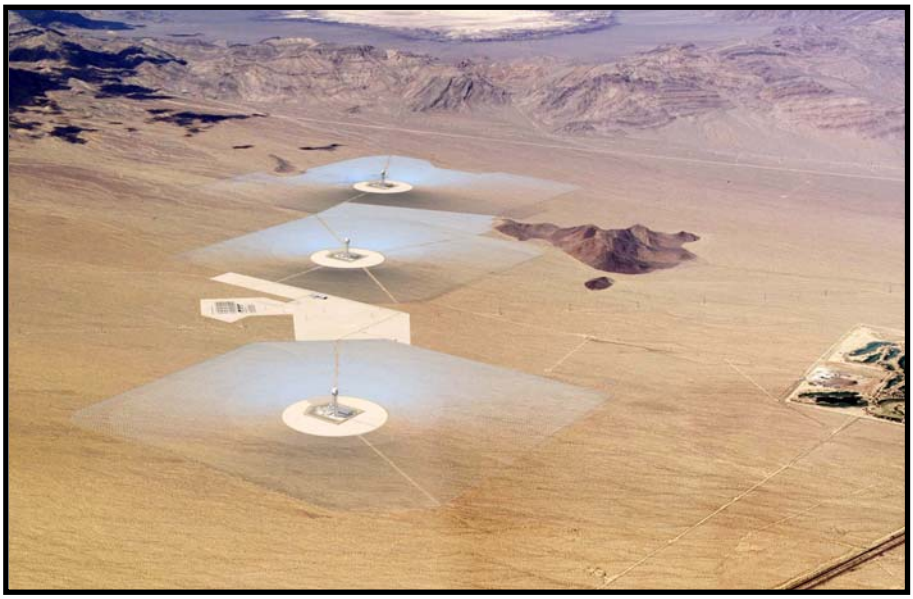
Final Staff Assessment Addendum

IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

Application For Certification (07-AFC-5)
San Bernardino County



CALIFORNIA ENERGY COMMISSION

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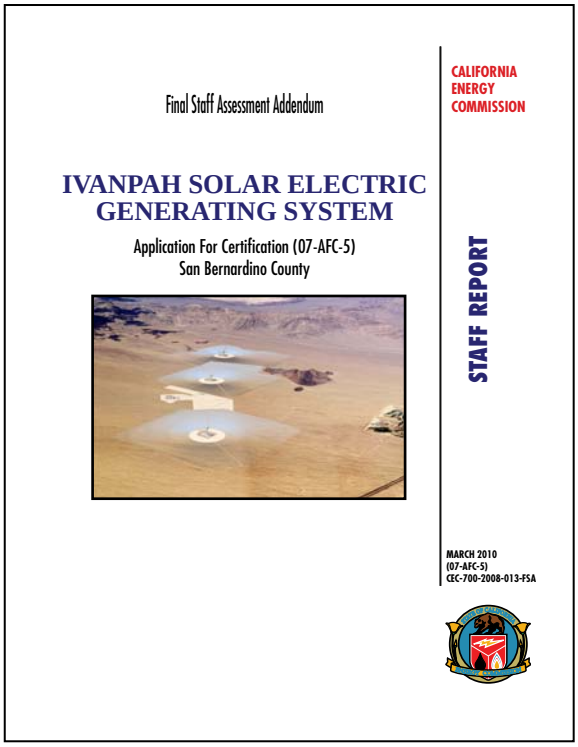


CALIFORNIA ENERGY COMMISSION

SITING OFFICE

John S. Kessler
Project Manager

Eileen Allen
Siting Office Manager

SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

Terrence O'Brien
Deputy Director

IVANPAH SOLAR ELECTRIC GENERATING SYSTEMS (ISEGS)

FINAL STAFF ASSESSMENT ADDENDUM

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

PROPOSED ACTION ALTERNATIVE / PROJECT DESCRIPTION 2

AIR QUALITY 3

BIOLOGICAL RESOURCES 4

SOIL AND WATER RESOURCES 5

VISUAL RESOURCES 6

EXECUTIVE SUMMARY

Prepared by John Kessler

INTRODUCTION

The applicant for the Ivanpah Solar Electric Generating System (ISEGS) project consists of Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC (applicant), which are subsidiaries of BrightSource Energy, Inc. On February 11, 2010, the applicant filed a biological mitigation proposal referred to as Mitigated Ivanpah 3. It is primarily designed to mitigate impacts to special-status plants to levels that are less than significant as staff recommended in its Condition of Certification BIO-18 of the Final Staff Assessment/Draft Environmental Impact Statement (FSA/DEIS) published on November 4, 2009.

The purpose of this Final Staff Assessment Addendum (FSA Addendum) is to update Energy Commission staff's analysis of the ISEGs project inclusive of the Mitigated Ivanpah 3 proposal from that presented in the FSA/DEIS. The FSA Addendum has been prepared in conformance with the Energy Commission's California Environmental Quality Act (CEQA) review process, while Bureau of Land Management (BLM) will be separately preparing a DEIS Supplement to ensure conformance with the National Environmental Policy Act (NEPA) process. The Energy Commission's ISEGS Committee will hear the various parties' views on this FSA Addendum, and the overall Mitigated Ivanpah 3 proposal in an Evidentiary Hearing scheduled for March 22, 2010.

SUMMARY OF PROJECT RELATED IMPACTS RESULTING FROM MITIGATED IVANPAH 3 PROPOSAL

The updated analysis of project-related direct and indirect impacts within this FSA Addendum shows that, with the exception of Visual Resources, the ISEGS project's potential direct and indirect impacts would be mitigated to a less than significant level. With respect to Visual Resources, staff believes the direct impacts to Visual Resources remain significant and unmitigable to existing scenic resource values as seen from three Key Observation Points in the Ivanpah Valley and Clark Mountains. With respect to Biological Resources, staff believes that the direct and indirect impacts of the project on special-status plant species would be mitigated to a less than significant level with the Mitigated Ivanpah 3 proposal combined with staff's recommended mitigation in Condition of Certification BIO-18. Prior to receiving the applicant's Mitigated Ivanpah 3 proposal, staff concluded in the FSA/DEIS that the direct and indirect impacts to special-status plants from the project as previously proposed were significant and unmitigable.

Staff's analysis has also identified cumulative impacts which are significant and unmitigable in the areas of Land Use, Traffic and Transportation, and Visual Resources. The Mitigated Ivanpah 3 proposal has not affected staff's assessment and conclusions from the FSA/DEIS for Land Use and Traffic and Transportation, and thus they are only summarized here. With respect to Land Use, impacts of the ISEGS project would combine with impacts of present and reasonably foreseeable projects to result in a

contribution to cumulative impacts in the Ivanpah Valley area related to land use which would be significant with respect to CEQA. Impacts of the ISEGS project would also combine with the potential impacts of reasonably foreseeable renewable energy projects in the southern California Mojave desert to result in significant and unmitigable regional cumulative impacts related to land use. With respect to Traffic and Transportation, staff has determined that with the implementation of the Traffic Control Plan required by proposed Condition of Certification **TRANS-1**, construction and operation of the ISEGS would not cause a direct significant impact on northbound I-15 on Friday afternoons, but would contribute to a cumulatively considerable significant impact on northbound I-15 on Friday afternoons.

Staff noted in the FSA/DEIS that the project would not conform with applicable visual resource goals and policies of the San Bernardino County General Plan Conservation and Open Space Elements. However, after reviewing applicable legal requirements, staff concludes that San Bernardino County jurisdiction only extends to off-site infrastructure installation and maintenance activities outside the BLM boundaries, which would exclude the ISEGS site located within BLM boundaries. Therefore, the Mitigated Ivanpah 3 project would conform with all applicable LORS.

The following table summarizes the potential environmental impacts and LORS compliance for each technical section as concluded by staff in the FSA/DEIS and as updated in this FSA Addendum. Following the table is a discussion of the conclusions with respect to all resource areas. Please see the appropriate section of this FSA Addendum and the FSA/DEIS for more detailed discussions of the environmental settings, impacts, and proposed mitigation measures and Conditions of Certification for each resource area.

ANALYSIS CHANGES RESULTING FROM CONSIDERATION OF MITIGATED IVANPAH 3

Technical Area	Complies with LORS	Direct & Indirect Impacts Fully Mitigated	Cumulative Impacts Fully Mitigated
Air Quality	Yes	Yes	Yes
Biological Resources	Yes	~~No~~ **Yes**	~~No~~ **Yes**
Cultural Resources and Native American Values	Yes	Yes	Yes
Facility Design	Yes	Yes	Yes
Geology, Paleontology, and Minerals	Yes	Yes	Yes
Hazardous Materials Management	Yes	Yes	Yes
Land Use	~~No~~ **Yes**	Yes	**No**
Livestock Grazing	Yes	Yes	Yes
Noise and Vibration	Yes	Yes	Yes
Public Health and Safety	Yes	Yes	Yes
Power Plant Efficiency	Not Applicable	Not Applicable	Yes
Power Plant Reliability	Not Applicable	Not Applicable	Yes
Recreation	Yes	Yes	Yes
Socioeconomic and Environmental Justice	Yes	Yes	Yes
Soil and Water Resources	Yes	Yes	Yes
Traffic and Transportation	Yes	Yes	**No**
Transmission Line Safety/Nuisance	Yes	Yes	Yes
Transmission System Engineering	Yes	Yes	Yes
Visual Resources	~~No~~ **Yes**	**No No**	
Waste Management	Yes	Yes	Yes
Wild Horses and Burros	Yes	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes	Yes

AIR QUALITY

Based on the analysis conducted for the original ISEGS project presented in the October 2009 FSA and the “envelope analysis” conducted for the Mitigated Ivanpah 3

proposal, staff has determined that the following conclusions for the original ISEGS project are still valid for the Mitigated Ivanpah 3 proposal for the ISEGS project:

- The original ISEGS project and the Mitigated Ivanpah 3 proposal would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related CEQA impacts;
- Conditions of Certification in the FSA serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the California Environmental Quality Act (CEQA) and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA);
- The original ISEGS project and the Mitigated Ivanpah 3 proposal would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause significant NEPA air quality impacts; and
- The original ISEGS project and the Mitigated Ivanpah 3 proposal have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation and could cause potential localized exceedances of the PM10 NAAQS during construction. The mitigation measures for controlling fugitive dust from construction and operation proposed in the October 2009 Final Staff Assessment address this potential and result in impacts that are less than significant.

BIOLOGICAL RESOURCES

The applicant's Biological Mitigation Proposal reduces the total project acreage by 476 acres. Much of that acreage contains individuals of the special-status plant species of concern, namely Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow. Small-flowered androstephium is restricted to the southern half of the project site, outside of the areas proposed for protection, and the applicant proposes to salvage the individuals for transplantation. In accordance with their special-status plant mitigation plan draft (Exhibit 81), the applicant proposes on-site minimization of impacts to the two most imperiled species, Mojave milkweed and Rusby's desert-mallow, by protecting a small perimeter or "halo" around the plants during construction and minimizing impacts during operation. However, Mitigated Ivanpah 3 eliminates the on-site impact minimization halos for the two special-status cactus species (desert pincushion and Parish's club-cholla) that was previously included in the applicant's draft mitigation plan. No rationale was given by the applicant for the removal of this mitigation component.

Mitigated Ivanpah 3 is similar to the mitigation by avoidance and a project alternative proposed by staff, but protects less total acreage and includes impact minimization measures within the solar field. Staff agrees that Mitigated Ivanpah 3 reduces impacts to special-status plants. For example, staff has concluded that the impact to Rusby's desert-mallow, which was considered to be significant even after mitigation in the Final Staff Assessment (FSA), has now been mitigated to a level of insignificance because the majority of individuals are located in the area to be completely avoided and removed from the project footprint, and on-site impact minimization is proposed for the remaining individuals. Although the on-site minimization or "halo" protection approach proposed in

the applicant's Exhibit 81 - Special-Status Plant Avoidance and Protection Plan (CH2MHill 2010a) is untested and of unknown efficacy, staff is willing to accept a limited amount of uncertainty provided that at a minimum the 476 acres proposed in Mitigated Ivanpah 3 is removed from the footprint. However, with regard to two species, desert pincushion and Mojave milkweed, the impact remains significant even after reducing the project footprint. This is because although the impact has been reduced by Mitigated Ivanpah 3, a substantial portion of the documented California occurrences would still be impacted by the project. Therefore, staff recommends adding the previous level of on-site minimization proposed for desert pincushion in Exhibit 81 back into the final mitigation plan to reduce impacts to a less-than-significant level. In summary, regarding the applicant's proposed on-site impact minimization or protection of "halos" around special-status plants within the solar field, staff recommends that this mitigation component be implemented for Mojave milkweed, desert pincushion, and Rusby's desert-mallow.

A substantial portion of the California documented occurrences of Mojave milkweed would still be directly, indirectly, and cumulatively impacted by the project following removal of the 476 acres from the footprint. Plant populations are vulnerable to the effects of habitat fragmentation; small fragments of habitat can only support small populations and are more vulnerable to extinction (Lienert 2004). Loss of a substantial portion of Mojave milkweed populations makes the species more vulnerable to extirpation within the state. Its California distribution outside of the Ivanpah Valley is restricted to 24 documented occurrences, of which only two are recent observations, and the rest consist of historic herbarium collections. Revised **Biological Resources Appendix A** included later in this addendum was updated considering Mitigated Ivanpah 3 and provides the percentage of statewide documented occurrences for special-status plant species of concern in the ISEGS project area.

Mojave milkweed is widely scattered throughout the site, making complete avoidance of all impacts to substantial acreage within the project footprint infeasible. To reduce the impact to Mojave milkweed to a level of insignificance, staff proposes changes, including compensatory mitigation, to Condition of Certification **BIO-18** (Special-Status Plant Impact Avoidance and Minimization). In the FSA, staff originally considered compensatory mitigation to be infeasible to mitigate special-status plants as a whole. However, during the analysis of Mitigated Ivanpah 3, staff updated its analysis of land ownership data in the vicinity of documented Mojave milkweed occurrences and found several parcels likely to be under private ownership and overlapping with or adjacent to two off-site occurrences documented in the California Natural Diversity Database (CNDDB). Therefore, in the case of this species, compensatory mitigation through acquisition of private land appears to be feasible. Acquisition and protection of adjacent land in the same watershed with known occurrences would provide conservation value for Mojave milkweed because it would allow expansion of existing occurrences into suitable habitat and could support the target species currently or following reintroduction efforts.

Staff is recommending both land acquisition and on-site minimization ("halo" protection) for Mojave milkweed because this type of on-site minimization is likely to result in substantial losses due to habitat fragmentation and other factors discussed previously in

rebuttal testimony and is unlikely to result in self-sustaining populations in the long-term. While staff does not endorse this approach as mitigation on its own because it has not been attempted elsewhere or demonstrated to be successful, staff does support the monitoring of the populations on-site that would result from the applicant's proposed on-site impact minimization efforts. Such monitoring would provide an assessment of the need for remedial actions to be implemented in the event of population decline. In addition, it is unknown whether the potential compensation lands are currently occupied by the plant or if adjacent occurrences are still extant. Due to this uncertainty associated with land acquisition and on-site minimization, staff believes that implementing only one of these mitigation components alone is insufficient, and both are needed to mitigate the project's impacts to Mojave milkweed.

Staff proposes in the revised **BIO-18** the acquisition, protection, and management of adequate mitigation land (estimated at a minimum of approximately 30 acres) that contains or abuts a known occurrence of Mojave milkweed and shares the same watershed. Staff also proposes restoring desert pincushion back into the group of special-status plant species targeted for on-site minimization in Mitigated Ivanpah 3. Therefore, Mojave milkweed, desert pincushion, and Rusby's desert-mallow would receive on-site impact minimization and "halos" around these plants within the solar field, and would be protected as described in Exhibit 81. The revised **BIO-18** would, if implemented, mitigate the project's impacts to all special-status plant species to less-than-significant levels.

SOIL AND WATER

Staff has reviewed the applicant's Mitigated Ivanpah 3 proposal and has determined that this proposal would not cause a significant impact to soil or water resources and instead would reduce the actual and potential impacts to these resources. The impacts to soil and water resources discussed in the FSA/DEIS would be less than significant or mitigated to less than significant with staff's proposed conditions of certification. The applicant's Mitigated Ivanpah 3 proposal would further reduce these impacts.

Based on estimates provided by the applicant, the Mitigated Ivanpah 3 proposal would result in the following reduction in acreage:

- The footprint of Ivanpah 3 would be reduced by approximately 433 acres;
- The construction logistics area would be reduced by approximately 109 acres; and
- The area in Ivanpah 3 that would require heavy grading due to the volume of boulders in the area would be reduced from 170 acres to 20 acres.

In general, this mitigation would remove areas from the proposed project where the most intense grading would have occurred and areas where the highest potential for flash flooding and mass erosion could have occurred (See **Project Description Figure 17**). The portion of Ivanpah 3 extending into the Gas Line Gulch alluvial fan channel has been reduced, and thus potential wind and water erosion of soil would be reduced. Potential storm water and sedimentation impacts would be reduced, including potential for scour generally across the site and affecting the heliostat pylons. The Mitigated

Ivanpah 3 proposal would reduce the potential for scour to cause heliostat instability and failure in the northern portion of Ivanpah 3 where the potential for loss was greatest under the previously proposed project area.

In addition, this mitigation would result in a smaller demand for groundwater during project construction and operation. Because the demand on groundwater would be less, the impact to the Ivanpah Valley Groundwater Basin would be less and the potential impact to other groundwater wells would be less. With less groundwater withdrawn attributable to ISEGS project use, the potential impact to groundwater quality would likewise be less.

The Mitigated Ivanpah 3 proposal would not change the project's ability to comply with all federal, state, and local laws, ordinances, rules, and standards. Because the proposed change would reduce project-related impacts already analyzed by staff, and staff previously concluded that impacts would be less than significant if the recommended conditions of certification are adopted, staff believes the Mitigated Ivanpah 3 proposal would not result in significant impacts to soil and water resources. Staff's proposed conditions of certification as published in the Final Staff Assessment/Draft Environmental Impact Statement would continue to apply for ISEGS as modified by the Mitigated Ivanpah 3 proposal.

VISUAL RESOURCES

Energy Commission staff has analyzed visual resource-related information pertaining to the proposed Ivanpah Solar Electric Generating System (ISEGS) Mitigated Ivanpah 3 proposal and concludes that despite a somewhat lower level of visual impact compared to the proposed project, the Mitigated Ivanpah 3 Project would nevertheless result in similar overall impact conclusions as the proposed project. Consequently, staff recommends adoption of all Conditions of Certification related to visual resources as identified in the FSA/DEIS

The Mitigated Ivanpah 3 proposal would not change Energy Commission staff's FSA/DEIS conclusions regarding significant and unavoidable adverse impacts to existing scenic resource values as seen from several Key Observation Points in the Ivanpah Valley and Clark Mountains, including:

- Middle-ground-distance viewpoints on Highway I-15;
- Viewpoints in the Mojave National Preserve on the east face of Clark Mountain; and
- Viewpoints in the Stateline Wilderness Area, including the Umberci Mine and vicinity.

Staff also concludes that although potential glare effects of the solar receiver units atop the power towers would be considerably reduced under the Mitigated Ivanpah 3 Project, the impacts of the remaining three solar receivers would be sufficient to require mitigation under Conditions of Certification TRANS-4. Potential impacts of glare from heliostats would remain substantially as under the proposed project. Staff concludes that with recommended Conditions of Certification TRANS-3 and TRANS-4, remaining glare under the Mitigated Ivanpah 3 Project, though not a hazard, would represent a visually dominant feature, potentially interfering with scenic views of Clark Mountain from the valley floor.

The project would be sited entirely on BLM-managed public lands, under federal (BLM) jurisdiction, and subject to BLM's California Desert Conservation Area (CDCA) Plan of 1980. Staff noted in the FSA/DEIS that the project would not conform with applicable visual resource goals and policies of the San Bernardino County General Plan Conservation and Open Space Elements. However, after reviewing applicable legal requirements, Staff concludes that San Bernardino County jurisdiction only extends to off-site infrastructure installation and maintenance activities outside the BLM boundaries, which would exclude the ISEGS site located within BLM boundaries. Therefore, the Mitigated Ivanpah 3 project would conform with all applicable LORS.

Additionally, staff concludes that the Mitigated Ivanpah 3 proposal in combination with foreseeable future projects would not change Energy Commission staff's FSA/DEIS conclusions regarding significant and unavoidable cumulative visual impacts of two kinds:

- Cumulative impacts within the immediate project viewshed, essentially comprising foreseeable future projects in the Ivanpah Valley; and

- Cumulative impacts of foreseeable future solar and other renewable energy projects within the Southern California Mojave Desert.

PROPOSED ACTION ALTERNATIVE/PROJECT DESCRIPTION

John Kessler

INTRODUCTION

The applicant for this project consists of Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC (applicant), which are subsidiaries of BrightSource Energy, Inc. On February 11, 2010, the applicant filed a Biological mitigatiion proposal referred to as Mitigated Ivanpah 3. Mitigated Ivanpah 3 is primarily designed to mitigate impacts to special-status plants to a level that is less than significant as staff recommended in its Condition of Certification BIO-18 of the Final Staff Assessment/Draft Environmental Impact Statement (FSA/DEIS) published on November 4, 2009.

As background, the applicant filed an Application for Certification (AFC) with the California Energy Commission (Energy Commission) on August 31, 2007, seeking permission to develop the Ivanpah Solar Electric Generating System (ISEGS) project. The applicant filed four right-of-way (ROW) applications with the U.S. Bureau of Land Management (BLM) for the ISEGS project on August 29, 2007. BrightSource Energy, Inc.(BrightSource), is a technology and development company and the parent company of the four limited liability companies. The Applicant will use BrightSource's solar thermal technology to develop ISEGS. The four ROW applications filed by BrightSource are for projects that are designed and intended to operate while sharing certain common areas and facilities.

The analysis contained in the FSA/DEIS applies to the proposed project as a whole. The AFC filed with the Energy Commission and the four applications to BLM include an application for shared facilities including a substation, administration and maintenance buildings within a construction logistics area, and separate applications for the three power plants. On October 31, 2007, the Energy Commission accepted the AFC as data adequate. The applicant's development plans have been updated several times since filing its original AFC and ROW applications with the most substantial revisions summarized as follows in **Project Description Table 1**.

Project Description Table 1
Summary of Applicant's Updates to its ISEGS Development Plans

Date	Reference Document	Project Area	Number of Heliostats	Other Revisions to Proposed Project
AFC and ROW Application				
8-31-07	AFC Section 2.1, page 2-2 (BSE2007a)	3,400	272,000	The original heliostat proposal consisted of a single 7 square meter (m²) mirror hung in a landscape orientation;
Revision 1 – Optimized Project Design				
5-9-08	Data Response 1D, page 4 (CH2ML2008g)	3,700	214,000	1. Reduced the total number of heliostats from 272, 000 in the single-hung to 214,000 in the double-hung mirror configuration (reducing from 68,000 to 55,000 heliostats each for Ivanpah 1 and 2, and reducing from 136,000 to 104,000 heliostats for Ivanpah 3); 2. Doubled the heliostat mirror surface area from 7 to 14 m²; 3. Reduced the number of power towers associated with Ivanpah 1 and 2 from three to one, and increased the height of the power tower from 262 to 459 feet; 4. Moved the project boundaries out an additional 250 feet on the perimeters within the surveyed areas to increase the spacing between the larger heliostats;
Revision 2 – Revision to Site Plans & Stormwater Drainage Design				
6-10-08	Data Response 2A (CH2MHL2008i)	4,065	214,000	1. Revised stormwater drainage plans from pass-through to active management including large detention ponds and conveyance features; 2. The addition of stormwater detention ponds resulted in an increased project area from 3,700 to 4,065 acres; 3. Proposed a high level of grading and ground disturbance;
Note: Because the revised plans were not supported with underlying site characterization assumptions and stormwater calculations, BLM and staff requested supporting information from the applicant. This led the applicant to reconsider its site plans and to develop Revision 3.				
Revision 3 – Revision to Site Plans & Stormwater Drainage Design				
5-18-09	Data Response 2I (CH2ML2009f)	4,073	214,000	1. Revised stormwater drainage plans again, eliminating large detention basins and conveyance features, and relying on existing ephemeral drainages; 2. Proposed Low Impact Development (LID) approach to minimize ground disturbance and to retain as much vegetation as possible; Vegetation would be cut and maintained to a height of 12 – 18" ;
Note: The Power Purchase Agreement would allow utilization of up to 270,000 heliostats.				

