies and observations made during the SI QR. Table 6.2 describes the three possible categories of MEC type for this evaluation.

TABLE 6.2
CATEGORIES OF MEC TYPE
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

MEC Type	Description
Potentially hazardous	Fuzed or unfuzed MEC that may result in physical injury to an individual if detonated by an individual's activities.
Small arms only(1)	Small arms ammunition is confirmed or suspected, and there is evidence that no other types of munitions were used or are present at the MRS.
Inert	Munitions debris or other items that will cause no injury (e.g., training ordnance containing no explosives, fuzes, spotting charges, etc.).

(1) Small arms ammunition is defined as "ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller or for shotguns" (Department of the Army, 2005a).

6.1.3.5 **Site accessibility** describes whether human receptors have access to the MRS and, therefore, may interact with any MEC at the surface or in the subsurface. For this qualitative risk evaluation, if MEC are confirmed or suspected at the MRS, it is assumed that human receptors might come into contact with those MEC unless there is complete restriction to access. This assessment will also describe the potential receptors. Table 6.3 describes the two possible categories of site accessibility for this evaluation.

TABLE 6.3
CATEGORIES OF SITE ACCESSIBILITY
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Site Accessibility	Description
Accessible	Access control is not complete: residents, site workers, or visitors can gain access to all or part of the MRS.
Complete restriction to access	Human receptors are completely prevented from gaining access to the MRS.

6.1.3.6 For this qualitative risk evaluation, further evaluation (i.e., RI/FS) for the MRS will typically be justified if the following conditions are all met:

- MEC are confirmed or suspected to be present;
- The MEC confirmed or suspected to be present are potentially hazardous; and
- The MRS is accessible.

6.1.3.7 The primary risk factors identified above were evaluated for the Rice Valley Training Area MRS at the former Rice Valley Sand Dunes using the data collected during the SI field investigation and the historical data available from other studies. The

following subchapters discuss the qualitative risk evaluation by each primary risk factor to determine whether further evaluation is justified in the MRS.

6.1.4 Munitions and Explosives of Concern Risk Assessment

6.1.4.1 Based on the INPR, the ASR, and the ASR Supplement, munitions previously identified at the FUDS include a 105mm HE projectile, a 75mm projectile, two 37mm projectiles, and 250 rounds of 7.62mm blank ammunition found during a 1969 clearance operation. The 105mm projectile was blown in place by the clearance team, indicating that it was believed to be MEC. The unfired 7.62mm rounds are also considered to be MEC, although unfired small arms ammunition is not considered to present a significant explosive hazard (Department of the Army, 2005a). The disposition of the 75mm and two 37mm projectiles is unknown, although it does not appear that they were blown in place by the clearance team. No munitions, munitions debris, or any other munitions-related items were noted during the INPR and ASR field visits.

6.1.4.2 All of the munitions debris observed by the site visit team during the 2008 SI consisted of metal fragments created by the detonation of HE ordnance and practice bomb debris. None of these pieces were large enough to determine the original munitions, although past projectile finds in the FUDS lead to the assumption that various types of projectiles were commonly used at the site. The only identifiable munitions found during the SI were a belt of 60 unfired 7.62mm blank rounds, which are considered MEC, although unfired small arms ammunition is not considered to present a significant explosive hazard (Department of the Army, 2005a). Based on the historical use of ordnance and the discovery of munitions debris and MEC, the presence category is considered "Confirmed or Suspected" at the Rice Valley Training Area MRS.

6.1.4.3 The ASR Supplement lists known or suspected munitions at the former Rice Valley Sand Dunes, which include general small arms ammunition, M54 37mm HE projectiles, M48 75mm HE howitzer projectiles, M38 105mm fixed-gun projectiles, and M8 practice anti-personnel mines. The 7.62mm blanks found by the SI team are not considered to present a significant explosive hazard, but any intact HE projectiles remaining in the MRS could pose an explosive hazard if present at the site. Based on this information, the MEC type at the Rice Valley Training Area MRS is assessed to be "Potentially Hazardous."

6.1.4.4 The former Rice Valley Sand Dunes is approximately 75 miles east of the city of Twentynine Palms, California, and is managed by the BLM in part as two wilderness areas and in part as multi-use public lands. The site visit team encountered no restrictions to access at any time during their QR. Therefore, it is assumed that the entire site is accessible to anyone wishing to enter. The site accessibility at the Rice Valley Training Area MRS is considered "Accessible."

