CH2M HILL
2485 Natomas Park Drive
Suite 600
Sacramento, Ca 95833
Tel 916-920-0300
Fax 916-920-8463

CH2MHILL

May 9, 2008
File No.: 04.02.06.02
Project No. 357891

Mr. Che McFarlin
California Energy Commission
Systems Assessment and Facilities Siting Division
1516 9th Street, MS 15
Sacramento, CA 95814-5504

RE: Data Response, Set 1D (Optimization)
Ivanpah Solar Electric Generating System (07-AFC-5)

Dear Mr. McFarlin:

On behalf of Solar Partners I, LLC, Solar Partners II, LLC, Solar Partners IV, LLC, and Solar Partners VIII, LLC, please find attached one original and 12 hard copies of Data Response, Set 1D, which provides a supplemental response to Staff's Data Request 23, dated December 12, 2007. This data response describes changes to the project description (an "optimized" project design) that resulted from responding to BLM and CEC requests.

Please call me if you have any questions.

Sincerely,

CH2M HILL

John L. Carrier, J.D.
Program Manager

Enclosure
c: POS List
Project File

Ivanpah Solar Electric Generating System (ISEGS)

(07-AFC-5)

Data Response, Set 1D

(Response to Data Requests: Project Description, Air Quality, Biological Resources, Land Use, Soil & Water, and Visual Resources)

Submitted to the

California Energy Commission

Submitted by

Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC

May 9, 2008

With Assistance from

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

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Introduction

Attached are Solar Partners I, LLC, Solar Partners II, LLC, Solar Partners IV, LLC, and Solar Partners VIII, LLC (Applicant) responses to the California Energy Commission (CEC) Staff's data requests for the Ivanpah Solar Electric Generating System (Ivanpah SEGS) Project (07-AFC-5). The CEC Staff served these data requests on December 12, 2007, as part of the discovery process for Ivanpah SEGS. 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. New 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 15 would be Figure DR15-1, and so on. AFC figures or tables that have been revised have "R1" following the original number, indicating revision 1.

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 may not be sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

The Applicant looks forward to working cooperatively with the CEC and BLM staff as the Ivanpah SEGS Project proceeds through the siting process. We trust that these responses address the Staff's questions and remain available to have any additional dialogue the Staff may require.

Project Description (4 and 6)

Background

Plan of Development, 2.2 Process Description cites "Additional heliostats would be located outside the power block perimeter road, focusing on the reheat tower. Their locations are not shown on the drawings, because they would be finalized only after power block equipment outlines and elevations are finalized."

4. Cite maximum acreage and location of "additional" heliostats located outside the power block road and plot area on the project maps.

Response: The CEC and the BLM have been concerned about stormwater drainage issues and have requested site design and drainage plans that are beyond the typical conceptual level required by the CEC for licensing a power plant. While the Applicant does not necessarily agree with the level of detail requested at this point in the siting process, rather than contest those issues, the Applicant wishes to continue to work with the Staffs to resolve issues. In this spirit, the Applicant has agreed to incur substantial costs and prepare more detailed design drawings. In examining these engineering issues, the Applicant has also sought to maximize the project's efficiency, looking for engineering opportunities to generate more electricity from the same geographic area, thus reducing overall impacts per kilowatt hour.

The Applicant hereby provides additional information and analyses responsive to the issues raised to date. These improvements to project features are referred to together as "optimization" of the Ivanpah SEGS design, since they resulted from preparation of additional design drawings. Optimization was achieved in the following areas:

- Reduction in the number of heliostats
- Increase in the heliostat surface area
- Move the project boundaries out an additional 250 feet on the perimeters -- within the surveyed areas
- Reduction in the number of power towers and consistent height for the power towers
- Realignment of the power block at Ivanpah 2 to reduce stormwater impacts
- Realignment of the Ivanpah 3 project boundary to avoid an existing mining claim
- Relocation of the linear corridors and project wells to move the wells farther away from the golf course supply wells
- Provide alternative locations for the SCE Substation, at the request of SCE
- Reroute existing trails to allow passage around the plant
- Add additional construction use area

These optimization features will result in a total acreage for permanent use of about 3,700 acres, with an additional area of about 120[1] acres that will be used during the construction period and then restored. Each of these enhancements will be summarized here, and more detailed information will be provided in response to relevant data requests.

Reduction in the Number of Heliostats

The first optimization is to reduce the number heliostats through the use of double-hung mirrors. The mirrors will remain the same size (7.22 square meters, or 77.7 square feet); however, the mirrors in the double-hung configuration are rotated 90 degrees. That is, instead of being hung in a "landscape" orientation, the mirrors are rotated 90 degrees so they hang in "portrait" orientation (see revised Data Response 102). By hanging two mirrors on a structure supported by a single pole, the Applicant will use substantially fewer poles. For example, Ivanpah 1 and 2 will now require about 55,000 poles in the double-hung configuration as opposed to 68,000 poles in the single-mirror configuration. Ivanpah 3 will require no more than 104,000 poles instead of 136,000. In addition to cutting the number of poles required to be driven into the ground, the double-hung portrait orientation allows the Ivanpah SEGS project to reduce the number of mechanical devices that must operate and increases the reflective area; thus, increasing the amount of heat at the power towers. This optimization is described further in the revised response to Data Request 102.

Increase in the Heliostat Surface Area

The number of heliostats described above represents the maximum number of heliostats to be constructed; however, all of them may not be constructed. Although the number of poles within Ivanpah 1 and 2 would be reduced about 19.1 percent, the permitted surface area of the heliostats would increase about 61.8 percent from about 5,283,600 square feet (~490,960 square meters) to about 8,547,000 square feet (~794,200 square meters). In Ivanpah 3, with a 23.5 percent reduction in the number of poles, the reflective surface area permitted would increase about 52.9 percent from about 10,567,200 square feet (~981,920 square meters) to about 16,161,600 square feet (~1,501,760 square meters). This surface area increase will result in additional electricity production on an annual basis with no change in installed capacity and with only a small amount of additional land. The steam turbine and interconnection capacity remain the same.

The increase in the heliostat surface area has three causes:

a. The double-hung mirror configuration is taller than the single-hung orientation, and the resulting increase in shadowing requires greater distance between the arrays, with the result that the last rows are farther from the towers. Energy collection is less efficient the farther the mirrors are from the tower receivers, so

[1] A 377-acre area has been field surveyed between Ivanpah 1 and 2. Of this area, about 120 acres will be used for construction purposes with the remaining 257 acres being available for relocation of plants (i.e., a plant nursery) for use in restoration of the temporary construction area.

additional heliostat surface area (approximately 5 to 10 percent) is needed to achieve the same annual energy output.

b. The Applicant has also sought to increase the annual electricity production from the same facility by adding heliostat surface area, an efficiency gain made possible by the double mirror configuration. Daily solar output is less in the early morning hours and later afternoon hours. Adding heliostat surface area results in increased heat to the receivers and increased steam to the steam turbine during these otherwise lower production hours. During the peak hours of the day, these additional mirrors will be placed on standby since the steam turbine remains the same size and cannot accept additional steam. The double-hung heliostats are more compact and use less land than the single-hung heliostats, which creates the opportunity for additional heliostat surface area within the same land area. This means that the land is more productive, and that the impacts per kilowatt hour (kWh) of production are less.

c. Finally, a portion of the increased heliostat surface area to be licensed ensures that the project will be able to meet its contractual output requirements even if the solar resource is less than forecasted. The final rows of heliostats may not be necessary. Pending the results of actual performance during plant operation, a decision will be made on whether or not to install the additional heliostats. Thus, the project optimization represents the maximum number of heliostat structures and heliostat surface area.

Move the Project Boundaries Out an Additional 250 Feet on the Perimeters– Within the Surveyed Areas

The double-hung mirrors in portrait orientation are slightly taller than the mirrors hung in a landscape orientation. This increased height means that the solar field arrays must be spaced slightly farther apart to prevent shadowing of one row by another. To gain these efficiencies and to avoid potential shadowing of one array by another, the concentric arrangement of the mirror arrays (which look like row crop patterns from an aerial view) have been modified to account for the portrait orientation and the reduction in the number of power towers. (see Figures DR4-1, -2, and -3). Similarly, the project boundaries have been moved out an additional 250 feet on the perimeters of the three plant boundaries – yet, these boundaries are within the previously surveyed areas with a few exceptions that were surveyed this year (see Figure DR4-4). Again, for the most part, these areas were surveyed during the Spring of 2007; the Applicant simply moved the project boundary to include much of the additional surveyed area. In some areas, additional surveys were performed in 2008 to provide flexibility for project features. Hence, the area affected by the 100-MW plant sites would increase about 7.5 percent from about 850 acres to 914 acres, and the area for the 200-MW site would increase about 7.5 percent, from 1,660 acres to 1,785 acres. The total plant area including the switchyard and the Administrative/warehouse building would total about 3,700 acres, an overall increase of approximately 8.8 percent in land use. Air Quality impacts from this optimization are discussed in Data Responses 8 and 9.

Reduction in the Number of Power Towers and Consistent Height

The Applicant has been able to reduce the number of power towers in both Ivanpah 1 and Ivanpah 2 to just one solar tower (at the power block), instead of three power tower receivers and one solar reheater (see Figures DR4-1 and 2). The 200 MW plant, Ivanpah 3, would still employ four power tower receivers and one solar reheater (at the power block). The trade off for the increased efficiency of the double-hung heliostats and the reduced number of towers is that the remaining towers need to be taller to accommodate the double hung mirror configuration and more distant mirrors. The increased height of the mirrors requires that the height of the receivers (i.e., the power towers) be increased so that the heliostats are able to reflect the sunlight over the top of the heliostat row in front of it.

For the Ivanpah 1 and 2 configuration, the power tower support structures would increase from 262 feet high (80 meters) to 393 feet high (~120 meters). The boiler/superheater panel height would be 66 feet tall (~20 meters) including the added height for upper steam drum and protective ceramic insulation panels. Overall, the tower height would be 459 feet tall (~140 meters), consistent with Ivanpah 3. In addition, FAA-required lighting and a lightening pole will extend above the top of the towers approximately 5 to 10 feet.

For the Ivanpah 3 configuration, the power tower receivers and solar reheater support structures would remain 459 feet tall (~140 meters). A rendering of the site with the new heliostat and tower configuration is provided as Figure DR4-5. In addition, as a result of these modifications, the heat balance and water balance diagram have been revised. They are provided as Figures DR4-6 and -7, respectively.

While this increased height will have modest potential visual impacts, the Applicant believes that the gains in efficiencies, the reduction in the number of heliostat poles, and the elimination of all but one of the power tower receivers in the 100 MW plants outweigh potential visual impacts. This optimization is analyzed in more detail in the revised Visual Resource Data Responses (97 and 102).

Realignment of the Power Block at Ivanpah 2 to Reduce Stormwater Impacts

As stated earlier, the Applicant is preparing more detailed design drawings addressing stormwater management issues. As part of that design process, the Applicant is proposing to relocate the power block of Ivanpah 2 about 200 feet to the south to avoid a sizable wash and reduce stormwater impacts. This optimization is described in more detail in the revised Data Responses 58 through 60.

Realignment of the Ivanpah 3 Boundary to Avoid an Existing Mining Claim

In adjusting the project boundaries, the Applicant also proposes to move the western Ivanpah 3 boundary line to exclude an existing mining claim at the limestone outcrop to the west of the project site. Although this is a substantial reduction in area, with the extension of the project boundaries outward to include the additional area that was field surveyed, the area for the 200-MW site would increase only

slightly (about 6.5 percent), from 1,660 acres to 1,767 acres. This optimization is described in more detail in the revised response to Data Request 26.

Relocation of the Project Wells and Linear Corridors

To reduce access roads and land impacts and as part of the optimization process, the water supply wells will be relocated approximately 4,250 feet to the south of their originally planned location to be farther away from the existing golf club wells. In the AFC, the wells were proposed to be located to the east of Ivanpah 2 and west of Colosseum Road. Based on comments received from BLM, it is now proposed that they be located adjacent to Ivanpah 1's northwest corner, which will eliminate the need for a separate access road and move the wells farther away from two existing wells on Colosseum Road. (The proposed wells will be about 1.1 miles from the Colosseum 1 well and about 0.97 miles (5,150 feet) from the Colosseum 2 well. As a result, the water lines from the wells to the 3 sites were also relocated. It is also proposed that a monitoring well be located between the project's supply wells and the two supply wells for the Primm Valley Golf Club. The location of this monitoring well is just southeast of the administration/warehouse building. The water optimization is described in more detail in the revised responses to Data Requests 68, 75, and 76 and the proposed monitoring and supply well locations are shown on Figure DR4-8.

It was determined that Southwest Gas Company would need access to the gas line for service/repair work. To minimize impacts to operating plants, the gas line was re-routed along the west side of Ivanpah 2 and 3 and a dirt road was added to provide the gas company with access. The realigned gas lines are also presented in Figure DR4-8.

Alternative Locations for SCE Substation

The project will loop into transmission lines owned and operated by Southern California Edison (SCE). SCE is planning to upgrade the existing 115 kV line to a double circuit 230 kV line between the planned Ivanpah substation and El Dorado substation in order to interconnect the Ivanpah SEGS, interconnect other proposed projects along the same line, and allow for future growth. The proposed upgrade is not proposed solely for the Ivanpah SEGS, and it will be the subject of a separate joint PUC and BLM environmental review. However, certain SCE facilities are also described within this environmental document as they support the early interconnection of the first Ivanpah project in advance of the completion of the upgrade.

Ivanpah Substation: SCE is evaluating two alternate substation locations, both to the north of the three electrical lines running southwest to northeast between Ivanpah 1 and Ivanpah 2. Only one location will be used, but the site layout shows both locations and the gen-tie lines that would be required for both. The substation area is 835 feet x 850 feet, with an additional 400 feet x 835 feet at both the southwest and northeast ends to accommodate the turning of the lines into the substation. This area outside the substation but within the ROW will also be used by SCE for a temporary laydown area during construction.

Telecommunications for the Substation: As part of a Special Protection Scheme required for the solar plant operation, SCE is evaluating a telecommunications route between the AT&T radio facility in Mountain Pass and the Ivanpah substation. The fiber optic cable would be added to the existing Nipton 33 kV wood pole line that parallels the 115 kV line from the Ivanpah substation approximately 7 miles southwest to the Mountain Pass substation and from there using the Earth 12 kV pole line that travels south approximately 1.5 miles to the radio facility. SCE is currently conducting engineering studies to determine the feasibility of this telecommunications route. If confirmed, the route, new work, and environmental impacts will be described in the Biological Assessment and Plan of Development. Figure DR4-8 shows the area proposed for the substation and alternative gen-tie alignments to those substation locations.

Reroute Existing Trails

Existing public trails criss-cross the Ivanpah Valley. To allow continued use and access to the Ivanpah Valley and environs, the Applicant is proposing to reroute three public trails and one trail that serves as an access to a mining claim. The AFC addressed the rerouting of Colosseum Road between Ivanaph 1 and 2. The other trails that would be rerouted are: 1) trail 699226, which passes through the northern third of Ivanpah 3, would be rerouted along the northern border of Ivanpah 3; 2) trail 699198, which passes between Ivanpah 2 and 3, would be rerouted between those two proposed plants; and 3) an unnumbered trail on the east side of Ivanpah 3, (north of the limestone outcrop), that is used to access the mining claim that is being excluded by the current Ivanpah 3 site boundary, would be relocated outside the project site so that it would provide continued access to the limestone outcrop and mining claim area. Rerouting of these trails is discussed further in the responses to Data Requests 44 to 49.

Additional Temporary Construction Use Area

Generally, the construction parking and laydown areas will be within the unit under construction. However, due to the phased construction there is a need for some fabrication buildings that will be used to assemble heliostats and for other work during all three construction phases. These fabrication buildings will be located in a 120-acre area (the "construction logistics area") located between Ivanpah 1 and 2. Once construction of Ivanpah 3 is completed, the buildings will be removed and the area restored. In addition to the 120-acre construction logistics area, 257 acres will be reserved for temporary use, making the total temporary construction area of about 377 acres. A portion of the 257-acre area may serve as a plant nursery so that plants can be relocated to that area prior to construction of the fabrication buildings or clearing of areas for other uses. The 377-acre area would also include the permanent substation and the water supply wells with associated piping. More information is provided in the revised responses to Data Requests 66 and 67.

Summary

While these optimizations may affect to some degree Air Quality and Biological Resources, and could have a larger potential impact on Soils and Visual Resources

before the implementation of mitigation measures, the enhancements will have little to no effect on the majority of disciplines. The potential impact to each discipline is summarized below.

Air Quality

A supplemental analysis was conducted in response to CEC staff questions. The analysis also incorporated small changes in project design (location of the power blocks and additional truck traffic for cement deliveries). The overall conclusions presented in the earlier submission have not changed: using the criteria employed by California's Air Districts and by USEPA, the project's emissions will not cause or contribute significantly to a violation of an ambient air quality standard, do not trigger requirements for offsets or BACT, and will have less than significant impacts for all pollutants for CEQA purposes. In addition, no LORS have changed as a result of the proposed enhancements. As a result, any potential air quality impacts associated with this optimization will be less than significant. Further discussion of air quality impacts is provided in responses to Data Requests 8 and 9.

Biological Resources

Moving the project boundaries, re-routing existing trails, and changing the heliostat design and location would not change the impacts as discussed in the Biological Resources section of the AFC because the new boundary lines will not expand beyond the area surveyed during Spring of 2007 and 2008. The other project enhancements (reduction in the number of power towers and making their height consistent; realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; providing an additional construction use area; and avoiding the mining claim) do not result in any potential impacts greater than those analyzed in the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential biological impacts associated with this optimization will be less than significant. A report on the 2008 botanical surveys will be provided once the data is validated and a report can be prepared (likely in July 2008). Tortoise surveys for the additional areas not covered in 2007 are underway this month and will also be provided once they are available (likely in June 2008).

Cultural Resources

Moving the project boundaries would not change the project impacts as discussed in the Cultural Resources section of the AFC because the new boundary lines will not expand beyond the area surveyed during Spring 2007and Spring 2008. The Spring 2008 survey resulted in no additional finds. A report will be provided by the end of May 2008. The other project enhancements (a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing an additional construction use area; and avoiding the mining claim) do not change the Cultural Resources section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any

potential cultural impacts associated with this optimization will be less than significant.