Revision 4 – Mitigated Ivanpah 3 Proposal				
2-11-10	Response to Staff's Recommended Condition of Certification BIO-18 (CH2ML201-bf)	3,582	173,500	1. Reduced the footprint of the ISEGS project by 433 acres on the northern-most portion of Ivanpah 3 and by 109 acres within the Construction Logisitics Area (for a total of 542 acres) to avoid disturbance to the site where some of the greatest concentrations of special-status plants occur; 2. Realigned the boundary between Ivanpah 2 and 3 in a northward direction to increase the area of the solar field of Ivanpah 2 and similarly reduce the area of the Ivanpah 3 solar field; 3. Reduced the number of solar power towers for Ivanpah 3 from five to one; 4. Modified the nominal installed generating capacity for Ivanpah 1, 2 and 3 from 100/100/200 MW respectively for a total of 400 MW to 120/125/125 MW respectively for a total of 370 MW; 5. Reduced the approximate total number of heliostats for all 3 power plants from 214,000 to 173,500;

PROJECT LOCATION

The applicant's Mitigated Ivanpah 3 proposal would not change the general location of the proposed ISEGS project. Rather, it would reduce the footprint of the project from 4,073 acres as previously proposed to 3,582 acres. The applicant has proposed to locate the ISEGS project in the Mojave Desert, near the Nevada border in San Bernardino County, California, on land administered by the BLM. The proposed project site is located 4.5 miles southwest of Primm, Nevada, and 0.5 mile west of the Primm Valley Golf Club, which is located just west of the Ivanpah Dry Lake. Access to the site is from the Yates Well Road Interchange on Interstate 15 (I-15) via Colosseum Road.

The change in project area boundaries is as shown in **Project Description Figure 13 – ISEGS Site Plan with Mitigated Ivanpah 3,** illustrating the mitigation area in the northern portion of what previously was proposed to be included in Ivanpah 3 and changes within the Construction Logistics Area (CLA). The changes in development within the CLA include the 38- and 5-acre mitigation areas, the 59-acre succulent nursery, and the 7-acre rare plant transplantation area for a total of 109 acres. The site plan for the CLA is shown in **Project Description Figure 14 – Construction Logistics Area Site Plan with Mitigated Ivanpah 3.**

PROJECT DESCRIPTION

The proposed ISEGS project would be a development of three solar concentrating thermal power plants, which are comprised of fields of heliostats (elevated mirrors guided by a tracking system) focusing solar energy on boilers located on centralized power towers. Each heliostat tracks the sun throughout the day and reflects the solar energy to the receiver boiler. In each plant, one Rankine-cycle reheat steam turbine-generator (STG) receives live steam from the solar boilers and reheat steam from the solar reheater, with the solar boiler and reheater contained within the receiver of the power tower. The applicant proposes to develop the ISEGS project as three power plants in separate and sequential phases that are designed to generate a total of 370 megawatts (MW) of electricity on a nominal basis. Ivanpah 1 would have an electrical generation capacity of 120 MW, and Ivanpah 2 and 3 would each have a capacity of 125 MW. Shared facilities consisting of the substation, administration and maintenance buildings would be developed during construction of the first power plant in the Construction Logistics area between Ivanpah 1 and 2.

As noted above in **Project Description Table 1**, since filing the AFC and ROW Application, the applicant's proposed project plans have been updated on four occasions in the interest of design optimization, revisions associated with stormwater management approaches and the Mitigated Ivanpah 3 proposal. The changes in acreages of long term (life of the facility) and temporary disturbances associated with the applicant's previous conceptual plans and the Mitigated Ivanpah 3 proposal are summarized as follows in **Project Description Table 2**:

Project Description Table 2
ISEGS' Long Term and Temporary Disturbance of BLM Land (acres)

Facility	**Previous Proposed Acres**	**Mit. I-3 Proposed Acres**
Long-Term Disturbance		
Ivanpah 1	913.5	913.5
Ivanpah 2	920.7	1,097.0
Ivanpah 3	1,836.30	1,227.0
Substation and diversion channel (Note 1)	16.1	33.3
Administration/warehouse & parking	8.9	8.9
Kern River Gas Transmission Line Tap Station	0.3	0.3
Master Metering Set for Ivanpah 1, 2, and 3 located near the tap station	0.02	0.02
Groundwater Wells (supply & monitoring)	0.01	0.4
Transmission Towers (8' x 8' area every 750 feet)	0.01	0.01
Linear Facilities (subtotal)	16.9	16.6
Colosseum Road (from Golf Club to site)		5.8
Gas line from I-3 to tap point at KRGT		1.4
Roads within the CLA		7.4
Soil Stockpile within the CLA		2.0
Subtotal – Long-Term Disturbance	**3,712.70**	**3,297.0**
Temporary Disturbance		
Main Construction Laydown Area	260	97.0
Equipment, Fabrication, and Wash Area	21.5	28.9
Contractor Trailers, Logistics, and construction parking	20.1	30.8
Colosseum Road Improvement (50-ft wide construction corridor from Primm Valley Golf Club to Ivanpah 2, less asphalt road)	12.4	4.7
Gen tie line for Ivanpah 1 through Mitigation avoidance area	5	2.5
Gas line construction corridor disturbance from tap to Ivanpah 3 for approximately 7,675 feet)	2.9	7.4
Kern River Gas Transmission Line tap and meter construction area (200' x 200')	0.9	0.9
Credit for Existing Dirt Roads	(1.8)	(9.9)
Substation/Diversion channel Construction Support Area (SCE use)		13.3
CLA Area used for Nursery and Rare Plant Storage	---	66.0
Subtotal – Temporary Disturbance	**321**	**241.6**
Existing Transmission Line Corridor (within CLA)	38.9	43.8
Total ISEGS Project Land Use	**4,073**	**3,582.4**

Overview of ISEGS Project Land Use		
Ivanpah 1	**913.5**	**913.5**
Ivanpah 2	**920.7**	**1097**
Ivanpah 3	**1,836.30**	**1227**
Construction Logistics Area Used During Construction	**377.5**	**177.9**
CLA Area used for Nursery and Rare Plant Storage	**---**	**66.0**
SCE-used portions of site	**---**	**90.4**
External Features (roads and gas line)	**24.5**	**10.62**
Total ISEGS Project Land Use	**4,073**	**3582.4**

Sources: CH2ML2009f, CH2ML 2010b, CH2M Hill 2010c
Notes:

1) Long-term disturbance from the substation and diversion channel includes area between the diversion channel and the substation;

2) Staff expects the ISEGS project acreage estimated in **Project Description Table 2** would be the maximum area of ISEGS effects within the fenced boundary. However, the applicant as it finalizes its detailed plans may be able to avoid or minize disturbance to some areas (i.e. Succulent Nursery area) where mitigation for Desert Tortoise would not be required. Staff has included a provision in Condition of Certification **BIO-17** such that the acreage requiring mitigation for Desert Tortoise can be updated subject to BLM and Energy Commission approval.

The proposed project would cause long term disturbance of about 3,297 acres, temporary disturbance of 241.6 acres, and including the existing transmission line corridor of about 43.8 acres within the Construction Logistics area, ISEGS would utilize about 3,582.4 acres (5.6 square miles) of federal land managed by BLM. Please see **Project Description Figure 15 – Visual Simulation of ISEGS with Mitigated Ivanpah 3 from Aerial Perspective Looking to the Northwest**.

SOLAR POWER PLANT EQUIPMENT AND FACILITIES

HELIOSTATS

As a result of the Mitigated Ivanph 3 proposal, the proposed number of heliostats for Ivanpah 2 would increase and for Ivanpah 3 would decrease approximately proportional to the change in area of the solar field. The proposed change in the number of heliostats is as follows:

Project Description Table 3
Proposed Change in the Number of Heliostats

Power Plant	Number of Heliostats Previous Proposal	Number of Heliostats ISEGS with Mitigated Ivanpah 3 Proposal
Ivanpah 1	55,000	53,500
Ivanpah 2	55,000	60,000
Ivanpah 3	104,000	60,000
ISEGS Total	**214,000 173,500**	

The Mitigated Ivanpah 3 proposal would not result in any change in the size, spacing, and double-mirror configuration of the heliostats themselves. There would be some realignment of heliostats originally allocated to Ivanpah 3 in order to serve the Ivapah 2 power tower, which would also result in moving the boundary between the Ivapah 2 and 3 solar fields northward by about 1,700 feet in the northwest corner and by about 2,170 feet in the northeast corner of Ivanpah 2.

Each heliostat would be configured with two mirrors hung in the portrait position. Each mirror would be 7.2 feet high by 10.5 feet wide, providing a reflective surface of 75.6 square feet (7.04 m^2) per mirror or 14.08 m^2 per heliostat . The overall height of the heliostats would be about 12 feet. The heliostats would be connected with communication cables strung aboveground between each heliostat. The communications cables would transmit signals from a computer-programmed aiming control system that would direct the movement of each heliostat to track the movement of the sun (CH2ML2009f).

SOLAR POWER TOWERS

As a result of the Mitigated Ivanpah 3 proposal, the proposed number of solar power towers for Ivanpah 3 would decrease from five to one. The reduction in number of solar power towers for Ivanpah 3 is associated with both the reduction in area of the solar field and the reduction in the number of heliostats. The Mitigated Ivanpah 3 proposal would also result in a slight change in the location of the power block and central solar power tower within the power block, moving approximately 272 feet southwest from the previous proposed location.

The solar power tower would be a metal structure designed specifically to support the boiler and efficiently move high-quality steam through a STG at its base. The power tower support structure would be about 120 meters high (approximately 393 feet). The receiving boiler (which sits on top of the support structure) would be 20 meters tall (approximately 66 feet) including the added height for upper steam drum and protective ceramic insulation panels . Overall, each of the three power towers would have a height of 140 meters (approximately 459 feet). Additionally, a Federal Aviation Administration (FAA)-required lighting and a lightning pole would extend above the top of the towers approximately 10 feet. The height of the power towers allows heliostats from significant distances to accurately reflect sunlight to the receiving boiler. The receiving boiler is a traditional high-efficiency boiler positioned on top of the power tower. The boiler converts the concentrated energy of the sun reflected from the heliostats into

superheated steam. The boiler's tubes are coated with a material that maximizes energy absorbance. The boiler has steam generation, superheating, and reheating sections and is designed to generate superheated steam at a pressure of 160 bars and a temperature of 550 degrees Celsius (°C).

POWER BLOCK

Each solar power plant (Ivanpah 1, 2 and 3) would have a power block located in the approximate center of the power plant area. Each of the three solar-thermal plants would include the following equipment and facilities in their power block:

- solar power tower;
- natural gas-fired boiler;
- the air emission control system for the combustion of natural gas in the start-up boiler;
- steam turbine generator;
- air-cooled condenser;
- auxiliary equipment (feed water heaters, a de-aerator, an emergency diesel generator, diesel fire pump, etc.);
- a raw water tank with a 250,000 gallon capacity, to supply water for plant use and fire fighting; and a
- water treatment system.

The natural gas-fired boiler, STG and air-cooled condenser associated with Ivanpah 3 would be reduced in size and capacity by about 50% as a result of the proposed Mitigated Ivanpah 3, and would be sized similar to Ivanpah 1 and 2. The number of emergency standby generators for Ivanpah 3 would also be reduced from two units to one. The MW capacity difference between Ivanpah 1 at 120 MW versus 125 MW each for Ivanpah 2 and 3, is a function of the number of heliostats rather than the generating equipment, which is the same.

RELATED EQUIPMENT AND FACILITIES

The following related equipment and facilities described in this section are included as part of the proposed action. All would be constructed, operated and maintained by the one or more of the individual applicants except for the Ivanpah Substation. The Ivanpah Substation would eventually be constructed, operated and maintained by the transmission line owner, Southern California Edison but is included in this analysis because it is directly connected to this proposed action.

NATURAL GAS PIPELINE

The solar heat used in the boiler (steam) process would be supplemented by burning natural gas to heat a partial load steam boiler when solar conditions are insufficient. Each power plant within the project would include a small package, natural gas-fired start-up boiler to provide additional heat for plant start-up and during temporary cloud cover. Natural gas would be supplied to the site through a new, proposed six-mile long

distribution pipeline ranging from 4 to 6 inches in diameter. From the Kern River Gas Transmission pipeline, the pipeline would extend 0.5 miles south to the northern edge of Ivanpah 3. The ROW area required for this section of the pipeline would be 75 feet wide and 0.5 miles long. The line would then run east along the northern edge, and then south along the eastern edge, of Ivanpah 3 to a metering station approximately 0.3 miles south of the southeast corner of Ivanpah 3. From there, a supply line would extend northwest into the Ivanpah 3 power block. The main pipeline would continue along the eastern edge of Ivanpah 2 to another metering station at its southeastern corner. Again, a branch supply line will extend northwestwards into the center of the Ivanpah 2 power block. From that station, the pipeline would follow the paved access road from Colosseum Road past the administration/warehouse building to the Ivanpah 1 power block. The extensions of the pipeline into the power blocks would be located within the project fenceline. However, the sections of pipeline along the northern boundary of Ivanpah 3, and then the eastern boundaries of Ivanpah 3 and 2, would be located outside of the fenced heliostat area, in order to allow access to the pipeline for maintenance.

AIR POLLUTION CONTROL

The Mitigated Ivanpah 3 proposal would not change the applicant's approach to implementing emission controls and for performing emission monitoring of ISEGS.

WATER SUPPLY AND DISCHARGE

The Mitigated Ivanpah 3 proposal would move the location of the two groundwater production wells and would result in a slight reduction in water use during: a) construction related to grading and compaction; and b) operations related to mirror washing and boiler makeup. The two wells would move northeastward from just outside the northeast corner of Ivanpah 1 within the CLA to a location within the CLA but on the opposite side of the SCE transmission line and the proposed substation. A monitoring well would be installed between the Ivanpah supply wells and the Primm Valley Golf Club wells (CH2ML 2008g). Annual water use would be less than or equal to the estimates evaluated in the FSA/DEIS and would not exceed 100 acre-feet/year for all three solar plants combined**.**

ACCESS ROADS AND MAINTENANCE PATHS

Access to the project site would occur from the Yates Well Road exit from I-15 to Colosseum Road. Colosseum Road in the vicinity of ISEGS would be realigned to pass through the CLA generally adjacent to the southern boundary of Ivanpah 2. As a result of the Mitigated Ivapah 3 proposal, a public access road is no longer proposed between the common boundary between Ivanpah 2 and 3.

Off-road, recreational vehicle trails currently authorized by BLM which run through the proposed project site would be re-located outside of the project boundary fence. In reference to the existing system of trails as shown in **Project Description Figure 15 – Ivanpah Roads and Trails**, the trails that would be modified 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 currently runs diagonally through the Ivanpah 2 footprint would be realigned to run along the southern boundary of Ivanpah 2 adjacent to the CLA, with connection points to the existing trail near the large metamorphic hill on the east side of Ivanpah 2 and at the existing trail intersection with the western boundary of Ivanpah 2; and

3. An unnumbered trail on the east side of Ivanpah 3 that ties into Trail 699226 would be relocated slightly to the west of its existing alignment outside of the Ivanpah 3 footprint and running north-south, and providing continued access to the limestone outcrop.

CONSTRUCTION LOGISTICS AREA, SUBSTATION, AND ADMINISTRATIVE COMPLEX

As a result of the Mitigated Ivanpah 3 proposal, the applicant has rearranged the location of some facilities and proposed activities within the CLA, resulting in removing 109 acres from construction use. Overall, the CLA would be reduced from 377.5 acres to 177.9 acres related to construction use. Removed from construction use would be two areas northwest of the transmission line ROW consisting of 59 acres to serve as a succulent nursery and 7 acres for rare plant transplantation. Also removed from construction use would be two plant mitigation areas southeast of the transmission line ROW for which disturbance would be avoided for the most part consisting of 38 and 5 acres each (Please see **Project Description Figure 13**). The administration and maintenance building would move westward fom the location previously proposed, but would remain southof the transmission line ROW. The two groundwater production wells would move from a location south of the transmission ROW and adjacent to Ivanpah 1 to north of the transmission line ROW and northeast of the substation. Additional details of the proposed arrangement of facilities in the CLA associated with the Mitigated Ivanpah 3 project are as shown in **Project Description Figure 14 – Construction Logistics Area Site Plan.**

FENCING

The Mitigated Ivanpah 3 Project would continue to utilize an 8-foot tall galvanized steel chain-link fence, with barbed wire at the top as required for security purposes around the outer perimeter of each power plant, the substation, and the administrative complex. Tortoise barrier fence would also be installed in accordance with the Recommended Specifications for Desert Tortoise Exclusion Fencing (USFWS 2005). Fencing within the CLA is as detailed in **Project Description Figure 14 – Construction Logistics Area Site Plan.**

TRANSMISSION SYSTEM INTERCONNECTION AND UPGRADES

The Mitigated Ivanpah 3 Project would not result in any significant changes to the proposed transmission system interconnection.

TELECOMMUNICATIONS FACILITIES

The Mitigated Ivanpah 3 Project would not result in any significant changes to the proposed telecommunications facilities.

PROJECT DESIGN AND MANAGEMENT APPROACH

STORMWATER MANAGEMENT APPROACH

The Mitigated Ivanpah 3 Project would follow the same principles for managing stowmwater as previously proposed, allowing runoff to pass through the project site in a complex series of braided channels that are normally dry thoughout the year. By avoiding development in the northern 433-acre portion of Ivanpah 3, disturbance to one of the most significant alluvial fan channels draining from the Clark Mountains, the Gas Line Gulch, would be substantially reduced. Please see **Project Description Figure 16 – Estimated Extents of Active Alluvial Fan Channels.**

PROJECT CONSTRUCTION

The applicant anticipates ISEGS construction would be performed in the following order: 1) the Construction Logistics Area; 2) Ivanpah 1 (the southernmost site) and other shared facilities; 3) Ivanpah 2 (the middle site); and 4) Ivanpah 3. However, it is possible that the order of construction may change. The shared facilities will be constructed in connection with the first plant construction, whether it is Ivanpah 1, 2, or 3. Construction is planned to take place over approximately 43 months, with the applicant's desire that it could begin during the fall of 2010 and be completed during the first quarter 2014 The applicant has estimated the overall durations and aerial extent of grading at the 3 sites and common construction logistics area as follows:

1. Ivanpah 1 and Common Construction Logistics Area - Total of 4 - 5 months for everything comprising the common construction logistics area (laydown, administration and other buildings, main access roads, road to access gas line, and the substation) and Ivanpah 1 comprising the diagonal access roads, perimeter road for fence, channel crossings as needed, and the power block;

2. Ivanpah 2 - Total of 3 - 4 months comprising the diagonal access roads, perimeter road for fence, channel crossings as needed, power block, and grading of approximately 90 acres in the southwest and central regions of the power plant area; and

3. Ivanpah 3 - Total of 5 months comprising the diagonal access roads, perimeter road for fence, channel crossings as needed, five solar power tower area and one power block, and grading of approximately 120acres in the southern and western regions of the power plant area.

FACILITY OPERATION AND MAINTENANCE

Assuming the construction of Ivanpah 1, 2 and 3 were to begin in a sequential fashion during the fall of 2010 and be completed during the first quarter of 2014, the applicant would expect to commence commercial operation in the first quarter in 2013 at Ivanpah 1, in mid 2013 at Ivanpah 2, and in the first quarter 2014 at Ivanpah 3.

REFERENCES

BSE 2007a – Bright Source Energy / J. Woolard (tn: 42174). Application for Certification, Volumes I and II, for the Ivanpah Solar Electric Generating System. Dated 8/28/2007.

CEC 2008o – California Energy Commission / M. Jones (tn: 48836). System Impact Study Application for Confidentiality. Dated 10/30/2008.

CH2ML2008b – CH2M Hill/ J. Carrier (tn: 45305). Data Response Set 1B. Dated 2/11/2008.

CH2ML2008e – CH2M Hill/ J. Carrier (tn: 45322). Attachment DR 93-1B, Interconnection System Impact Study. Dated 2/11/2008.

CH2ML2008g – CH2M Hill/ / J. Carrier (tn: 46239). Data Responses Set 1D. Dated 5/09/2008.

CH2ML2008i – CH2M Hill/ J. Carrier (tn: 46666). Data Response Set 2A –. Dated 6/10/2008.

CH2ML2008m – CH2M Hill / J. Carrier (tn: 47190). Data Response, Set 2B. Dated 7/22/2008.

CH2ML 2008o - CH2M Hill/ J. Carrier (tn: 47476). Data Response 1F - Weed Management Plan for ISEGS, Eastern Mojave Desert. Dated 8/6/2008.

CH2ML2008u – CH2M Hill/ J. Carrier (tn: 48033). Data Responses Set 2D – Draft Biological Assessment. Dated 9/12/2008.

CH2ML 2008v - CH2M Hill/ J. Carrier (tn: 48034). Data Response Set 1H - Draft Raven Management Plan, Ivanpah Solar Electric Generating System. Dated 9/12/2008.

CH2ML 2009c - CH2M Hill/ J. Carrier (tn: 50610). Data Response Set 2A - Draft Desert Tortoise Translocation/Relocation Plan for ISEGS. Dated 3/19/09

CH2ML2009d - CH2M Hill/ J. Carrier (tn: 51575). Data Response Set 2B - Draft ISEGS Construction Stormwater Pollution Prevention Plan. Dated 5/13/2009.

CH2ML2009e - CH2M Hill/ J. Carrier (tn: 51576). Data Response Set 2H - Drainage, Erosion and Sediment Control Plan. Dated 5/13/2009.

CH2ML2009f – CH2M HILL / J. Carrier (tn 51597). Data Response Set 2I – Project Description and Stormwater Plans. Dated on 05/18/2009. Submitted to CEC / J. Kessler on 05/18/2009.

CH2ML2009g - CH2M Hill/ J. Carrier (tn: 51612). Data Response Set 2C - Draft Contractor Health and Safety Standards. Dated 5/19/2009.

CH2ML2009i - CH2M Hill/ J. Carrier (tn: 51720). Data Response Set 2D - Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code. Dated 5/27/2009.

CH2ML 2009j - CH2M Hill/ J. Carrier (tn: 51790). Data Response 1L - Streambed Alteration Agreement Application. Dated 6/2/2009.

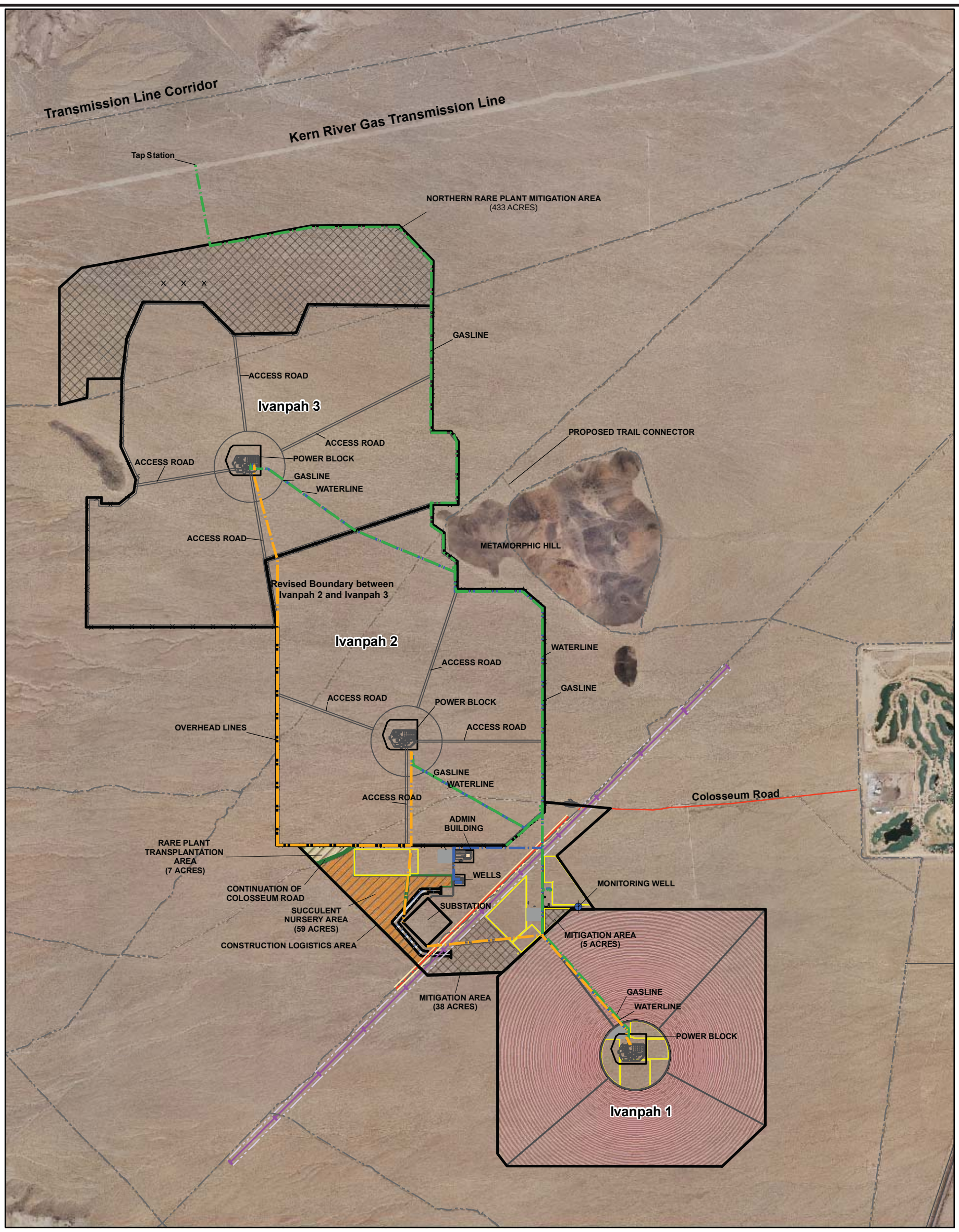
CH2ML 2009q – CH2M HILL / J. Carrier (tn 52208). Data Response Set 2K – Draft Closure, Revegetation, and Rehabilitation Plan. Dated on 06/30/2009. Submitted to CEC / J. Kessler on 06/30/2009.