6.1.5 Risk Summary

Table 6.4 summarizes the qualitative MEC risk evaluation for the former Rice Valley Sand Dunes. Based on this qualitative MEC risk evaluation, contact by human receptors with explosively hazardous MEC is possible at the Rice Valley Training Area MRS; therefore, there is a potential for an explosive safety risk in this MRS.

TABLE 6.4
MEC RISK EVALUATION
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

MRS	MEC Presence	MEC Type		Site Accessibility	Further Evaluation?
Rice Valley Training Area	Confirmed or suspected	Projectile, 105mm, HE, M38A1	Potentially hazardous	Accessible	Yes

6.2 MUNITIONS CONSTITUENTS SCREENING-LEVEL HUMAN HEALTH RISK ASSESSMENT

6.2.1 Conceptual Site Model

Potential human receptors for the former Rice Valley Sand Dunes site include commercial and industrial workers (BLM personnel) and site visitors. There is no reason to suspect that the land use or the receptors at this site will change. The MC CSEM for the MRS identifies affected media, transport mechanisms, exposure routes, and potential receptors (Appendix J).

6.2.2 Affected Media

Releases of MC through munitions activities at the site are most likely to affect surface soil. Entrainment of dust could result in transport to air. Surface water and sediment could be affected by transport of MC via overland flow following precipitation or through contact with contaminated sediment, although it is unknown how often surface water is present on-site. Groundwater may be affected through leaching of contaminants from surface soil. Soil was the only medium sampled during the SI at the former Rice Valley Sand Dunes, and samples were biased toward locations most likely to be contaminated. Based on the findings presented in Chapter 5, there are potential sources of MC contamination in the Rice Valley Training Area MRS.

6.2.3 Screening Values

The TPP Team concurred that the more conservative of the USEPA Region 9 or Cal-Modified industrial PRGs would be used to provide criteria for achieving the MC DQO for soil. Since the TPP meeting, the Department of Energy's Oak Ridge National Laboratory (ORNL) collaborated with USEPA Regions 3, 6, and 9 to establish a single set of risk-based screening levels (USEPA-ORNL, 2008). The new values were

calculated using the latest toxicity values that the USEPA considers to be protective for humans (including sensitive groups) over a lifetime.

6.2.4 Soil Risk Characterization

6.2.4.1 The maximum concentrations of each analyte retained for consideration in the SLRA was compared to the screening criteria to determine whether potential human health risks are present at this site. For an analyte to be considered a possible health concern related to a release from munitions activities at the former Rice Valley Sand Dunes, the following conditions must be met:

- The analyte is present above the background screening concentration (metals only, all explosives were considered MC);
- The analyte is a potential constituent of the formerly used munitions; and
- The analyte is present above the human health screening level.

The following subchapters complete the MC evaluation started in Chapter 5 for potential effects on human health. Only those analytes that met the first two of the above-listed criteria, as discussed in Chapter 5, are included in the SLRA in this subchapter.

6.2.4.2 The only medium sampled at the Rice Valley Training Area MRS was soil. As discussed in Chapter 5, aluminum, barium, copper, lead, and zinc are retained for consideration for the SLRA for this MRS. Table 6.5 provides the results of the human health screening for soil at the Rice Valley Training Area MRS.

TABLE 6.5
HUMAN HEALTH SCREENING-LEVEL RISK ASSESSMENT FOR THE RICE VALLEY TRAINING AREA MRS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Analyte	Maximum Detected Site Concentration (mg/kg)	Human Health Screening Value(1) (mg/kg)	Exceeds Screening Level?
Aluminum	12,000	990,000	No
Barium	260	190,000	No
Copper	22	41,000	No
Lead	49	400(2)	No
Zinc	46	310,000	No

(1) USEPA-ORNL screening values, industrial screening values for soil, dated May 20, 2008
(2) No industrial screening value is available for lead, so the more conservative residential value was used.

6.2.4.3 As indicated in the table, none of the analytes exceed the screening levels. Therefore, based on the analytical results presented in this report, no unacceptable human health risk from MC is expected from exposure to soil at this MRS.

6.2.5 Discussion

Although some analytes were present in concentrations suggesting complete exposure pathways at the Rice Valley Training Area MRS, based on the analytical results presented in this report, no unacceptable human health risk is expected due to MC contamination in soil. Because the MRS covers the entire FUDS, there is no unacceptable human health risk expected anywhere in the former Rice Valley Sand Dunes.

6.3 MUNITIONS CONSTITUENTS SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT

Portions of the Rice Valley Sand Dunes FUDS and the Rice Valley Training Area MRS are within the Rice Valley Wilderness and the Riverside Mountains Wilderness. Several federally and state-listed T&E species potentially occur within the wilderness areas. Because protected species and habitats are present, the site is considered an important ecological place, and a SLERA is required.