Geologic Hazards and Resources

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change the Geologic Hazards and Resources section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential Geologic Hazards and Resources impacts associated with this optimization will be less than significant.

Hazardous Materials Handling

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change the Hazardous Materials Handling section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential Hazardous Materials Handling impacts associated with this optimization will be less than significant.

Land Use

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) result in slightly increased acreage within the project boundary (about 8.8 percent), but do not change the Land Use section of the AFC, and no LORS will change as a result of the proposed enhancements. Two trails will be blocked by the development of Ivanpah 2 and 3. The Applicant proposes to reroute the trail that cuts through the northern third of Ivanpah 3 around the north end of the plant. Another trail passes through the bottom of Ivanpah 3 and top of Ivanpah 2. This trail would be rerouted between Ivanpah 2 and 3. As a result, any potential Land Use impacts associated with this optimization will be less than significant. More information on Land Use impact issues is provided in the revised Data Responses 44 to 49.

Noise

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the

realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change the Noise section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential Noise impacts associated with this optimization will be less than significant.

Paleontological Resources

Moving the project boundaries and re-routing existing trails would not change the project impacts as discussed in the Paleontological Resources section of the AFC because the new boundary lines will not expand the project boundaries beyond the area analyzed in the AFC. The other project enhancements (a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; providing additional construction use area; and avoiding the mining claim) do not change the Paleontological Resources section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential paleontological impacts associated with this optimization will be less than significant.

Public Health

Moving the project boundaries, reducing number of power towers and making their height consistent, and realignment of the Ivanpah 2 power block and other proposed optimization changes do change the project impacts as discussed in the Public Health section of the AFC. The other project enhancements (a reduction in the number of heliostats, an increase in the heliostat surface area; relocation of the wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) will not result in any potential Public Health impacts greater than those analyzed in the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential public health impacts associated with this optimization will be less than significant. Further discussion of public health impacts is provided in Data Responses 8 and 9.

Socioeconomics

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change workforce estimates, construction schedule, or capital costs beyond the ranges analyzed in the Socioeconomic section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential Socioeconomics impacts associated with this optimization will be less than significant.

Soils

Increasing the project boundaries would have a minor, but insignificant, impact on soil resources. The area affected by the 100-MW plant sites (Ivanpah 1 and 2) would increase about 7.5 percent from 850 acres each to 914 acres each. The area for the 200-MW site would increase about 7.5 percent, from 1,660 acres to 1,785 acres. The total plant area, including the switchyard and Administrative/warehouse building would total approximately 3,700 acres. Thus, there would be about 300 acres of additional area permanently impacted representing a 8.8 percent increase.

The expansion of the project boundaries; providing additional construction use area; re-routing existing trails; and relocation of the wells and linear corridors will result in an incremental increase in soil erosion. This is because additional acreage will be disturbed in the construction phase of the project. Implementation of best management practices (BMPs) will significantly reduce soil loss through erosion; this is especially significant for this project because of the size and nature of the project area. Updated water and wind erosion calculations are presented below (i.e., AFC Tables 5.11-3 and 5.11-5 have been revised).

The other project enhancements (a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block; adding an alternate substation location; and avoiding the mining claim) do not result in any additional potential soil impacts greater than those analyzed in the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential soils impacts associated with this optimization will be less than significant.

TABLE 5.11-3R

Estimate of Soil Loss by Water Erosion Using Revised Universal Soil Loss Equation (RUSLE2)

Feature (acreage)[2]	Activity	Duration (months)	Estimates Using Revised Universal Soil Loss Equation[1]		
			Soil Loss (tons) without BMPs	Soil Loss (tons) with BMPs	Soil Loss (tons/yr) No Project
Ivanpah 1 (913.812 acres total; 690.28 acres to grade)	Grading	5	155.3	2.1	0.0088
	Construction	15	217.0	6.2	---
Ivanpah 2 (914.345 acres total; 690.68 acres to grade)	Grading	5	155.4	2.1	0.0088
	Construction	15	217.2	6.2	---
Ivanpah 3 (1785.36 acres total; 1335.13 acres to grade)	Grading	5	350.4	4.9	0.0453
	Construction	15	517.2	14.6	---
Substation and Storage/Administration Buildings (22.15 and 2.64 = 24.79 acres)	Grading	1	1.797	0.018	0.00038
	Construction	3	1.897	0.054	---
Laydown Area (120 acres, remaining 257 acres is not included due to the low level of disturbance)	Grading	1	5.400	0.054	0.00115
	Construction	40	76.000	2.160	---
Roads and Trails (7.353 acres)	Grading	1.5	1.824	0.019	0.000377
	Construction	1	0.436	0.012	---
Gen-tie Lines (5.094 acres for construction; 0.0084 acre for pole footprints)	Grading	1	0.0002	0.000004	0.000000
	Construction	3	0.000	0.000	---
Water Line (2.702 acres for construction; 0.0135 acre for trench)	Grading	1	0.2624	0.00001	0.00006
	Construction	1	0.092	0.003	---
Gas Line Corridor (7.298 acres for construction; 0.584 acre for trench)	Grading	1	0.534	0.0003	0.00011
	Construction	3	0.563	0.016	---
Project Soil Loss Estimates	**TOTAL**		**1701.3**	**38.3**	**0.065**

Notes:

1. Soil losses (tons/acre/year) are estimated using RUSLE2 software available on line [http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_index.htm].

- The soil characteristics were estimated using RUSLE2 soil profiles corresponding to the mapped soil unit.

- Soil loss (R-factors) were estimated using 2-year, 6-hour point precipitation frequency amount for the nearest National Weather Service station to the EEP site [on line at http://hdsc.nws.noaa.gov/hdsc/pfds/sa/sca_pfds.html].

- Estimates of actual soil losses use the RUSLE2 soil loss times the duration and the affected area. The No Project Alternative estimate does not have a specific duration so loss is given as tons/year.

2. Acreages assume a 40-ft corridor for the access roadways and 50-ft corridors for the gas, water, and transmission line construction corridors. Outside of the project footprint, the gas line will have a 4-ft wide trench and the gen-tie lines will have poles every 750 with each pole having a 4 by 4-foot excavation footprint.

Other Project Assumptions as follows:

- About 75.5% of the entire ISEGS site will be disturbed.
- Overhead gen-tie lines will have 23 towers outside of project footprint. Each tower will have a 4-foot x 4-foot footprint.
- It is assumed that the grading/excavation for all the poles will be completed within 1 month and the entire installation will be completed within 3 months.
- It is assumed that grading for each site will take 5 months and construction will take 15 months according to construction schedule.
- It is assumed that grading for access roads will take 1.5 months and construction will take 1 additional month.
- It is assumed that grading for substation and storage and administration buildings will take 1 month and that construction will take an additional 3 months.
- It is assumed that grading of the active laydown area will take one month, then the site will be covered with temporary buildings and materials so soil loss will be negligible during a 40-month construction period (assumes Phase 1 and 2 done concurrently and Phase 3 done afterwards).
- It is assumed that the excavation for transmission poles and gas line trench will take 1 month each and that construction will take an additional 3 months.
- It is assumed that the excavation for water line trench will take 1 month each and that construction will take an additional 1 month.

RUSLE2 Assumptions as follows:

- 100-ft slope length. Estimated soil unit slope is the midpoint of the minimum and maximum of the unit slope class.

Construction soil losses assume the following inputs: Management - Bare ground; Contouring - None, rows up and down hill;

- Diversion/terracing - None; Strips and Barriers - None.

Grading soil losses assume the following inputs: Management - Bare ground/rough surface; Contouring - None, rows up and down hill;

- Diversion/terracing - None; Strips and Barriers - None.

Construction with BMP soil losses assume the following inputs: Management - Silt fence; Contouring - Perfect, no row grade;

- Diversion/terracing - None; Strips and Barriers - 2 fences, 1 at end of RUSLE slope.

No Project soil losses assume the following inputs: Management - Dense grass, not harvested; Contouring - None, rows up and down hill;

- Diversion/terracing - None; Strips and Barriers - None.

TABLE 5.11-5R
Estimate of Total Suspended Particulates Emitted from Grading and Wind Erosion

Emission Source	Acreage	Duration (months)	Unmitigated TSP (tons)	Mitigated TSP (tons)
Grading Dust:				
Project Site (all 3 Areas)	3730.28	5	320.571	112.200
Substation and Storage/Admin Buildings	39.94	1	0.686	0.240
Laydown Area	120.00	1	2.063	0.722
Roads and Trails	25.75	1.5	0.664	0.232
Gen-tie Lines (poles)	0.0044	1	0.00008	0.00003
Water Line (4-ft wide trench)	5.8315	1	0.10023	0.03508
Gas Line (4-ft wide trench)	11.859	1	0.204	0.071
Wind Blown Dust:				
Project Site	3613.52	15	171.642	60.075
Substation and Storage/Admin Buildings	39.94	20	0.000	0.000
Laydown Area	0.00	40	0.000	0.000
Roads and Trails	25.75	1	0.082	0.029
Gen-tie Line Corridor	0.0044	3	0.000	0.000
Water Line Corridor	5.83	1	0.018	0.006
Gas Line Corridor	11.86	3	0.563	0.197
Estimated Total			**496.6**	**173.8**

Notes:

All linear feature impacts noted above are for portions outside of the project areas footprints.

Project Assumptions:

Grading for each site will be completed in a 5-month period and that approximately 100% of the area will be disturbed.

Construction on each of the three project areas will extend an additional 15 months after grading.

Roadways will require 1.5 months for grading and additional 1 month to construct.

Grading at the substation and storage and administrative building areas will take 1 month followed by 3-month construction period.

Grading of active laydown area will take one month, then the site will be covered with temporary buildings and materials so dust emissions will be negligible during a 40-month construction period (assumes Phase 1 and 2 done concurrently and Phase 3 done afterwards).

Excavation of transmission line pole holes and gas line trench will take 1 month followed by a 3-month construction period.

The overhead gen-tie lines will have 23 new poles outside of the project footprint. Each pole will have a 4 by 4-foot area for a total impact permanent area of 0.008 acre.

Approximately 1/10th of the project site, substation and storage/administration building areas has bare soil exposure during the length of the construction period.

Approximately 1/2 of the transmission line and gas line corridors areas has bare soil exposure during the length of the construction period.

Data Sources:

PM10 Emission Factor Source: Midwest Research Institute, South Coast AQMD Project No. 95040, Level 2 Analysis Procedure, March 1996

PM10 to TSP Conversion Factor Source: Bay Area Air Quality Management District CEQA Guidelines, Assessing the Air Quality Impacts of Projects, December 1999.

SCAQMD CEQA Handbook (1993) Table 11-4 for mitigation efficiency rates (as summarized in Table 8.9-4)

Traffic and Transportation

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change workforce estimates or the construction schedule from that analyzed in the Traffic and Transportation section of the AFC, and no LORS will change as a result of the proposed enhancements. As a result, any potential Traffic and Transportation impacts associated with this optimization will be less than significant.

Visual Resources

Most of the proposed optimization enhancements (moving the project boundaries; a the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not affect the Visual Resources section of the AFC. The only optimization changes that would have some visual resource impact are the reduction in the number of heliostats; an increase in the heliostat surface area; and the reduction in the number of power towers and making their height consistent; However, no LORS will change as a result of the proposed changes and no mitigation measures would change. These changes, and their visual resource effects, are described and analyzed in Visual Resource Data Responses 97 and 102. As described in those data responses, any potential Visual Resources impacts associated with this optimization will be less than significant.

Waste Management

The proposed optimization enhancements (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the

realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change the Waste Management section of the AFC, and no LORS will change as a result of the proposed changes. As a result, any potential Waste Management impacts associated with this optimization will be less than significant.

Water Resources

Moving the project boundary line, and changing the heliostat design and their location does not change the project impacts as discussed in the Water Resources section of the AFC but will affect the stormwater design. For example, moving the Ivanpah 2 power block should help the project ensure that pre- and post-construction stormwater flows are similar. Potential stormwater impacts are analyzed in the revised responses to Data Requests 53-55, and 57.

As part of the optimization process, the water supply wells will be relocated to be near the northwest corner of Ivanpah 1. The optimization changes will not change the water supply requirements, estimated at no more than 100 acre-feet/year, nor will they negatively affect existing golf course wells, which are about 1 mile away. Potential impacts from relocating the water supply wells are analyzed in the revised responses to Data Requests 68, 75, and 76.

As discussed in the revised data responses and with the implementation of the proposed avoidance and mitigation measures, the optimization will not result in any potential impacts to water resources greater than those analyzed in the AFC, and no LORS will change as a result of the proposed changes. As a result, any potential water resource impacts associated with this optimization will be less than significant.

Worker Health and Safety

Because the safety plans and programs that will be developed for the project's construction and operation will still be prepared, the proposed optimization changes (moving the project boundaries; a reduction in the number of heliostats, an increase in the heliostat surface area; a reduction in the number of power towers and making their height consistent; the realignment of the Ivanpah 2 power block, wells and linear corridors; adding an alternate substation location; re-routing existing trails; providing additional construction use area; and avoiding the mining claim) do not change the Worker Health and Safety section of the AFC, and no LORS will change as a result of the proposed changes. As a result, any potential Worker Health and Safety impacts associated with this optimization will be less than significant.

Background

Plan of Development, 2.15.3 Distributed Power Tower and Heliostat Erection cites that excavation spoils would be stored in an approved area of the site. Heliostat Construction cites a pre-casting shed would be adjacent to the batch plant, outside the plant entrance.

Data Request

6. Describe and plot spoils storage location, confirming the location would be located within the proposed project footprint or an added acreage.

Response: It is the intent of the civil engineering design package to provide interested parties with the civil engineering methodology used in development of the Ivanpah solar fields.

This package will consist of ten design drawings/plans and a descriptive write-up that provides the specific design principles used to resolve each of the major site development issues. The drawings are to include: An overall site drawing providing site layout and orientation for Ivanpah units 1 through 3. Three general arrangement drawings (one for each unit) to provide site layout information including features such as site borders, survey limits, public and private roadways, fences, public and private trails, site utilities and wells, transmission towers, receiver towers, power towers, building locations, lay-down areas, transmission yards and existing topographic features. Three stormwater drainage and erosion control drawings (one for each unit) to illustrate how stormwater and erosion will be managed within each unit through a system of staged ponds and diversion dikes and channels, diversion berms, check dams and rock filters to detain and convey stormwater, dissipate energy to minimize erosion and discharge water as sheet flow. In addition, three grading plans (one for each unit) will be provided depicting the extent each unit will be graded. Included within the site grading plan will be designated areas that will require leveling, areas requiring extensive grading and areas that are to be cleared of vegetation without grubbing.

Finally, a detailed write-up will be provided to address site specific requirements and the design parameters used in the development of the engineering solutions to the sites' major development issues. Topics are to include site hydrology, detention and by-passing concepts, staged release, stormwater run-on and run-off, erosion and sedimentation control measures and site stabilization. It is anticipated that these materials will be provided to the CEC and BLM prior to the end of May 2008.

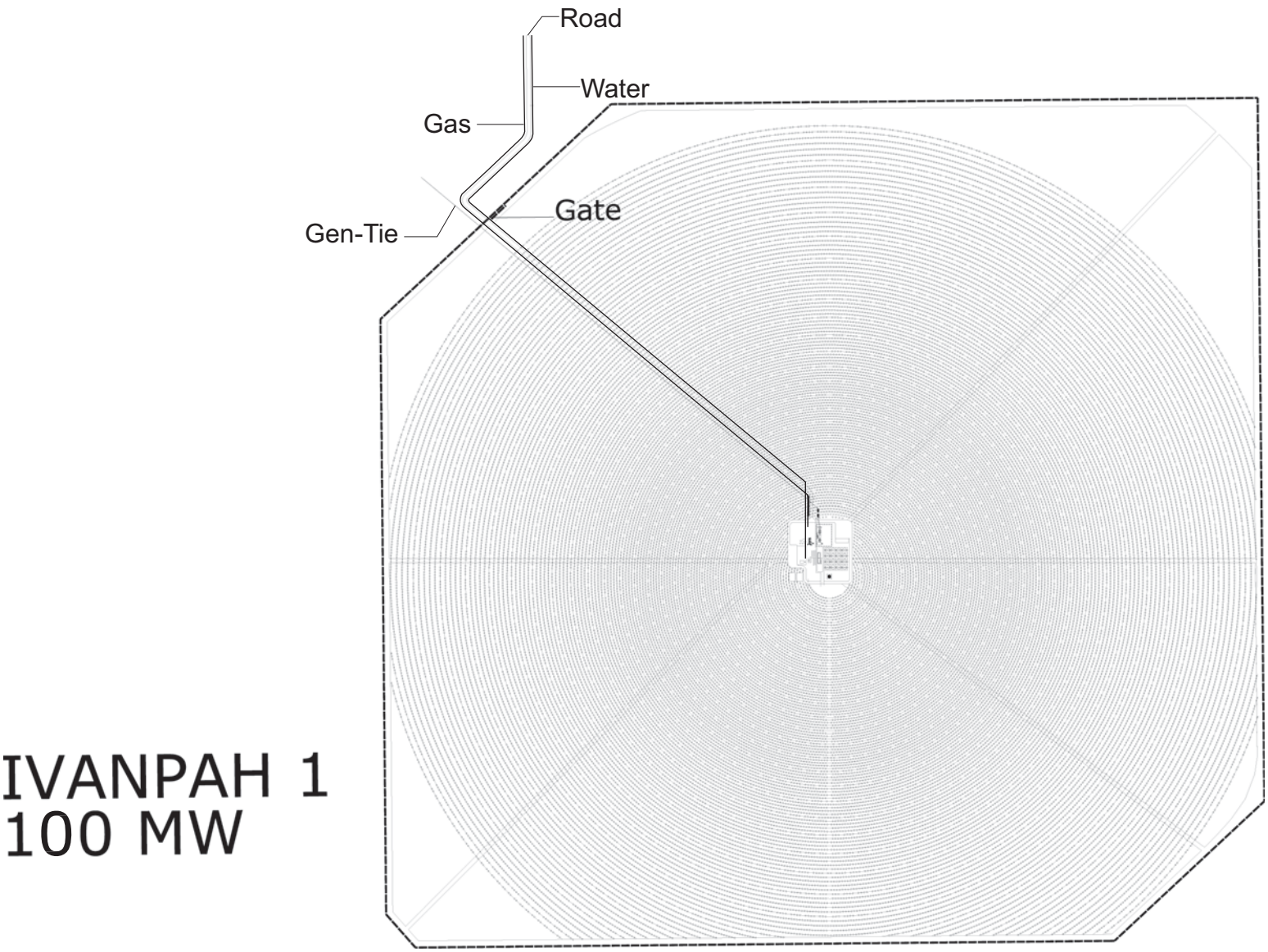

FIGURE DR4-1
IVANPAH 1 SOLAR FIELD LAYOUT
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