CH2M Hill 2010b – CH2M Hill / J. Carrier (tn55374). Applicant's Biological Mitigation Proposal ("Mitigated Ivanpah 3"). Dated February 11, 2010. Submitted to CEC / J. Kessler on February 12, 2010.

CH2M Hill 2010c – CH2M Hill / J. Carrier. Applicant's Updated Table of ISEGS Project Acreage – Long-Term and Short-Term Land Disturbances Associated with the Mitigated Ivanpah 3 Proposal. Dated March12, 2010. Submitted to CEC / J. Kessler on March 12, 2010.

PROJECT DESCRIPTION - FIGURE 13

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 Site Plan



LEGEND

- Wells

Heliostat Features

- Heliostat Maintenance Paths
- Heliostat Arrays

Main Utility Features

- Proposed Overhead Line
- Proposed Gas Line (50-foot Corridor)
- Proposed Water Line
- Facility Areas
- Existing 500 KV Line
- Existing 115 KV Line

Project Roads

- Proposed Dirt Roads
- Proposed Gravel Road
- Proposed Paved Road
- Trails

Site Features

- Proposed Fence
- Diversion Chanel
- Rare Plant Transplantation Area
- Succulent Nursery
- Rare Plant Mitigation Area

N

0 1,500 3,000
Feet

Notes:
1. Design pending for Ivanpah 3 / Ivanpah 2 heliostats arrays.
2. Site feature acreages rounded to nearest whole number.
3. Map Revised 02/08/2010.

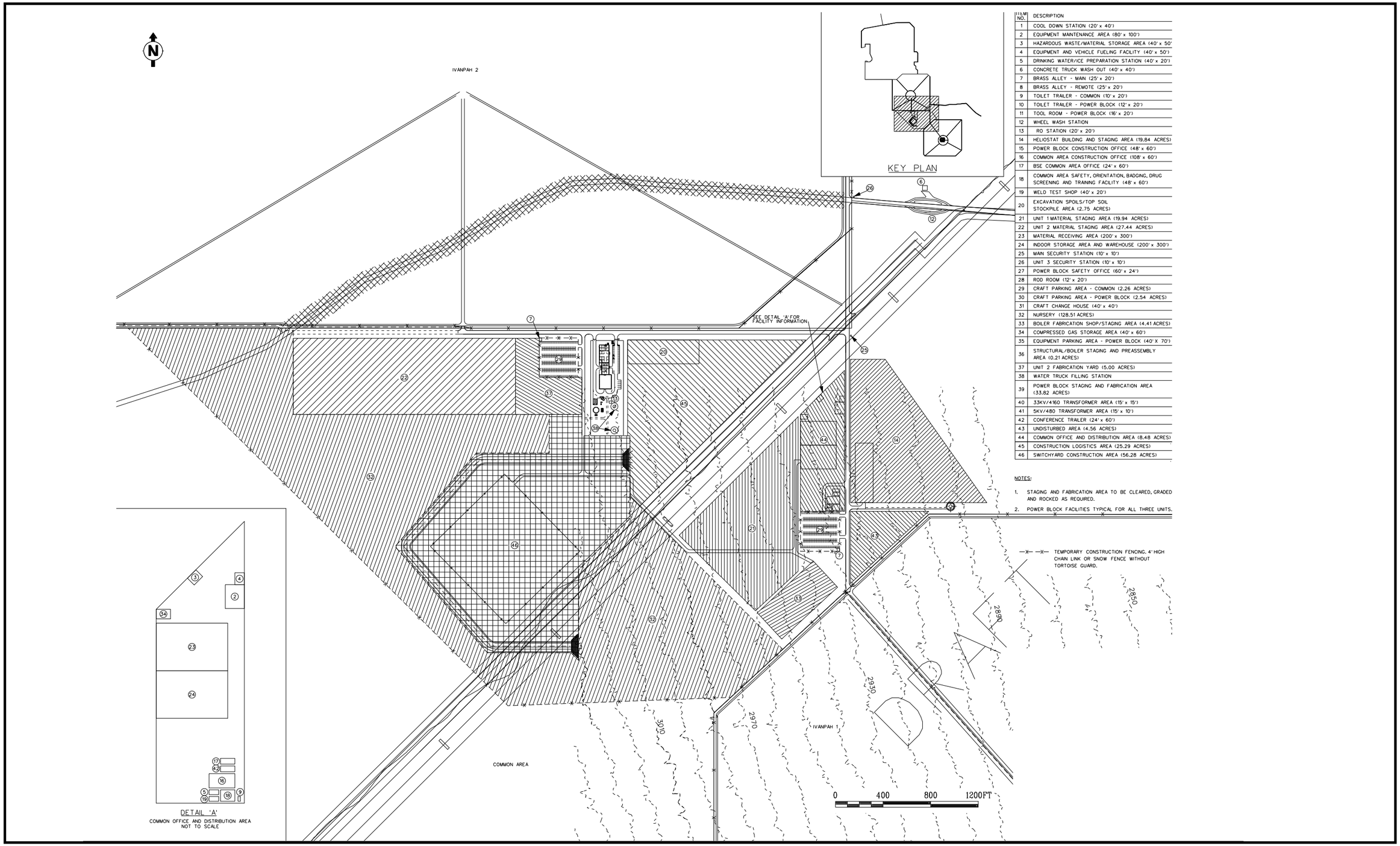
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

PROJECT DESCRIPTION - FIGURE 14

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 Construction Logistics Area Site Plan



ITEM NO.	DESCRIPTION
1	COOL DOWN STATION (20' x 40')
2	EQUIPMENT MAINTENANCE AREA (80' x 100')
3	HAZARDOUS WASTE/MATERIAL STORAGE AREA (40' x 50'
4	EQUIPMENT AND VEHICLE FUELING FACILITY (40' x 50')
5	DRINKING WATER/ICE PREPARATION STATION (40' x 20')
6	CONCRETE TRUCK WASH OUT (40' x 40')
7	BRASS ALLEY - MAIN (25' x 20')
8	BRASS ALLEY - REMOTE (25' x 20')
9	TOILET TRAILER - COMMON (10' x 20')
10	TOILET TRAILER - POWER BLOCK (12' x 20')
11	TOOL ROOM - POWER BLOCK (16' x 20')
12	WHEEL WASH STATION
13	RO STATION (20' x 20')
14	HELIOSTAT BUILDING AND STAGING AREA (19.84 ACRES)
15	POWER BLOCK CONSTRUCTION OFFICE (48' x 60')
16	COMMON AREA CONSTRUCTION OFFICE (108' x 60')
17	BSE COMMON AREA OFFICE (24' x 60')
18	COMMON AREA SAFETY, ORIENTATION, BADGING, DRUG SCREENING AND TRAINING FACILITY (48' x 60')
19	WELD TEST SHOP (40' x 20')
20	EXCAVATION SPOILS/TOP SOIL STOCKPILE AREA (2.75 ACRES)
21	UNIT 1 MATERIAL STAGING AREA (19.94 ACRES)
22	UNIT 2 MATERIAL STAGING AREA (27.44 ACRES)
23	MATERIAL RECEIVING AREA (200' x 300')
24	INDOOR STORAGE AREA AND WAREHOUSE (200' x 300')
25	MAIN SECURITY STATION (10' x 10')
26	UNIT 3 SECURITY STATION (10' x 10')
27	POWER BLOCK SAFETY OFFICE (60' x 24')
28	ROD ROOM (12' x 20')
29	CRAFT PARKING AREA - COMMON (2.26 ACRES)
30	CRAFT PARKING AREA - POWER BLOCK (2.54 ACRES)
31	CRAFT CHANGE HOUSE (40' x 40')
32	NURSERY (128.51 ACRES)
33	BOILER FABRICATION SHOP/STAGING AREA (4.41 ACRES)
34	COMPRESSED GAS STORAGE AREA (40' x 60')
35	EQUIPMENT PARKING AREA - POWER BLOCK (40' X 70')
36	STRUCTURAL/BOILER STAGING AND PREASSEMBLY AREA (0.21 ACRES)
37	UNIT 2 FABRICATION YARD (5.00 ACRES)
38	WATER TRUCK FILLING STATION
39	POWER BLOCK STAGING AND FABRICATION AREA (33.82 ACRES)
40	33KV/4160 TRANSFORMER AREA (15' x 15')
41	5KV/480 TRANSFORMER AREA (15' x 10')
42	CONFERENCE TRAILER (24' x 60')
43	UNDISTURBED AREA (4.56 ACRES)
44	COMMON OFFICE AND DISTRIBUTION AREA (8.48 ACRES)
45	CONSTRUCTION LOGISTICS AREA (25.29 ACRES)
46	SWITCHYARD CONSTRUCTION AREA (56.28 ACRES)

NOTES:

1. STAGING AND FABRICATION AREA TO BE CLEARED, GRADED AND ROCKED AS REQUIRED.
2. POWER BLOCK FACILITIES TYPICAL FOR ALL THREE UNITS.

—X— —X— TEMPORARY CONSTRUCTION FENCING, 4' HIGH CHAIN LINK OR SNOW FENCE WITHOUT TORTOISE GUARD.

PROJECT DESCRIPTION

MARCH 2010

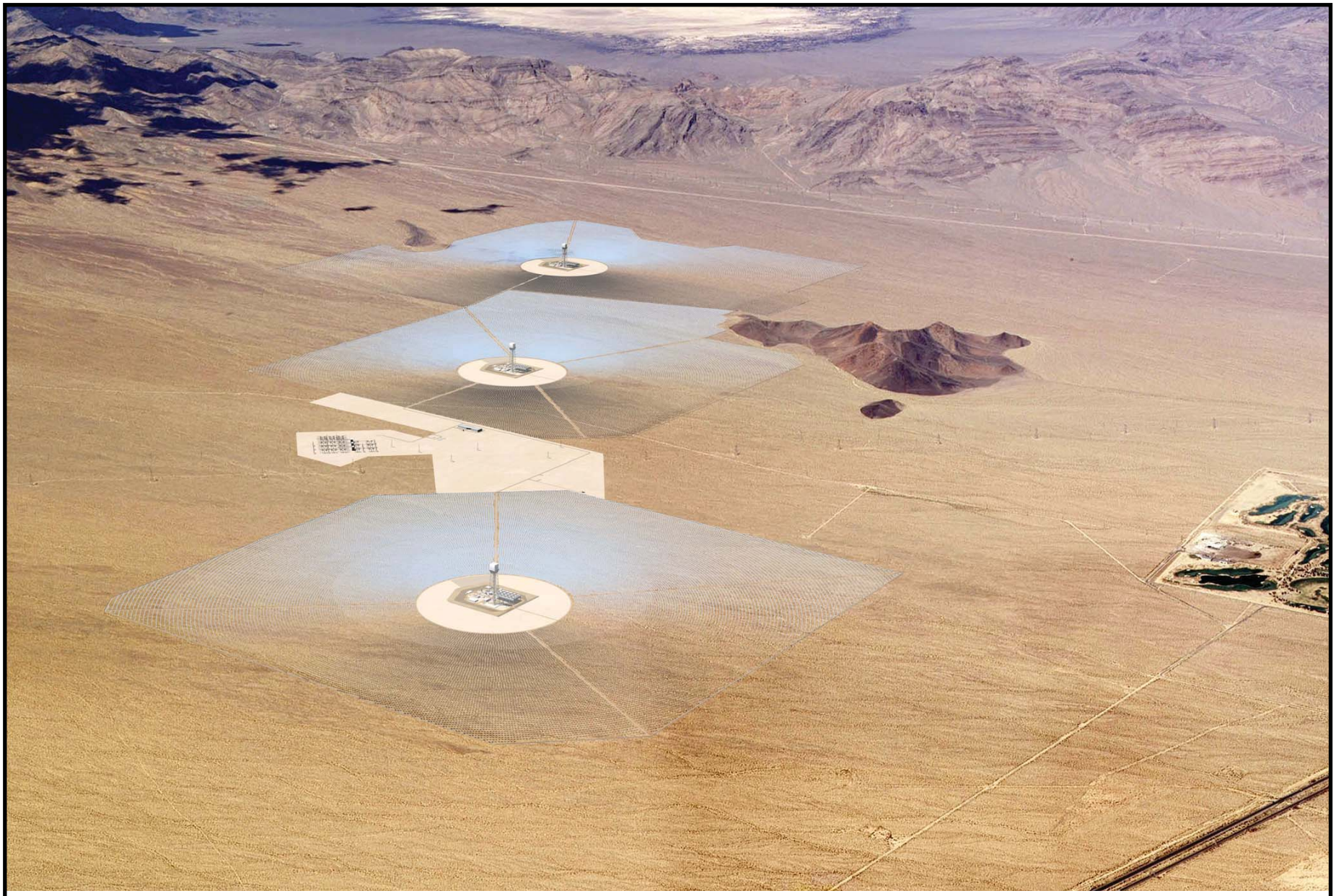
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

PROJECT DESCRIPTION - FIGURE 15

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 - Artist Rendering



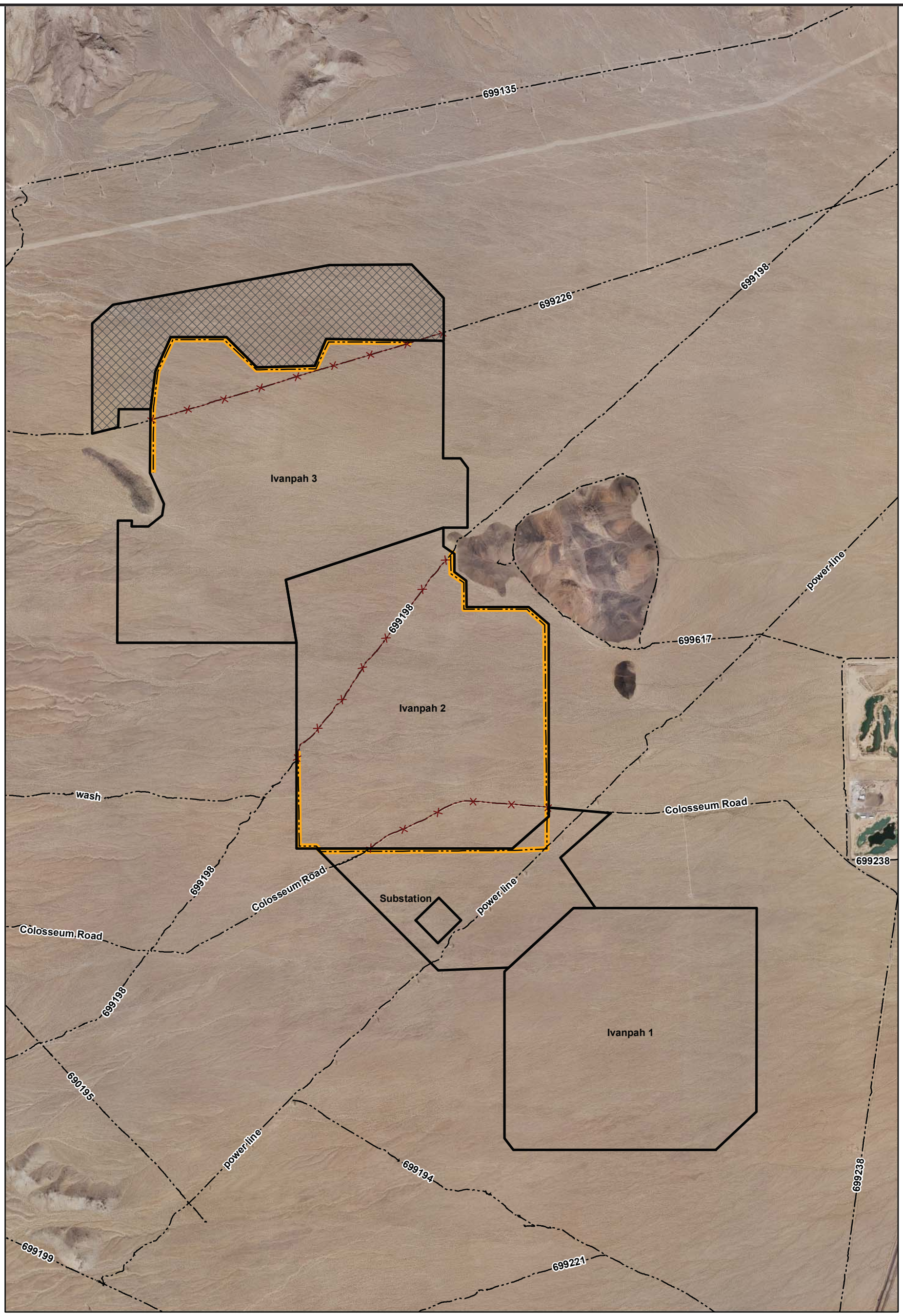
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

PROJECT DESCRIPTION - FIGURE 16

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 - Trails and Roads



LEGEND

- Trails
- Rerouted Trails
- Discontinued Segment
- Rare Plant Mitigation Area
- Project Boundary

N

0 1,500 3,000
Feet

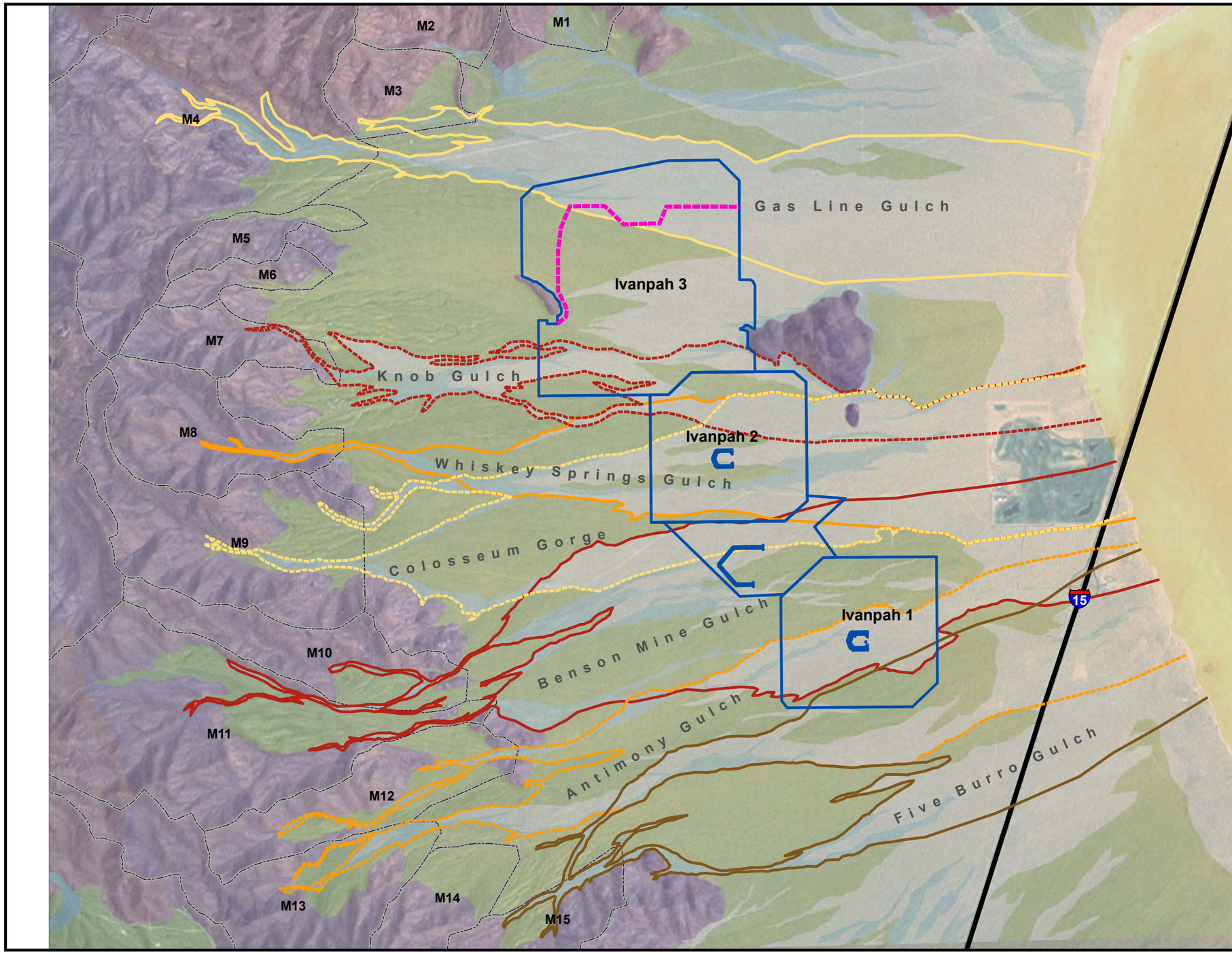
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

PROJECT DESCRIPTION - FIGURE 17

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 - Active Alluvial Fan Channels



Notes

1. Extents are estimated based on geomorphological evidence obtained from literature review, digital elevation models, aerial photography, and field visits conducted under this effort.
2. Field visits were conducted January 6 - January 8, 2009, March 17 - March 19, 2009, and December 10 - December 12, 2009.
3. Extent names are informal designations for identification purposes.
4. References:
   1. Schmidt, K.M. and M. McMackin, 2006, Preliminary Surficial Geologic Map of the Mesquite Lake 30' X 60' Quadrangle, California and Nevada, U. S. Geological Survey Open-File Report 2006-1035.
   2. 1/3 Arcsecond Digital Elevation Model (10 meter DEM). U. S. Geological Survey, 2007, National Elevation Dataset (NED): http://seamless.usgs.gov/
   3. Declassified Satellite Imagery, 1970, U. S. Geological Survey.
   4. I3 Imagery Prime World (2D), 2009, ESRI ArcGIS Online: http://services.arcgisonline.com/v92

LEGEND

- Original Ivanpah SEGS Boundary
- Proposed Ivanpah SEGS North Boundary
- HEC-1 Watershed Boundary

PROJECT DESCRIPTION

MARCH 2010

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

AIR QUALITY

Testimony of Brenner Munger, Ph.D., P.E.

SUMMARY OF CONCLUSIONS

This Addendum to the Air Quality Analysis summarizes the air quality elements of the Mitigated Ivanpah 3 proposal (BSE 2010), the changes in the basis for the FSA air quality analysis(CEC 2009), and the impacts on the results and conclusions presented in the FSA.

Mitigated Ivanpah 3 would include a reduced scope for the proposed Ivanpah Unit 3 with offsetting increases in Units 1 and 2, for a net reduction in electrical output from the entire facility from 400 MW to 370 MW.

Since the Mitigated Ivanpah 3 proposal is based on an overall reduction in project scope and the changes in the air quality elements for the Mitigated Ivanpah 3 proposal were in general reductions (e.g., reduction in size of sources, reduction in number of sources), an "envelope approach" was taken for the Addendum analysis. The "envelope" is defined by the results and conclusions of the air quality analysis for the FSA. Since the air quality impacts resulting from the originally proposed Ivanpah facility would be mitigated to the point where staff determined them to be less than significant, emissions within this envelope would likewise be deemed to be less than significant. Thus, the focus of this analysis of the Mitigated Ivanpah 3 proposal is on those elements of the Mitigated Ivanpah 3 proposal with the potential to increase the impacts above those identified for the original ISEGS project scope.

Based on the analysis conducted for the original ISEGS project presented in the October 2009 FSA and the "envelope analysis" conducted for the Mitigated Ivanpah 3 proposal, staff has determined that the following conclusions for the original ISEGS project are still valid for the Mitigated Ivanpah 3 proposal for the ISEGS project:

- The original ISEGS project and the Mitigated Ivanpah 3 proposal would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related CEQA impacts;
- Conditions of Certification in the FSA serve the purpose of both the Energy Commission's Conditions of Certification for purposes of the California Environmental Quality Act (CEQA) and BLM's Mitigation Measures for purposes of the National Environmental Policy Act (NEPA);
- The original ISEGS project and the Mitigated Ivanpah 3 proposal would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause significant NEPA air quality impacts; and
- The original ISEGS project and the Mitigated Ivanpah 3 proposal have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation and could cause potential localized exceedances of the PM10 NAAQS during construction. The mitigation measures for controlling fugitive dust from construction and operation proposed in the October 2009 Final Staff Assessment address this potential and result in impacts that are less than significant.