6.3.1 Conceptual Site Model

According to the Biogeographic Data Branch of California Department of Fish and Game, Riverside County supports 40 federally listed T&E species, consisting of 23 animals and 17 plants. Riverside County is home to an additional 32 California-listed species that are considered threatened, endangered, or rare. The CNDDB lists the desert tortoise (*Gopherus agassizii*) as the only federal and state-listed species known to occur within the area of the former Rice Valley Sand Dunes. Although the CNDBB does not list other species within this area, other T&E species could be on site. Exposure of wildlife to MC could occur through direct exposure to contaminated soil, surface water, and sediment and through the ingestion of biota that may have been exposed to MC. The MC CSEM identifies affected media, transport mechanisms, and potential ecological receptors. Appendix J includes the CSEM for the Rice Valley Training Area MRS.

6.3.2 Management Goals

6.3.2.1 Management goals are defined as general statements about the desired condition of ecological values of concern. The goals vary based on the objectives of the property owner, current and reasonable future land use, regulatory requirements, the ecosystem, and the environmental needs of the community or other stakeholders (USACE, 2006). The Army has an overarching management goal for ecological risk assessments:

> *Protect valuable biological resources fr om unreasonable adverse effects due to the release of hazardous substances asso ciated with Army operations, including past Department of Defense operations for F UDS* (Department of the Army, 2005b).

All site-specific management goals should be consistent with this comprehensive goal.

6.3.2.2 Because protected species and habitats may be present within the former Rice Valley Sand Dunes, for this SLERA the entire site is considered an important ecological place. Various valuable ecological resources are present or expected to be present within the site, potentially including at least one T&E animal species. Based on these ecological resources, the primary ecological risk assessment management goal is to protect habitat and individuals of any listed species that occur at the site.

6.3.3 Affected Media

Direct release of MC from munitions activities at the site would have been to soil. Other mechanisms for release include: leaching of MC into groundwater; entrainment of MC to air as fugitive dust; and transport of MC to surface water and sediment through runoff and erosion. However, there are no permanent surface water bodies within the FUDS. In addition, groundwater is not directly accessible to most organisms except deeply rooted plants, so exposure for wildlife would be limited to ingestion of deeply rooted plants. Therefore, surface water, sediment, and groundwater are not considered in the SLERA.

6.3.4 Screening Values

The criteria used for the screening-level comparison for soil are USEPA EcoSSLs (USEPA, 2007a). If USEPA did not provide a screening value (as for most explosive compounds), the soil screening level presented in Table 1-A, Appendix D of the Sampling and Analysis Plan Addendum was used (Parsons, 2006).

6.3.5 Ecological Risk Characterization

6.3.5.1 Subchapter 5.2.7 describes how the soil data was screened to determine whether analytes were MC and present above ambient levels. Only those analytes that exceed background concentrations and are potential MC are retained for risk characterization in this chapter. To complete the ecological risk characterization for this site, the maximum detected concentration of selected analyte was evaluated against the screening values (Subchapter 6.3.4). This comparison resulted in the calculation of hazard quotients (HQs) for each analyte. The HQ was calculated by determining the ratio of the maximum detected site concentration to the screening value. If the HQ was equal to or less than one, the potential for ecological risk for that receptor group was considered to be negligible. If the HQ was greater than one, then unacceptable ecological risks cannot be ruled out based on the screening comparison alone.

6.3.5.2 The only medium sampled in the Rice Valley Training Area MRS was soil. As discussed in Chapter 5, aluminum, barium, copper, lead, and zinc are retained for consideration for risk characterization. Table 6.6 provides the results of the ecological risk screening at the Rice Valley Training Area.

6.3.5.3 As indicated in Table 6.6, detected concentrations of aluminum and lead exceeded their screening values, resulting in HQs of 240 and 4.5, respectively. Barium, copper, and zinc concentrations were at or below the screening value. Based on these

results, there is potential unacceptable ecological risk due to aluminum and lead in soil at the Rice Valley Training Area MRS. However, EcoSSLs are based on conservative assumptions about the types of receptors at a site (e.g., insectivores, terrestrial mammals) and about exposure parameters such as soil ingestion rate and receptor range. Site-specific information was not used to develop these EcoSSLs. The use of site-specific information typically results in higher EcoSSLs that are less conservative.