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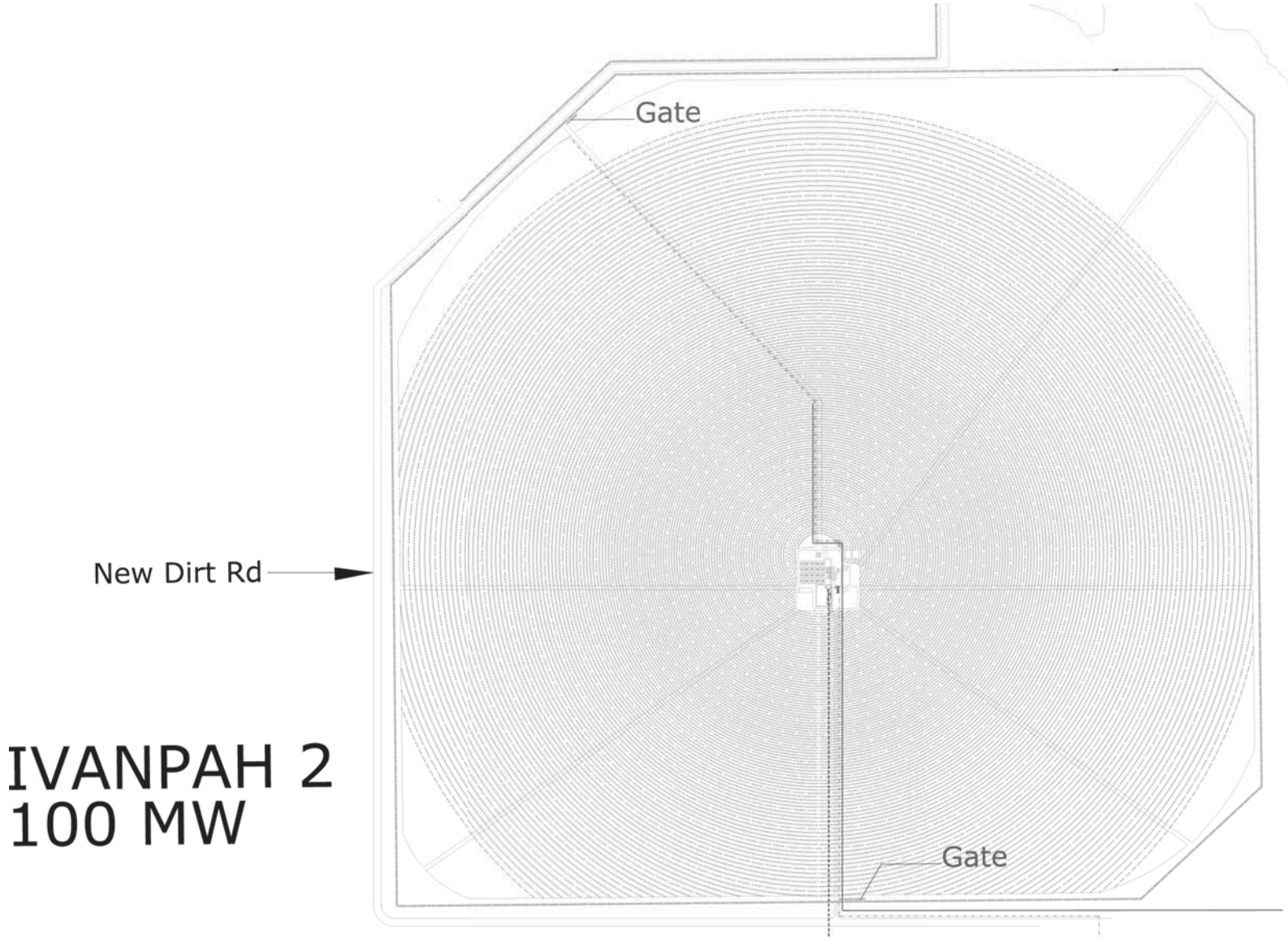

FIGURE DR4-2
IVANPAH 2 SOLAR FIELD LAYOUT
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

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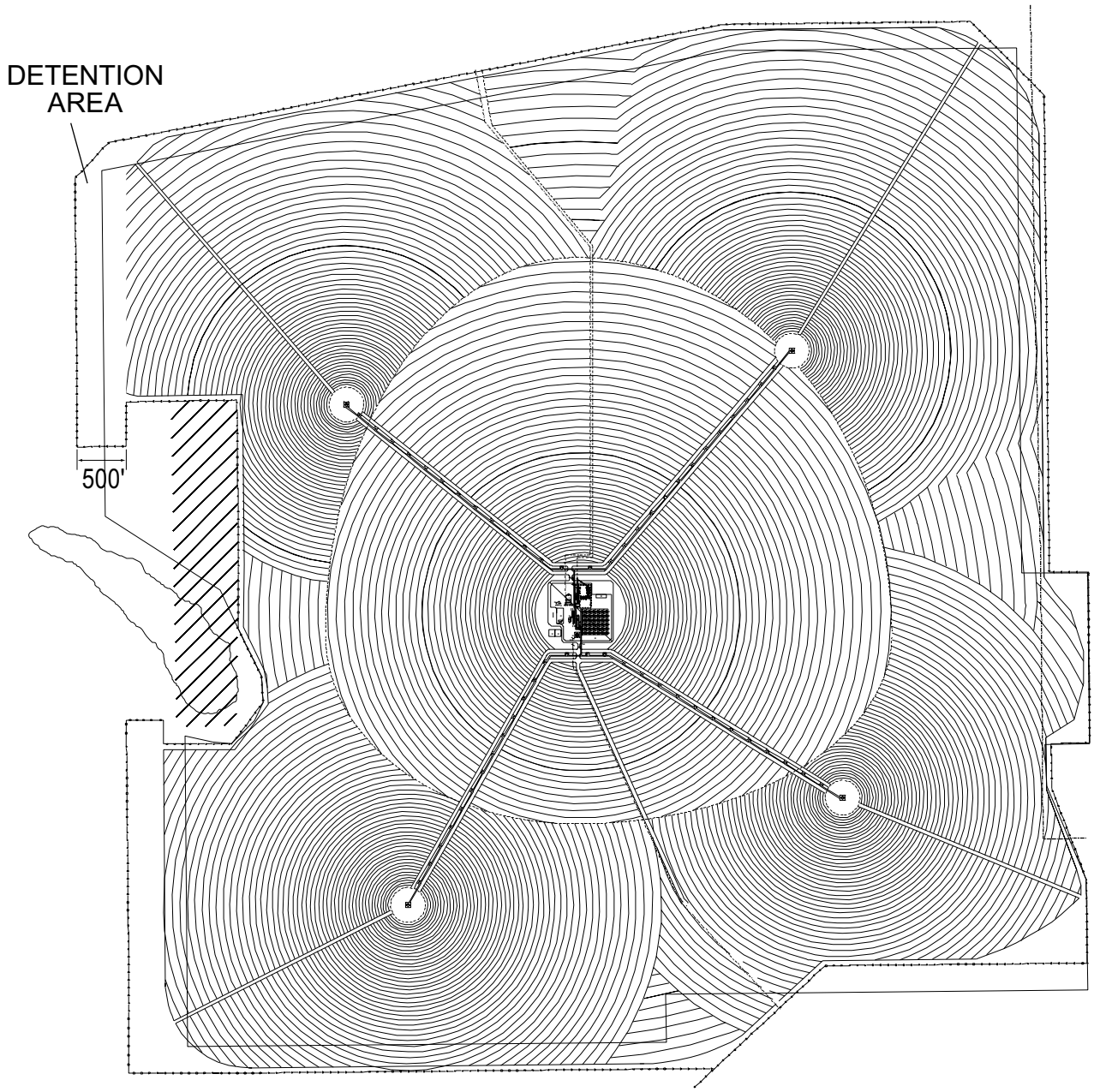

NOT
TO SCALE

FIGURE DR4-3
IVANPAH 3 SOLAR FIELD LAYOUT
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

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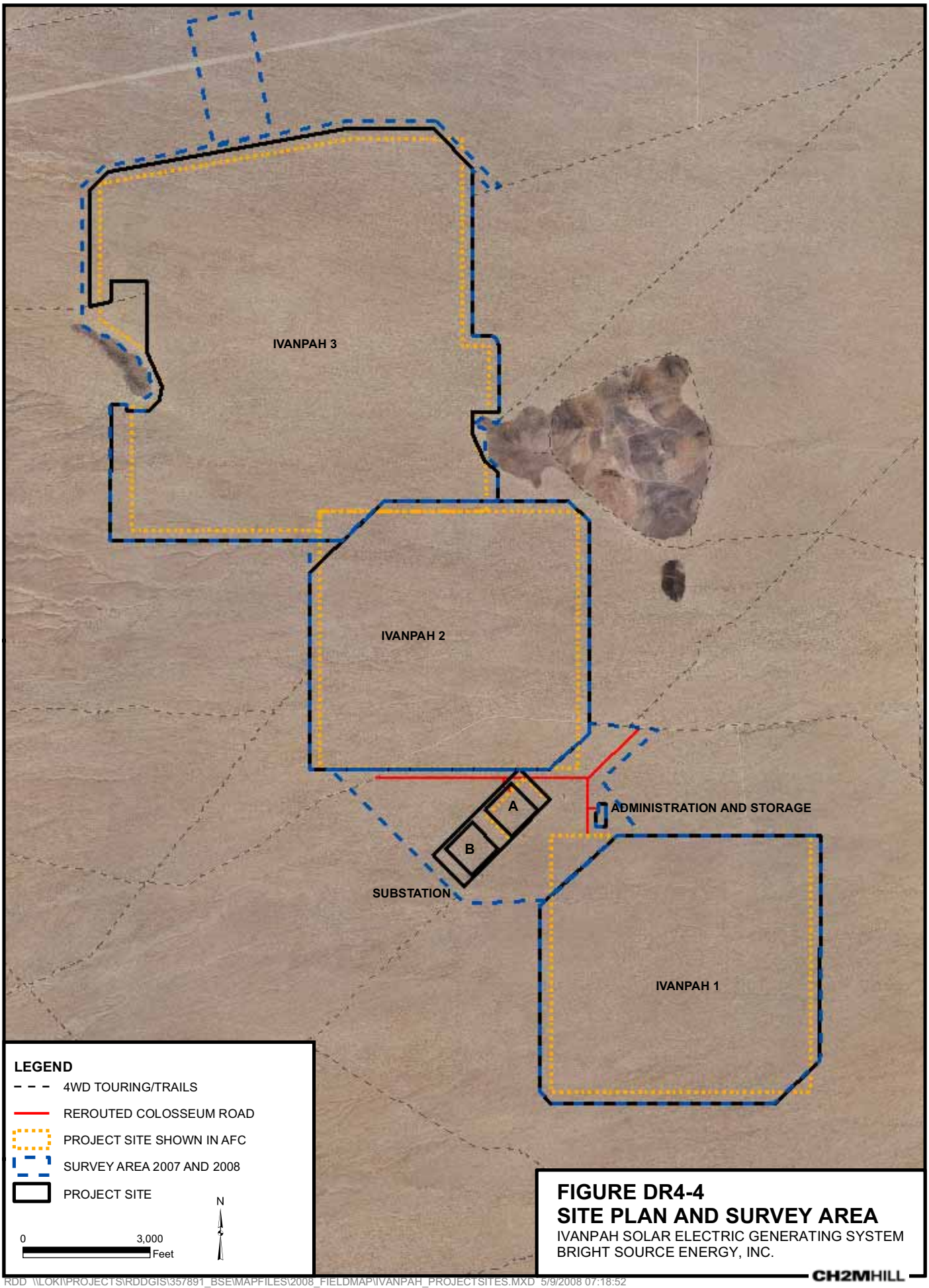

FIGURE DR4-4
SITE PLAN AND SURVEY AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM
BRIGHT SOURCE ENERGY, INC.

CH2MHILL

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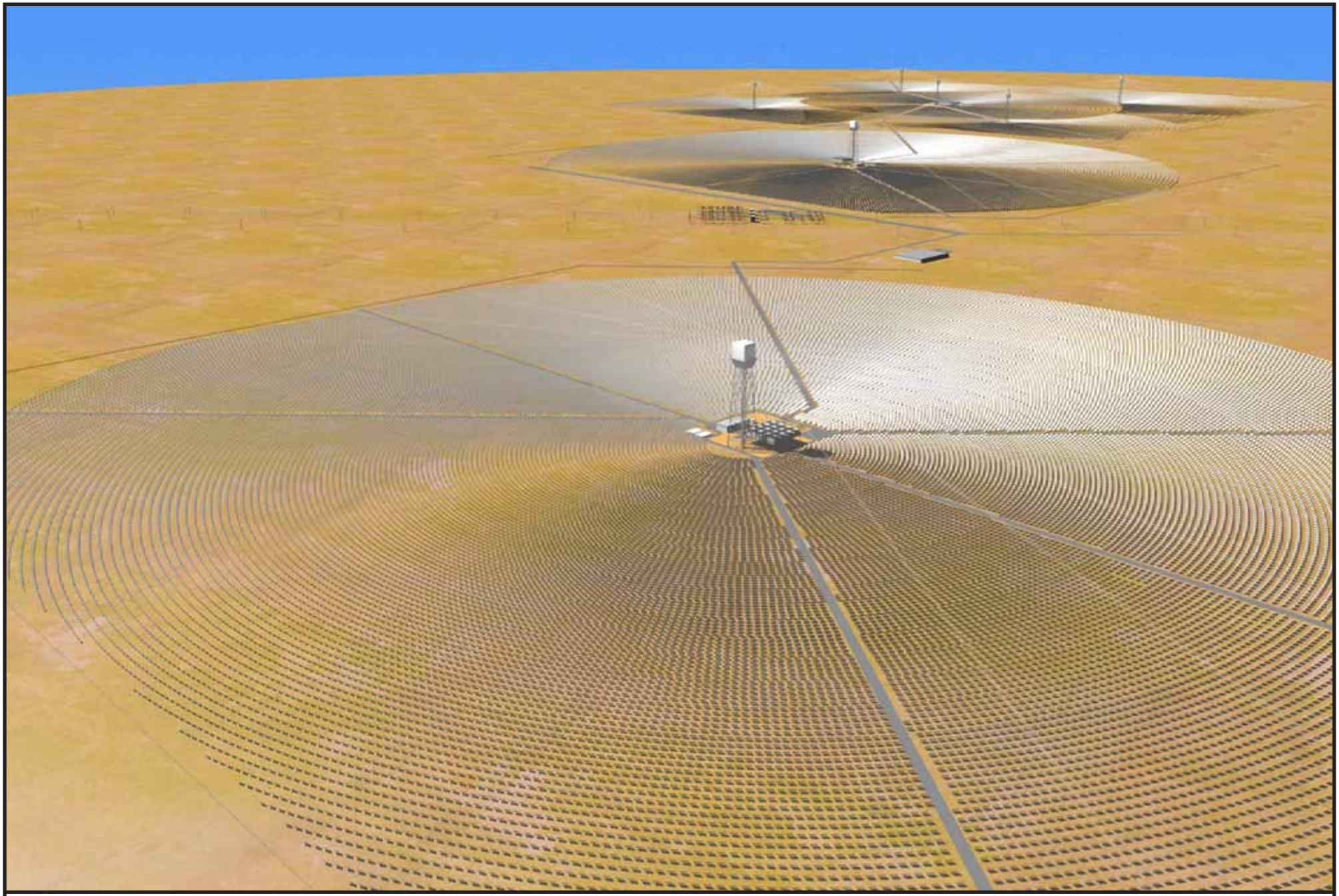
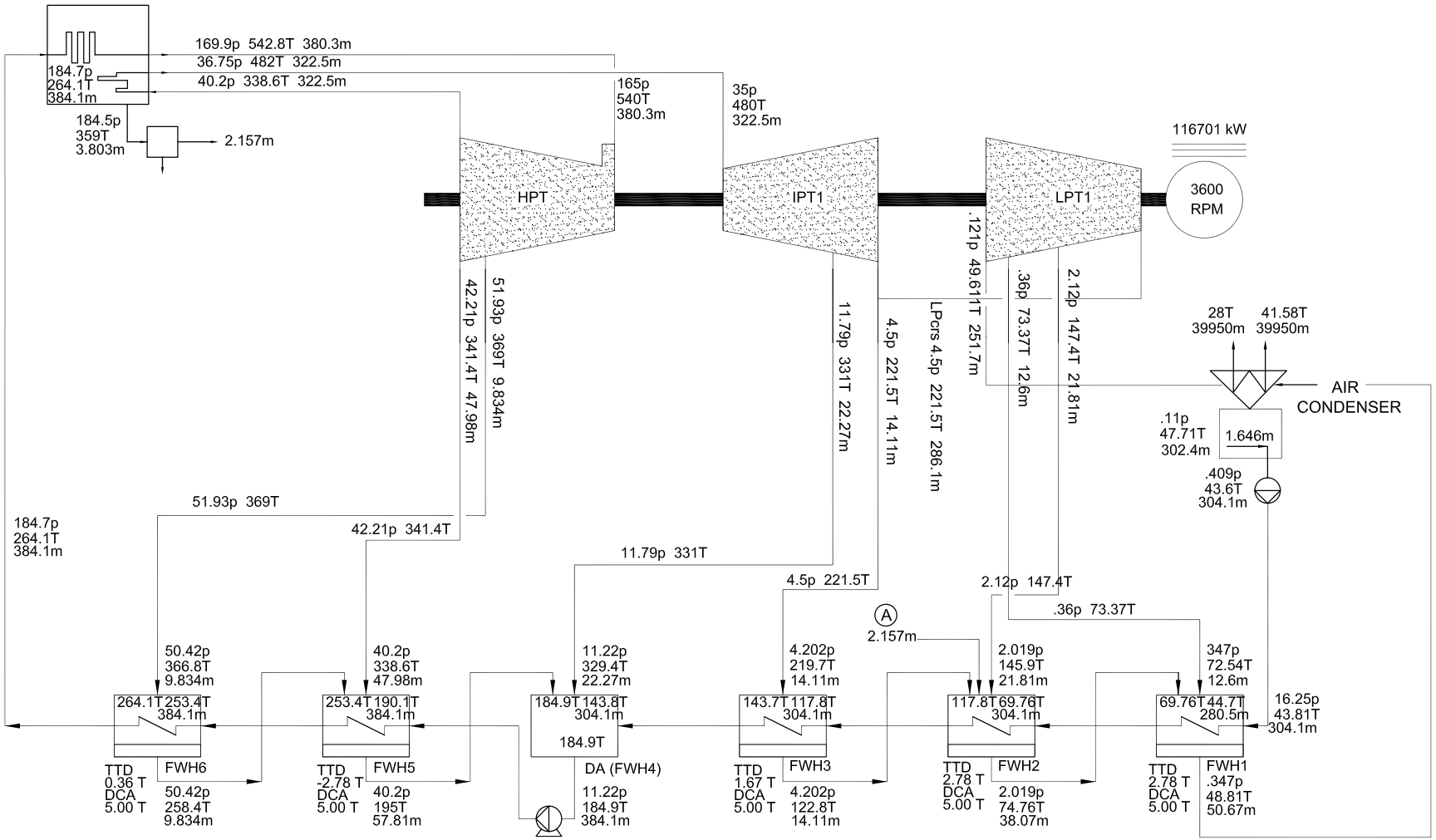


FIGURE DR4-5
APPEARANCE OF SITE AFTER CONSTRUCTION
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL



LEGEND:

p - PRESSURE (bar)
T - Temperature (°C)
h - Enthalpy (Kj/Kg)
m - Mass (Tons /hr)

Qin=268.1 MWth
NOMINAL OUTPUT 100 MW
GROSS / NET PLANT HR 8270 / 8774 kJ/kWh (43.53% / 41.03%).