CHANGES IN PROJECT SCOPE

The basic conceptual design for the overall project remains the same. The overall project comprises three solar concentrating thermal power plants (Ivanpah 1, 2 and 3 –Ivanpah 1, Ivanpah 2 and Ivanpah 3) based on power tower and heliostat mirror technology, in which heliostat (mirror) fields focus solar energy on power tower receivers near the center of each heliostat field. The power tower receivers absorb the reflected solar energy and generate steam which is used in conventional steam turbine generators to produce electricity. Each plant includes a natural gas-fired steam boiler to provide thermal input to the steam turbine during the morning start-up cycle and during transient cloudy conditions. Air-cooled condensers (ACCs) at each of the three plants would provide steam cycle cooling.

The project would include other operating emission sources for operation and maintenance of the facility. Each plant includes a diesel-fired fire pump engine (3 total for the project) and an emergency generator engine. Originally, Ivanpah 3 was proposed with two emergency generator engines for a total of four emergency generators for the project but the Mitigated Ivanpah 3 proposal eliminates one of the Ivanpah 3 emergency generators. The project plans to use a mirror washing machine and dedicated pickup trucks for personnel transport within the plants, which will produce both tailpipe and fugitive dust emissions during operation.

The changes in the project scope in the Biological Mitigation Proposal (Mitigated Ivanpah3) include:

- Eliminate approximately 40,000 heliostats from the heliostat field for Ivanpah 3 to reduce the acreage for the Ivanpah 3 heliostat field by approximately 430 acres. This reduces the project total for the heliostats from approximately 213,500 to 173,500;
- Move the northern boundary for the Ivanpah 3 heliostat field southward and move the power block for Ivanpah 3 southward to the center of the smaller Ivanpah 3 heliostat field.
- Reduce the number of power towers for Ivanpah 3 from five to one. This reduces the number of power towers for the entire project from seven to three;
- Reduce the size of the Ivanpah 3 auxiliary boiler by half to match the size of the Ivanpah 1 and Ivanpah 2 auxiliary boilers;
- Resize the steam turbine generators from the original 100MW, 100MW and 200MW for Ivanpah 1, Ivanpah 2 and Ivanpah 3 respectively to 120MW, 125MW and 125MW respectively, reducing facility total generation capacity from 400MW to 370MW;
- Reduce the number of emergency generators for Ivanpah 3 from two to one;
- Realign some of the heliostats originally allocated to Ivanpah 3 to serve the Ivanpah 2 power tower and move the boundary between the Ivanpah 2 and Ivanpah 3 heliostat fields northward;
- Realign some roads and utilities with the project footprint; and
- Reduce the size of the Construction Logistics Area (CLA) by 109 acres and relocate the administration building and water supply wells within the CLA.

PROJECT CONSTRUCTION

The project scope changes in the Mitigated Ivanpah 3 proposal represent substantial reductions in project construction. The number of heliostats would be reduced by approximately 18% (from 213,500 to 173,500), the project “footprint” would be reduced by 12% (from 4,062 acres to 3,520 acres), the emergency generators would be reduced by 25% (four to three), the number of

power towers reduced by from seven to three and the size of the Ivanpah 3 auxiliary boiler reduced by 50%. With the reduced construction scope, the project applicant plans to use a reduced work force.

Even though the project applicant plans to reduce the construction schedule from 48 months to 43 months (approximately a 10% reduction), the proportionally larger scope reductions and the reduced work force would result in reduced short term and long term construction emissions for the Mitigated Ivanpah 3 project compared to the original ISEGS project.

Thus, the construction emissions and the associated air quality impacts for the Mitigated Ivanpah 3 proposal are "within the envelope" of construction emissions and impacts analyzed for the original ISEGS project in the October 2009 FSA.

PROJECT OPERATION

The original ISEGS facility was proposed as a nominal 400 Megawatt (MW) heliostat mirror and power tower thermal solar electrical generating facility comprising three plants, Ivanpah1 (100 MW), Ivanpah 2 (100 MW) and Ivanpah 3 (200 MW) (BSE 2007a). The Mitigated Ivanpah 3 proposal revises the facility design, retaining the original plan for three plants but resizing the power plants to have nominal capacities of 120MW, 125MW and 125MW for Ivanpah 1, Ivanpah 2 and Ivanpah 3 respectively. Also, the Ivanpah 3 design is revised to have only one central power tower rather than five power towers.

Even though the applicant is proposing to install larger steam turbine generators for the Ivanpah 1 and Ivanpah 2 plants, there are no proposed changes in the location, configuration, or the short-term hours of operation or fuel usage for the emitting sources in the Ivanpah 1 and Ivanpah 2 power plants. This means there would be no changes in the short-term quantity or timing of emissions from these sources and thus no changes in the estimated short-term air quality impacts resulting from the operation of these sources. Thus, for the short-term averaging periods, the operations emissions for the Ivanpah 1 and Ivanpah 2 power plant for the Mitigated Ivanpah 3 Project are "within the envelope" of emissions and air quality impacts for the Ivanpah 1 and Ivanpah 2 sources analyzed in the FSA.

On an annual basis, the only potential changes would involve the auxiliary boilers. The most stringent boiler use limitation, more stringent than the District permit limits, is AQ-SC10 which limits the annual boiler fuel use for Ivanpah 1, Ivanpah 2 and Ivanpah 3 to no more than 5 percent of the solar energy input for the ISEGS 1, ISSEGS 2 and ISEGS 3 plants, respectively. For the envelope analysis, staff assumes that the annual solar energy input is directly proportional to the number of heliostats for each unit. The mitigation proposal would reduce the number of heliostats for Ivanpah 1 (55,000 to 53,500). Thus, the annual emissions and associated annual air quality impacts for Ivanpah 1 for the Mitigated Ivanpah 3 project would be "within the envelope" of the emissions and air quality impacts for Ivanpah 1 analyzed in the FSA. For Ivanpah 2, the Mitigated Ivanpah 3 proposal would increase the number of heliostats by approximately 9% from 55,000 to 60,000. The estimated annual average impacts for the auxiliary boilers were reviewed and staff determined that a 9% increase in the contribution from the Ivanpah 2 auxiliary boiler the annual averages would be so small that this change would be lost in the rounding and thus not significant.

For Ivanpah 3, the mitigation measures presented in the Mitigated Ivanpah 3 proposal that impact operations emissions and which were evaluated in this analysis are:

- 50% reduction in the capacity and fuel usage (hourly, daily and annual) for the Ivanpah 3 auxiliary boiler,

- Elimination of one of the emergency generators for Ivanpah 3, and
- Relocation of the Ivanpah 3 power block, including the three emissions sources (auxiliary boiler, emergency generator and diesel engine fire pump) southward to the center of the reconfigured Ivanpah 3 heliostat field.

The first two Ivanpah 3 design changes that result from the mitigated project proposal would reduce the emissions and the associated air quality impacts from operations presented in the FSA. Moving the Ivanpah 3 power block southward closer to the southern boundary of the Ivanpah 3 heliostat field (i.e., closer to the fence line) has the potential to increase air quality impacts at the southern portion of the fence line because the sources would be moved closer to the fence.

The elimination of 40,000 heliostats would reduce the mirror washing and other maintenance requirements for the facility. This would reduce vehicle miles traveled (VMT) and the associated tailpipe and fugitive dust emissions. These reductions in VMT were considered in the update of the estimate for GHG emissions presented in the Addendum to Appendix Air-1.

ASSESSMENT OF IMPACTS

As noted above, the major emissions reductions from the Mitigated Ivanpah 3 proposal are for the Ivanpah 3 power block. Specifically, the emissions from the Ivanpah 3 boiler decrease by 50%. The emission rate for the emergency generator remains the same but the emergency generator is moved southward closer to the fence line. Accordingly, the assessment of impacts for this Addendum focused on the changes in impacts due to the reconfiguration (i.e., location and size) for the Ivanpah 3 sources. To determine how the relocation of the Ivanpah 3 power block sources and the reduction in size for the Ivanpah 3 boiler would affect the air quality impacts for the overall project, the applicant conducted additional air quality dispersion modeling for the Mitigated Ivanpah 3 configuration using the EPA-approved AERMOD model. The predicted maximum impacts for the revised Ivanpah 3 sources were then compared to the predicted maximum impacts for the Ivanpah 3 sources for their original location and size. The results for this modeling are summarized in Addendum Air Quality Table 1.

The U.S. Environmental Protection Agency (U.S. EPA) is implementing a new, 1-hour NO_2 standard is scheduled to become effective April 12, 2010. This new standard is expressed as a 3-year average of the 98th percentile of the *daily maximum* 1-hour concentration (i.e., the 8th highest of daily highest 1-hour concentrations). The new standard requires “first tier” ambient NO_2 monitoring near major roadways as defined in the implementing language and “second tier” monitoring for regional NO_2 concentrations. Although U.S. EPA has specified NO_2 monitoring requirements and a schedule for determining attainment status relative to this new standard, it has not yet developed modeling software to generate the statistics in a form that can be used in a compliance demonstration. Therefore, the analyses described below do not include this project’s impact on the new federal 1-hour NO_2 standard and the conclusions reached likewise do not include this impact.

Addendum Air Quality Table 1 Comparison of Modeled Maximum Ivanpah 3 Source Impacts with Ivanpah 3 Sources in Original Configuration and with Ivanpah 3 Sources in the Mitigated Configuration			
Pollutant	**Averaging Time**	**Maximum Ivanpah 3 Source Impacts Original Configuration ($\mu g/m^3$)**	**Maximum Ivanpah 3 Source Impacts Mitigated Ivanpah 3 ($\mu g/m^3$)**
NO_2	1-hour	123.7	126.7
	Annual	0.0	0.0
SO_2	1-hour	4.1	2.8
	3-hour	1.1	0.9
	24-hour	0.0	0.0
	Annual	0.0	0.0
CO	1-hour	73.3	34.3
	8-hour	1.6	1.4
PM10	24-hour	0.2	0.1
	Annual	0.0	0.0
PM2.5	24-hour	0.2	0.1
	Annual	0.0	0.0

Source: Sierra 2010a

With the exception of the 1-hour NO_2 impacts, the mitigation measures in the Mitigated Ivanpah 3 proposal result in reduced or equivalent maximum modeled air quality impacts for all pollutants and all averaging times compared to the estimates of air quality impacts for the original Ivanpah 3 sources and locations. This means that, with the exception of the 1-hour NO_2 impacts, the impacts for the Mitigated Ivanpah 3 configuration are “within the envelope” of air quality impacts established for the original configuration of the ISEGS project. Please note that the maximum 1-hour NO_2 impact for the Ivanpah 3 sources in the Mitigated Ivanpah 3 configuration is located along the southern fence line of the Ivanpah 3 heliostat field.

To assess the significance of the increase in the 1-hour NO_2 impacts for the Ivanpah 3 sources in the Mitigated Ivanpah 3 configuration, the incremental increase of 3 ug/m3 in the maximum 1-hour NO_2 impact due to Ivanpah 3 sources in the Mitigated Ivanpah 3 configuration was added to the maximum 1-hour NO_2 impact for overall project operations developed for the original ISEGS project. The maximum 1-hour NO_2 impact for overall project operations developed for the original ISEGS project is located along the western fence line of the Ivanpah 1 heliostat field. This is a different location than the location of the maximum 1-hour NO_2 impact from the Ivanpah 3 sources. Adding the incremental increase in maximum impact from one location to the maximum impact at a different location adds additional conservatism to the envelope analysis.

The Maximum Modeled Facility Impacts for the original facility and for the Mitigated Ivanpah 3 facility were then added to the background 1-hour NO_2 concentration. The total of the facility impacts plus background concentration were then compared to the 1-hour NO_2 standard. The results are presented in Addendum Air Quality Table 2.

Addendum Air Quality Table 2

Comparison of Project Operations 1-hour NO_2 Emissions Impacts for Original ISEGS Project and Mitigated Ivanpah 3 ISEGS Project

	Avg. Period	Maximum Modeled Facility Impact ($\mu g/m^3$)	Background [a] ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	Standard ($\mu g/m^3$)	Percent of Standard
Original ISEGS[a]	$NO_2$1-hr	150.4[a]	73.3	223.4	339	66%
Mitigated Ivanpah 3 Proposal	$NO_2$1-hr	153.4 (150.4 + 3.0)	73.3	226.4	339	67%

a) Source CEC 2009 (FSA, Air Quality Table 10)

This modeling analysis indicates that the incremental increases in the 1-hour NO_2 impacts for the Mitigated Ivanpah 3 project would not create new exceedances or contribute to existing exceedances of the state's 1-hour NO_2 ambient air quality standard.

The Mitigated Ivanpah 3 proposal includes the reconfiguration of the Ivanpah 3 heliostat field, relocation of the northern boundary southward and relocation of the Ivanpah 3 power block southward. Based on the air quality modeling analysis for the Mitigated Ivanpah 3 configuration of the Ivanpah 3 sources, the location of the maximum 1-hour NO_2 impacts was along the southern fence line for the Ivanpah 3 heliostat field. Since the emissions rates for the Ivanpah 3 sources in the Mitigated Ivanpah 3 proposal are the same or lower, this increase in impacts was the result of the Ivanpah 3 sources moving southward closer to the southern fence line. As discussed above and as shown in Addendum Air Quality Tables 1 and 2, the incremental increases in the maximum 1-hour NO_2 impacts for the Mitigated Ivanpah 3 project along the southern fence line would not create new exceedances or contribute to existing exceedances of the NO_2 standards. However, as stated above, this analysis does not include the new federal 1-hour NO_2 standard. To assess the impacts of the relocation of the northern boundary of the Ivanpah 3 heliostat southward, the applicant provided plots of the maximum 1-hour NO_2 impacts for the area within the original northern fence line (Sierra 2010b). These plots are based on modeled values for specific receptors and extrapolated values. Staff concurs with the applicant's results that the modeled and extrapolated values in the northern fence area for the Ivanpah 3 heliostat field are less than half of the maximum impacts estimated for the southern fence line. Based on this information, staff has concluded that the maximum NO_2 impacts for the revised northern perimeter will be lower than the modeled maximum impacts for the southern fence line.

COMPLIANCE WITH LORS

Based on the analysis conducted for the original ISEGS project presented in the October 2009 FSA and the "envelope analysis" conducted for the Mitigated Ivanpah 3 proposal and documented in this addendum, the proposed reduced scope for the ISEGS project (Mitigated

Ivanpah 3) would comply with all applicable air quality laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related CEQA impacts.

CONCLUSIONS

Based on the analysis conducted for the original ISEGS project presented in the October 2009 FSA and the "envelope analysis" conducted for the Mitigated Ivanpah 3 proposal, staff has determined that the following conclusions for the original ISEGS project are still valid for the Mitigated Ivanpah 3 proposal for the ISEGS project:

- The ISEGS Mitigated Ivanpah 3 project would not have the potential to exceed PSD emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause significant NEPA air quality impacts. However, without adequate fugitive dust mitigation, the ISEGS Mitigated Ivanpah 3 project would have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation, and could cause potential localized exceedances of the PM10 NAAQS during construction. Recommended Conditions of Certification **AQ-SC1** through **AQ-SC4**, for construction, and **AQ-SC7**, for operation, will mitigate these potentially significant NEPA impacts for both the original ISEGS project and the ISEGS Mitigated Ivanpah 3 project to less than significant.
- The ISEGS Mitigated Ivanpah 3 project would comply with applicable District Rules and Regulations, including New Source Review requirements, and staff recommends the inclusion of the Districts FDOC conditions as Conditions of Certification **AQ-1** through **AQ-39** and the addition of staff recommended Condition of Certification **AQ-SC9** to ensure that the emergency engines meet applicable model year emission standards.
- The construction activities from the ISEGS Mitigated Ivanpah 3 project would likely contribute to significant CEQA adverse PM10 and ozone impacts unless mitigation measures are implemented. Staff recommends **AQ-SC1** to **AQ-SC5** to mitigate these potential impacts to less than significant.
- The ISEGS Mitigated Ivanpah 3 project operation would not cause new violations of any NO_2, SO_2, PM2.5 or CO ambient air quality standards, and therefore, the projects' direct operational NOx, SOx, PM2.5 and CO emission impacts are not CEQA significant. However, the analysis did not include the new federal 1-hour NO_2 ambient air quality standard scheduled to become effective April 12, 2010.
- Unless mitigated, the contribution of the Mitigated Ivanpah 3 project's direct and indirect, or secondary emissions to existing violations of the ozone and PM10 ambient air quality standards would likely be CEQA significant. Therefore, staff recommends **AQ-SC6** to mitigate the onsite maintenance vehicle emissions and **AQ-SC7** to mitigate the operating fugitive dust emissions to ensure that the potential ozone and PM10 CEQA impacts are mitigated to less than significant over the life of the project.
- Staff recommends **AQ-SC10** to formalize the applicant's stipulation that "Heat input from natural gas will not exceed 5 percent of the heat input from the sun, on an annual basis", which also generally corresponds the amount of operation included in the applicant's air dispersion modeling impact analysis.
- The ISEGS Mitigated Ivanpah 3 project would be consistent with the requirements of SB 1368 and the Emission Performance Standard for greenhouse gases (see **Appendix Air-1 and Addendum to Appendix Air-1)**) mitigation measures/ proposed Conditions of Certification

STAFF CONDITIONS OF CERTIFICATION

Staff conditions **AQ-SC1** through **AQ-SC4** and **AQ-SC7** are both CEQA and NEPA mitigation conditions. Staff conditions **AQ-SC5**, **AQ-SC6**, and **AQ-SC8** through **AQ-SC10** are CEQA-only conditions.

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the BLM's Authorized Officer and CPM for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4,** and **AQ-SC5**.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the BLM's Authorized Officer and CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The BLM's Authorized Officer or CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the BLM's Authorized Officer and CPM in each Monthly Compliance Report that demonstrates compliance with the following mitigation measures for the purposes of preventing all fugitive dust plumes from leaving the project. Any deviation from the following mitigation measures shall require prior BLM Authorized Officer and CPM notification and approval.

A. The main access roads through the facility to the power block areas will be paved prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved prior to taking initial deliveries.

B. All unpaved construction roads and unpaved operational site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation. All other disturbed areas in the project and linear construction sites shall be watered as frequently as necessary during grading and stabilized with a non-toxic soil stabilizer or soil weighting agent to comply with the dust mitigation objectives of Condition of

Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

C. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

D. Visible speed limit signs shall be posted at the construction site entrances.

E. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

F. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

G. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

H. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM and BLM Authorized Officer..

I. Construction areas adjacent to any paved roadway shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

J. All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

K. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

L. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

M. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to provide at least one foot of freeboard.

N. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may

be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

Verification: The AQCMM shall provide the BLM's Authorized Officer and the CPM a Monthly Compliance Report (**COMPLIANCE-6**) to include:

A. a summary of all actions taken to maintain compliance with this condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the BLM Authorized Officer, CPM, and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported (A) off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner or (B) 200 feet beyond the centerline of the construction of linear facilities indicate that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM or BLM Authorized Officer any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM or BLM Authorized Officer before that time.

Verification: The AQCMM shall provide the BLM's Authorized Officer and the CPM a Monthly Compliance Report (**COMPLIANCE-6**) to include:

A. a summary of all actions taken to maintain compliance with this condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior and CPM notification and approval.

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors along with documented correspondence with at least two construction equipment rental firms. In the event that a Tier 3 engine is not available for any off-road equipment larger than 100 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons.

   1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

   2. The construction equipment is intended to be on site for 5 days or less.

   3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not possible.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item “b” occurs within 10 days of termination of the use, if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

   1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

   2. The retrofit control device is causing or is reasonably expected to cause engine damage.

   3. The retrofit control device is causing or is reasonably expected to cause a

substantial risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

f. Construction equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report (**COMPLIANCE-6**):

A. A summary of all actions taken to maintain compliance with this condition;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM, and the AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner, when obtaining dedicated vehicles for mirror washing activities and other facility maintenance activities, shall only obtain new model year vehicles that meet California on-road vehicle emission standards for the model year when obtained.

Other vehicle/fuel types may be allowed assuming that the emission profile for those vehicles, including fugitive dust generation emissions, is comparable to the vehicles types identified in this condition.

Verification: At least 60 days prior to the start commercial production, the project owner shall submit to the CPM a copy of the plan that identifies the size and type of the on-site vehicle and equipment fleet and the vehicle and equipment purchase orders and contracts and/or purchase schedule. The plan shall be updated every other year and submitted in the Annual Compliance Report (**COMPLIANCE-7**).

AQ-SC7 The project owner shall provide a site operations dust control plan, including all applicable fugitive dust control measures identified in **AQ-SC3** that would be applicable to reducing fugitive dust from ongoing operations; that:

A. describes the active operations and wind erosion control techniques such as windbreaks and chemical dust suppressants, including their ongoing maintenance procedures, that shall be used on areas that could be disturbed by vehicles or wind anywhere within the project boundaries; and

B. identifies the location of signs throughout the facility that will limit traveling on unpaved portion of roadways to solar equipment maintenance vehicles only. In addition, vehicle speed shall be limited to no more than 10 miles per hour on

these unpaved roadways, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

The site operations fugitive dust control plan shall include the use of durable non-toxic soil stabilizers on all regularly used unpaved roads and disturbed off-road areas within the project boundaries, and shall include the inspection and maintenance procedures that will be undertaken to ensure that the unpaved roads remain stabilized. The soil stabilizer used shall be a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation.

The performance and application of the fugitive dust controls shall also be measured against and meet the performance requirements of condition **AQ-SC4**. The performance requirements of **AQ-SC4** shall also be included in the operations dust control plan.

Verification: At least 60 days prior to start of commercial operation, the project owner shall submit to the BLM's Authorized Officer and the CPM for review and approval a copy of the plan that identifies the dust and erosion control procedures, including effectiveness and environmental data for the proposed soil stabilizer, that will be used during operation of the project and that identifies all locations of the speed limit signs. At least 60 days after commercial operation, the project owner shall provide to the BLM's Authorized Officer and the CPM a report identifying the locations of all speed limit signs, and a copy of the project employee and contractor training manual that clearly identifies that project employees and contractors are required to comply with the dust and erosion control procedures and on-site speed limits.

AQ-SC8 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) for the facility.

The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed air permit modification to the CPM within 5 working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC9 The emergency generator and fire pump engines procured for this project will meet or exceed the NSPS Subpart IIII emission standards for the model year that corresponds to their date of purchase.

Verification: The project owner shall submit the emergency engine specifications to the CPM at least 30 days prior to purchasing the engines for review and approval.

AQ-SC10 The ISEGS 1, ISEGS 2, and ISEGS 3 boilers shall not exceed a total annual natural gas fuel heat input that is more than 5 percent of the total annual heat input from the sun for ISEGS1, ISEGS2, and ISEGS 3, respectively.

Verification: Annual natural gas fuel heat input data and annual solar heat input data for the ISEGS 1, ISEGS 2, and ISEGS 3 units showing compliance with this condition shall be provided in the Annual Compliance Report (**COMPLIANCE-7**).

DISTRICT CONDITIONS OF CERTIFICATION

District conditions **AQ-1** through **AQ-39** are CEQA-only required conditions. The District is reviewing these conditions to identify changes necessary to reflect the revised project scope presented in the Mitigated Ivanpah 3 proposal. The District will issue any changes as a revision to the District's Final Determination of Compliance (FDOC) for the project. After the District issues the FDOC revision, staff will revised these conditions appropriate.

Conditions Applicable to Ivanpah 1 & 2 Boilers, MDAQMD Application Numbers/Permit Numbers; 00009311 (B010375) & 00009314 (B010376)

Equipment Description:

Nebraska boilers, Model NSX-G-120, each equipped with Natcom Low-NOx Burners rated at a maximum heat input of 231.1 MMBTU/hr, and flue gas recirculation (FGR or EGR) operating at 13.9 percent excess air, fueled exclusively on utility grade natural gas. Equipment boiler is equipped with stacks that are 130 feet high and 60 inches in diameter.

These conditions apply separately to both boilers unless otherwise specified.

AQ-1 Operation of this equipment must be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

Verification: Any non-compliant operations shall be listed in the Annual Compliance Report (**COMPLIANCE-7**).

AQ-2 The owner/operator shall operate this equipment in strict accord with the recommendations of the manufacturer or supplier and/or sound engineering principles and consistent with all information submitted with the application for this permit, which produce the minimum emission of air contaminants.

Verification: As part of the Annual Compliance Report (**COMPLIANCE-7**), the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQ-3 This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet.

Verification: As part of the Annual Compliance Report (**COMPLIANCE-7**), the project owner shall include proofs that only pipeline quality, or Public Utility Commission regulated natural gas are used for the boilers.

AQ-4 The owner owner/operator shall maintain a current, on-site (at a central location if necessary) log for this equipment for five (5) years, which shall be provided to District, state or federal personnel upon request. This log shall include calendar year fuel use for this equipment in standard cubic feet, or BTU's, and daily hours of operation.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or Energy Commission staff.