TABLE 6.6
SCREENING-LEVEL ECOLOGICAL RISK ASSESSMENT
FOR THE RICE VALLEY TRAINING AREA MRS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

Analyte	Maximum Detected Site Concentration (mg/kg)	Ecological Screening Value[(1)] (mg/kg)	Hazard Quotient
Aluminum	12,000	50[(2)]	**240**
Barium	260	330	<1
Copper	22	28	<1
Lead	49	11	**4.5**
Zinc	46	46	1

(1) USEPA Ecological soil screening levels on URL: http://www.epa.gov/ecotox/ecossl/
(2) PSAP Addendum (Parsons, 2006)

CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 SUMMARY

7.1.1 The SI performed at the former Rice Valley Sand Dunes FUDS in Riverside County, California, evaluated site-specific conditions that could impact the potential for complete exposure pathways on human and ecological receptors at the FUDS. The project was planned and performed to satisfy the DQOs set for the project: 1) evaluate potential presence of MEC; 2) evaluate potential presence of MC; 3) collect data needed to complete MRSPP scoring sheets; and 4) collect information for HRS scoring. Successful completion of the DQOs allowed determination of whether this FUDS project warrants further response action under CERCLA.

7.1.2 The SI evaluation included approximately 39 miles of QR and the collection of 14 soil samples. Eleven of the soil samples were collected from areas that represented the highest likelihood for the presence of MEC or MC contamination within the Rice Valley Training Area MRS. The other three soil samples were collected as background (ambient) samples within the FUDS boundary, away from the suspected range location.

7.1.3 TestAmerica in Arvada, Colorado, analyzed the soil samples for explosives and select metals. No explosive compounds were detected in any of the samples collected during the SI. Most metals for which an analysis was performed were detected in all of the soil samples. The exception was antimony, which was not detected in any of the samples. The only metals that exceed background concentrations and are considered potential MC are aluminum, barium, copper, lead, and zinc. Other metals detected are not potential MC or are essential nutrients that are not expected to pose a risk to receptors. Based on the metals exceedances, the soil exposure pathway was determined to be complete in the Rice Valley Training Area MRS. Comparison of the detected MC concentrations with the screening criteria used in the SLRA indicate that human health risk due to MC is not expected in the MRS. However, comparison of the same detected MC concentrations with the screening criteria used in the SLERA indicate that there is potential ecological risk due to MC in the Rice Valley Training Area MRS.

7.1.4 A belt of 60 unfired 7.62mm blank rounds was found by the site visit team during the SI and were considered MEC. In addition to these rounds, the site visit team also identified many pieces of explosively derived fragments assumed to be from HE projectiles. The identification of projectile munitions debris indicates that MEC in the

form of intact HE projectiles are potentially present at the former Rice Valley Sand Dunes.

7.2 CONCLUSIONS REGARDING POTENTIAL MUNITIONS AND EXPLOSIVES OF CONCERN EXPOSURE PATHWAYS

The evaluation of potential MEC exposure (Subchapter 6.1) concluded that the MEC exposure pathway is potentially complete for the former Rice Valley Sand Dunes based on MEC and munitions debris observed during the SI and previous field visits. MEC were found at the FUDS during a 1969 clearance operation and during the 2008 SI. The MEC found in 1969 included at least one HE projectile and 250 rounds of 7.62mm blanks. A belt of 60 unfired 7.62mm blanks was found during the SI, in addition to many fragments assumed to be from HE munitions. Because human receptors might contact explosively hazardous MEC, there is a potential explosive safety risk at the former Rice Valley Sand Dunes.

7.3 CONCLUSIONS REGARDING POTENTIAL MUNITIONS CONSTITUENTS EXPOSURE PATHWAYS

7.3.1 An exposure pathway is not considered to be complete unless all four of the following elements are present (USEPA, 1989):

- A source and mechanism for chemical release;
- An environmental transport and/or exposure medium;
- A receptor exposure point; and
- A receptor and a likely route of exposure at the exposure point.

7.3.2 Eleven biased location soil samples were collected in the Rice Valley Training Area MRS and analyzed for explosives and selected metals. No explosive compounds were detected in any of the samples. With the exception of antimony, all of the metals for which an analysis was performed were detected. Concentrations of potential MC aluminum, barium, copper, lead, and zinc exceeded the background criteria developed for the former Rice Valley Sand Dunes. Based on these background exceedances, complete exposure pathways were identified in the Rice Valley Training Area MRS. None of the metals exceeded their respective screening criteria in the SLRA; therefore, no unacceptable risk to human health is expected in this MRS. However, aluminum and lead did exceed the screening criteria used in the SLERA, indicating potential ecological risk due to concentrations of these metals in soil at the Rice Valley Training Area MRS.