FIGURE DR4-6
HEAT BALANCE 100% SOLAR
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Source: LUZ II, April 2008

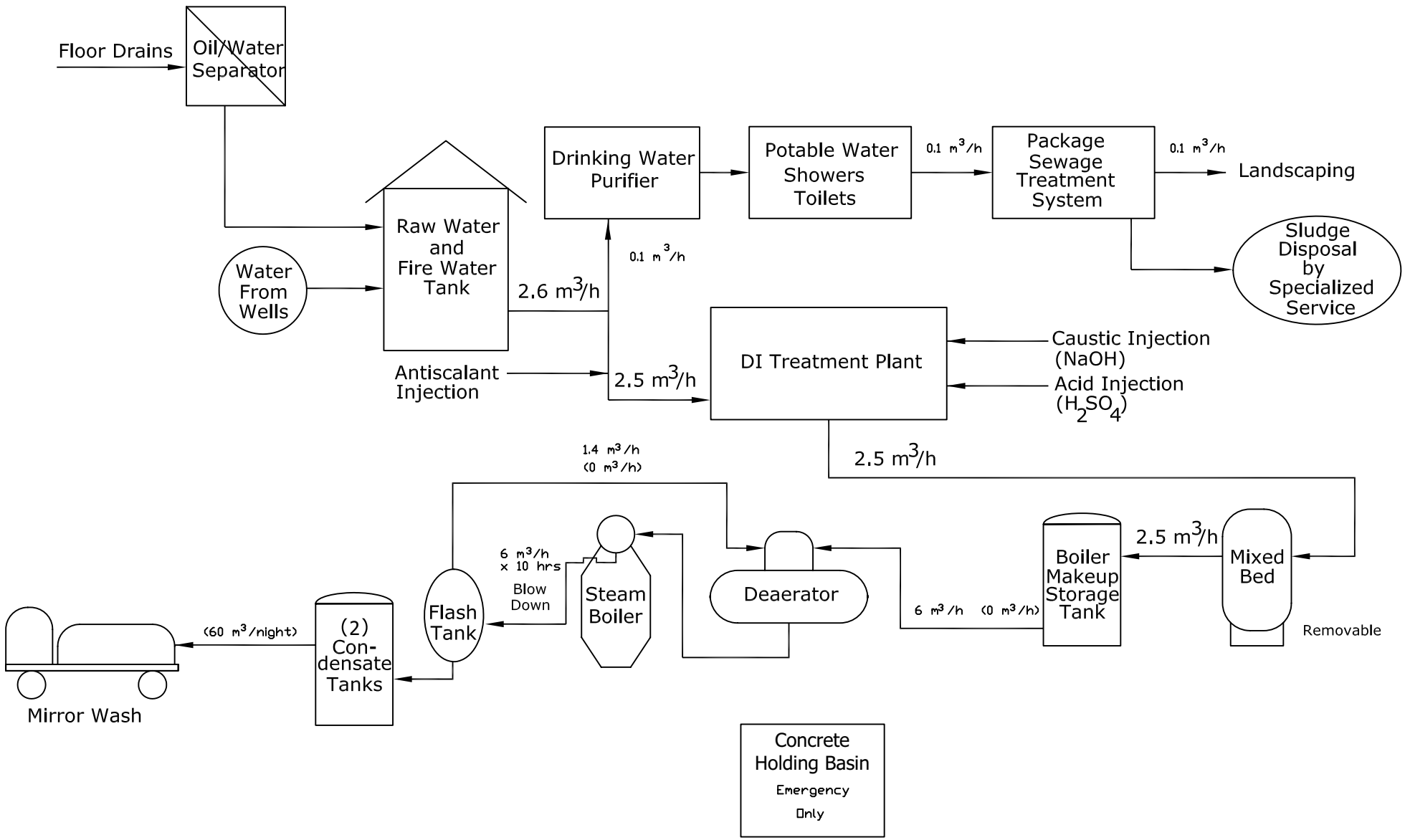


FIGURE DR4-7
100 MW WATER BALANCE DIAGRAM
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Source: DWG 01-PB-F-D-100 Rev A

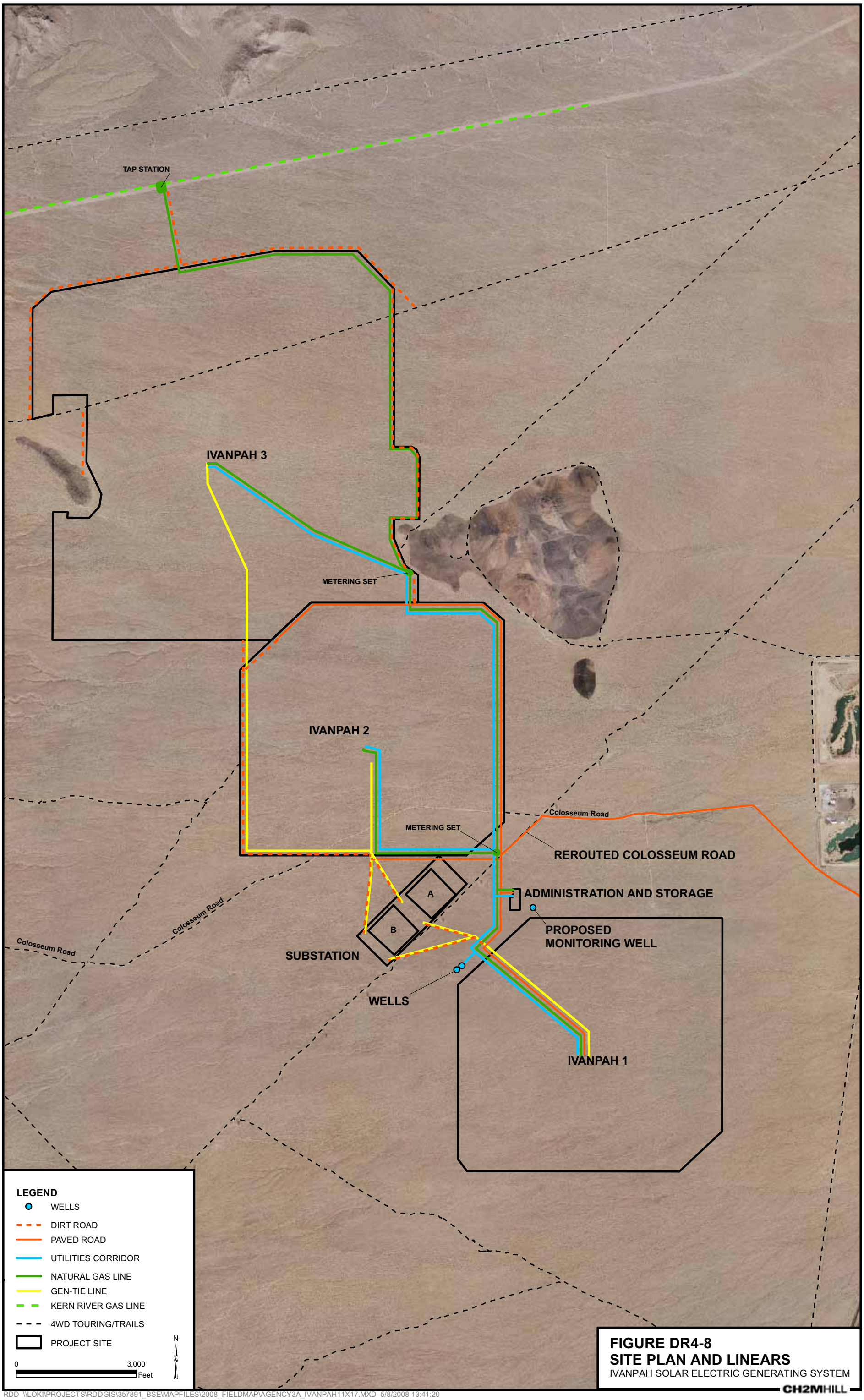


FIGURE DR4-8
SITE PLAN AND LINEARS
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

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Air Quality (8 and 9)

Background

Facility Operational Emissions

The AFC does not appear to document or estimate emissions from vehicles and equipment used to provide maintenance of the solar mirrors. For examples, there is no mention of the frequency of washing the mirrors and whether associated vehicle and equipment activity would cause emissions of NOx, VOC and PM10, and how much. Thus, the facility operational emissions may not be fully quantified.

Data Request

8. Provide an estimate of emissions of NOx, VOC and PM10, including fugitive PM10, cause by the maintenance equipment, vehicles and activities.

Response: On December 12, 2007, CEC staff requested additional analysis of air impacts from the Ivanpah SEGS project. Specifically, staff requested the following:

1. Include maintenance activities (i.e., vehicle combustion emissions and fugitive dust emissions) as part of the operating emissions.
2. Provide additional analysis of the combined impacts of construction of Ivanpah II and operation of Ivanpah I.
3. Provide additional analysis of the combined impacts of construction of Ivanpah III and operation of Ivanpah I & II.

The requested modeling has been conducted. The results are presented below. In addition, the basis for the modeling has been changed in the following ways:

- The construction emissions have been modified to include additional truck deliveries of cement.
- The original application stated that the testing of emergency engines would be limited to one hour per day. The modeling results submitted with the application, however, were based on limiting emergency engine testing to 30 minutes per day. This restriction was included in the PDOC.
- The locations of stacks, buildings, and facility boundaries were revised to reflect adjustments made as a result of the project optimization.

SUMMARY OF RESULTS

Air Quality Impact Analysis

Emissions from maintenance activities are small and spread over the entire facility. As a result, their contribution to the air quality impact is small, and does not affect

any of the conclusions presented in the original AFC submittal. Adjustments in the location of the power blocks resulted in a higher modeled maximum 1-hour NO_2 impact (dominated by emergency engine testing). This modeled impact was enough to require additional refinement of the analysis.

The maximum hourly impact presented in the original AFC was obtained by adding the highest modeled impact, under any conditions, to the highest measured ambient concentration in the baseline data. At that time, no attempt was made to determine if the conditions leading to the highest measured concentration were similar to the conditions leading to high project impacts. This screening approach is routinely used in air quality impact analyses because it simplifies the analysis. If the sum of the highest modeled impact and the highest measured background is less than the ambient air quality standard, then the actual cumulative impact will be below the standard at all times.

For all pollutants and timeframes other than one-hour NO_2, the new modeling still gives an acceptable answer using this screening approach. In the case of one-hour NO_2; however, the screening analysis showed a maximum one-hour impact slightly above the standard.

It is very unlikely that the highest modeled impact occurs under the atmospheric conditions leading to the highest measured background concentration. For example, the wind speed and direction that result in plume impact on terrain may not be the same as those giving rise to high background ambient NO_2 concentrations.

Consistent with industry practice, screening analysis was followed by a more refined analysis, examining the 200 highest modeled one-hour project impacts. Some of these impacts occurred during the same hour, but at slightly different locations. Once these overlaps were identified and consolidated, 35 discrete hours were examined. For each of these 35 hours, the modeled maximum impact was added to the measured background concentration for the same hour. The state standard is 338 $\mu g/m^3$. The highest combined NO_2 concentration using this approach was 255.6 $\mu g/m^3$.

The 197th highest project impact was 114.4 $\mu g/m^3$, and the highest measured background concentration was 190.1 $\mu g/m^3$. Because all of the other modeled project impacts are less than or equal to 114.4 $\mu g/m^3$, the maximum combined impact for these data points cannot exceed 304.5 $\mu g/m^3$.

Therefore, applying the refined analysis to the top 35 NO_2 impact hours, and the screening approach to all other hours, the maximum 1-hr NO_2 impact from the project is 150.4 $\mu g/m^3$ and the maximum combined background plus project impact will not exceed 304.5 $\mu g/m^3$. This is lower than the state standard of 338 $\mu g/m^3$.

Table 5.1-21 presents the Air Quality Modeling Results that were included in the AFC. Table 5.1.21R presents the Air Quality Modeling Results, including emissions from maintenance activities, determined using the refined analysis described above.

TABLE 5.1-21
Air Quality Modeling Results

Pollutant	Averaging Time	Modeled Maximum Concentrations ($\mu g/m^3$) Normal Operations AERMOD	Modeled Maximum Concentrations ($\mu g/m^3$) Fumigation SCREEN3
NO_2	1-hour	123.7	4.4
	Annual	0.0	a
SO_2	1-hour	4.1	1.1
	3-hour	1.1	0.9
	24-hour	0.0	0.1
	Annual	0.0	a
CO	1-hour	73.3	7.4
	8-hour	1.6	2.5
$PM_{2.5}/PM_{10}$	24-hour	0.1	0.2
	Annual	0.0	a

[a.] Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.

TABLE 5.1-21R
Air Quality Modeling Results (including maintenance)

Pollutant	Averaging Time	Modeled Maximum Concentrations ($\mu g/m^3$) Normal Operations AERMOD	Modeled Maximum Concentrations ($\mu g/m^3$) Fumigation SCREEN3
NO_2	1-hour	150.4	4.4
	Annual	0.0	a
SO_2	1-hour	3.9	1.1
	3-hour	1.1	0.9
	24-hour	0.0	0.1
	Annual	0.0	a
CO	1-hour	319.0	7.4
	8-hour	54.9	2.5
PM_{10}	24-hour	3.3	0.2
	Annual	0.5	a
$PM_{2.5}$	24-hour	0.1	0.2
	Annual	0.0	a

[a.] Not applicable, because inversion breakup is a short-term phenomenon and as such is evaluated only for short-term averaging periods.

Table 5.1-23 presents the Modeled Maximum Impacts that were included in the AFC. Table 5.1.23R presents the Air Quality Modeling Results, including emissions from maintenance activities. This table has also been revised to reflect the fact that the new State one-hour NO_2 standard has been approved by OAL and is now effective.

TABLE 5.1-23
Modeled Maximum Impacts

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	123.7	190.1	313.8	470[a]	-
	Annual	0.0	43.3	43.3	Note a	100
SO_2	1-hour	4.1	60.3	64.4	650	-
	3-hour	1.1	44.5	45.6	-	1300
	24-hour	0.0	13.1	13.1	109	365
	Annual	0.0	2.6	2.6	-	80
CO	1-hour	73.3	4,010	4083.3	23,000	40,000
	8-hour	1.6	1,535	1536.6	10,000	10,000
PM_{10}	24-hour	0.2 [b]	**184.4**	**184.6**	50	150
	Annual	0.0	**25.4**	**25.4**	20	-
$PM_{2.5}$	24-hour	0.2[b]	28.8	30.0	--	35
	Annual	0.0	10.6	10.6	12	15

[a] State has adopted a new 1-hour NOx standard of 0.18 ppm (338 $\mu g/m^3$) and an annual NOx standard of 0.030 ppm (56 $\mu g/m^3$) that are awaiting OAL approval before implementation.

[b] Maximum 24-hour PM10 and PM2.5 impacts occur under fumigation conditions.

TABLE 5.1-23R
Modeled Maximum Impacts

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Maximum Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	150.4	190.1	304.5[a]	338	-
	Annual	0.0	43.3	43.3		100
SO_2	1-hour	3.9	60.3	64.4	650	-
	3-hour	1.1	44.5	45.6	-	1300
	24-hour	0.0	13.1	13.1	109	365
	Annual	0.0	2.6	2.6	-	80
CO	1-hour	319.0	4,010	4329	23,000	40,000
	8-hour	54.9	1,535	1590	10,000	10,000
PM_{10}	24-hour	3.3	**184.4**	**187.9**	50	150
	Annual	0.5	**25.4**	**25.9**	20	-
$PM_{2.5}$	24-hour	0.2[b]	28.8	29.0	--	35
	Annual	0.0	10.6	10.6	12	15

[a] Maximum modeled facility one-hour NO_2 impact does not occur under conditions that result in maximum background concentration. As a result, the maximum total impact is less than the sum of the maximum facility impact and the background.

[b] Maximum 24-hour PM2.5 impacts occur under fumigation conditions.

Construction Impacts Analysis

Tables 5.1-26 and 27 present the construction emissions that were included in the AFC. Tables 5.1-26R and 27R present the construction emissions that have been revised to include truck deliveries of cement to the site during construction. The revised emissions were used in this supplemental analysis.

TABLE 5.1-26
Maximum Daily Emissions During Construction, Pounds Per Day

	NOx	CO	VOC	SOx	PM_{10}	$PM_{2.5}$
Onsite						
Construction Equipment	363.36	116.74	22.96	1.01	13.35	13.35
Fugitive Dust	--	--	--	--	176.98	31.57
Offsite						
Worker Travel, Truck Deliveries[a]	108.09	376.47	37.69	0.99	77.06	12.65
Total Emissions						
Total	471.45	493.21	60.65	1.99	267.38	57.56

[a.] Offsite emissions. Emissions from onsite worker travel and truck deliveries are included in the fugitive dust and construction equipment emissions.