AQ-5 Not later than 180 days after initial startup, the operator shall perform an initial compliance test on this boiler in accordance with the District Compliance Test Procedural Manual. This test shall demonstrate that this equipment does not exceed the following emission maximums:

Pollutant	ppmvd	Lb/MMBtu	Lb/hr	
*NOx	9.0	0.011	2.5	(per USEPA Methods 19 and 20)
SOx	1.7	0.003	0.6	
*CO	25.0	0.018	4.2	(per USEPA Methods 10)
VOC	12.6	0.0054	1.2	(per USEPA Methods 25A and 18)
PM10	n/a	0.007	1.7	(per USEPA Methods 5 and 202 or CARB Method 5)

*corrected to 3% oxygen, on a dry basis, averaged over one hour

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQ-6 This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Db - Standards of Performance for Industrial Steam Generating Units (NSPS Db).

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the 40 CFR 60 Subpart Db plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the ISEGS Boilers 1 and 2 at least 30 days prior to first fire of the boilers or earlier as necessary for compliance with Subpart Db.

AQ-7 Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emission limits.

Verification: Complying with Condition of Certification **AQ-3** shall be used to demonstrate compliance with this condition.

AQ-8 The owner/operator shall continuously monitor fuel flow rate and flue gas oxygen level.

Verification: At least 120 days prior to construction of the boiler stacks, the project owner shall provide the District for approval, and the CPM for review, a detailed drawing and a plan on how the measurements and recordings, required by this condition, will be performed by the chosen monitoring system.

AQ-9 The owner/operator shall conduct an initial compliance test for NOx emissions within 180 days of startup. This initial compliance test shall be used to develop a relationship between fuel firing rate, flue gas oxygen, and flue gas NOx concentration. This relationship shall be used to determine compliance with NOx emission limits contained in these conditions.

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQ-10 The owner/operator shall comply with all applicable recordkeeping and reporting requirements of NSPS Db.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-11 This boiler shall not operate more than 4 hours in any single day, and no more than 1460 hours in any calendar year.

a. These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

Conditions Applicable to Ivanpah 3 Boiler, MDAQMD Application Number; 00009320

Equipment Description:

Babcock-Wilcox boiler, Model unknown, equipped with an unknown Low-NOx Burner rated at a maximum heat input of 462.2 MMBTU/hr, and flue gas recirculation (FGR or EGR) operating at 13.9 percent excess air, fueled exclusively on utility grade natural gas. Equipment shall use 450,000 cu-ft/hr of fuel and provide 440,000 lb/hr of steam. This boiler is equipped with a stack that is 130 feet high and 60 inches in diameter.

AQ-12 Operation of this equipment must be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted below.

Verification: Any non-compliant operations shall be listed in the Annual Compliance Report (**COMPLIANCE-7**).

AQ-13 The owner/operator shall operate this equipment in strict accord with the recommendations of the manufacturer or supplier and/or sound engineering principles and consistent with all information submitted with the application for this permit, which produce the minimum emission of air contaminants.

Verification: As part of the Annual Compliance Report, (**COMPLIANCE-7**) the project owner shall include information on the date, time, and duration of any violation of this permit condition.

AQ-14 This boiler shall use only natural gas as fuel and shall be equipped with a meter measuring fuel consumption in standard cubic feet.

Verification: As part of the Annual Compliance Report (**COMPLIANCE-7**), the project owner shall include proofs that only pipeline quality, or Public Utility Commission regulated natural gas are used for the boilers.

AQ-15 The owner owner/operator shall maintain a current, on-site (at a central location if necessary) log for this equipment for five (5) years, which shall be provided to District, state or federal personnel upon request. This log shall include calendar year fuel use for this equipment in standard cubic feet, or BTU's, and daily hours of operation.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or Energy Commission staff.

AQ-16 Not later than 180 days after initial startup, the operator shall perform an initial compliance test on this boiler in accordance with the District Compliance Test Procedural Manual. This test shall demonstrate that this equipment does not exceed the following emission maximums:

Pollutant	ppmvd	Lb/MMBTU	Lb/hr	
*NOx	9.0	0.011	5	(per USEPA Methods 19 and 20)
SOx	1.7	0.003	1.3	
*CO	25.0	0.018	8.5	(per USEPA Methods 10)
VOC	12.6	0.0054	2.5	(per USEPA Methods 25A and 18)
PM10	n/a	0.007	3.4	(per USEPA Methods 5 and 202 or CARB Method 5)

*corrected to 3% oxygen, on a dry basis, averaged over one hour

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQ-17 This boiler shall be operated in compliance with all applicable requirements of 40 CFR 60 Subpart Da - Standards of Performance for Industrial Steam Generating Units (NSPS Da).

Verification: The project owner shall complete and submit to the CPM a compliance plan that provides a list of the 40 CFR 60 Subpart Da plans, tests, and recordkeeping requirements and their compliance schedule dates as applicable for the ISEGS Boiler 3 at least 30 days prior to first fire of the boiler or earlier as necessary for compliance with Subpart Da.

AQ-18 Records of fuel supplier certifications of fuel sulfur content shall be maintained to demonstrate compliance with the sulfur dioxide and particulate matter emission limits.

Verification: Complying with Condition of Certification **AQ-14** shall be used to demonstrate compliance with this condition.

AQ-19 The owner/operator shall install, calibrate, maintain and operate a continuous emissions monitoring system (CEMS) to measure and record NOx emissions and oxygen concentration according to 40 CFR Part 60 specifications.

Verification: At least 120 days prior to construction of the boiler stacks, the project owner shall provide the District for approval and the CPM for review, a detailed drawing and a plan on how the measurements and recordings, required by this condition, will be performed by the chosen monitoring system.

AQ-20 The owner/operator shall conduct an initial compliance test for NOx emissions by conducting the CEMS RATA test within 180 days of startup; and shall collect data from the CEMS at all times that fuel is combusted in the boiler.

Verification: The project owner shall notify the District and the CPM within fifteen (15) working days before the execution of the compliance test required in this condition. The test results shall be submitted to the District and to the CPM within 60 days of the date of the tests.

AQ-21 The owner/operator shall comply with all applicable recordkeeping and reporting requirements of NSPS Da.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-22 This boiler shall not operate more than 4 hours in any single day, and no more than 1460 hours in any calendar year.

a. These limits shall not apply during the facility commissioning period. The commissioning period shall begin the first time fuel is fired in the boiler. The commissioning period shall end when the facility achieves commercial operation, but no later than 180 days after first fire.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

Conditions Applicable to Ivanpah I, II, and III Emergency Fire Pumps, MDAQMD Application Numbers/Permit Numbers; 00009312 (E010380), 00009315 (E010378), and 00009319 (E010384)

Equipment Description:

Year of Manufacture 2008, Tier II, One Clarke, Diesel fired internal combustion engine, Model No. JU6H-UF62, and Serial number tbd, After Cooled, Direct Injected, Turbo Charged, producing 240 bhp with 6 cylinders at 2,600 rpm while consuming a maximum of 10 gal/hr. This equipment powers a pump.

These conditions apply separately to all three emergency fire pump engines unless otherwise specified.

AQ-23 This system shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, EPA or CEC staff.

AQ-24 These engines may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engines are located or expects to order such outages at a particular time, the engines are located in the area subject to the rotating outage, the engines are operated no more than 30 minutes prior to the forecasted outage, and the engines are shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-25 These engines may operate in response to fire suppression requirements and needs.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-26 These units shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-27 A non-resettable four-digit (9,999) hour timer shall be installed and maintained on these units to indicate elapsed engine operating time.

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

AQ-28 These units shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-29 The hour limit of **AQ-28** can be exceeded when the emergency fire pump assemblies are driven directly by a stationary diesel fueled CI engine when operated per and in accord with the National Fire Protection Association (NFPA) 25 - "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," 2006 edition or the most current edition approved by the CARB Executive Officer. {Title 17 CCR 93115(c)16}

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-30 The owner/operator shall maintain a operations log for these units current and on-site, either at the engine location or at a on-site location, for a minimum of two (2) years, and for another year where it can be made available to the District staff within 5 working days from the District's request, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);

b. Reason for use (testing & maintenance, emergency, required emission testing);

c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,

d. Fuel sulfur concentration (the owner/operator may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-31 These fire protection units are subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR

93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

Verification: Not necessary.

Conditions Applicable to Ivanpah I, II, and III Emergency Generators, MDAQMD Application Numbers/Permit Numbers; 00009313 (E010381), 00009316 (E010379), 00009317 (E010382) and 00009318 (E010383)

Equipment Description:

Year of Manufacture 2008, Tier II, One Caterpillar, Diesel fired internal combustion engine, Model No. 3516C-HD, and Serial No. tbd, After Cooled, Direct Injected, Turbo Charged, producing 3,750 bhp with 16 cylinders at 1,800 rpm while consuming a maximum of 173 gal/hr. This equipment powers a Generator.

These conditions apply separately to all four emergency generator engines unless otherwise specified.

AQ-32 Engine may operate in response to notification of impending rotating outage if the area utility has ordered rotating outages in the area where the engine is located or expects to order such outages at a particular time, the engine is located in the area subject to the rotating outage, the engine is operated no more than 30 minutes prior to the forecasted outage, and the engine is shut down immediately after the utility advises that the outage is no longer imminent or in effect.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-33 This unit shall only be fired on ultra-low sulfur diesel fuel, whose sulfur concentration is less than or equal to 0.0015% (15ppm) on a weight per weight basis per CARB Diesel or equivalent requirements.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-34 This equipment shall be installed, operated and maintained in strict accord with those recommendations of the manufacturer/supplier and/or sound engineering principles which produce the minimum emissions of contaminants. Unless otherwise noted, this equipment shall also be operated in accordance with all data and specifications submitted with the application for this permit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-35 A non-resettable four-digit (9,999) hour timer shall be installed and maintained on this unit to indicate elapsed engine operating time.

Verification: At least thirty (30) days prior to the installation of the engine, the project owner shall provide the District and the CPM the specification of the hour timer.

AQ-36 This unit shall be limited to use for emergency power, defined as in response to a fire or when commercially available power has been interrupted. In addition, this unit shall be operated no more than 50 hours per year, and no more than 0.5 hours per

day for testing and maintenance, excluding compliance source testing. Time required for source testing will not be counted toward the 50 hour per year limit.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-37 The owner/operator shall maintain an operations log for this unit current and on-site (or at a central location) for a minimum of five (5) years, and this log shall be provided to District, State and Federal personnel upon request. The log shall include, at a minimum, the information specified below:

a. Date of each use and duration of each use (in hours);

b. Reason for use (testing & maintenance, emergency, required emission testing);

c. Calendar year operation in terms of fuel consumption (in gallons) and total hours; and,

d. Fuel sulfur concentration (the owner/operator may use the supplier's certification of sulfur content if it is maintained as part of this log).

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

AQ-38 This genset is subject to the requirements of the Airborne Toxic Control Measure (ATCM) for Stationary Compression Ignition Engines (Title 17 CCR 93115). In the event of conflict between these conditions and the ATCM, the more stringent requirements shall govern.

Verification: Not necessary.

AQ-39 This unit shall not be used to provide power during a voluntary agreed to power outage and/or power reduction initiated under an Interruptible Service Contract (ISC); Demand Response Program (DRP); Load Reduction Program (LRP) and/or similar arrangement(s) with the electrical power supplier.

Verification: During site inspection, the project owner shall make all records and reports available to the District, ARB, U.S. EPA or CEC staff.

REFERENCES

BSE 2007 – Bright Source Energy/ Solar Partners I, LLC/ J. Woolard (tn: 42174). Application for Certification, Volumes I and II, for the ISEGS Solar Electric Generating System. Dated 8/28/2007. Submitted to CEC/Docket Unit on 8/31/2007.

BSE 2010 – Bright Source Energy/ Solar Partners I, LLC/ Biological Mitigation Proposal (Mitigated Ivanpah 3) for Ivanpah Solar Electric Generating System (ISEGS) (07-AFC-5) Dated 2/11/10, Submitted to CEC 2/11/10..

CEC 2009 – California Energy Commission Final Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment for Ivanpah Solar Electric Generating System (07-AFC-5) CEC-700-2008.013-FSA-DEIS. Dated October 2009. Submitted to CEC / Docket Unit on 11/04/09.

Sierra 2010a – Sierra Research. 2/18/10 e-mail from S. Hill, Sierra Research, to B. Munger, CEC.

Sierra 2010b – Sierra Research. 2/18/10 letter from S. Hill, Sierra Research, to J. Kessler, CEC transmitting air quality impact modeling files for Biological Mitigation Proposal (Mitigated Ivanpah 3).

Sierra 2010b – Sierra Research. 2/23/10 e-mail from S. Hill, Sierra Research, to J. Kessler and B. Munger, CEC.

ADDENDUM TO APPENDIX AIR-1 - GREENHOUSE GAS EMISSIONS

Testimony of Brenner Munger, Ph.D., P.E.

SUMMARY OF CONCLUSIONS

On August 28, 2007, BrightSource Energy (applicant) submitted an Application for Certification (AFC) (BSE 2007) to construct and operate ISEGS in the Mojave Desert region near the border of California and Nevada in San Bernardino County. In October 2009, U.S. Bureau of Land Management (BLM) and Energy Commission staff issued a joint Final Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment (FSA) (CEC 2009). In Appendix Air-1 to the FSA, staff provided estimates of greenhouse gas (GHG) emissions based on the project scope presented in the AFC submitted in August 2007.

On February 11, 2010, the applicant submitted to the Energy Commission a Biological Mitigation Proposal (Mitigated Ivanpah3) for the ISEGS project (BSE 2010). The Mitigated Ivanpah 3 proposal presents a reduced scope for the ISEGS project and affects primarily the Ivanpah 3 phase of the ISEGS project.

This Addendum to Appendix Air-1 to the FSA presents updated estimates of GHG emissions for the Mitigated Ivanpah 3 configuration (i.e., reduced scope) of the ISEGS project. The reductions in GHG emissions for the Mitigated Ivanpah 3 project compared to the GHG emissions for the original ISEGS project result primarily from reductions in the operation emissions for the Ivanpah 3 portion of the project.

The operation of the ISEGS Mitigated Ivanpah 3 plant would affect the overall electricity system operation and GHG emissions in several ways:

- ISEGS Mitigated Ivanpah 3 would provide low-GHG, renewable generation.
- ISEGS Mitigated Ivanpah 3 would facilitate to some degree the replacement of out-of-state high-GHG-emitting (e.g., coal) electricity generation that must be phased out in conformance with the State's new Emissions Performance Standard.
- ISEGS Mitigated Ivanpah 3 would facilitate to some extent the replacement of generation provided by aging fossil-fired power plants that use once-through cooling.

These system impacts would result in a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff concludes that the project would result in a cumulative overall reduction in GHG emissions from power plants, would not worsen current conditions, and would not result in impacts that are cumulatively CEQA significant.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new low GHG-emitting power generating facility would be sufficiently reduced by "best practices" and would, therefore, not be CEQA significant.

The Ivanpah Solar Electric Generating System project, as a solar project with a nightly shutdown would operate less than 60% of capacity and would therefore not be subject to the requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2900 et. seq.). However, the ISEGS would easily comply with the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

PROJECT OPERATIONS

The mitigation measures presented in the Mitigated Ivanpah 3 proposal that would reduce GHG emissions from operations are:

- Reduction in annual fuel usage in the auxiliary boilers resulting primarily from the 50% reduction in the capacity for the Ivanpah 3 auxiliary boiler,
- Elimination of one of the emergency generators for Ivanpah 3, and
- Elimination of approximately 40,000 heliostats (from 213,500 to 173,500) which reduce the vehicle miles travelled (VMT) for maintenance (i.e., mirror washing) and the associated tailpipe GHG emissions.

Updated GHG emissions from operations for the ISEGS Mitigated Ivanpah 3 project are shown in Addendum Greenhouse Gas Table 1.

Based on this updated estimate of GHG emissions, the ISEGS Mitigated Ivanpah 3 project, including stationary sources and onsite and offsite mobile sources, would be permitted, on an annual basis, to emit approximately 20,900 metric tonnes of CO_2-equivalent (MTCO2E) per year if operated at its maximum permitted level.

Addendum Greenhouse Gas Table 1 Updated GHG Emissions for Ivanpah Solar EGS Based on Mitigated Ivanpah 3 Project Scope						
Source Category	**Assumed Prorata Metric**	**Original Project Scope[1]**	**Revised Project Scope**	**Prorata Factor**	**GHG Emissions for Original Project Scope[2] (MTCO2E/yr)**	**GHG Emissions for Revised Project Scope (MTCO2E/yr)**
Boilers	Annual Fuel Use Limited to 5% of Solar Input (MMBtu/yr)	480,000	444,000[3]	0.925	25,458	23549
Emergency Generators	Number of Emergency Generators	4	3[1]	0.75	346	260
Diesel Engine Fire Pumps	No Change	N/A	N/A	1.00	15	15
Maintenance Vehicles	Number of Heliostats	213,500	173,500[1]	0.81	474	385
Worker Vehicles	No Change	N/A	N/A	1.00	1,118	1,118
Delivery Vehicles and Waste Haul Vehicles	No Change	N/A	N/A	1.00	22	22
Equipment Leakage (SF6)	No Change	N/A	N/A	1.00	10	10
				TOTAL	27,443	25,359
			Facility MWh per year		960,000	888,000[3]
			GHG Performance (MTCO2E/MWh)		0.029	0.029

1) Source: BSE 2010.

2) Source: CEC 2009

3) Based on revised facility capacity of 370MW vs. 400MW for original project (BSE 2010)

COMPLIANCE WITH LORS

Based on the analysis conducted for the original ISEGS project presented in the October 2009 FSA and the "envelope analysis" conducted for the Mitigated Ivanpah 3 proposal and documented in this addendum, the proposed reduced scope for the ISEGS project (Mitigated Ivanpah 3) would comply with all applicable GHG laws, ordinances, regulations, and standards (LORS) identified in the FSA and would not result in any significant air quality-related CEQA impacts.

Staff would like to note that this project, due to its use of boilers for some direct electrical generation, is not exempt from AB32 GHG emission reporting, unlike most solar facilities, and will be required to provide annual GHG emission reports to ARB.

Additionally, U.S. EPA has recently promulgated a federal GHG reporting rule (40 CFR Part 98). Stationary source emissions greater than 25,000 MT CO2E per year would trigger GHG emission reporting under this rule. The proposed Mitigated Ivanpah 3 facility, with the boiler energy input/fuel use limitation included in recommended staff condition AQ-SC10 would not have stationary source emissions greater than 25,000 MT CO2E, as shown in the first row of Addendum Greenhouse Gas Table 1.

CONCLUSIONS

The Ivanpah Solar Electric Generating System Mitigated Ivanpah 3 project would emit considerably less greenhouse gases (GHG) than existing power plants and most other generation technologies, and thus would contribute to continued improvement of the overall western United States, and specifically California, electricity system GHG emission rate average. The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff concludes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, and would thus not result in CEQA impacts that are cumulatively significant.

Staff does not believe that the GHG emission increases typical from construction and decommissioning activities would be CEQA significant for several reasons. First, the period of construction would be short-term and not ongoing during the life of the project. Second, the best practices control measures that staff recommends, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. Finally, the construction and decommissioning emissions are miniscule when compared to the reduction in fossil-fuel power plant greenhouse gas emissions during project operation. For all these reasons, staff would conclude that the short-term emission of greenhouse gases during construction would be sufficiently reduced and would be offset during proposed project operations and would, therefore, not be CEQA significant.

The Mitigated Ivanpah 3 project, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). However, the Ivanpah Solar Electric Generating System Mitigated Ivanpah 3 project

would easily meet the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to project greenhouse gas emissions are proposed because the project would create beneficial GHG impacts. The project owner would comply with any future applicable GHG regulations formulated by the ARB or the U.S.EPA, such as GHG reporting or emissions cap and trade markets.

REFERENCES

BSE 2007 – Bright Source Energy/ Solar Partners I, LLC/ J. Woolard (tn: 42174). Application for Certification, Volumes I and II, for the ISEGS Solar Electric Generating System. Dated 8/28/2007. Submitted to CEC/Docket Unit on 8/31/2007.

BSE 2010 – Bright Source Energy/ Solar Partners I, LLC. Biological Mitigation Proposal (Mitigated Ivanpah 3) for Ivanpah Solar Electric Generating System (ISEGS) (07-AFC-5) Dated 2/11/10, Submitted to CEC 2/11/10..

CEC 2009 – California Energy Commission. Final Staff Assessment and Draft Environmental Impact Statement and Draft California Desert Conservation Area Plan Amendment for Ivanpah Solar Electric Generating System (07-AFC-5) CEC-700-2008.013-FSA-DEIS. Dated October 2009. Submitted to CEC / Docket Unit on 11/04/09.

BIOLOGICAL RESOURCES

Supplemental Testimony of Misa Milliron and Susan Sanders

Staff offers the following corrections and updates to the Biological Resources Section of the Final Staff Assessment. Changes and deletions are indicated by striking through the deleted portions of text and underlining the substituted language or new text where needed for clarification. Most of these changes are in response to the applicant's February 11, 2010 filing (CH2M Hill 2010), Biological Mitigation Proposal ("Mitigated Ivanpah 3") (CH2MHill 2010b).

SUMMARY OF STAFF'S CONCLUSIONS ON MITIGATED IVANPAH 3

The applicant's Biological Mitigation Proposal reduces the total project acreage by 476 acres. Much of that acreage contains individuals of the special-status plant species of concern, namely Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow. Small-flowered androstephium is restricted to the southern half of the project site, outside of the areas proposed for protection, and the applicant proposes to salvage the individuals for transplantation. In accordance with their special-status plant mitigation plan draft (Exhibit 81), the applicant proposes on-site minimization of impacts to the two most imperiled species, Mojave milkweed and Rusby's desert-mallow, by protecting a small perimeter or "halo" around the plants during construction and minimizing impacts during operation. However, Mitigated Ivanpah 3 eliminates the on-site impact minimization halos for the two special-status cactus species (desert pincushion and Parish's club-cholla) that was previously included in the applicant's draft mitigation plan. No rationale was given by the applicant for the removal of this mitigation component.

Mitigated Ivanpah 3 is similar to the mitigation by avoidance and a project alternative proposed by staff, but protects less total acreage and includes impact minimization measures within the solar field. Staff agrees that Mitigated Ivanpah 3 reduces impacts to special-status plants. For example, staff has concluded that the impact to Rusby's desert-mallow, which was considered to be significant even after mitigation in the Final Staff Assessment (FSA), has now been mitigated to a level of insignificance because the majority of individuals are located in the area to be completely avoided and removed from the project footprint, and on-site impact minimization is proposed for the remaining individuals. Although the on-site minimization or "halo" protection approach proposed in the applicant's Exhibit 81 - Special-Status Plant Avoidance and Protection Plan (CH2MHill 2010a) is untested and of unknown efficacy, staff is willing to accept a limited amount of uncertainty provided that at a minimum the 476 acres proposed in Mitigated Ivanpah 3 is removed from the footprint. However, with regard to two species, desert pincushion and Mojave milkweed, the impact remains significant even after reducing the project footprint. This is because although the impact has been reduced by Mitigated Ivanpah 3, a substantial portion of the documented California occurrences would still be impacted by the project. Therefore, staff recommends adding the previous level of on-site minimization proposed for desert pincushion in Exhibit 81 back into the final mitigation plan to reduce impacts to a less-than-significant level. In summary, regarding the applicant's proposed on-site impact minimization or protection of "halos" around

special-status plants within the solar field, staff recommends that this mitigation component be implemented for Mojave milkweed, desert pincushion, and Rusby's desert-mallow.

A substantial portion of the California documented occurrences of Mojave milkweed would still be directly, indirectly, and cumulatively impacted by the project following removal of the 476 acres from the footprint. Plant populations are vulnerable to the effects of habitat fragmentation; small fragments of habitat can only support small populations and are more vulnerable to extinction (Lienert 2004). Loss of a substantial portion of Mojave milkweed populations makes the species more vulnerable to extirpation within the state. Its California distribution outside of the Ivanpah Valley is restricted to 24 documented occurrences, of which only two are recent observations, and the rest consist of historic herbarium collections. Revised **Biological Resources Appendix A** included later in this addendum was updated considering Mitigated Ivanpah 3 and provides the percentage of statewide documented occurrences for special-status plant species of concern in the ISEGS project area.