CHAPTER 8

RECOMMENDATIONS

8.1 The former Rice Valley Sand Dunes is recommended to proceed to RI/FS status (Table 8.1), based on the following:

- Historical documentation indicates that the former Rice Valley Sand Dunes may have been used as part of CAMA and Operation Desert Strike and that general small arms ammunition, M54 37mm HE projectiles, M48 75mm HE howitzer projectiles, M38 105mm fixed-gun projectiles, and M8 practice anti-personnel mines may have been used during training operations.

- During the SI field work, the site visit team found 60 rounds of small arms ammunition classified as MEC and many metal fragments derived from the explosive detonation of HE ordnance, most likely projectiles. In addition, at least one 105mm projectile that was suspected to be live was found during a clearance operation at the site in 1969.

- Detected concentrations of aluminum and lead exceeded the screening criteria used in the SLERA in the Rice Valley Training Area MRS.

8.2 The site is currently managed by the BLM as part of the Rice Valley Wilderness and the Riverside Mountains Wilderness, and as multi-use public lands. However, the area is extremely remote and is not heavily trafficked; therefore, a removal action for MEC is not warranted at this time.

TABLE 8.1
RECOMMENDATIONS
FORMER RICE VALLEY SAND DUNES, CALIFORNIA

MRS	Recommendation	Justification
Rice Valley Training Area	RI/FS	Munitions debris, most likely projectile fragments, observed during the SI as well as live small arms blank ammunition. Live projectile found during 1969 clearance operation. Potential for ecological risk due to aluminum and lead in surface soil.

CHAPTER 9

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Attachment DR165-2
Records of Conversation

CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Omoruyi Patrick, DTSC

Phone No.: 714-484-5452 **Date:** Nov 18, 2009

Call From: Doug Urry/SAC **Time:**

Subject: RSEP/DTSC/ACOE FUDS SITE COORDINATION – T-LINE CONSTRUCTION

I briefed Mr. Patrick on the location and nature of our project (including T-line across Rice Valley Sand Dunes FUDS area), and asked for guidance on how we should coordinate with DTSC and ACOE moving forward due to the ongoing site investigation and RI/FS project.

He stated that a coordination meeting for our project is really outside his scope/role for the Rice Valley Sand Dunes FUDS project, but indicated he could attend an initial introductory meeting. Any efforts beyond that would require a consultative agreement with DTSC.

He indicated two issues of importance:

1) UXO Safety – coordinate with ACOE and manage H&S in accordance with the potential hazards

2) Project permitting – coordinate with BLM

Omoruyi has no knowledge of any issues/concerns outside of the Rice Valley Sand Dunes FUDS boundary. No knowledge of issues at the Rice Air Field. He also confirmed that the 2008 Parsons Site Inspection Report is the appropriate/most current reference for the ongoing UXO investigation work.

He would be the appropriate DTSC point of contact if CEC has questions about the FUDS site.

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CH2MHILL TELEPHONE CONVERSATION RECORD

Call To: Lloyd Goddard Army Corps of Engineers

Phone No.: 213-452-4014 **Date:** Dec 03, 2009

Call From: Doug Urry/SAC **Time:**

Subject: RSEP/ACOE FUDS SITE COORDINATION – T-LINE CONSTRUCTION

I briefed Lloyd on the location and nature of our project (including T-line across Rice Valley Sand Dunes FUDS area), and asked for guidance on how we should coordinate with ACOE moving forward due to their ongoing site investigation and RI/FS project.

I asked whether it would be appropriate to have a meeting to brief him on the project; he responded that a meeting is really not needed, but he would be willing to attend a meeting, if available. Since this is a private project, ACOE has no role. He also indicated that he would want to be careful about their level of participation. ACOE wants to avoid perception that they are involved and approving anything we are doing, due to potential liability. In this case UXO would be managed by private parties, not ACOE.

Lloyd indicated that ACOE has no authority over our project, but would like to eventually be informed of our findings. He would like to receive any final documentation of UXO findings, or UXO clearance results, so that data can be incorporated into their work.

Additionally, Lloyd confirmed that the September 2008 Site Inspection Report provides the most current and complete information for the site conditions.

I asked whether he is the appropriate point of contact moving forward (or to provide CEC if necessary). Lloyd suggested that we use his Program Manager, since his is possible that someone other than Lloyd will be assigned to the next phase. Lloyd remains the best point of contact for questions about prior investigations.

Jeff Armentrount, Program Manager, 213-452-3990

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