TABLE 5.1-27
Peak Annual Emissions During Project Construction, Tons Per Year

	NOx	CO	VOC	SOx	PM_{10}	$PM_{2.5}$
Onsite						
Construction Equipment	29.91	9.93	1.97	0.07	1.17	1.17
Fugitive Dust	--	--	--	--	16.66	2.99
Offsite						
Worker Travel, Truck Deliveries[a]	9.07	33.02	3.30	0.08	5.99	1.39
Total Emissions						
Total	38.98	42.95	5.27	0.16	23.83	5.55

[a.] Offsite emissions. Emissions from onsite worker travel and truck deliveries are included in the fugitive dust and construction equipment emissions.

TABLE 5.1-26R
Maximum Daily Emissions During Construction, Pounds Per Day (Includes Cement)

	NOx	CO	VOC	SOx	PM_{10}	$PM_{2.5}$
Onsite						
Construction Equipment	363.36	116.74	22.96	1.01	13.35	13.35
Fugitive Dust	--	--	--	--	185.80	32.92
Offsite						
Worker Travel, Truck Deliveries[a]	136.88	392.30	39.69	1.27	85.85	16.46
Total Emissions						
Total	500.25	509.04	62.65	2.28	285.02	62.76

[a.] Offsite emissions. Emissions from onsite worker travel and truck deliveries are included in the fugitive dust and construction equipment emissions.

TABLE 5.1-27R
Peak Annual Emissions During Project Construction, Tons Per Year (Includes Cement)

	NOx	CO	VOC	SOx	PM_{10}	$PM_{2.5}$
Onsite						
Construction Equipment	29.91	9.93	1.97	0.07	1.18	1.18
Fugitive Dust	--	--	--	--	17.35	3.09
Offsite						
Worker Travel, Truck Deliveries[a]	11.38	34.28	3.46	0.11	5.99	1.51
Total Emissions						
Total	41.29	44.22	5.43	0.18	24.52	5.78

[a.] Offsite emissions. Emissions from onsite worker travel and truck deliveries are included in the fugitive dust and construction equipment emissions.

The refined analysis described previously (for operating emissions) was applied to the top 1,000 hourly NO_2 impacts for construction. Because construction emissions are released at ground level, without much vertical velocity, the number of receptors hit on the worst days is very high. In this case, the top 1,000 impacts are all grouped in only 14 hours of 2 years' worth of data.

As a result of the refined analysis, the total impact does not equal the maximum project impact plus background, because the ambient concentration is less than the maximum under the meteorological conditions that result in the maximum project

impact. The highest total NO_2 impact was 200.4 µg/m^3; the 957th highest construction impact is 124.4 µg/m^3. The state standard is 338 µg/m^3.

Table 5.1-28 presents the construction impacts that were included in the original AFC. Table 5.1-28R presents the revised construction impacts when cement deliveries are included.

TABLE 5.1-28
Modeled Maximum Construction Impacts (Includes All Onsite Emissions)

Pollutant	Averaging Time	Maximum Facility Impact (µg/m^3)	Maximum Background (µg/m^3)	Total Impact (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2	1-hour	124.5	190.1	314.6	338	-
	Annual	1.2	43.3	44.5		100
SO2	1-hour	0.4	60.3	60.7	650	-
	3-hour	0.1	44.5	44.6	-	1300
	24-hour	0.04	13.1	13.1	109	365
	Annual	0.003	2.6	2.6	-	80
CO	1-hour	78.8	4,010	4089	23,000	40,000
	8-hour	15.6	1,535	1551	10,000	10,000
PM10	24-hour	6.7	184.4	191.1	50	150
	Annual	0.7	25.4	26.1	20	-
PM2.5	24-hour	1.6	28.8	30.4	--	35
	Annual	0.2	10.6	10.8	12	15

TABLE 5.1-28R
Modeled Maximum Construction Impacts (Includes All Onsite Emissions, Including Cement)

Pollutant	Averaging Time	Maximum Facility Impact (µg/m^3)	Maximum Background (µg/m^3)	Total Impact (µg/m^3)	State Standard (µg/m^3)	Federal Standard (µg/m^3)
NO_2	1-hour	200.4	190.1	314.5 [a]	338	-
	Annual	0.2	43.3	43.5		100
SO2	1-hour	0.9	60.3	61.2	650	-
	3-hour	0.3	44.5	44.8	-	1300
	24-hour	0.04	13.1	13.1	109	365
	Annual	0.001	2.6	2.6	-	80
CO	1-hour	109.4	4,010	4119	23,000	40,000
	8-hour	23.8	1,535	1559	10,000	10,000
PM10	24-hour	6.7	184.4	191.1	50	150
	Annual	0.2	25.4	25.6	20	-
PM2.5	24-hour	1.6	28.8	30.4	--	35
	Annual	0.0	10.6	10.6	12	15

[a] Maximum modeled facility one-hour NO_2 impact does not occur under conditions that result in maximum background concentration. As a result, the maximum total impact is less than the sum of the maximum facility impact and the background.

Background

Facility Emission Impacts May Be Underestimated

Calculations of criteria air contaminants, provided in the AFC and its appendices, for the facility appeared to be underestimated. Page 5.1-27 of the AFC states that the construction of each phase of the facility would last approximately 24 months, and that overlapping of construction of the three phases would occur. However, the air quality impact analysis, contained in the AFC, includes two distinct, separate phases of construction and operation as if they are not overlapping. Because of this, staff believes that the facility operational emission impacts may be underestimated.

Data Request

9. Please provide a revised air quality impact analysis to identify the facility's impacts for two special cases:

a. when Ivanpah 1 is in operation (including emissions identified in Data Requests 1 and 2) and Ivanpah 2 is under construction; and

b. Ivanpah 1 and 2 are operational (including emissions identified in Data Requests 1 and 2) and Ivanpah 3 is under construction.

Response: Because the project will be built in three phases, and because each phase will go into operation as soon as it is built, CEC staff requested an evaluation of the combined impact of operation and construction. Two scenarios were evaluated: operation of Ivanpah 1 during construction of Ivanpah 2, and operation of Ivanpah 1 and 2 during construction of Ivanpah 3.

The refined analysis described previously (for operating emissions) was applied to the top 400 hourly NO_2 impacts for each construction scenario. As a result, the total impact does not equal the maximum project impact plus maximum background concentration, because the ambient concentration is less than the maximum under the meteorological conditions that result in the maximum project impact. For operation + construction of Ivanpah 2, the highest total background plus project impact was 255.6 $\mu g/m^3$; the 399th highest operation+construction project impact is 112.7 $\mu g/m^3$. For operation+construction of Ivanpah 3, the highest total background plus project impact was 266.4 $\mu g/m^3$; the 393rd highest operation + construction project impact is 100.4 $\mu g/m^3$.

Table DR9-1 presents the combined impacts of construction of Ivanpah 2 and operation of Ivanpah 1. Table DR9-2 presents the combined impacts of construction of Ivanpah 3 and operation of Ivanpah 1 and 2. These tables show that determination of the significance of construction impacts is not affected by including operating emissions. Emissions from the project will not cause an exceedance of ambient standards.

The area is already out of compliance with state and federal PM_{10} standards. However, PM_{10} impacts from plant operation alone are below the USEPA significance levels of 1.0 $\mu g/m^3$ on an annual average basis and 5 $\mu g/m^3$ on a 24-hour average basis as defined in 40 CFR 51.165(b)(2). The project's construction plus operation PM_{10} impacts are small relative to existing background concentrations, but exceed the USEPA 24-hour significance threshold. However, the USEPA significance threshold applies to stationary sources and not construction activities, and these temporary construction impacts occur immediately adjacent to the property line, away from any potential receptors. Construction impacts have also been mitigated to the maximum extent feasible, and, therefore, do not result in a significant environmental impact.

TABLE DR9-1
Modeled Impacts (Ivanpah 2 Construction Plus Ivanpah 1 Operation)

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	150.4	190.1	302.8[a]	338	-
	Annual	0.3	43.3	43.6		100
SO2	1-hour	3.55	60.3	63.4	650	-
	3-hour	0.5	44.5	45.0	-	
	24-hour	0.03	13.1	13.1	109	1300
	Annual	0.001	2.6	2.6	-	365
						80
CO	1-hour	202.1	4,010	4212	23,000	40,000
	8-hour	44.4	1,535	1579	10,000	10,000
PM10	24-hour	10.4	**184.4**	**194.8**	50	150
	Annual	0.3	**25.4**	**125.7**	20	-
PM2.5	24-hour	2.6	28.8	31.4	--	35
	Annual	0.3	10.6	10.9	12	15

[a] Maximum modeled facility one-hour NO_2 impact does not occur under conditions that result in maximum background concentration. As a result, the maximum total impact is less than the sum of the maximum facility impact and the background.

TABLE DR9-2
Modeled Impacts (Ivanpah 3 Construction Plus Ivanpah 1 & 2 Operation)

Pollutant	Averaging Time	Maximum Facility Impact ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour	202.4	190.1	290.5 [a]	338	-
	Annual	0.09	43.3	43.4		100
SO_2	1-hour	3.55	60.3	63.9	650	-
	3-hour	0.5	44.5	45.0	-	1300
	24-hour	0.02	13.1	13.1	109	365
	Annual	0.001	2.6	2.6	-	80
CO	1-hour	261.2	4,010	4271	23,000	40,000
	8-hour	52.3	1,535	1587	10,000	10,000
PM_{10}	24-hour	6.6	**184.4**	**191.0**	50	150
	Annual	0.3	**25.4**	**25.7**	20	-
$PM_{2.5}$	24-hour	3.2	28.8	32.0	--	35
	Annual	0.3	10.6	10.9	12	15

[a] Maximum modeled facility one-hour NO_2 impact does not occur under conditions that result in maximum background concentration. As a result, the maximum total impact is less than the sum of the maximum facility impact and the background.

Biological Resources (26)

Background

The AFC lacks a detailed project description for the following elements as they relate to biological resources: site runoff, pre-construction ground disturbance, and post-construction operations and maintenance activities. More information is needed for staff to determine whether these elements could result in additional impacts to biological resources. In addition, BLM needs this information for its consultation with USFWS on the effects of the proposed action on desert tortoise. BLM expressed concern regarding the formal consultation process with USFWS because other agencies may recommend project footprint changes, and it may be necessary to re-initiate the consultation process and biological evaluation.

Data Request

26. Provide a graphic and description of areas of the site that will be graded and areas where root systems will be left in place, and indicate other areas of ground disturbance.

Response: See Data Response 6. These materials will be provided prior to the end of May, 2008.

Land Use (44 – 49)

Background

As stated in the AFC, the July 2002 Northern and Eastern Mojave Desert Management Plan (NEMO) amends the BLM California Desert Area Conservation Plan (CDCA) for the area identified as the Northern and Eastern Mojave Desert. The ISEGS site is located in the southeastern portion of the NEMO Planning Area Boundary. The NEMO Plan addresses threatened and endangered species conservation and recovery and adoption of public land health standards, evaluation of segments for eligibility in the National Wild and Scenic river system, and changes resulting from the California Desert Protection Act passed in 1994. The NEMO Plan also designates routes of travel in Desert Wildlife Management Areas consistent with Federal regulations.

The management of backcountry roads and trails (routes) is an important part of BLM's management of public lands. The use of these routes by Off Highway Vehicles (OHV) and related established recreation activity is a major concern for the BLM. The Ivanpah Valley falls within the NEMO plan amendment area and includes routes of travel designated for OHV use in that land use plan amendment. The ISEGS project overlays several of these routes. The analysis for the project will need to consider the impact to these designated routes and their uses. Where use, if any, will be allowed through or in the vicinity of the project, special prescriptions will need to be discussed. Where use would be discontinued, alternative means of transportation will need to be described. Finally, because the use of routes is such a sensitive subject for the public, consideration should be given to conditions of approval which serve to ensure continued existence of this recreation.

Data Request

44. Provide a complete inventory and assessment of travel routes within and adjacent to the planning area using the California BLM Route Inventory Data Dictionary.

Response: The Applicant was provided electronic files from BLM of catalogued trails within the vicinity of the Ivanpah SEGS. These trails are shown on Figure DR44-1. Table DR44-1 identifies each trail shown in Figure DR44-1 and describes whether the trail will remain open or whether a modification is required. As previously committed by the Applicant, travel routes in the area of the Ivanpah SEGS that would be disturbed through implementation of the three phases of the project, would be addressed in a Trail Plan that will be developed in coordination with BLM. The purpose of the Plan will be to avoid or mitigate potential impacts on these existing routes. This Plan will also identify fencing, gates, dust abatement and restoration measures that would be taken to manage the use of the routes requiring modifications to accommodate the development and operation of the Ivanpah SEGS. The modifications and the Trail

Plan will be developed to ensure that the recreational experience of trail users in the vicinity of the Ivanpah SEGS is maintained or improved from present conditions.

TABLE DR44-1
Modification Status for BLM Trails in Proximity of Ivanpah Site

BLM Trail #	Proximity to Ivanpah SEGS Component	Status
699135	North of Project Site	Remains Open – no impact
699194	South of Project Site, runs between Trails 699238, 699244, and Power Line	Remains Open – no impact
699195	Southwest of Project Site, runs between Power Line and Colosseum Trails	Remains Open – no impact
699197	Southwest of Project Site	Remains Open – no impact
699198	Runs through southern portion of Ivanpah 3 and northern portion of Ivanpah 2	Modification required - on east side of Ivanpah 3, close trail 100-feet from site boundary and connect with dirt road to be constructed that connects to a road between Ivanpah 2 and 3. Follow new road to reconnection with 699198 on the west side of Ivanpah 2 as shown on Figure DR44-1.
699199	South of Project Site	Remains Open – no impact
699221	South of Project Site, runs between Trails 699194 and 699199	Remains Open – no impact
699223	South of Ivanpah 2, runs between the Wash and Colosseum Road Trails.	Remains Open – no impact
699226	Runs through northern portion of Ivanpah 3	Modification required - relocate trail around the north side of Ivanpah 3, as shown on Figure DR44-1.
699227	West of Project Site	Remains Open – no impact
699232	West of Project Site	Remains Open – no impact
699238	East of Project Site and goes around Primm Valley Golf Club and continues south	Remains Open – no impact
699239	East of Project Site	Remains Open – no impact
699244	Southeast of Project Site	Remains Open – no impact
699617	Goes around metamorphic hill and connects to Trail 699238.	Remains Open – no impact
Power line	Runs diagonally between Ivanpah 1 and 2 along existing power line corridor.	Remains Open – section between Ivanpah 1 and 2 may be improved as part of the re-routing of Colosseum Road.
Wash	East of Ivanpah 2, runs between Trails 699223 and 699198	Remains Open – no impact

TABLE DR44-1
Modification Status for BLM Trails in Proximity of Ivanpah Site

BLM Trail #	Proximity to Ivanpah SEGS Component	Status
Colosseum Road	Runs through the southern portion of Ivanpah 2	Modification required - realign and improve road as shown on Figure DR44-1 to follow the existing power line corridor and then follow the southern boundary of Ivanpah 2 to the original Colosseum Road Trail southwest of Ivanpah 2.

45. Identify all routes that would be closed due to development of the facility.

Response: As shown on Figure DR44-1 and described in Table DR44-1, there are 18 trails located in the vicinity of the Ivanpah SEGS and only three of these trails would require modifications to accommodate development of the facility. All of those trails will be rerouted either around or through the project. It is planned that these routes would remain open during construction of the respective phases.

46. Identify all routes that would be rerouted and would be proposed for new alignment.

Response: As shown on Figure DR44-1 and described in Table DR44-1, only three trails would require modifications to accommodate development of the Ivanpah SEGS. There are three trails requiring re-alignments to accommodate the facility, but no closures will be required for any portion of these trails. Trail 699226 located on the north side of Ivanpah 3 would be re-aligned along the north side of Ivanpah 3. Trail 699198 would be realigned to pass between Ivanpah 2 and 3. The Colosseum Road Trail would also require a re-alignment along the southern boundary of Ivanpah 2.

47. Identify all routes that would remain open to the public.

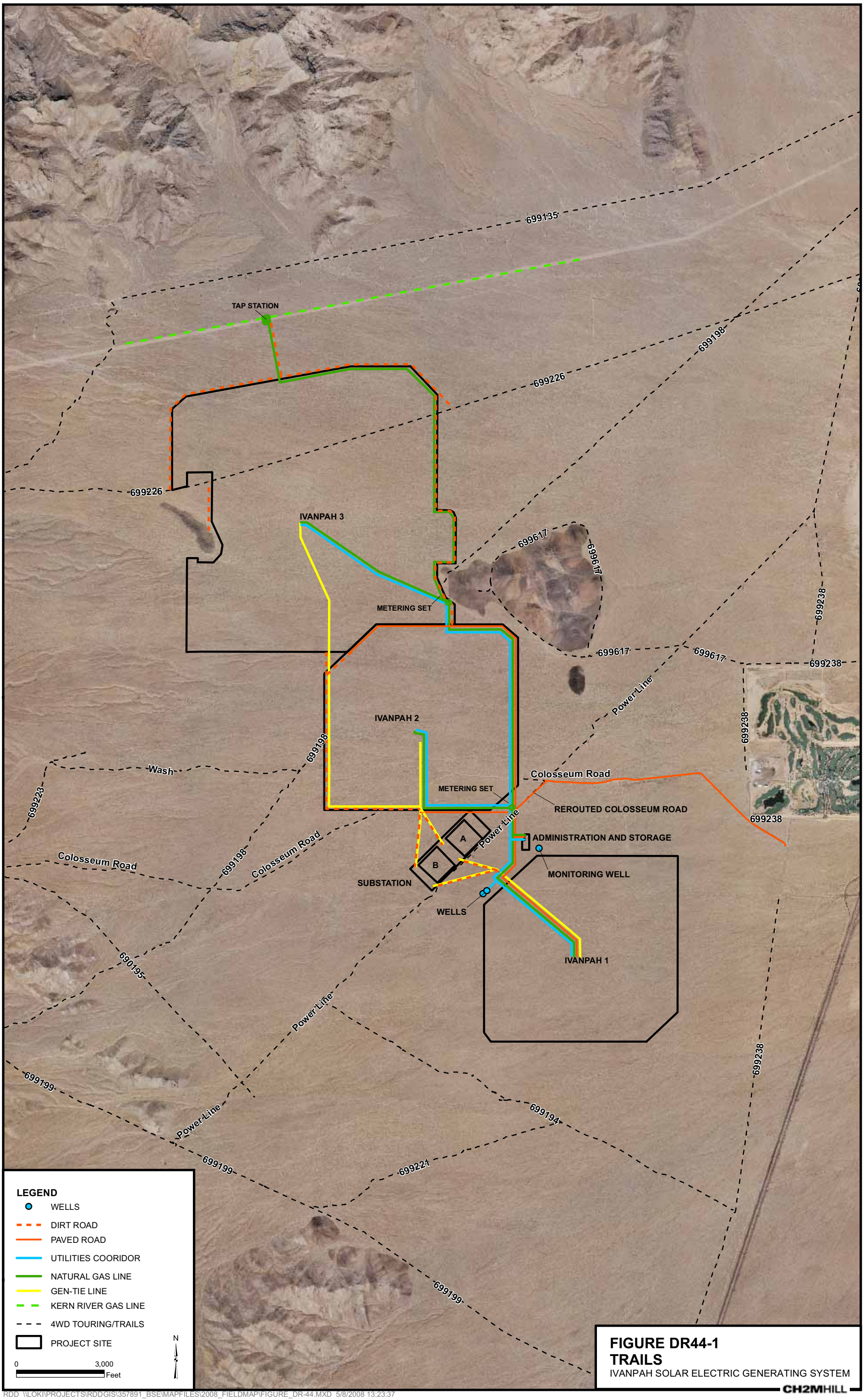
Response: As shown on Figure DR44-1 and described in Table DR44-1, all of the trails in the vicinity of the Ivanpah SEGS will remain open to the public. Of the 18 trails, only three will require modifications to accommodate the facility. Unless temporary closure is required during construction of the rerouted trail, all will remain open with no impacts to trail users. At most, only one trail will be temporarily closed at any one time.