Mojave milkweed is widely scattered throughout the site, making complete avoidance of all impacts to substantial acreage within the project footprint infeasible. To reduce the impact to Mojave milkweed to a level of insignificance, staff proposes changes, including compensatory mitigation, to Condition of Certification **BIO-18** (Special-Status Plant Impact Avoidance and Minimization). In the FSA, staff originally considered compensatory mitigation to be infeasible to mitigate special-status plants as a whole. However, during the analysis of Mitigated Ivanpah 3, staff updated its analysis of land ownership data in the vicinity of documented Mojave milkweed occurrences and found several parcels likely to be under private ownership and overlapping with or adjacent to two off-site occurrences documented in the California Natural Diversity Database (CNDDB). Therefore, in the case of this species, compensatory mitigation through acquisition of private land appears to be feasible. Acquisition and protection of adjacent land in the same watershed with known occurrences would provide conservation value for Mojave milkweed because it would allow expansion of existing occurrences into suitable habitat and could support the target species currently or following reintroduction efforts.

Staff is recommending both land acquisition and on-site minimization ("halo" protection) for Mojave milkweed because this type of on-site minimization is likely to result in substantial losses due to habitat fragmentation and other factors discussed previously in rebuttal testimony and is unlikely to result in self-sustaining populations in the long-term. While staff does not endorse this approach as mitigation on its own because it has not been attempted elsewhere or demonstrated to be successful, staff does support the monitoring of the populations on-site that would result from the applicant's proposed on-site impact minimization efforts. Such monitoring would provide an assessment of the need for remedial actions to be implemented in the event of population decline. In addition, it is unknown whether the potential compensation lands are currently occupied by the plant or if adjacent occurrences are still extant. Due to this uncertainty associated with land acquisition and on-site minimization, staff believes that implementing only one of these mitigation components alone is insufficient, and both are needed to mitigate the project's impacts to Mojave milkweed.

Staff proposes in the revised **BIO-18** the acquisition, protection, and management of adequate mitigation land (estimated at a minimum of approximately 30 acres) that contains or abuts a known occurrence of Mojave milkweed and shares the same watershed. Staff also proposes restoring desert pincushion back into the group of special-status plant species targeted for on-site minimization in Mitigated Ivanpah 3. Therefore, Mojave milkweed, desert pincushion, and Rusby's desert-mallow would receive on-site impact minimization and "halos" around these plants within the solar field, and would be protected as described in Exhibit 81. The revised **BIO-18** would, if implemented, mitigate the project's impacts to all special-status plant species to less-than-significant levels.

REVISIONS TO FSA TEXT

The changes in conclusions regarding special-status plant impacts results in the following revisions to some key special-status plant sections of the FSA text as indicated below. Strikethrough text for changes to wildlife and waters of the state sections are not included because the conclusions have not changed substantially and only revision of acreages and associated dollar amounts is necessary. In the case of desert tortoise mitigation, references to 4,073 acres should be changed to 3,582 acres, and in the case of state waters, references to 198 acres should be changed to 175 acres.

Correction and Additions to Status

The status of several special-status plants in **Biological Resources Table 2** are updated below due to one typographical error and because updates to the table were received from BLM. The following pages require changes.

Pages 6.2-16 and 6.2-17, Biological Resources Table 2

Small-flowered androstephium	*Androstephium breviflorum*	__/__/2.2~~3~~
Cima milk-vetch	*Astragalus cimae var. cimae*	__/__/1B.2/S
Alkali mariposa lily	*Calochortus striatus*	__/__/1B.2/S
Limestone daisy	*Erigeron uncialis var. uncialis*	__/__/1B.2/S
Forked buckwheat	*Eriogonum bifurcatum*	__/__/1B.2/S
Pungent glossopetalon	*Glossopetalon pungens*	__/__/1B.2/S
Jaeger's ivesia	*Ivesia jaegeri*	__/__/1B.3/S
Polished blazing star	*Mentzelia polita*	__/__/1B.2/S
Short-joint beavertail	*Opuntia basilaris var. brachyclada*	__/__/1B.2/S
White-margined beardtongue	*Penstemon albomarginatus*	__/__/1B.2/S
Limestone beardtongue	*Penstemon calcareous*	__/__/1B.3/S
Death Valley beardtongue	*Penstemon fruticiformis var. amargosae*	__/__/1B.3/S
Stephen's beardtongue	*Penstemon stephensii*	__/__/1B.3/S
Parish's phacelia	*Phacelia parishii*	__/__/1B.1/S
Jaeger's phacelia	*Phacelia perityloides var. jaegeri*	__/__/1B.3/S

Changes to Impacts and Conclusions

The applicant's Biological Mitigation Proposal designates three areas for removal from all project footprint impacts for the purpose of special-status plant mitigation by complete avoidance, an approach recommended by staff in the FSA. The resulting changes to staff's impact analysis and conclusion are indicated below. Also indicated are changes reflecting the addition of small-flowered androstephium to the discussion of special-status plant species of concern as previously explained in staff's rebuttal testimony.

Page 6.2-1, Summary of Conclusions; Page 6.2-95, Conclusions

The ISEGS project site supports a diverse flora including numerous special-status plant species. Eight special-status plant species, only one of which is considered sensitive by the Bureau of Land Management (BLM), would be directly impacted by construction of ISEGS. Energy Commission staff consider impacts to ~~five~~ six of these (small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow) to be significant ~~according to~~ in a California Environmental Quality Act (CEQA) ~~guidelines~~ context because the project ~~would~~ could eliminate a substantial portion of their documented occurrences in the state or world. ~~Depending~~ Based on the degree of avoidance that the applicant has proposed in **Project Description Figure 13** ~~can achieve~~, Energy Commission staff's proposed avoidance and minimization measures ~~may~~ as identified in Condition of Certification **BIO-18** and serving as a complement to the applicant's Mitigated Ivanpah 3 proposal would reduce impacts to ~~three of~~ these species ~~(desert pincushion, nine-awned pappus grass, and Parish's club-cholla)~~ to less-than-significant levels. ~~However, impacts to Mojave milkweed and Rusby's desert-mallow would remain significant in a CEQA context even after implementation of the special-status plant impact avoidance and minimization measures described in Energy Commission staff's proposed conditions of certification.~~

Page 6.2-4

Energy Commission staff has determined that if these issues are resolved, the proposed land acquisitions and enhancement activities described above would satisfy requirements of the California Endangered Species Act. ~~Except for the special-status plant impacts described earlier,~~ T~~t~~his mitigation would also reduce CEQA impacts to less-than-significant levels. Staff anticipates resolution of these outstanding issues by working closely and cooperatively with USFWS, CDFG, and the applicant to finalize a mitigation and enhancement plan that would offset impacts to desert tortoises.

Pages 6.2-35 to 6.2-37, Impacts to Special-Status Plants

The following impact assessment and recommended conditions of certification represent Energy Commission staff's analysis and conclusions, not those of BLM staff. Energy Commission staff have concluded that construction of the ISEGS project would directly impact eight special-status plant species, and that impacts to ~~five~~ six of these — small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow — would be considered significant ~~under~~ in a CEQA ~~guidelines~~ context. Energy Commission staff considers project impacts to ~~three~~ two of the eight special-status plant species ~~— small-flowered~~

~~androstephium,~~ Utah vine milkweed~~,~~ and desert portulaca—to be less than significant. In the case of small-flowered androstephium, many new occurrences of this species have been found recently, and it has a larger total number of documented occurrences. However, the majority of these occurrences are under relatively immediate threat as they are located within the footprint of planned solar energy developments. Utah vine milkweed, Utah mortonia, and desert portulaca are ranked as "watch list" by CNPS and CDFG's CNDDB and as such are generally considered more regionally common than plants on higher priority lists.

Energy Commission staff's conclusion of CEQA significance was based on an analysis of impacts to small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow in light of the following variables:

Proportion of Occurrences Affected and Occurrence Size:

A substantial portion of the Ivanpah Valley documented occurrences of small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow would be directly, indirectly, and cumulatively impacted by the project. Plants and other sessile organisms are particularly vulnerable to the effects of habitat fragmentation; small fragments of habitat can only support small populations and are more vulnerable to extinction. Even minor fluctuations in climate can be catastrophic in a small fragmented population. For small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, and Parish's club-cholla, the California populations are already geographically marginal relative to their core populations outside the state. For most of these species, these Ivanpah Valley populations represent a substantial portion of their total documented range regionally and within California. Loss of a substantial portion of these populations makes them more vulnerable to extirpation within the state, especially for Mojave milkweed; its California distribution outside of the Ivanpah Valley is restricted to only two other observations and a handful of historic herbarium collections. **Biological Resources Figure 1** illustrates the restricted range of these species. **Biological Resources Appendix A** summarizes the percentage of statewide documented occurrences for special-status plant species in the ISEGS project area for which impacts are considered significant by Energy Commission staff under CEQA guidelines.

A substantial portion of the documented occurrences for the ~~five~~ six species of concern (small-flowered androstephium, Mojave milkweed, desert pincushion, nine-awned pappus grass, Parish's club-cholla, and Rusby's desert-mallow) is attributed to the project area. Of the remaining documented occurrences, many are threatened by livestock grazing, transmission line and access road maintenance, and non-native plants (CNDDB 2009). All of these species have a highly restricted range in California, and ~~all~~ most are known from fewer than 30 documented occurrences (including those found in the project area). ~~Numerous new occurrences of small-flowered androstephium (also a CNPS List 2 species) have been found in recent years during surveys conducted for other recent development projects. For this reason (combined with a larger total~~

~~number of documented occurrences), the project effects to this species were not considered significant in a CEQA context.~~

Page 6.2-44, Conclusion

~~Uncertainty remains as to what level of avoidance could be achieved to protect special-status plants.~~ The applicant stated at the July 31, 2009 staff workshop that they cannot yet commit to specific avoidance areas because site-specific heliostat layouts have not yet been developed. During that workshop the applicant also indicated a willingness to work with staff to discuss specific avoidance areas and reduce impacts to the extent feasible. On February 11, 2010, the applicant filed its Biological Mitigation Proposal ("Mitigated Ivanpah 3"), which designates three areas that would be removed from the project footprint.

~~Given the uncertainties as to extent of special-status plant protection that might be feasible~~ Considering the level of complete avoidance and on-site minimization that would be accomplished for special-status plants as proposed in Mitigated Ivanpah 3, Energy Commission staff has concluded that implementation of staff's proposed Condition of Certification **BIO-18** is needed to complement the applicant's proposal and reduce impacts to special-status plant species ~~desert pincushion, nine-awned pappus grass, and Parish's club-cholla~~ to less-than-significant levels if the protection goals and other mitigation measures described above were achieved. The impacts to Mojave milkweed and desert pincushion cannot be sufficiently reduced by the applicant's proposed avoidance alone ~~in the three areas described above~~ because ~~it is~~ they are so widely distributed throughout the site, and therefore the majority of plants occur outside the areas proposed for complete impact avoidance. In addition, the occurrences for which complete avoidance could not be achieved represent a substantial proportion of the remaining occurrences in the state. Therefore, staff has added a Mojave milkweed compensatory mitigation component into **BIO-18** and recommends that on-site impact minimization for desert pincushion be retained in the applicant's special-status plant mitigation plan. ~~The impacts to Rusby's desert-mallow would also remain significant in a CEQA context because construction would still eliminate a substantial portion of its global population even if the majority of individuals are protected on site.~~ The majority of Rusby's desert-mallow in the project footprint and immediate vicinity would not be impacted if the applicant's mitigation proposal is accepted. Therefore, staff is willing to accept a limited amount of uncertainty in this case regarding the on-site mitigation proposed for those individuals located in the project area but outside protected areas designated in Mitigated Ivanpah 3.

Pages 6.2-72 and 6.2-73, Biological Resources Table 7

Biological Resource	Impact/Mitigation
Mojave Desert Plant Communities & Wildlife Habitat	**Impacts:** Permanent loss of ~~4,073~~ 3,582+ acres of Mojave creosote scrub and other native plant communities, including ~~approximately 6,400~~ several thousand barrel cacti; permanent loss of cover, foraging, breeding habitat for wildlife; habitat fragmentation and loss of connectivity for terrestrial wildlife; disturbance/dust to nearby vegetation and wildlife; increased predation due to increased raven/predator presence; spread of non-native invasive weeds. **Mitigation**: Off-site habitat acquisition and enhancement of (**BIO-17**); implement Best Management Practices **(BIO-11)**
Waters of the State	**Impacts:** Impacts to biological functions and values of ~~198~~ 175 acres of project area ephemeral; **Mitigation**: Acquisition and enhancement of ~~198~~ 175 acres off-site waters (**BIO-17**);
Special-Status Plant Species	**Impact:** Direct, indirect, and cumulative impacts to eight special-status plant species. **Mitigation**: Avoid, protect, and minimize impacts to occurrences (**BIO-18**); implement weed management plan (**BIO-13**); implement Best Management Practices (**BIO-11**).
Special-Status Wildlife	
Desert tortoise *Gopherus agassizii*	**Impact:** Loss of ~~4,073~~ 3,582+ acres of occupied habitat; translocation of an estimated minimum of 25 desert tortoise, resulting in reduced survivorship and reproduction for translocated individuals; fragmentation and loss of connectivity with surrounding habitat; increased risk from ravens and other predators; increased road kill hazard from construction and operations traffic; cumulative impacts to Ivanpah Valley population. Impact would be to a threatened species, and would likely be highly controversial, resulting in a significant impact with respect to NEPA significance criteria in 40 CFR 1508.27 **Mitigation**: Off-site habitat acquisition, endowment, and enhancement of suitable desert tortoise habitat (**BIO-17**); conduct desert tortoise clearance surveys and establish exclusionary fencing (**BIO-8**); develop and implement desert tortoise translocation plan (**BIO-9**); implement avoidance measures and Best Management Practices (**BIO-11**); implement raven and weed management plant (**BIO-12** and **BIO-13**)
Special-Status Plants	
Small-flowered androstephium *Androstephium breviflorum*	**Impact**: Potential direct impacts to 3 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Mojave milkweed *Asclepias nyctaginifolia*	**Impact**: Potential direct ~~or indirect impacts~~ to ~~16~~ 11 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Desert pincushion *Coryphantha chlorantha*	**Impact**: Potential direct ~~or indirect impacts~~ ~~8~~ 5 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).

Nine-awned pappus grass *Enneapogon desvauxii*	**Impact**: Potential direct ~~or indirect impacts~~ to 3 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Parish's club-cholla *Grusonia parishii*	**Impact**: Potential direct ~~or indirect impacts~~ to ~~5~~ 2 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).
Rusby's desert-mallow *Sphaeralcea rusbyi var. eremicola*	**Impacts**: Potential direct ~~or indirect impacts~~ to ~~7~~ 4 occurrences. **Mitigation**: Implement weed management plan (**BIO-13**); Best Management Practices (**BIO-11**); special-status plant avoidance and minimization measures (**BIO-18**).

Pages 6.2-148 and 6.2-149, Biological Resources Appendix A

Biological Resources Appendix A - Table A-1
Percentage of Statewide Documented Element Occurrences[1] for Special-Status Plant Species in the ISEGS Project

Name Scientific (Common)	CDFG's CNDDB Rank Global/State and CNPS List	Total Documented Occurrences in CNDDB* (including project occurrences)	Additional Occurrences from Consortium of California Herbaria**	Occurrences From Other Available Data (other projects)***	Project Site Occurrences (as reported by CNDDB ~~8/2009~~ 2/2010)	Project Site % of Documented Occurrences in California (List 2 plants) or Globally (List 1B)
Androstephium breviflorum (**small-flowered androstephium**)	G5 S1.2, List 2.2	82	0	1	3	3/(82+1) = 4%
Asclepias nyctaginifolia (**Mojave milkweed**)	G4G5 S1, List 2.1	22	1	1	~~16~~ 11	~~16~~ 11/(22+1+1) = ~~67~~ 46%
Coryphantha chlorantha **(desert pincushion)**	G2G3 S1, List 2.1	22	1	n/a	~~8~~ 5	~~8~~ 5/(22+1) = ~~35~~ 22%
Enneapogon desvauxii (**nine-awned pappus grass**)	G5 S2, List 2.2	21	0	1	3	3/(21+1) = 14%
Grusonia parishii (**Parish's club-cholla)**	G3G4 S2, List 2.2	16	0	1	~~5~~ 2	~~5~~ 2/(16+1) = ~~29~~ 12%
Sphaeralcea rusbyi var. *eremicola* (**Rusby's desert-**	G4T2 S2, List 1B.2	29	4	n/a	~~7~~ 4	~~7~~ 4/(29+4) = ~~21~~ 12%

[1] The term "Element Occurrence (EO)" refers to populations or groups of individuals occurring in close proximity to each other, and is defined by the CNDDB as individuals of a particular species occurring within one-quarter mile of each other. When numerous localities are documented by a reporter within very close proximity of each other, CNDDB uses this standardized and nationally accepted mapping convention, which allows a common metric for comparison, using a quarter-mile grid. Data provided to CNDDB by the applicant (CH2M Hill 2008c, Table 5-1) were mapped by CNDDB using this convention into the number of EOs shown in the column "Project Site Occurrences as reported by CNDDB ~~8/2009~~ 2/2010." These numbers should not be confused with numbers of individual plants.

mallow)						

* Number of CNDDB element occurrences (~~August 2009~~ February 2010 update)
** Number of occurrences derived from herbarium records, California Consortium of Herbaria
*** Number of occurrences derived from EA for the SCE El Dorado to Ivanpah 220 kV transmission line project

Global Rank is a reflection of the overall condition of an element throughout its global range:

G2—Imperiled	At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors;
G3—Vulnerable	At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors;
G4—Apparently Secure	Uncommon but not rare; some cause for long-term concern due to declines or other factors;
G5— Secure	Common; widespread and abundant.

Some of the G-ranks above are expressed as a range. Subspecies receive a T-rank attached to the G-rank. The G-rank refers to the whole species range, but the T-rank refers to the global condition of variety *eremicola* only.

State Rank:

S1— Critically Imperiled	Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province;
S2— Imperiled	Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province;
S3— Vulnerable	Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation;
? —	Indicates some uncertainty about the rank.

State Rank Extension:
0.2—threatened

Table A-1 describes the status of the special-status plants found within the project footprint (i.e., excluding the applicant's proposed mitigation areas totaling 476 acres that would be removed from the footprint as depicted in **Project Description Figure 13**) in terms of Element Occurrences (EOs) rather than numbers of individual plants. An EO is defined by CDFG's CNDDB as individuals of a particular species occurring within one-quarter mile of each other. Due to incomplete data, contributors to the CNDDB sometimes do not note the number of individuals when reporting CNDDB EOs and herbaria records, and the occurrence size in terms of individual plants cannot be ascertained. To provide a common metric for comparison with the CNDDB and herbarium data, **Table A-1** expresses the occurrences of special-status plant species found on the revised 3,564-acre ISEGS site during the 2007 and 2008 surveys in terms of EOs. Utah vine milkweed and desert portulaca are not included because they are not mapped in the CNDDB, as is the case for most CNPS List 4 plants.

Recommended Changes to Conditions of Certification

Staff has made the following changes to its proposed conditions of certification in response to the applicant's Biological Mitigation Proposal. Although some of the changes below were previously included in staff's rebuttal testimony, the changed conditions of certification are included in their entirety with all changes since the FSA indicated.

DESERT TORTOISE COMPENSATORY MITIGATION

BIO-17 To fully mitigate for habitat loss and potential take of desert tortoise, the project owner shall provide compensatory mitigation at a 3:1 ratio for impacts to ~~4,073~~ 3,582 acres or the area disturbed by the final project footprint. At least two thirds of the 3:1 mitigation to satisfy the Energy Commission's Complementary Mitigation Measures shall be achieved by acquisition, in fee

title or in easement, of no less than ~~8,146~~ 7,164 acres of land suitable for desert tortoise. The project owner shall provide funding for the acquisition, initial habitat improvements and long-term management endowment of these Energy Commission complementary compensation lands. The remaining third of the 3:1 compensatory mitigation, to satisfy BLM's mitigation requirements and the balance of the Energy Commission's mitigation requirements, shall be developed in accordance with BLM's desert tortoise mitigation requirements as described in the Northern and Eastern Mojave Desert Management Plan (BLM 2002). BLM's compensatory mitigation plan, serving as one third of the 3:1 mitigation ratio required to satisfy CESA, would include acquisition of up to ~~4,073~~ 3,582 acres of land within the Eastern Mojave Recovery Unit, or desert tortoise habitat enhancement or rehabilitation activities that meet BLM, CDFG, USFWS and Energy Commission approval, or some combination of the two. The Energy Commission requirements for acquisition of ~~8,146~~ 7,164 acres of compensation lands shall include the following:

1. Responsibility for Acquisition of Lands: The responsibility for acquisition of lands may be delegated by written agreement from the Energy Commission and CDFG to a third party, such as a non-governmental organization supportive of Mojave Desert habitat conservation. Such delegation shall be subject to approval by the CPM and CDFG, in consultation with BLM and USFWS, prior to land acquisition, enhancement or management activities. If habitat disturbance exceeds that described in this analysis, the project owner shall be responsible for funding acquisition, habitat improvements and long-term management of additional compensation lands or additional funds required to compensate for any additional habitat disturbances. Additional funds shall be based on the adjusted market value of compensation lands at the time of construction to acquire and manage habitat. Water and mineral rights shall be included as part of the land acquisition. Agreements to delegate land acquisition to CDFG or an approved third party and to manage compensation lands shall be implemented within 18 months of the Energy Commission's decision.

2. Selection Criteria for Compensation Lands. The compensation lands selected for acquisition shall:

   a. be as close to the project site as possible;

   b. provide good quality habitat for desert tortoise with capacity to regenerate naturally when disturbances are removed;

   c. be near larger blocks of lands that are either already protected or planned for protection, or which could feasibly be protected long-term by a public resource agency or a non-governmental organization dedicated to habitat preservation;

d. be connected to lands currently occupied by desert tortoise, ideally with populations that are stable, recovering, or likely to recover;

e. not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

f. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration, and

g. not contain hazardous wastes.

3. Review and Approval of Compensation Lands Prior to Acquisition. A minimum of three months prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for desert tortoise in relation to the criteria listed above. Approval from CDFG and the CPM, in consultation with BLM and the USFWS, shall be required for acquisition of all parcels comprising the ~~8,146~~ 7,164 acres.

4. Energy Commission Complementary Mitigation Security The project owner shall provide financial assurances to the CPM and CDFG with copies of the document(s) to BLM and the USFWS, to guarantee that an adequate level of funding is available to implement the Energy Commission Complementary Mitigation Measures described in this condition. These funds shall be used solely for implementation of the measures associated with the project. Alternatively, financial assurance can be provided to the CPM and CDFG in the form of an irrevocable letter of credit, a pledged savings account or another form of security ("Security") prior to initiating ground-disturbing project activities. Prior to submittal to the CPM, the Security shall be approved by CDFG and the CPM, in consultation with BLM and the USFWS, to ensure funding in the amount of ~~$20,446,460~~ 17,981,640. This Security amount was calculated as follows and may be revised upon completion of a Property Analysis Record (PAR) or PAR-like analysis of the proposed compensation lands:

   a. land acquisition costs for compensation lands, calculated at $910/acre = ~~$7,412,860~~ $6,519,240;

   b. costs of initial habitat improvements to compensation lands, calculated at $250/acre = ~~$2,036,500~~ $1,791,000;

   c. costs of establishing an endowment for long-term management of compensation lands, calculated at $1,350/acre = ~~$ 10,997,100~~ $9,671,400; and

   d. total security = ~~$20,446,460~~$17,981,640.