48. Identify all fencing, gates, and dust abatement measures that would be taken to manage use of routes designated open within and adjacent to the facility.

Response: As described in Response 44, in cooperation with the BLM, the Applicant will develop a Trail Plan to address the types of fencing, gates, dust abatement and restoration measures required for the three trails that would be modified.

49. Please develop appropriate mitigation for numbers 44 through 48.

Response: See response to DR 48.



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Soils and Water Resources (53-60, 63, 66-68, and 75-76)

Background

As described in the October 18, 2007 RWQCB letter (posted on the CEC's project webpage), specific post-construction stormwater controls are not discussed in the AFC. The RWQCB requires Low Impact Development (LID). The goal of LID is to maintain landscape functionality equivalent to predevelopment hydraulic conditions and minimize the generation of non-point source pollutants. To accomplish these goals, LID principles include:

- Helping maintain natural drainage paths and landscape features to slow and filter runoff and maximize groundwater recharge.
- Reducing the impervious ground cover created by development of the project and the associated transportation network.
- Managing runoff as close to the source as possible.

CEC and BLM staff need to see how principals of LID will be incorporated into the project design. Natural drainage features and patterns must be maintained to the extent feasible. Staff needs to evaluate designs that minimize impervious surface, such as permeable surface parking areas, directing runoff onto vegetated areas using curb cuts and rocks, swales, etc., and infiltrating runoff as close to the source as possible to avoid forming erosion channels.

The project must incorporate measures to ensure that stormwater generated by the project is managed onsite during both pre-construction and post-construction with development features that span the drainage channels or allow for broad crossings. Design features should be incorporated to ensure that runoff is not concentrated by the proposed project, thereby causing downstream erosion.

A draft copy of the Industrial Stormwater Pollution Prevention Plan (SWPPP) is presented as Appendix 5.15A. Section 2.4 (Description of Storm Drainage System and Outfalls) of the Industrial SWPPP discusses the proposed project grading and control measures for managing stormwater runoff. The project is proposing to maintain existing sheet flow conditions where possible, except in the power block area. Section 5.11.6.2 (Permanent Erosion Control Measures) of the AFC discusses in general terms the type of permanent soil erosion control measures that can be expected at the project site and that will be included as part of the final SWPPP.

Data Request

53. Please provide a project grading plan.[2]

Response: See Data Response 6. A grading plan will be provided for each unit prior to the end of May 2008.

54. Provide an appropriately scaled detailed drawing of the location of all project access routes and indicate whether these are paved, graveled, or graded. This should include the access routes to and between the heliostat mirrors.

Response: Appropriately scaled detailed drawings will be provided indicating the location of all project access routes and whether each are paved, graveled, or graded. Access routes to and between the heliostat mirrors will be provided in the 90 percent engineering package.

55. Provide a calculation of the amount and area of compacted soils resulting from biweekly traverses by a truck mounted tanker for washing of heliostat arrays and cutting of vegetation.

Response: The amount of area where soils will be compacted will be determined and included in development of the Curve Number (CN) for the SCS method in TR-55 as required by San Bernardino County. TR-55 uses the SCS runoff equation to predict the peak rate of stormwater runoff as well as the total runoff volume. TR-55 also provides a simplified "tabular method" for the generation of complete runoff hydrographs. In this method, Curve Numbers are applied to hydrologic soil groups to represent the average percent impervious area. Western deserts typically have a CN between 63 and 88 for hydrologic soil group B (our site is 78). In locations where western desert industrial areas are to be developed, TR-55 directs the use of a CN=96. The SCS method does not take into account soil compaction only that it is less pervious.

56. Provide a discussion and calculations establishing that the proposed stormwater management system has sufficient capacity for a 100-year flood storm.

Response: These materials will be provided prior to the end of May 2008.

Background

To determine the potential erosion impacts to water and soil resources from construction of the project, the California Energy Commission (CEC) requires a draft Drainage Erosion and Sediment Control Plan (DESCP). The draft DESCP is to be updated and revised as the project moves from the preliminary to final design phases and is to be a separate document from the construction Storm Water Pollution Prevention Plan (SWPPP). The final DESCP, submitted prior to site

[2] Response to this item can be addressed in the draft Drainage Erosion and Sediment Control Plan requested in #57.

mobilization, must be developed and signed by a professional engineer/erosion control specialist.

Data Request

57. Please provide a draft DESCP containing elements A through I listed below. These elements will outline site management activities and erosion/sediment control Best Management Practices (BMPs) to be implemented during site mobilization, excavation, construction, and post-construction activities. The level of detail in the draft DESCP should correspond to the current level of planning for site construction and corresponding site grading and drainage. Please provide all conceptual erosion control information for those phases of construction and post-construction that have been developed or provide a statement when such information will be available.

a. Vicinity Map: A map(s) at a minimum scale 1”=100’ shall be provided indicating the location of all Project elements and depictions of all significant geographic features including swales, storm drains, and sensitive areas.

b. Site Delineation: All areas subject to soil disturbance, such as the construction area, laydown area, parking area, all linear facilities, and landscaping areas shall be delineated showing boundary lines and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

c. Watercourses and Critical Areas: The DESCP shall 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: The DESCP shall provide a topographic site map(s) at a minimum scale 1”=100’ showing 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 shall be extended off-site for a minimum distance of 100 feet in flat terrain.

e. Drainage of Project Site Narrative: The DESCP shall include a narrative of the drainage measures to be taken to protect soil and water resources onsite and downstream. The narrative shall include a summary of the hydraulic analysis prepared by a professional engineer/erosion control specialist. The narrative shall state the watershed size in acres that was used in the calculation of drainage measures. The hydraulic analysis should be used to support the selection of BMPs and structural controls to divert off-site and on-site drainage around or through the construction and laydown areas.

f. Clearing and Grading Plans: The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross-sections, or other means. The locations of any

disposal areas, fills, or other special features shall also be shown. Illustrate existing and proposed topography tying in proposed contours with existing topography.

g. Clearing and Grading Narrative: The DESCP shall include a table with the quantities of material excavated or filled during construction in all area such as the construction area, laydown area, and transmission and pipeline corridors. This table shall identify whether the materials removed and brought in were temporarily or permanently added or removed and the amount of such material brought in or removed.

h. Best Management Practices Plan: The DESCP shall 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. BMPs shall include measures designed to prevent wind and water erosion. Treatment control BMPs used during construction should enable testing of groundwater and/or stormwater runoff prior to discharge.

i. Best Management Practices Narrative: The DESCP shall show the location (as identified in H above), timing, and a maintenance schedule of all erosion and sediment control BMPs to be used prior to initial grading, during project excavation and construction, final grading/stabilization, and post-construction. Separate BMP implementation schedules shall be provided for each phase of construction. The maintenance schedule should include post-construction maintenance of structural control BMPs or a statement provided when such information will be available.

Response: Once the additional design drawings and calculations are received (prior to the end of May 2008) the DESCP will be revised to incorporate the latest drawings.

Background

Approximately 3,400 acres of land will be disturbed by the project construction activity. Section 5.11.4.6 (Construction) of the AFC states that "…substantial water erosion and dust control measures will be required to prevent an increased dust load and sediment load to ephemeral washes on and off the project site." In section 4.2.4 (Erosion Control) in the AFC, year-round and rainy season erosion control practices are discussed. To the extent not discussed in Item 57 above, please provide the following information.

Data Request

58. Describe in detail the purpose, construction, and effectiveness of the controls to protect slopes susceptible to erosion and the controls to stabilize non-active areas, and provide an appropriately scaled map showing the location and engineering drawings illustrating the construction of these controls.

Response: This information will be provided in the revised DESCP as part of Data Response 57.

59. Describe and illustrate the measures to maintain the integrity of existing onsite and adjacent offsite drainages and how existing drainages would be altered.

Response: This information will be provided in the revised DESCP as part of Data Response 57.

60. Describe and illustrate the purpose, construction, and effectiveness of proposed rock filters, local diversion berms, and how existing drainage patterns would be altered.

Response: See Data Response 6. These drawings will be provided prior to the end of May 2008.

Background

Section 5.11.4.6 (Construction) of the AFC discusses stockpiling soil from grading operations. An estimated 156,875 cubic yards of material will be cut and reused as fill at the site. The cut soil will have to be stockpiled at a staging area prior to use as fill, and the topsoil will be separately stockpiled from the underlying soil. In addition, an estimated 412,600 cubic yards of vegetation will be generated and available as mulch for erosion control. To minimize and control soil erosion and transport, a DESCP and SWPPP would be developed.

Data Request

63. Describe and illustrate the soil stockpile staging locations, confirming the locations would be within the proposed project footprint or within an area to which the applicant has legal access.

Response: These stockpile staging locations will be within either the heliostat field of the unit under construction or the 120-acre construction logistics area.

Background

Section 3.2.2 (Heliostat Erection) of Appendix 5.15A of the AFC discusses the use of at least two pre-casting assembly sheds for each heliostat construction. These pre-assembly sheds will be approximately 100 feet by 100 feet and used for pre-casting heliostat bases and for assembling heliostat structures to mirrors.

Data Request

66. Please describe and illustrate the dimensions of the pre-casting sheds.

Response: As stated in Data Response, Set 1A, heliostats will be constructed using a driven steel pile method. Therefore, pre-casting sheds will not be required. However, other temporary construction buildings will be needed. Temporary construction facilities would include uses such as offices, training facilities, first aid, sanitary, dining, various material storage areas, subcontractors workshops, heavy equipment service, truck parking, car parking (200), bus area, heliostat assembly facility (about 1.5

acres). They will be located in the Construction Logistics Area shown in Figure DR66-1, which comprises about 120 acres.

67. Please provide a map showing the shed locations.

Response: See Data Response 66.

Background

San Bernardino County Ordinance No. 3872 applies to groundwater management in the unincorporated, non-adjudicated desert region of the county. San Bernardino County (County) and Bureau of Land Management (BLM) have entered into a Memorandum of Understanding (MOU) that provides that BLM will require conformance with County Ordinance No. 3872 for all projects proposing to use groundwater from beneath Public Lands. The MOU also provides that the County and BLM will work cooperatively to ensure that conditions required of project applicants will jointly conform to applicable local, state, and federal laws and regulations.

Data Request

68. Please provide copies to the BLM of all correspondence, including applications, data, and approvals, with or between the County, for permitting water wells associated with the proposed project.

Response: As described in Data Response 4, the project wells have been relocated approximately 4,250 feet (0.80 miles) south of their original location. The proposed wells in their new location will be about 1.1 miles from the Colosseum 1 well and about 0.97 miles (5,150 feet) from the Colosseum 2 well, the two production wells that serve the Primm Valley Golf Club. Based on the analysis conducted to determine the groundwater impacts of the proposed project, at one mile from the proposed project wells groundwater elevations are expected to decline by approximately 1.4 feet over the 50 year life of the project. Thus, moving the groundwater wells farther away from the Primm Valley Golf Club production wells (Colosseum 1 and Colosseum 2) would reduce the expected groundwater elevation decline at these wells by 0.6 feet. As described previously in Data Response 4, it is also proposed that a monitoring well be located between the project's supply wells and the two supply wells for the Primm Valley Golf Club.

Background

A letter, dated October 18, 2007 by the RWQCB, reports that Molycorp intends to resume mining operations, near the ISEGS project area, in the future. Molycorp may resume operations and groundwater pumping, and if so, the existing nitrate groundwater contamination plume below the Molycorp New Ivanpah Evaporation Pond may migrate. Please note that in the Groundwater Availability Report, Appendix 5.15C of the AFC, it is not clear whether the estimated future 400 acre-feet per year of groundwater pumping at Molycorp was incorporated into the conclusions about the projects' cumulative impacts on groundwater. Also, several groundwater models and assumptions were discussed in the Groundwater Availability Report, but

it is not clear what assumptions and model were used in the conclusions of the report.

Data Request

75. Please quantify the impact to the wells of other groundwater users by the proposed project over the life of the project. If additional groundwater calculations are required to answer this question, please discuss the assumptions and calculations used.

Response: As shown in Figure 5.2 and described in Section 5.0 of AFC Appendix 5.15C, declines in groundwater elevation due to the proposed project would be minor. Over the 50-year life of the project and assuming 100 ac-ft/yr extraction for project uses, groundwater elevations would decline on the order of 2.1 feet at 0.5 mile from the well site, 1.4 feet at 1 mile from the well site, and 0.8 feet at 2 miles from the well site. The nearest groundwater wells to the site are the Primm Valley Golf Club wells, which are located about one mile from the project wells. Over the life of the project, groundwater elevations in these wells would decline about 1.4 feet. A decline of about 1.4 feet in the groundwater elevations at the golf course wells is not anticipated to negatively impact the use of those wells, nor is this amount expected to affect the production rate of those wells such that they could no longer support the golf course.

76. If the wells of other groundwater users are negatively affected by the project's use of groundwater or by the cumulative use of groundwater, please discuss the need to provide alternative groundwater well locations and the specific location of those wells.

Response: See Data Response 75. Because the project wells are not anticipated to negatively impact the use of these wells or affect the production rate of these wells such that they could no longer support the golf course, no alternative groundwater well locations have been identified. Additionally, and as described in Data Response 68, the project wells have been relocated and would now be located about 1.1 miles from Colosseum 1 well and about 0.97 miles (5,150 feet) from the Colosseum 2 well, the two production wells that serve the Primm Valley Golf Club. Moving the groundwater wells farther away from the Primm Valley Golf Club production wells would reduce the expected groundwater elevation decline at these wells by 0.6 feet, resulting in an expected groundwater elevation decline at these wells of approximately 1.4 feet over the life of the project.

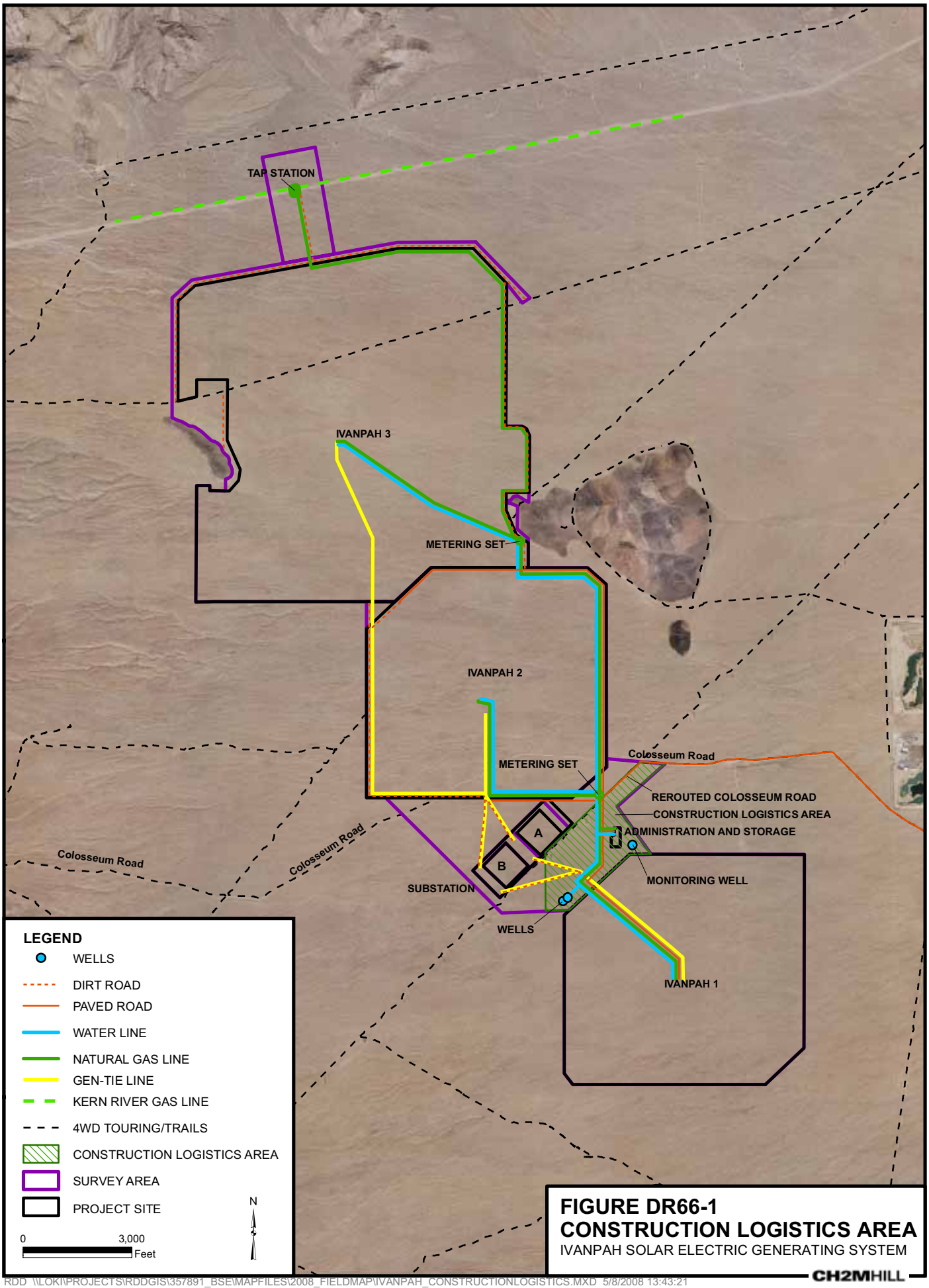

FIGURE DR66-1
CONSTRUCTION LOGISTICS AREA
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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Visual Resources (97 and 102)

Background

The AFC presents two visual simulations of the project from Key Observation Points (KOPs) selected in discussion with staff at the Energy Commission prior to filing the AFC. We were unable to accompany applicant's staff in the initial field visit at that time due to intensive workload and scheduling conflicts. However, with further study of the project it has become apparent that additional analysis of potential impacts to viewers on Interstate 15 (I-15) is necessary. According to the California Environmental Quality Act (CEQA) Guidelines, a project may cause a significant visual impact if it would substantially degrade the existing visual character or quality of the site and its surroundings. Viewer exposure and visual quality are key factors in staff's methodology for assessing visual impacts. I-15 represents the primary entry to the city of Las Vegas. According to the AFC, viewer exposure may exceed 40,000 motorists per day, including a high proportion of tourists. In addition, the existing visual setting appears to be scenically intact. Because the nearest portions of Ivanpah 1 would fall within near-middleground distances of under one mile, it would be appropriate to include a representation of the project from I-15, and discuss the feasibility and appropriateness of considering moving Ivanpah 1 further west to reduce potential visual effects to motorists on I-15.

Data Request

97. Please provide a full-page, color simulation of the proposed project (at life-size scale when the picture is held 10 inches from the viewer's eyes) from a viewpoint on I-15 at near middleground distance of roughly 1 mile or less, along with corresponding location and camera lens information.

Response: The Applicant's revisions to the project would result in the following changes from a visual resources perspective:

- For Ivanpah 1 and 2, instead of each having one 312-foot-tall power tower in the center of the heliostat field array with three 312-foot-tall receiver structures sited around the power tower (as was originally proposed), they would each have one 393-foot-tall power tower in the center of the heliostat field and no receiver structures. Instead of having a maximum of 68,000 landscape-oriented single-hung mirrors in the heliostat field, the project would have a maximum of 55,000 portrait-oriented double-hung mirrors (see Figure DR102-1). Due to the change in mirror orientation and use of double-hung mirrors, the total reflective surface area could be up to 61.8 percent larger.

- For Ivanpah 3, there are no changes in the number of power towers, number of receivers, or height of any of those structures. Instead of having a maximum of 136,000 landscape-oriented single-hung mirrors in the heliostat field, the project

would have a maximum of 104,000 portrait-oriented double-hung mirrors. Due to the change in mirror orientation and use of double-hung mirrors, the total reflective surface area could be as much as 52.9 percent larger.

- No change to the originally proposed construction or operation lighting is expected with the project optimization. However, because the project optimization would have fewer receiver towers than originally proposed, fewer lights would be visible during nighttime maintenance activities. Lights atop the power towers would continue to meet Federal Aviation Administration regulations. In addition, there would be no change to project vehicle-mounted lights used for nighttime maintenance activities.
- No changes to the cumulative impacts analysis that was presented for the originally configured project would result as a consequence of the project optimization.
- No changes in the mitigation measures that were provided for the originally configured project are necessary as a consequence of the project optimization.
- No changes to the conclusions regarding the originally configured project's consistency with the LORS are necessary as a consequence of the project optimization.
- The project optimization includes an alternate site for the electrical substation and providing additional construction use area. These proposed changes do not change the conclusions previously submitted. In addition, making the construction use area larger is a temporary visual change, lasting only throughout the project construction period.

An analysis of the visual impacts of the project optimization, when compared with the original project design presented in the AFC, is provided below.

Ivanpah 1 – Analysis of KOPs 1 and 4

KOPs 1 and 4 (Figures 5.13-9bR[3] and DR97-2bR, respectively) show views of Ivanpah 1. Figure 5.13-9bR shows the KOP 1 view of Ivanpah 1 from the Primm Valley Golf Club. While Ivanpah 1 originally included four power towers (see AFC Figure 5.13-9b), the project optimization has fewer structures, but has a taller power tower with greater mass and a larger heliostat field, making them more visible from this location.

Figure DR97-2bR shows the KOP 4 view of Ivanpah 1 from the Yates Well Road exit. Similar to that described for KOP 1, when compared to the four power towers (Figure DR97-2b previously submitted in Data Response, Set 1A), the project optimization is more prominent in the view due to the larger taller structure and the greater visibility of the heliostat field. This view is from approximately 1.2 miles away from the eastern boundary of the Ivanpah 1 plant site, and is the closest I-15 location to the project. This viewing location is not considered a sensitive receptor

[3] Figures 5.13-1R, 5.13-9bR, 5.13-10bR, DR97-1bR, and DR97-2bR are included at the end of this section.

location. It has a Low sensitivity level, and is considered a Class IV BLM VRM Management Class.

BLM's Form 8400-4, the Visual Contrast Rating Worksheet (BLM, 1986), was completed for KOP 4[4]. (The form for KOP 3 is included at the end of this section as Attachment DR97-1). The elements of the existing landscape, including descriptions of existing form, line, color, and texture as they relate to the land/water, vegetation, and structures are provided, and a rating indicating the level of contrast between the proposed project's features and the landscape is also provided. The project would be visible from this KOP, and would be more visible than indicated in the original visual simulation (Figure DR97-2b submitted previously). Four of the 12 criteria on Form 8400-4 were rated as having a Strong degree of contrast, and all other criteria were rated as having Moderate, Weak, and no contrast.

From this KOP location, the project would not significantly degrade the existing view. The project may attract the attention of the casual viewer, but it would not preclude viewers from seeing the mountains in the distance. In addition, the project would meet the objective of the BLM Interim VRM Class IV rating of the land.

Ivanpah 2 and 3 – Analysis of KOPs 2 and 3

KOPs 2 and 3 (Figures 5.13-10bR and DR97-1bR, respectively) show views of Ivanpah 2 and 3. Figure 5.13-10bR shows the KOP 2 view of Ivanpah 2 and 3 from the Primm Valley Golf Club. When compared to the previous project configuration showing the many vertical structures (Figure 5.13-10b previously submitted in the AFC), the project optimization has fewer structures, but has a taller power tower with greater mass and a larger heliostat field, making them more visible from this location. In comparing both project designs, there is no difference in the visibility of the receiver structures from this distance.

Figure DR97-1bR shows the KOP 3 view of Ivanpah 1 from the Yates Well Road exit. When compared to the previous project configuration showing more power towers (Figure DR97-1b previously submitted in Data Response, Set 1A), the optimization of the power tower and heliostat field is more visible than the original project design from this location. In comparing both project designs, there is no difference in the visibility of the power tower structures from this distance. Similar to that described for KOP 4, this viewing location is not considered a sensitive receptor location, it has a Low sensitivity level, and is considered a Class IV BLM VRM Management Class.

BLM's Form 8400-4, the Visual Contrast Rating Worksheet (BLM, 198a), was completed for KOP 3. The form for KOP 4 is included at the end of this of this section as Attachment DR97-2). Similar to that described for KOP 4, the elements of the existing landscape as they relate to the land/water, vegetation, and structures are provided, including a rating indicating the level of contrast between the proposed project's features and the landscape. The project would be visible from this KOP; the power tower would be more visible than indicated in the original visual simulation (Figure DR97-2b submitted previously in Data Response, Set 1A), and there would

[4] BLM's Form 8400-4 Visual Contrast Rating Worksheets were previously prepared and submitted for KOPs 1 and 2.

be no change in the visibility of the receiver structures. One of the 12 criteria (color) on Form 8400-4 was rated as having a Strong degree of contrast, and all other criteria were rated as having Moderate, Weak, and no contrast.

From this KOP location, the project would not significantly degrade the existing view. The project may attract the attention of the casual viewer, but it would not preclude viewers from seeing the mountains in the distance. In addition, the project would meet the objective of the BLM Interim VRM Class IV rating of the land.

Figure 5.13-1R is included in this submittal to provide context of the attached visual simulations, and to correct some KOP information.

Source:

U.S. Department of the Interior, Bureau of Land Management (BLM). 1986. Visual Resource Contrast Rating. BLM Manual Handbook 8431-1. January 17.

Background

The description of the project's appearance in Section 5.13.4.4, as well as the project description, provide depictions of the power generation facilities, but very little of the mirror arrays, and none of the mirror components. However, a much better understanding of the mirror component of the project is needed to understand and evaluate the project operation and, specifically, the potential for glare impacts and glare mitigation. For example, the AFC states that the mirrors would be operated to avoid glare on I-15 and the Primm Valley Golf Club (p. 5.13-28).

Data Request

102. Please provide elevation drawings presenting the dimensions of the proposed mirror units.

Response: See Figure DR102-1R showing dimensions of the proposed double-mirror heliostats.

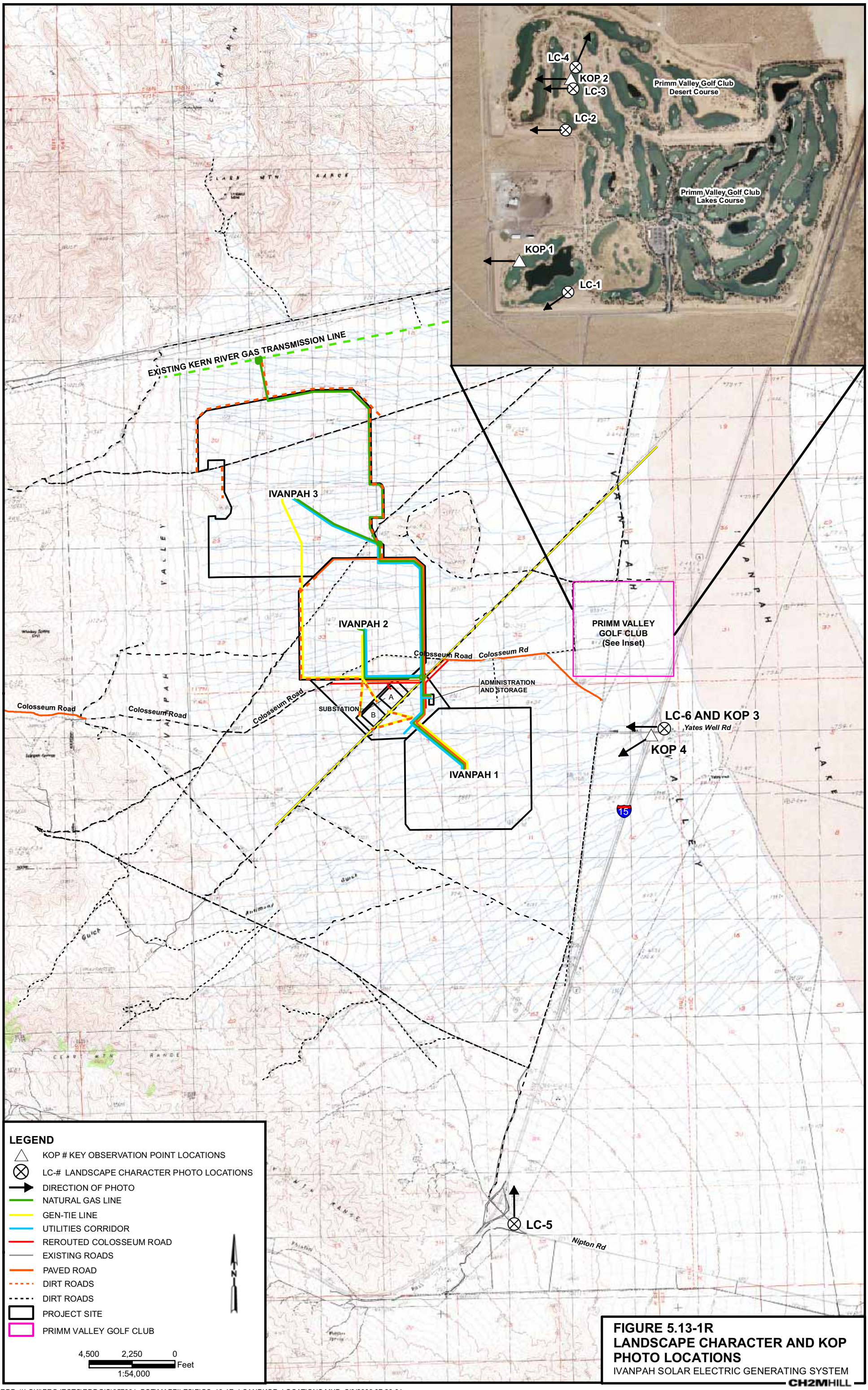

FIGURE 5.13-1R
LANDSCAPE CHARACTER AND KOP PHOTO LOCATIONS
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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RDD \\LOKI\PROJECTS\RDDGIS\357891_BSE\MAPFILES\FIG5_13-1R_LCANDKOP_LOCATIONS.MXD 5/9/2008 07:20:01

KOP 1: Simulated “with-project” view looking southwest toward the Ivanpah 1 project site from Primm Valley Golf Club, Desert Course Hole 1.

FIGURE 5.13-9bR
SIMULATED VIEW OF IVANPAH 1 FROM KOP 1 (HOLE 1)
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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ES062007009SAC Figure_5.13-9b_full_sheet.ai 05/02/08 tdaus

KOP 2: Simulated “with-project” view looking west toward the Ivanpah 2 and 3 project sites from Primm Valley Golf Club, Desert Course Hole 8. This photo shows the one tower for Ivanpah 2 (the left-most tower in the center of the photo) and three receiver towers for Ivanpah 3 (the three at the right side of the photo).

FIGURE 5.13-10bR
SIMULATED VIEW OF IVANPAH 2 AND 3 FROM KOP 2 (HOLE 8)
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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Simulated “with-project” view looking northwest toward the Ivanpah 2 and 3 project sites from the Yates Well Road exit off I-15.

FIGURE DR97-1bR
SIMULATED VIEW OF IVANPAH 2 and 3 FROM KOP 3 (Yates Well Road Exit off I-15)
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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ES062007009SAC Figure_DR97-1bR.ai 05/05/08 dash

KOP 4: Simulated "with-project" view looking southwest toward the Ivanpah 1 project site from the Yates Well Road exit off I-15.

FIGURE DR97-2bR
SIMULATED VIEW OF IVANPAH 1 FROM KOP 4 (Yates Well Road Exit off I-15)
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

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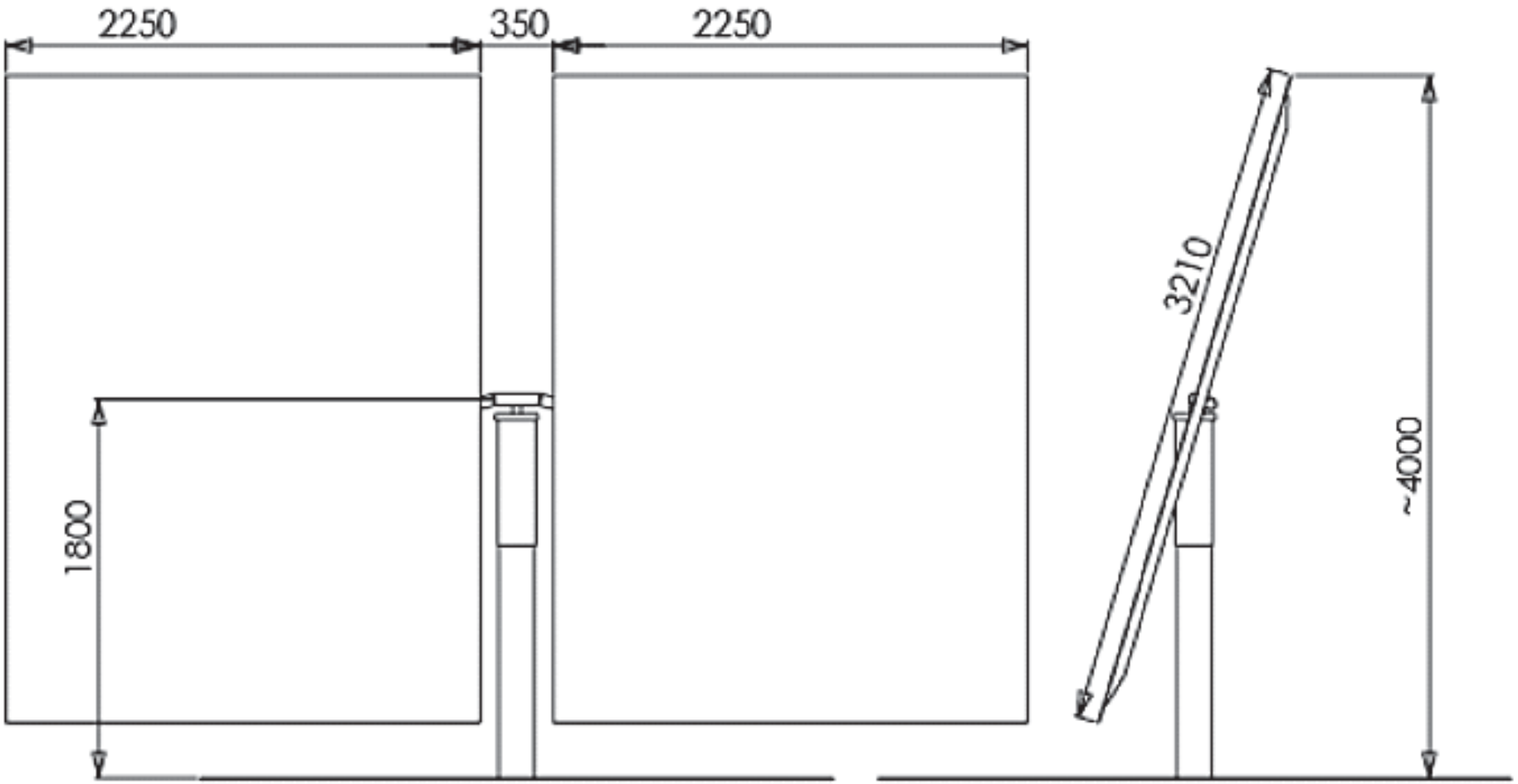

Double-mirror heliostat

Note: Units are in millimeters.