5. Compensation Lands Acquisition Conditions The project owner shall comply with the following conditions relating to acquisition of the Energy Commission Complementary Mitigation compensation lands after the CDFG and the CPM, in consultation with BLM and the USFWS, have approved the proposed compensation lands and received Security as applicable and as described above.

   a. Preliminary Report: The project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, and other necessary documents for the proposed ~~8,146~~ 7,164 acres. All documents conveying or conserving compensation lands and all conditions of title/easement are subject to a field review and approval by CDFG and the CPM, in consultation with BLM and the USFWS, California Department of General Services and, if applicable, the Fish and Game Commission and/or the Wildlife Conservation Board.

   b. Title/Conveyance: The project owner shall transfer fee title or a conservation easement to the ~~8,146~~ 7,164 acres of compensation lands to CDFG under terms approved by CDFG. Alternatively, a non-profit organization qualified to manage compensation lands (pursuant to California Government Code section 65965) and approved by CDFG and the CPM may hold fee title or a conservation easement over the habitat mitigation lands. If the approved non-profit organization holds title, a conservation easement shall be recorded in favor of CDFG in a form approved by CDFG. If the approved non-profit holds a conservation easement, CDFG shall be named a third party beneficiary. If a Security is provided, the project owner or an approved third party shall complete the proposed compensation lands acquisition within 18 months of the start of project ground-disturbing activities.

   c. Initial Habitat Improvement Fund. The project owner shall fund the initial protection and habitat improvement of the ~~8,146~~ 7,164 acres. Alternatively, a non-profit organization may hold the habitat improvement funds if they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the habitat improvement fund must go to CDFG.

   d. Long-term Management Endowment Fund. Prior to ground-disturbing project activities, the project owner shall provide to CDFG a non-wasting capital endowment in the amount determined through the Property Analysis Record (PAR) or PAR-like analysis that will be conducted for the ~~8,146~~ 7,164 acres. The project owner's financial responsibility for the actual cost of mitigation shall not increase by more than 25% of the Security Amount $17,981,640 ~~20,446,460~~). Alternatively, a non-profit organization may hold the endowment fees if

they are qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if they meet the approval of CDFG and the CPM. If CDFG takes fee title to the compensation lands, the endowment must go to CDFG, where it will be held in the special deposit fund established pursuant to California Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation or similarly approved entity identified by CDFG shall manage the endowment for CDFG and with CDFG supervision.

e. Interest, Principal, and Pooling of Funds. The project owner, CDFG and the CPM shall ensure that an agreement is in place with the endowment holder/manager to ensure the following conditions:

- Interest. Interest generated from the initial capital endowment shall be available for reinvestment into the principal and for the long-term operation, management, and protection of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by CDFG designed to protect or improve the habitat values of the compensation lands.
- Withdrawal of Principal. The endowment principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party endowment manager to ensure the continued viability of the species on the ~~8,146~~ 7,164 acres. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established pursuant to Government Code section 16370. If the special deposit fund is not used to manage the endowment, the California Wildlife Foundation or similarly approved entity identified by CDFG will manage the endowment for CDFG with CDFG supervision.
- Pooling Endowment Funds. CDFG, or a CPM and CDFG approved non-profit organization qualified to hold endowments pursuant to California Government Code section 65965, may pool the endowment with other endowments for the operation, management, and protection of the ~~8,146~~ 7,164 acres for local populations of desert tortoise. However, for reporting purposes, the endowment fund must be tracked and reported individually to the CDFG and CPM.
- Reimbursement Fund. The project owner shall provide reimbursement to CDFG or an approved third party for reasonable expenses incurred during title, easement, and documentation review; expenses incurred from other state or state approved federal agency reviews; and overhead related to providing compensation lands.

The project owner is responsible for all compensation lands acquisition/easement costs, including but not limited to, title and document review costs, as well as expenses incurred from other state agency reviews and overhead related to providing compensation lands to the department or approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures.

Verification: A minimum of three months prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS and BLM describing the parcels intended for purchase.

No later than 18 months following the publication of the Energy Commission Decision the project owner shall provide written verification to the CPM and CDFG that the Energy Commission Complementary Mitigation compensation lands or conservation easements have been acquired and recorded in favor of the approved recipient(s). Alternatively, no later than 30 days prior to beginning project ground-disturbing activities, the project owner shall provide written verification of Security in accordance with this condition of certification. If Security is provided, the project owner, or an approved third party, shall complete and provide written verification of the proposed compensation lands acquisition within 18 months of the start of project ground-disturbing activities. Within six months of the land or easement purchase, as determined by the date on the title, the project owner, or an approved third party, shall provide CDFG and the CPM with a management plan for the Energy Commission Complementary Mitigation compensation lands and associated funds. CDFG and the CPM shall review and approve the management plan, in consultation with BLM and the USFWS.

Within 90 days after completion of project construction, the project owner shall provide to the CPM and CDFG an analysis with the final accounting of the amount of habitat disturbed during project construction. If habitat disturbance exceeds ~~4,073~~ 3,582 acres, the project owner shall provide a compensation plan to the CMP and CDFG for their review and approval, in consultation with BLM and the USFWS. The compensation plan shall be submitted no later than 90 days from the CPM's receipt of the final accounting, and shall include a description of additional funds required or lands that must be purchased to compensate for the unanticipated habitat disturbances, and a schedule for that acquisition or funding inclusive of all associated endowment and enhancement costs. The amount of funding for habitat acquisition, initial habitat improvement, and long-term management endowment shall be calculated at the adjusted market value at the time of construction. The project owner's financial responsibility for the actual cost of mitigation shall not increase by more than 25% of the Security Amount ($17,981,640 ~~20,446,460~~).

SPECIAL-STATUS PLANT IMPACT AVOIDANCE AND MINIMIZATION

BIO-18 The project owner shall implement the following measures to avoid and minimize impacts to special-status plant species. Items 2, 3, 5, 6, 7, ~~and~~ 10, and 11 are recommended exclusively by Energy Commission staff.

1. On-Site Plant Avoidance/Minimization Areas: To the extent feasible the project owner shall avoid and minimize disturbance to all special-status

plant species within the project site. Impact avoidance (i.e., protection from project-related impacts of any kind through removal of acreage from the project footprint) and impact minimization efforts shall occur in all feasible locations. Impact avoidance shall focus on areas that support the highest density and diversity of special-status plant species and shall remove, at a minimum, ~~shall focus in particular on~~ the three areas totaling 476 acres and labeled "Rare Plant Mitigation Area" in **Project Description Figure 13** from the project footprint. The natural gas pipeline shall be aligned and narrowed to avoid special-status plant occurrences north of Ivanpah 3 as depicted in **Project Description Figure 13**. Impact minimization shall be conducted throughout the site. ~~depicted in **Biological Resources Figure 2** that indicate the highest densities of small-flowered androstephium, Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The highest priorities for protection shall be~~ Impact minimization within the solar field shall consist of protecting small perimeters ("halos") around Mojave milkweed, desert pincushion, and Rusby's desert-mallow plants as indicated in the applicant's January 2010 draft plan (Exhibit 81, Appendix B). ~~The project owner shall implement all feasible impact avoidance and minimization measures within the following areas:~~

~~a. ISEGS 1 and 3: Reconfigure project features to the extent feasible within the northern portions of ISEGS 1 and 3 to avoid areas that support the highest density and diversity of special-status plant species.~~

~~b. Construction Logistics Area: Reconfigure the layout and design of the Construction Logistics Area to maximize protection of high density and diversity special-status plant areas.~~

~~c. Natural Gas Pipeline: Adjust the alignment of the proposed 75-foot wide natural gas pipeline and narrow the construction footprint to avoid special-status plant occurrences north of ISEGS 3.~~

2. Protection Goals : The project owner shall implement all feasible measures to protect 75 percent of the individuals of small-flowered androstephium, Mojave milkweed, Rusby's desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla within the project area (as mapped in Figure 5-3 of the applicant's final botanical survey report [CH2M Hill 2008x]). Each year during construction the measurement of percent protection achieved shall be calculated based on a comparison of numbers of individuals of each of these five species present in this area identified before construction compared to numbers remaining post –construction. These pre- and post-construction plant numbers shall be based on floristic surveys conducted by a qualified botanist.

3. Identify and Establish Special-Status Plant Protection Areas: The project owner shall identify Special-Status Plant Protection Areas ~~within~~ for

exclusion from the project footprint and avoidance of project-related impacts of any kind ~~as needed~~ to ~~achieve~~ facilitate achieving the 75 percent protection goal. To accurately identify the ~~locations~~ boundaries of these areas, pre-construction floristic surveys shall be conducted by a qualified botanist at the appropriate time of year for special-status plant identification, including both spring and summer/fall blooming periods. The surveys shall encompass at a minimum the three areas totaling 476 acres and labeled "Rare Plant Mitigation Area" in **Project Description Figure 13** ~~all the high plant density areas depicted in **Biological Resources Figure 2**~~ and shall extend 150 feet on both sides of the proposed gas pipeline alignment and 250 feet out from the project fenceline. The locations of the Special-Status Plant Protection Areas shall be clearly depicted on all final maps and project drawings and descriptions for exclusion of all project activities.

4. Protection of Adjacent Occurrences: The project owner shall identify special-status plants occurrences within 250 feet of the project fenceline during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special status plant occurrences ~~at least 30 days~~ prior to the initiation of ground disturbing activities. These flagged special status plant occurrences shall be designated as Environmentally Sensitive Areas on plans and specifications, and shall be protected from accidental impacts during construction (e.g., vehicle traffic, temporary placement of soils or vegetation) and from the indirect impacts of project operation (e.g., herbicide spraying, changes in upstream hydrology, etc).

5. Develop and Implement a Special-Status Plant Protection and Monitoring Plan: The project owner shall develop and implement a Special-Status Plant Protection and Monitoring Plan for special-status plants occurring within the Special-Status Plant Protection Areas and on-site areas designated for impact minimization. The goal of the Special-Status Plant Protection and Monitoring Plan shall be to maintain the special-status plant species ~~within the Special-Status Plant Protection Areas~~ as healthy, reproductive populations that can be sustained in perpetuity. At a minimum, the Special-Status Plant Protection and Monitoring Plan shall:

   - establish baseline conditions and numbers of the plant occurrences in all protected areas (i.e., those to be excluded from the footprint and on-site areas to be protected) ~~within the Special-Status Plant Protection Areas~~ and success standards for protection of special-status plant occurrences ~~within the Plant Protection Areas~~;
   - provide information about microhabitat preferences and fecundity, essential pollinators, reproductive biology, and propagation and culture requirements for each special-status species;

- describe measures (e.g., fencing, signage) to avoid direct construction and operation impacts to special-status plants within ~~the~~ all protected areas~~Special-Status Plant Protection Areas~~;
- describe measures to avoid or minimize indirect construction and operations impacts to special-status plants within ~~the Special-Status Plant Protection Areas~~ protected areas (e.g., runoff from mirror-washing, use of soil stabilizers/tackifiers, alterations of hydrology from drainage diversions, erosion/sedimentation from disturbed soils upslope, herbicide drift, the spread of non-native plants, etc).
- provide a monitoring schedule and plan for assessing the numbers and condition of special-status plants~~ within the Special-Status Plant Protection Areas~~; and
- identify specific triggers for remedial action (e.g., numbers of plants dropping below a threshold);

6. Develop Special-Status Plant Remedial Action Plan : The project owner shall develop a detailed Special-Status Plant Remedial Action Plan to be implemented if special-status plants within the ~~Plant Protection Areas~~ 476 acres of protected area and on-site minimization “halos” fail to meet success standards described in the Special-Status Plant Protection and Monitoring Plan. The Plant Remedial Action Plan shall include specifications for ex-situ/off-site conservation of seed and other propagules, and the seed bank and other symbionts contained in the topsoil where these plants occur. The remedial measures described in the Plant Remedial Action Plan shall not substitute for plant protection or other mitigation measures. The Special-Status Plant Remedial Action Plan shall include, at a minimum:
   - guidelines for pre-construction seed collection (and/or other propagules) for each ~~of the five~~ species;
   - specifications for collecting, storing, and preserving the upper layer of soil containing seed and important soil organisms;
   - detailed replacement planting program with biologically meaningful quantitative and qualitative success criteria (see Pavlik 1996), monitoring specifications, and triggers for remedial action; and
   - ecological specifications for suitable planting sites.

7. Seed Collection: Implementation of the Special-Status Plant Remedial Action Plan would require a source of local source of seeds/propagules. In addition, seed collection would serve to preserve germplasm in the event that all mitigation fails. The project owner shall develop and implement a Seed Collection Plan to collect and store seed for small-flowered androstephium, Mojave milkweed, Rusby’s desert-mallow, desert pincushion, nine-awned pappus grass, and Parish's club-cholla. The source of these seeds shall be from plants proposed for removal within the

project footprint. The project owner shall engage the services of a qualified contractor approved by the CPM to undertake seed collection and storage.

8. Gas Pipeline Revegetation and Monitoring: In the natural gas pipeline construction corridor where disturbed soils will be revegetated, the topsoil excavated shall be segregated, kept intact, and protected, under conditions shown to sustain seed bank viability. At a minimum, the top 2 cm of the soil shall be separately stored and preserved. Topsoil salvage, storing, and replacement shall be replaced in its original vertical orientation following pipeline installation ensuring the integrity of the top 2 cm in particular. The project owner shall prepare a Gas Pipeline Revegetation and Monitoring Plan targeted at re-establishment of Rusby's desert-mallow, desert pincushion, Mojave milkweed, and potentially other special-status plant species. The Gas Pipeline Revegetation and Monitoring Plan shall identify success criteria for re-establishment and shall continue for a period of no less than 10 years until the defined success criteria are achieved. The Gas Pipeline Revegetation and Monitoring Plan shall include measures for seeding or other remedial actions. If no individuals of Rusby's desert-mallow, desert pincushion, or Mojave milkweed, are located during the first year of monitoring, the project owner shall conduct supplemental seeding or other remedial measures in the area disturbed by natural gas pipeline installation.

9. Surveys on Acquired and Public Lands: The project owner shall conduct floristic surveys for Rusby's desert-mallow and Mojave milkweed on all lands that will be acquired as part of the desert tortoise compensatory mitigation requirements (see Condition of Certification **BIO-17**). ~~Similar surveys shall be conducted for desert pincushion, nine-awned pappus grass, and Parish's club-cholla for those species for which the 75 percent on-site avoidance goal has not been achieved.~~ The goal of the surveys shall be to identify at least the same number of occurrences on off-site compensation or public lands as the number of occurrences in the project area excluding the occurrences in the Special-Status Plant Protection Areas in **Project Description Figure 13** ~~were impacted by the ISEGS project~~. If this goal is not met by surveys on proposed acquisition lands, additional surveys shall be conducted within suitable habitat on public lands ~~until the same number of occurrences of each species that were impacted are identified~~. To be counted toward fulfillment of the goal, the occurrences must reflect new data not previously documented in other survey efforts. The survey requirements shall include the following:

   - All surveys shall be conducted by a qualified botanist in accordance with BLM, CDFG, and CNPS plant survey guidelines;
   - Surveys shall occur the first spring after construction begins and continue each year for a maximum of ten years until the same number of ~~special-status plant~~ Mojave milkweed and Rusby's desert-mallow occurrences are identified on acquisition lands and/or ~~BLM~~ public lands as located outside Special-Status Plant Protection Areas~~as were~~

~~impacted, or predicted to be impacted based on final site design, by the ISEGS project construction and operation~~;

- For each year surveys are conducted yearly survey results shall be provided to the CPM, BLM's Authorized Officer and CDFG, and shall include CNDDB field survey forms for all special-status plant species encountered during the surveys;
- All field survey forms shall be submitted to the CNDDB at the time of submittal to the CPM, BLM and CDFG; and
- ~~For each of the species for which surveys were conducted, t~~The project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped. Locations shall be reported with GPS coordinates compatible with inclusion in a GIS database.

10. Security for Implementation of Plans : The project owner shall provide security adequate to fund implementation of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan for the life of the project, as well as the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan.

11. Acquire Off-Site Occurrence of Mojave Milkweed or Adjacent Land: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes at least 30 acres supporting a viable occurrence of Mojave milkweed (or suitable habitat adjacent to a known occurrence). The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-17** with the additional criteria that the Mojave milkweed mitigation lands: 1) provide habitat for the special-status plant species that is of similar or better quality (e.g., in terms of native plant composition) than that impacted; 2) contain OR abut a known occurrence of Mojave milkweed, ideally with populations that are stable, recovering, or likely to recover, that shares the same watershed as the land; and 3) be adequately sized and buffered to support self-sustaining special-status plant populations. These mitigation lands may be included with the desert tortoise mitigation lands ONLY if the above criteria are met. If sufficient new Mojave milkweed occurrences are discovered on desert tortoise compensation lands (not public lands) in accordance with item 9 above prior to acquiring this land, the associated security shall be refunded to the project owner.

Verification: No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit final maps and design drawings depicting the location of Special-Status Plant Protection Areas within and adjacent to the project site, and shall identify the species and numbers of plants within each of the Special-Status Plant Protection Areas.

No less than 30 days following the publication of the Energy Commission Decision the project owner shall submit draft versions of the Special-Status Plant Protection and Monitoring Plan, the Special-Status Plant Remedial Action Plan, the Seed Collection Plan, and the Gas Pipeline Revegetation Monitoring Plan for review by the CPM, BLM's Authorized Agent, and CDFG. The project owner shall also provide a cost estimate for implementation of these plans which is subject to approval by the CPM, BLM's authorized agent, and the CDFG. The final plans shall be submitted for approval by the CPM, in consultation with BLM's Authorized Agent, CDFG, and CNPS within 90 days of the publication of the Commission Decision. The final plans shall be incorporated into the BRMIMP. At this time, the project owner shall also provide security sufficient to fund the implementation of the plans.

Within 30 days of the start of construction, the project owner shall submit ~~a~~ cop~~y~~ies of the contract with the CPM-approved seed contractor and the check for seed collection and curation fees to the CPM.

The project owner shall identify special-status plant occurrences within 250 feet of the project fence line during the pre-construction plant surveys described above. A qualified botanist shall delineate the boundaries of these special-status plant occurrences at least 30 days prior to the initiation of ground disturbing activities.

On January 31st of each year following construction the project owner's qualified botanist shall submit a report, including CNDDB field survey forms, describing the results of off-site plant surveys for Mojave milkweed and Rusby's desert-mallow to the BLM's authorized officer, the CPM, CDFG, and CNDDB. Submittal of survey reports shall continue for a maximum of 10 years until the same number of occurrences in the project area excluding the occurrences in the Special-Status Plant Projection Areas ~~impacted by the project for Rusby's desert-mallow and Mojave milkweed~~ are identified on these off-site lands ~~as were impacted by the project~~. ~~Similar reports shall be submitted for small-flowered androstephium, desert pincushion, nine-awned pappus grass, and Parish's club-cholla for each of those three species for which 75 percent avoidance was not achieved. For each of the species for which surveys were conducted, the~~ The project owner's qualified botanist shall submit a completion report documenting fulfillment of the target goals and which describe the number of new, previously undiscovered occurrences identified and mapped using GIS techniques for each species. Mapping results shall include GPS coordinates of the plants found.

The Designated Biologist shall maintain written and photographic records of the tasks described above, and summaries of these records shall be submitted along with the Monthly Compliance Reports to the CPM, BLM Authorized Agent, and CDFG. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report for a period not less than 10 years for the Gas Pipeline Revegetation Plan, and for the life of the project for the Special-Status Plant Protection and Monitoring Plan, and the Special-Status Plant Remedial Action Plan, including funding for the seed storage.

No less than 90 days prior to acquisition of the parcel (s) containing or adjacent to a known Mojave milkweed occurrence, the project owner, or a third-party approved by the

CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

STREAMBED IMPACT MINIMIZATION AND COMPENSATION MEASURES

BIO-20 The project owner shall implement the following measures to avoid, minimize and mitigate for impacts to ephemeral drainages:

1. Acquire Off-Site Desert Wash: The project owner shall acquire, in fee or in easement, a parcel or parcels of land that includes ephemeral washes with at least ~~198~~175 acres of state jurisdictional waters. The terms and conditions of this acquisition or easement shall be as described in Condition of Certification **BIO-17** with the additional criteria that the desert wash mitigation lands: 1) include at least ~~198~~175 acres of state jurisdictional waters; 2) be characterized by similar soil permeability, hydrological and biological functions as the impacted drainages; and 3) be within the same watershed as the impacted wash. The desert wash mitigation lands may be included with the desert tortoise mitigation lands ONLY if the above three criteria are met.

2. Security for Implementation of Mitigation: A security in the form of an irrevocable letter of credit, pledged savings account, or certificate of deposit for the amount of all mitigation measures pursuant to this condition of certification shall be submitted to, and approved by, the CPM, in consultation with CDFG, prior to commencing project activities within areas of CDFG jurisdiction. This amount shall be based on a cost estimate which shall be submitted to CDFG for review and to the CPM for approval within 60 days of the Energy Commission Decision's publication and prior to commencing project activities within areas of CDFG jurisdiction. The security shall be approved by the CPM, in consultation with CDFG's legal advisors, prior to its execution, and shall allow the CPM at its discretion to recover funds immediately if the CPM, in consultation with CDFG, determines there has been a default.

3. Preparation of Management Plan: The project owner shall submit to Energy Commission CPM and CDFG a draft Management Plan that reflects site-specific enhancement measures for the drainages on the

acquired compensation lands. The objective of the Management Plan shall be to enhance the wildlife value of the drainages, and may include enhancement actions such as weed control, fencing to exclude livestock, or erosion control. No later than 12 months after publication of the Energy Commission Decision the project owner shall submit a final Management Plan for review and approval to the CPM and CDFG.

4. Right of Access and Review for Compliance Monitoring: The CPM reserves the right to enter the project site or allow CDFG to enter the project site at any time to ensure compliance with these conditions. The project owner herein grants to the CPM and to CDFG employees and/or their representatives the right to enter the project site at any time, to ensure compliance with the terms and conditions and/or to determine the impacts of storm events, maintenance activities, or other actions that might affect the restoration and revegetation efforts. The CPM and CDFG may, at the CPM's discretion, review relevant documents maintained by the operator, interview the operator's employees and agents, inspect the work site, and take other actions to assess compliance with or effectiveness of mitigation measures.

5. Notification: The project owner shall notify the CPM and CDFG, in writing, at least five days prior to initiation of project activities in jurisdictional areas as noted and at least five days prior to completion of project activities in jurisdictional areas. The project owner shall notify the CPM and CDFG of any change of conditions to the project, the jurisdictional impacts, or the mitigation efforts, if the conditions at the site of a proposed project change in a manner which changes risk to biological resources that may be substantially adversely affected by the proposed project. The notifying report shall be provided to the CPM and CDFG no later than seven days after the change of conditions is identified. As used here, change of condition refers to the process, procedures, and methods of operation of a project; the biological and physical characteristics of a project area; or the laws or regulations pertinent to the project as defined below. A copy of the notifying change of conditions report shall be included in the annual reports.

   a. Biological Conditions: a change in biological conditions includes, but is not limited to, the following: 1) the presence of biological resources within or adjacent to the project area, whether native or non-native, not previously known to occur in the area; or 2) the presence of biological resources within or adjacent to the project area, whether native or non-native, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

   b. Physical Conditions: a change in physical conditions includes, but is not limited to, the following: 1) a change in the morphology of a river, stream, or lake, such as the lowering of a bed or scouring of a bank, or

changes in stream form and configuration caused by storm events; 2) the movement of a river or stream channel to a different location; 3) a reduction of or other change in vegetation on the bed, channel, or bank of a drainage, or 4) changes to the hydrologic regime such as fluctuations in the timing or volume of water flows in a river or stream.

c. Legal Conditions: a change in legal conditions includes, but is not limited to, a change in Regulations, Statutory Law, a Judicial or Court decision, or the listing of a species, the status of which has changed to endangered, rare, or threatened, as defined in section 15380 of Title 14 of the California Code of Regulations.

6. Code of Regulations: The project owner shall provide a copy of the Streambed Impact Minimization and Compensation Measures from the Energy Commission Decision to all contractors, subcontractors, and the applicant's project supervisors. Copies shall be readily available at work sites at all times during periods of active work and must be presented to any CDFG personnel or personnel from another agency upon demand. The CPM reserves the right to issue a stop work order or allow CDFG to issue a stop work order after giving notice to the project owner, the CPM, if the CPM in consultation with CDFG, determines that the project owner has breached any of the terms or conditions or for other reasons, including but not limited to the following:

   a. The information provided by the applicant regarding streambed alteration is incomplete or inaccurate;

   b. New information becomes available that was not known to it in preparing the terms and conditions;

   c. The project or project activities as described in the Final Staff Assessment have changed; or

   d. The conditions affecting biological resources changed or the CPM, in consultation with CDFG, determines that project activities will result in a substantial adverse effect on the environment.

7. Best Management Practices: The project owner shall also comply with the following conditions:

   a. The project owner shall minimize road building, construction activities and vegetation clearing within ephemeral drainages to the extent feasible.

   b. The project owner shall not allow water containing mud, silt, or other pollutants from grading, aggregate washing, or other activities to enter ephemeral drainages or be placed in locations that may be subjected to high storm flows.

c. The project owner shall comply with all litter and pollution laws. All contractors, subcontractors, and employees shall also obey these laws, and it shall be the responsibility of the project owner to ensure compliance.

d. Spoil sites shall not be located within drainages or locations that may be subjected to high storm flows, where spoil shall be washed back into a drainage.

e. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, shall be prevented from contaminating the soil and/or entering waters of the state. These materials, placed within or where they may enter a drainage or Ivanpah Dry Lake, by project owner or any party working under contract or with the permission of the project owner shall be removed immediately.

f. No broken concrete, debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or washings thereof, oil or petroleum products or other organic or earthen material from any construction or associated activity of whatever nature shall be allowed to enter into, or placed where it may be washed by rainfall or runoff into, waters of the state.

g. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any drainage.

h. No equipment maintenance shall occur within 150 feet of any ephemeral drainage where petroleum products or other pollutants from the equipment may enter these areas under any flow.

Verification: No less than 90 days prior to acquisition of the parcel (s) containing ~~198~~175 acres of waters of the state, the project owner, or a third-party approved by the CPM, in consultation with CDFG, shall submit a formal acquisition proposal to the CPM and CDFG describing the parcel(s) intended for purchase.