FIGURE DR102-1R
CONCEPTUAL HELIOSTAT DRAWING
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

CH2MHILL

ATTACHMENT DR97-1

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date – May 4, 2008
District – California Desert District
Resource Area
Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name Ivanpah Solar Electric Generating System	4. Location T17N, R14E, Sections 17, 20, 21, 27, 28, 29, 33, and 34 T16N, R14E, Sections 2, 3, 10, and 11	5. Location Sketch See attached Figure 5.13-1R showing the location of KOP 4
2. Key Observation Point 4		
3. VRM Class Lands were not classified into VRM Classes in the California Desert Conservation Area Plan. Consideration of the project area's scenic quality, sensitivity level, and distance zone results in the area qualifying for being classified as interim Class IV.		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	KOP 4 is located at the Yates Well Road exit off I-15. The relatively flat desert terrain is visible in the middleground; it is where the project would be constructed. The mountains are visible in the background view. No water bodies exist in this area.	Vegetation in this view consists of typical desert vegetation (grasses and low-lying shrubs).	A patched I-15 is dominant in the foreground from this viewpoint.
LINE	A horizontal line is created by the ridge of the mountains and by the ground surface at the base of the mountains to the west of the project area. A horizontal line is also created where the desert meets the I-15 pavement.	No horizontal or vertical lines from vegetation are apparent.	A horizontal line is evident due to the presence of I-15 in this view.
COLOR	The desert ground surface in the foreground appears tan. The project area beyond the foreground is a light brown. The mountains further to the west (background) appear as shades of blue, gray, and brown.	Vegetation appears as shades of green, tan, brown, with minor hues of yellow.	I-15 appears gray in this view.
TEXTURE	The exposed (bare) soil in the foreground provides texture. Texture beyond the foreground is not apparent.	Vegetation in the foreground provides texture.	The I-15 pavement provides minimal texture in this view.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change in the foreground or background views would occur, as shown in Figure DR97-2bR. No water exists in this area, so no change in water bodies would occur. The land surface at the project site would be modified by grading and the addition of project facilities.	No change would occur to the vegetation in the foreground or background from the project. Vegetation would be removed to allow for the installation of the power tower and field of mirrors, but the vegetation at the project site is not visible from this viewpoint.	The project would add human-made forms to the landscape, as shown in Figure DR97-2bR (power tower in the midst of a field of mirrors).
LINE	No change in ridgeline of the mountains or the horizontal line where the desert meets the I-15 pavement. The horizontal line at the base of the mountains is obscured by the presence of project facilities. Less of the flat terrain in the project area is seen due to the presence of project facilities.	No change in the foreground or background vegetation would occur. As indicated above, vegetation is not visible at the project site from this KOP.	Adding the project features (a power tower and a field of mirrors) to the landscape would add both vertical and horizontal lines to the view (see Figure DR97-2bR).

SECTION C. PROPOSED ACTIVITY DESCRIPTION (Continued)

COLOR	No change in the foreground or background landscape colors. A change in color of the land surface in the project area would occur due to the addition of project facilities.	No change in foreground or background vegetation would occur. Vegetation at the project site would be removed to allow for the installation of the power tower and field of mirrors, but the vegetation at the project site is not visible from this viewpoint.	The project would include the presence of a power tower and field of mirrors in this view.
TEXTURE	No change in foreground or background landscape texture. Texture of the project site from this viewpoint is not evident.	No change in the foreground or background view of vegetation. No change in view of vegetation at the project site (vegetation is not visible at this distance and perspective).	Moderate texture is provided by the proposed project features.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES												2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)
		LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)				
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	3. Additional mitigating measures recommended ☒ Yes ☐ No (Explain on reverse side)
ELEMENTS	Form			X					X	X				Evaluator's Names: Wendy Haydon/CH2M HILL — Date: May 4, 2008
	Line			X					X	X				
	Color	X							X	X				
	Texture			X					X		X			

Additional Mitigating Measures (See item 3 above)

Section 5.13.6 of the AFC submittal identified mitigation measures that have been incorporated into the project design to minimize visual resources impacts. They are listed below:

- Siting the project on the selected parcel in an area that currently has minimal development and is located near a designated utility corridor.
- Painting onsite plant structures and equipment colors that would harmonize with the surrounding environment, including shades of beige, tan, and gray, and using non-glare finishes on project equipment.
- Using minimal signage and project construction signs; signs that would be installed should be made of non-glare materials and unobtrusive colors. The design of any signs required by safety regulations will need to conform to the criteria established by those regulations.
- Minimizing lighting to areas required for safety, security, or operations, and shielding of lighting from public view to the extent possible. Timers and sensors should be used to minimize the amount of time that lights are on in areas where lighting is not normally needed for safety, security, or operation.
- Directing and shielding of lighting to reduce light scatter and glare. Highly directional light fixtures should be used.
- Designing the transmission line structure to be similar in appearance to the existing transmission lines in the project vicinity to the extent feasible.
- Using non-specular conductors should be used, and insulators should be non-reflective and non-refractive.
- After project construction is complete, disturbed ground surfaces should be restored to their original condition, and any vegetation to the extent feasible.
- The project applicant should meet with Primm Valley Golf Club landscaping and management staff to determine landscaping preference, type, and location of plantings on the west side of the Hole 2 tee (across the lake in the visual simulation in Figure 5.13-9bR), and the west side of the Hole 8 tee to reduce the visibility of the project's features from those locations on the Desert Course. In addition, the project applicant should coordinate with

Primm Valley Golf Club landscaping and management staff to determine landscaping preference, type, and location of plantings to screen the project and potential views of the project at Holes 1, 6, and 7.

- The project applicant should prepare the landscape planting and maintenance plan, and should purchase the planting materials. The existing onsite landscape vegetation should be considered during selection of the species of landscape vegetation to be planted, with the intent to screen views of project facilities, and to make the newly planted vegetation blend in with the existing vegetation. Planting of the landscape materials and their maintenance should be performed by the Golf Course landscaping staff. The landscaping should be monitored for three years by the Golf Course landscaping staff. At the end of the three-year period, project mitigation plantings that have died, if any, should be replaced, with the cost of the replacement plants and their planting borne by the project applicant. Planting of the replacement landscaping materials and their maintenance should be performed by the Golf Course landscaping staff.

Conclusion: Although the proposed project would be visible from certain locations within the golf course or along I-15, only a limited number of sensitive viewers (such as residents or recreationists) would have views of the project. One residence that has a view of the project area was identified. Other residents in the area (east of the casinos in Primm, Nevada) do not have a clear view of the project area. Recreationists visiting the golf course would have views of the project from certain holes and from certain locations along the golf cart path between the holes. Golfers' attention would likely be focused primarily on the course, the golf ball and golfing activity, and other golfers rather than on the surrounding landscape. Views from I-15 would last from seconds to a few minutes. To minimize the views of the project facilities from I-15 and the golf course, the applicant has included mitigation measures into its project design. The project's mirror control system design will ensure that no glare occurs when the sun is low on the horizon (early mornings).

Implementation of the proposed project, although visible in the attached visual simulations, would not significantly degrade the existing view from these locations. The project's presence may attract the attention of the casual viewer, but would not preclude viewers from seeing the mountains in the distance, and the project would meet the objective of the BLM Interim VRM Class IV rating of the land.

ATTACHMENT DR97-2

Form 8400-4
(September 1985)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

VISUAL CONTRAST RATING WORKSHEET

Date – May 4, 2008
District – California Desert District
Resource Area
Activity (program)

SECTION A. PROJECT INFORMATION

1. Project Name Ivanpah Solar Electric Generating System	4. Location T17N, R14E, Sections 17, 20, 21, 27, 28, 29, 33, and 34 T16N, R14E, Sections 2, 3, 10, and 11	5. Location Sketch See attached Figure 5.13-1R showing the location of KOP 3
2. Key Observation Point 3		
3. VRM Class Lands were not classified into VRM Classes in the California Desert Conservation Area Plan. Consideration of the project area's scenic quality, sensitivity level, and distance zone results in the area qualifying for being classified as interim Class IV.		

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	KOP 3 is located at the Yates Well Road exit off I-15. The relatively flat desert terrain is visible in the foreground and middleground. The middleground is where the project would be constructed. The mountains are visible in the background view. No water bodies exist in this area.	Vegetation in this view consists of typical desert vegetation (grasses and low-lying shrubs) in the foreground.	A highway marker is visible in this view.
LINE	A horizontal line is created by the ridge of the mountains and by the ground surface at the base of the mountains to the west of the project area. A horizontal line is also created where the desert meets the I-15 pavement.	No horizontal or vertical lines from vegetation are apparent.	A highway marker introduces a vertical line in this view.
COLOR	The desert ground surface in the foreground appears tan. The project area beyond the foreground is a light brown. The mountains further to the west (background) appear as shades of blue, gray, and brown.	Vegetation appears as shades of green, tan, brown, with minor hues of yellow and gray.	A highway marker introduces a gray structure in this view.
TEXTURE	The exposed (bare) soil in the foreground provides texture. Texture beyond the foreground is not apparent.	Vegetation in the foreground provides texture.	Texture is not provided by the highway marker that is visible in this view.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	No change in the foreground or background views would occur, as shown in Figure DR97-1bR. No water exists in this area, so no change in water bodies would occur. The land surface at the project site would be modified by grading and the addition of project facilities.	No change would occur to the vegetation in the foreground or background from the project. Vegetation would be removed to allow for the installation of the power tower and receiver towers and mirror fields, but the vegetation at the project site is not visible from this distance.	The project would add human-made forms to the landscape, as shown in Figure DR97-1bR (power tower and receiver towers in the midst of fields of mirrors). At this distance, the structures do not dominate the view.
LINE	No change in ridgeline of the mountains or the horizontal line where the desert meets the I-15 pavement. The horizontal line at the base of the mountains is obscured by the presence of project facilities. Less of the flat terrain in the project area is seen due to the presence of project facilities.	No change in the foreground or background vegetation would occur. As indicated above, vegetation is not visible at the project site from this KOP.	Adding the project features (a power tower, receiver towers, and fields of mirrors) to the landscape would add both vertical and horizontal lines to the view (see Figure DR97-1bR). At this distance, the structures do not dominate the view.

SECTION C. PROPOSED ACTIVITY DESCRIPTION (Continued)

COLOR	No change in the foreground or background landscape colors. A change in color of the land surface in the project area would occur due to the addition of project facilities.	No change in foreground or background vegetation would occur. Vegetation at the project site would be removed to allow for the installation of the power tower and field of mirrors, but the vegetation at the project site is not visible from this viewpoint.	The project would include the presence of several project structures. Figure DR97-1bR shows the power tower for Ivanpah 2 (left-most structure), and the power tower and four receiver towers for Ivanpah 3, and the fields of mirrors for Ivanpah 2 and 3. At this distance, the structures do not dominate the view.
TEXTURE	No change in foreground or background landscape texture. Texture of the project site from this viewpoint is not evident.	No change in the foreground or background view of vegetation. No change in view of vegetation at the project site (vegetation is not visible at this distance and perspective).	Moderate texture is provided by the proposed project features. At this distance, the structures do not dominate the view.

SECTION D. CONTRAST RATING ☐ SHORT TERM ☒ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		Strong	Moderate	Weak	None	Strong	Moderate	Weak	None	Strong	Moderate	Weak	None
ELEMENTS	Form			X					X			X	
	Line		X						X			X	
	Color	X							X		X		
	Texture			X					X		X		

2. Does project design meet visual resource management objectives? ☒ Yes ☐ No (Explain on reverse side)

3. Additional mitigating measures recommended ☒ Yes ☐ No (Explain on reverse side)

Evaluator's Names: Wendy Haydon/CH2M HILL

Date: May 4, 2008

Additional Mitigating Measures (See item 3)

Section 5.13.6 of the accompanying report has identified mitigation measures that have been incorporated into the project design to minimize visual resources impacts. They are listed below:

- Siting the project on the selected parcel in an area that currently has minimal development and is located near a designated utility corridor.
- Painting onsite plant structures and equipment colors that would harmonize with the surrounding environment, including shades of beige, tan, and gray, and using non-glare finishes on project equipment.
- Using minimal signage and project construction signs; signs that would be installed should be made of non-glare materials and unobtrusive colors. The design of any signs required by safety regulations will need to conform to the criteria established by those regulations.
- Minimizing lighting to areas required for safety, security, or operations, and shielding of lighting from public view to the extent possible. Timers and sensors should be used to minimize the amount of time that lights are on in areas where lighting is not normally needed for safety, security, or operation.
- Directing and shielding of lighting to reduce light scatter and glare. Highly directional light fixtures should be used.
- Designing the transmission line structure to be similar in appearance to the existing transmission lines in the project vicinity to the extent feasible.
- Using non-specular conductors should be used, and insulators should be non-reflective and non-refractive.
- After project construction is complete, disturbed ground surfaces should be restored to their original condition, and any vegetation to the extent feasible.
- The project applicant should meet with Primm Valley Golf Club landscaping and management staff to determine landscaping preference, type, and location of plantings on the west side of the Hole 2 tee (across the lake in the visual simulation in Figure 5.13-9bR), and the west side of the Hole 8 tee to reduce the visibility of the project's

features from those locations on the Desert Course. In addition, the project applicant should coordinate with Primm Valley Golf Club landscaping and management staff to determine landscaping preference, type, and location of plantings to screen the project and potential views of the project at Holes 1, 6, and 7.

- The project applicant should prepare the landscape planting and maintenance plan, and should purchase the planting materials. The existing onsite landscape vegetation should be considered during selection of the species of landscape vegetation to be planted, with the intent to screen views of project facilities, and to make the newly planted vegetation blend in with the existing vegetation. Planting of the landscape materials and their maintenance should be performed by the Golf Course landscaping staff. The landscaping should be monitored for three years by the Golf Course landscaping staff. At the end of the three-year period, project mitigation plantings that have died, if any, should be replaced, with the cost of the replacement plants and their planting borne by the project applicant. Planting of the replacement landscaping materials and their maintenance should be performed by the Golf Course landscaping staff.

Conclusion: Although the proposed project would be visible from certain locations within the golf course or along I-15, only a limited number of sensitive viewers (such as residents or recreationists) would have views of the project. One residence that has a view of the project area was identified. Other residents in the area (east of the casinos in Primm, Nevada) do not have a clear view of the project area. Recreationists visiting the golf course would have views of the project from certain holes and from certain locations along the golf cart path between the holes. Golfers' attention would likely be focused primarily on the course, the golf ball and golfing activity, and other golfers rather than on the surrounding landscape. Views from I-15 would last from seconds to a few minutes. To minimize the views of the project facilities from I-15 and the golf course, the applicant has included mitigation measures into its project design. The project's mirror control system design will ensure that no glare occurs when the sun is low on the horizon (early mornings).

Implementation of the proposed project, although visible in the attached visual simulations, would not significantly degrade the existing view from these locations. The project's presence may attract the attention of the casual viewer, but would not preclude viewers from seeing the mountains in the distance, and the project would meet the objective of the BLM Interim VRM Class IV rating of the land.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA

APPLICATION FOR CERTIFICATION FOR THE *IVANPAH SOLAR ELECTRIC GENERATING SYSTEM*

DOCKET NO. 07-AFC-5

PROOF OF SERVICE (Revised 4/1/08)

INSTRUCTIONS: All parties shall 1) send an original signed document plus 12 copies OR 2) mail one original signed copy AND e-mail the document to the web address below, AND 3) all parties shall also send a printed OR electronic copy of the documents that shall include a proof of service declaration to each of the individuals on the proof of service:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-5
1516 Ninth Street, MS-14
Sacramento, CA 95814-5512
docket@energy.state.ca.us

APPLICANT

Solar Partners, LLC
John Woolard, Chief Executive Officer
Alicia Torre, Project Manager
1999 Harrison Street, Suite #500
Oakland, CA 94612
ATorre@BrightSourceEnergy.com

Steve De Young
Ivanpah solar Electric Generating System
Project Manager
4155 Arbolado Drive
Walnut Creek, CA 94598
steve4155@astound.net.

APPLICANT'S CONSULTANTS

John L. Carrier, J. D.
2485 Natomas Park Dr. #600
Sacramento, CA 95833-2937
jcarrier@ch2m.com

COUNSEL FOR APPLICANT

Jeffrey Harris
Ellison, Schneider & Harris L.L.P.
Attorneys at Law
2015 H Street
Sacramento, CA 95814-3109
jdh@eslawfirm.com

INTERESTED AGENCIES

Larry Tobias
Ca. Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630
LTobias@caiso.com

Tom Hurshman, Project Manager
Bureau of Land Management
2465 South Townsend Ave.
Montrose, CO 81401
tom_hurshman@blm.gov

Sterling White, Field Manager
Bureau of Land Management
Needles Field Office
1303 South Highway 95
Needles, CA 92363
Sterling_White@blm.gov

INTERVENORS

California Unions for Reliable Energy ("CURE")
Tanya A. Gulesserian
Marc D. Joseph
Adams Broadwell Joseph & Cardozo
601 Gateway Boulevard, Suite 1000
South San Francisco, CA 94080
tgulesserian@adamsbroadwell.com

ENERGY COMMISSION

JEFFREY D. BYRON
Commissioner and Presiding Member
jbyron@energy.state.ca.us

JAMES D. BOYD
Commissioner and Associate Member
jboyd@energy.state.ca.us

Paul Kramer
Hearing Officer
pkramer@energy.state.ca.us

*** Che McFarlin**
Project Manager
Cmcfarli@energy.state.ca.us

Dick Ratliff
Staff Counsel
dratliff@energy.state.ca.us

Public Advisor
pao@energy.state.ca.us

DECLARATION OF SERVICE

I, Haneefah Walker, declare that on May 9, 2008, I deposited copies of the attached All Parties Letter and new Proof of Service List in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed to those identified on the Proof of Service list above.

OR

Transmission via electronic mail was consistent with the requirements of California Code of Regulations, title 20, sections 1209, 1209.5, and 1210. All electronic copies were sent to all those identified on the Proof of Service list above.

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

Haneefah Walker