Draft agreements to delegate land acquisition to CDFG or an approved third party and agreements to manage compensation lands shall be submitted to Energy Commission staff for review and approval (in consultation with CDFG) prior to land acquisition. Such agreements shall be mutually approved and executed at least 60 days prior to start of any project-related ground disturbance activities. The project owner shall provide written verification to the CPM that the compensation lands have been acquired and recorded in favor of the approved recipient(s). Alternatively, before beginning project ground-disturbing activities, the project owner shall provide Security in accordance with this condition. Within 90 days after the land purchase, as determined by the date on the title, the project owner shall provide the CPM with a management plan for review and approval, in consultation with CDFG, for the compensation lands and associated funds.

No fewer than 30 days prior to the start of work potentially affecting waters of the state, the project owner shall provide written verification (i.e., through incorporation into the BRMIMP) to the CPM that the above best management practices will be implemented and provide a discussion of work in waters of the state in Compliance Reports for the duration of the project.

REFERENCES

CH2M Hill 2010a – CH2M Hill / J. Carrier. Applicant's Special-Status Plant Avoidance and Protection Plan, Exhibit 81. Dated January 2010.

CH2M Hill 2010b – CH2M Hill / J. Carrier (tn55374). Applicant's Biological Mitigation Proposal ("Mitigated Ivanpah 3"). Dated February 11, 2010. Submitted to CEC / J. Kessler on February 12, 2010.

Lienert, J. 2004. Habitat fragmentation effects on fitness of plant populations – a review. Journal for Nature Conservation. Volume 12, Issue 1, 2 July 2004, Pages 53-72.

SOIL AND WATER RESOURCES

Testimony of Christopher Dennis, P.G.

SUMMERY OF CONCLUSIONS

Staff has reviewed the applicant's Mitigated Ivanpah 3 proposal and has determined that this proposal would not cause a significant impact to soil or water resources and instead would reduce the actual and potential impacts to these resources. The impacts to soil and water resources discussed in the FSA/DEIS would be less than significant or mitigated to less than significant with staff's proposed conditions of certification. The applicant's Mitigated Ivanpah 3 proposal would further reduce these impacts.

Based on estimates provided by the applicant, the Mitigated Ivanpah 3 proposal would result in the following reduction in acreage:

- The footprint of Ivanpah 3 would be reduced by approximately 433 acres;
- The construction logistics area would be reduced by approximately 109 acres; and
- The area in Ivanpah 3 that would require heavy grading due to the volume of boulders in the area would be reduced from 170 acres to 20 acres.

In general, this mitigation would remove areas from the proposed project where the most intense grading would have occurred and areas where the highest potential for flash flooding and mass erosion could have occurred (See **Project Description Figure 17**). The portion of Ivanpah 3 extending into the Gas Line Gulch alluvial fan channel has been reduced, and thus potential wind and water erosion of soil would be reduced. Potential storm water and sedimentation impacts would be reduced, including potential for scour generally across the site and affecting the heliostat pylons. The Mitigated Ivanpah 3 proposal would reduce the potential for scour to cause heliostat instability and failure in the northern portion of Ivanpah 3 where the potential for loss was greatest under the previously proposed project area.

In addition, this mitigation would result in a smaller demand for groundwater during project construction and operation. Because the demand on groundwater would be less, the impact to the Ivanpah Valley Groundwater Basin would be less and the potential impact to other groundwater wells would be less. With less groundwater withdrawn attributable to ISEGS project use, the potential impact to groundwater quality would likewise be less.

The Mitigated Ivanpah 3 proposal would not change the project's ability to comply with all federal, state, and local laws, ordinances, rules, and standards. Because the proposed mitigation would reduce project-related impacts already analyzed by staff, and staff previously concluded that impacts would be less than significant if the recommended conditions of certification are adopted, staff believes the Mitigated Ivanpah 3 proposal would not result in significant impacts to soil and water resources. Staff's proposed conditions of certification as published in the Final Staff

Assessment/Draft Environmental Impact Statement would continue to apply for ISEGS as modified by the Mitigated Ivanpah 3 proposal.

VISUAL RESOURCES

Prepared by William Kanemoto

SUMMARY OF CONCLUSIONS

The project applicant has submitted a project mitigation proposal, Mitigated Ivanpah 3, primarily to address biological concerns, but also to reduce potential impacts to ephemeral washes, reduce grading, and reduce visual impacts of glare and reflectivity.

Energy Commission staff has analyzed visual resource-related information pertaining to the proposed Ivanpah Solar Electric Generating System (ISEGS) Mitigated Ivanpah 3 proposal and concludes that despite a somewhat lower level of visual impact compared to the proposed project, the Mitigated Ivanpah 3 Project would nevertheless result in similar overall impact conclusions as the proposed project. Consequently, staff recommends adoption of all Conditions of Certification related to visual resources as identified in the FSA/DEIS

The Mitigated Ivanpah 3 proposal would not change Energy Commission staff's FSA/DEIS conclusions regarding significant and unavoidable adverse impacts to existing scenic resource values as seen from several Key Observation Points in the Ivanpah Valley and Clark Mountains, including:

- Middle-ground-distance viewpoints on Highway I-15;
- Viewpoints in the Mojave National Preserve on the east face of Clark Mountain; and
- Viewpoints in the Stateline Wilderness Area, including the Umberci Mine and vicinity.

Staff also concludes that although potential glare effects of the solar receiver units atop the power towers would be considerably reduced under the Mitigated Ivanpah 3 Project, the impacts of the remaining three solar receivers would be sufficient to require mitigation under Conditions of Certification TRANS-4. Potential impacts of glare from heliostats would remain substantially as under the proposed project. Staff concludes that with recommended Conditions of Certification TRANS-3 and TRANS-4, remaining glare under the Mitigated Ivanpah 3 Project, though not a hazard, would represent a visually dominant feature, potentially interfering with scenic views of Clark Mountain from the valley floor.

Staff concludes that the project would conform with applicable LORS.

Additionally, staff concludes that the Mitigated Ivanpah 3 proposal in combination with foreseeable future projects would not change Energy Commission staff's FSA/DEIS conclusions regarding significant and unavoidable cumulative visual impacts of two kinds:

- Cumulative impacts within the immediate project viewshed, essentially comprising foreseeable future projects in the Ivanpah Valley; and

- Cumulative impacts of foreseeable future solar and other renewable energy projects within the southern California Mojave Desert.

INTRODUCTION

The following analysis evaluates potential visual impacts of the Biological Mitigation Proposal or Mitigated Ivanpah 3 proposal submitted by the project applicant and dated February 11, 2010. Specifically, the analysis compares impacts of the Mitigated Ivanpah 3 Project with the proposed project analyzed in the Final Staff Assessment/Draft Environmental Impact Statement (FSA/DEIS). This evaluation included review of the Mitigated Ivanpah 3 project's consistency with applicable Laws, Ordinances, Regulations and Standards (LORS); and conformance with applicable guidelines of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Applicable laws, ordinances, regulations and standards (LORS) are summarized in Visual Resources Table 1 of the FSA/DEIS. The project would be sited entirely on BLM-managed public lands, under federal (BLM) jurisdiction, and subject to BLM's California Desert Conservation Area (CDCA) Plan of 1980. Staff noted in the FSA/DEIS that the project would not conform with applicable visual resource goals and policies of the San Bernardino County General Plan Conservation and Open Space Elements. However, after reviewing applicable legal requirements, staff concludes that San Bernardino County jurisdiction only extends to off-site infrastructure installation and maintenance activities outside the BLM boundaries, which would exclude the ISEGS site located within BLM boundaries. Therefore, the Mitigated Ivanpah 3 project would conform with all applicable LORS.

SETTING

The reader is referred to the Setting discussion in the FSA/DEIS.

IMPACTS

VISUAL IMPACT ASSESSMENT

DIRECT IMPACTS

Potential direct impacts of the Mitigated Ivanpah 3 Project are discussed below under the four significance criteria of the CEQA Guidelines Appendix G.

A. Would the project have a substantial adverse effect on a scenic vista?

The FSA/DEIS visual analysis identified substantial adverse effects on scenic vistas in the Clark Mountains within the Mojave Preserve and Stateline Wilderness; and to scenic views toward Clark Mountain as seen from Highway I-15.

Although the Mitigated Ivanpah 3 Project would reduce these impacts, they would not, in staff's opinion, reduce these to a less-than-significant level. Panoramic elevated views of the valley would still change from a relatively undisturbed desert floor/bajada landscape to an industrial, highly man-altered one dominated by roughly four square miles of mirror-arrays and 459-foot tall solar collector towers topped with brightly lit receiver units, a large graded area, as well as light rays reflected off of ambient atmospheric dust.

Very bright levels of glare from the receiver units atop the solar power towers, though less than under the proposed project due to the reduction in number of towers, would continue to appear in the foreground of views of Clark Mountain. Although less than under the proposed project, strong levels of contrast would be caused by the remaining three solar towers that could strongly alter the character of these views or make viewing difficult.

B. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

The proposed project would not directly damage any specific scenic resources located within the project site. This would remain the case under the Mitigated Ivanpah 3 Project. Potential effects on scenic resources in general are discussed under CEQA Criterion C, below.

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

Project Operation Impacts

Impacts of Structures on Key Observation Points

For purposes of this FSA Addendum, the discussion focuses on those KOPs in which significant project impacts were found in the FSA/DEIS, and the way in which the effects of the Mitigated Ivanpah 3 Project could differ from the proposed project.

Ivanpah Valley – Primm Valley Golf Course

KOP 1 – Looking Southwest from Primm Valley Golf Course toward Ivanpah 1, (roughly 1.5 miles).
KOP 2 – Looking West from Primm Valley Golf Course toward Ivanpah 2 and 3 (roughly 1.5 miles).

Staff's conclusions with respect to KOPs 1 and 2 do not substantially differ from those of the FSA/DEIS. The applicant previously agreed to proposed Condition of Certification VIS-2, intended to mitigate potential impacts at this location.

Ivanpah Valley – I-15 Motorists

I-15 views are all located within the valley and have moderate overall visual sensitivity, with moderate existing visual quality, moderately high viewer concern, and high viewer exposure. Viewer numbers on this segment of highway are extremely high, particularly on Friday evenings and other peak periods, although the recreational destination for the majority of such motorists is Las Vegas rather than the Mojave Desert, thus the level of concern with scenic quality of many motorists is likely to be moderate or low.

KOP 3 – Looking West from I-15 near Yates Well Road (Toward Ivanpah 2 and 3), 2.5 Miles from site (Ivanpah 2). **VISUAL RESOURCES Figure 9** (of FSA/DEIS)**.**

KOP 4 – Looking West from I-15 near Yates Well Road (Toward Ivanpah 1), 1 Mile from site. **VISUAL RESOURCES Figure 10** (of FSA/DEIS).

The view from KOP 3, looking toward Ivanpah 2 and 3, would change under the Mitigated Ivanpah 3 Project. Rather than 6 power towers, there would be two, one for Ivanpah 2, and one for Ivanpah 3. The overall area affected by Ivanpah 3 would be less; however, the portion of Ivanpah 3 that would be eliminated under the Mitigated Project would not actually be visible in this view. Hence, the overall affected area of the Mitigated Ivanpah 3 Project would be essentially similar to motorists from this location, the nearest point of I-15 to the project.

KOP 4, depicting Ivanpah 1, would not change under the Mitigated Ivanpah 3 Project. KOPs 3 and 4, however, taken together are meant to capture the full panoramic field of view of motorists on I-15 at their closest point to the project. KOP 3 is rotated to capture the view of Ivanpah 2 and 3 in relation to the prominent rock outcropping in their visual foreground. KOP 4 is rotated to the left to capture the view of adjoining Ivanpah 1. However, the two photographs together represent different portions of what would be experienced by viewers as one panoramic view.

The visual effect of Ivanpah 3 would be less than that under the proposed project due to the reduction in the number of power towers. However, considering that Ivanpah 3 under both the proposed and mitigated projects represents only a portion of the overall affected panoramic view, the reduction in the number of towers at Ivanpah 3 and the reduction in area of mirror fields, would not, in themselves reduce the overall visual contrast and dominance from a strong to a lower level. Strong vertical form, line and glare contrast would continue to result from the remaining power towers; strong spatial and scale dominance would remain from the alteration of the project footprint from visually intact bajada landscape to mirror fields. View intrusion as exhibited in KOPs 3 and 4, representing the effect on the entire field of view from these middle ground highway viewpoints, would remain strong. although somewhat reduced.

Impact Significance - This strong level of overall visual change under the Mitigated Ivanpah 3 Project would not be compatible with the moderate overall sensitivity level of the Ivanpah Valley as seen by motorists in the visual middle-ground. These effects, though somewhat reduced, would remain a potentially significant visual impact.

Mitigation – No available mitigation measures were identified to fully address these impacts.

KOP 5 - Looking Northwest from I-15 at Nipton Road, 4 Miles from Site. **VISUAL RESOURCES Figures 11A** and **11B(**of FSA/DEIS**).**

In the FSA/DEIS analysis, staff concluded that at background distances of 4 miles or more, as depicted in the simulation provided by the applicant, the proposed project would exhibit moderate levels of overall visual change and be compatible with the moderate overall sensitivity of the valley, resulting in a less than significant impact. This would remain the case under the Mitigated Ivanpah 3 Project.

However, as motorists progressed a short distance northward, visual exposure of the project would remain high and contrast and dominance would rapidly increase to strong levels. Although no simulations were prepared to represent highway views at a distance of 3 miles, staff concluded in the FSA/DEIS that such views within a middle-ground distance zone of roughly 3 miles or less would experience strong levels of contrast and overall visual change, and impacts would be potentially significant. This would also remain the case under the Mitigated Ivanpah 3 Project, particularly in northbound views in which Ivanpah 3 would remain in the visual background of the nearer Ivanpah 1 and 2.

Impact Significance - This strong level of overall visual change under the Mitigated Ivanpah 3 Project would not be compatible with the moderate overall sensitivity level of the Ivanpah Valley as seen by motorists in the visual middle-ground. These effects, though somewhat reduced, would remain a potentially significant visual impact.

Mitigation – No available mitigation measures were identified to fully address these impacts.

Ivanpah Valley – Ivanpah Lakebed

KOP 6 – View of Ivanpah 2 and 3 Looking West Toward Site from Eastern Side of Ivanpah Lake, 4 Miles from Site. **VISUAL RESOURCES Figures 12A** and**12B (**of FSA/DEIS**).**

KOP 6 is taken from the most heavily-used access point to the dry lakebed by wind sailors, on the eastern edge of the lakebed at a distance of roughly 4 miles.

Staff's analysis in the FSA/DEIS found that a weak to moderate level of overall project visual change from this viewpoint would be compatible with the moderate overall visual sensitivity of the setting from this viewpoint, and that impacts would thus be less than significant. This would also be the case under the Mitigated Ivanpah 3 Project, which would have a somewhat lower level of impact in views from this location.

KOP 7 - Looking Southwest Toward Site from Western Side of Ivanpah Lake, 3 Miles from Site. **VISUAL RESOURCES Figures 13A** and 13**B (**of FSA/DEIS).

KOP 7 is taken from a second heavily-used wind sailing access point on the west side of the lakebed west of I-15, and illustrates the nearer range of viewing conditions existing for lakebed visitors.

As in the case of KOP 6, staff's analysis in the FSA/DEIS found that a weak to moderate level of overall project visual change from this viewpoint would be compatible with the moderate overall visual sensitivity of the setting from this viewpoint, and that impacts would thus be less than significant. This would also be the case under the Mitigated Ivanpah 3 Project, which would have a somewhat lower level of impact in views from this location.

Ivanpah Valley - Primm

KOP 8 - Looking South from Primm, 4 Miles from Site. **VISUAL RESOURCES Figure 14 (**of FSA/DEIS**).**

As in the case of KOP 6, staff's analysis in the FSA/DEIS found that a weak to moderate level of overall project visual change from this viewpoint would be compatible with the moderate overall visual sensitivity of the setting from this viewpoint, and that impacts would thus be less than significant. This would also be the case under the Mitigated Ivanpah 3 Project, which would have a somewhat lower level of impact in views from this location.

Clark Mountains

As described previously, views from within the Clark Mountains are considered to have high overall visual sensitivity, with high existing visual quality, high viewer concern associated with their Desert Protection Act status, and high viewer exposure due to the elevated vista points. These viewpoints, represented by KOPs 9 and 10, have represented a principal area of disagreement between staff and the applicant.

Stateline Wilderness

KOP 9 – Looking South from Road to Umberci Mine, 1 Mile from Site. **VISUAL RESOURCES Figures 15A** and **15B (**of FSA/DEIS**)**. **VISUAL RESOURCES Figure 17** depicts a simulation of the Mitigated Ivanpah 3 Project from KOP 9. KOP 9 is located on the trail to Umberci Mine, a popular hiking destination from Primm and the northern part of the Ivanpah Valley, located within the BLM Stateline Wilderness Area.

As depicted in **VISUAL RESOURCES Figure 17,** the overall dominance of the project from this viewpoint, which is dominated by views of Ivanpah 3 in the foreground, would be greatly reduced as compared to the proposed project, with four fewer power towers, and with mirror fields further away.

From the perspective of findings of impact significance, however, the key question is whether the overall visual change of the project as a whole would be reduced at this viewpoint from *strong* to *moderate* by the Mitigated Ivanpah 3 Project. In staff's opinion, the answer to that question is no. As in the FSA/DEIS analysis, staff notes that KOP 9 depicts a portion of the overall affected view, which also includes the view of Ivanpah 1, to the left of this photo frame. Staff also notes the vast scale of the affected area to be

transformed from relatively intact natural landscape to mirror fields. This expanse, so great that it will not fit into one photograph, would continue to have strong spatial dominance under the Mitigated Ivanpah 3 Project. That level of spatial dominance would tend to increase as viewers gained in elevation, compared to the relatively low elevation and oblique viewing angle of the KOP photograph. In addition, staff believes that, based on photographic evidence from other solar projects, the level of brightness of reflection from the heliostats will frequently, though not always, be quite high from such elevated viewpoints. The brightness of the solar towers is known to be very bright under almost all daylight operating conditions. This effect would be greatly reduced compared to the proposed project but, based on staff's best available information, would continue to represent a strong contrast. These various considerations, taken together suggest that overall visual contrast and dominance of the project will remain strong under the Mitigated Ivanpah 3 Project.

Impact Significance –This strong level of overall project visual change would not be compatible with the moderate overall visual sensitivity of the Ivanpah Valley, nor with the high overall visual sensitivity of the Stateline Wilderness Area in which this viewpoint is located. This level of impact is thus considered to be a significant visual impact under the Mitigated Ivanpah 3 Project, although it is considerably improved over the previous proposed project.

Mitigation – No available mitigation measures were identified to fully address these impacts.

Mojave Preserve

KOP 10 – Looking East from Vicinity of Benson Mine, 4 Miles from Site. **VISUAL RESOURCES Figures 16A** and **16B** (of FSA/DEIS). **VISUAL RESOURCES Figure 18** depicts a simulation of the Mitigated Ivanpah 3 Project from KOP 10.

KOP 10, located in the vicinity of the Benson Mine, is representative of Mojave National Preserve visitors in the Clark Mountains within the project viewshed. Visitors in the vicinity of the KOP include rock climbers, hunters, OHV drivers on Yates Well, Colosseum and other roads, hikers, and campers estimated to total over 50,000 visitors per year (USDOI, 2004b; USDOI 2008b).

S**taff Comment on VISUAL RESOURCES Figure 19 (**Mitigated Ivanpah 3 Project Figure 3-5, Viewshed Map)**.** Staff notes that in **VISUAL RESOURCES Figure 2** of the FSA/DEIS**,** staff included GIS-generated viewshed mapping of the project, representing composite viewshed mapping of visible areas as projected from the top of the three towers originally proposed and described in the AFC. The data set used was USGS 10-meter digital elevation model (DEM) data. This mapping was not revised to reflect changes under the Site Optimization changes to Ivanpah 3. Staff simply notes the considerable difference in the two versions of viewshed mapping submitted under the FSA/DEIS by staff, and under the Mitigated Ivanpah 3 Project proposal by the applicant. Staff's mapping produced a much greater area of visibility in the Mojave Preserve than depicted in the Mitigated Ivanpah 3 Project proposal. Staff does not currently have an explanation for this discrepancy in mapping. Staff also notes that DEM data is well-

known for the limits of its accuracy; however, this is the data set typically used in GIS viewshed mapping, which is at best a very broad-brush and approximate exercise.

As depicted in **VISUAL RESOURCES Figure 18** (Mitigated Ivanpah 3 Project Figure 3-8), although reduced from the proposed project, the Mitigated Ivanpah 3 Project would display a strong level of form, line, color and texture contrast into a wide portion of the field of view. In this view, the spatial visual magnitude and dominance of the mirror fields appears greater than that of Ivanpah Dry Lake. The number of power towers and bright receivers would be reduced from seven to three, a considerable improvement. As noted in the FSA/DEIS, the mirror fields would vary in their appearance from dark blue to very bright diffuse glare depending on light conditions, season, and time of day. At certain times the mirror arrays could potentially create strong diffuse or spread glare, particularly in the morning if viewed on axis with the sun, and in late afternoon. Bright receiver glare is anticipated during all sunny periods. Potential glare impacts are discussed further under Glare Impacts, below.

From such elevated viewpoints in the surrounding mountains, the mirror arrays would thus remain a dominant feature in views of the valley, strongly altering a large portion of the field of view under the Mitigated Ivanpah 3 Project. Though somewhat superior to the proposed project, the overall difference in level of visual change is limited.

Overall, project visual change would remain strong from elevated viewpoints in the Clark Mountains. The project would demand attention, could not be overlooked, and would be dominant in the landscape.

The area of disturbed ground in the CLA would be reduced by 109 acres under the Mitigated Ivanpah 3 Project, an improvement in the contrast of the area between Ivanpah 1 and 2. Though a substantial area, when compared to the 3,582 acres of the overall project, this would represent a relatively minor proportion and would not substantially affect the overall level of perceived visual change.

Impact Significance – This strong level of contrast would not be compatible with the moderate overall sensitivity of the Ivanpah Valley in its current condition, nor with the high overall visual sensitivity of the Mojave Preserve. Implementation of the project would represent a substantial decline in scenic quality of views by MNP visitors. This level of impact is considered a significant visual impact.

Mitigation – No available mitigation measures were identified to fully address these impacts. However, if the project is approved, staff recommends the following Conditions of Certification:

In order to minimize the degree of color contrast of the mirror structures, staff recommends Condition of Certification VIS-1, Surface Treatment of Structures. In order to minimize color contrast of disturbed soil areas, staff recommends Condition of Certification VIS-3, Revegetation of Disturbed Soil Areas. The primary area requiring revegetation would be the large area to be used for construction laydown, and siting of a substation and other operation and support structures, located between Ivanpah 1

and 2. However, other structures including soil berms, shall also require revegetation where soil disturbance is expected to occur.

Residual Impact Significance After Mitigation with Staff-Recommended Measures – Recommended Condition of Certification VIS-1 would reduce the potential contrast of the non-mirror portions of the heliostat units. Recommended Condition of Certification VIS-3 would reduce the area and level of high contrast from soil disturbance over the long term. However, the larger impact of strong visual contrast and dominance of the mirror arrays, towers and solar receivers could not be mitigated. Impacts would thus remain significant and unavoidable.

Project Construction Impacts

Project construction impacts under the Mitigated Ivanpah 3 Project would, from a strictly visual point of view, be substantially the same as under the proposed project. The area affected by the modified Ivanpah 3 would be less. However, the difference in area would not be sufficient to reduce the overall level of visual change. Staff therefore recommends the same mitigation measures recommended in the FSA/DEIS. Under both the previously proposed and Mitigated Ivanpah 3 projects, residual impacts of project grading and construction lighting would be less-than-significant in the long term.

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

In The FSA/DEIS, staff identified potential hazards to motorists and aircraft due to light reflected from heliostats and recommended Condition of Certification **TRANS-3**. Under the Mitigated Ivanpah 3 Project this impact would remain substantially similar.

In the FSA/DEIS, staff also concluded that solar radiation and light reflected from proposed project power tower receivers is not expected to pose a significant human safety or hazard to navigation of vehicles on adjacent roadways or air traffic flying above the site, but could potentially cause a distraction of drivers on I-15 that could lead to road hazards. Under the Mitigated Ivanpah 3 Project, the level of bright illumination from receivers would be considerably reduced by the elimination of four towers at Ivanpah 3. However, staff continues to regard solar receiver glare of the Mitigated Ivanpah 3 Project as capable of distracting motorists on I-15. Staff continues to recommend Condition of Certification **TRANS-4** to ensure glare from power tower receivers does not impair the view of motorists or pilots traveling near the site and that the potential for exposure of observers to light reflected from the power tower receivers is minimized to the maximum extent possible.

However with Condition **TRANS-4**, the anticipated level of nuisance from glare of the solar receiving units under the Mitigated Ivanpah 3 Project could remain conspicuous. Though reduced from the level of the proposed project, this level of glare could be dominant and could detract from the public's ability to enjoy views of Clark Mountain from the valley floor. As under the proposed project the glare would alter the character of those views, but would do so to a lesser extent in the direction of Ivanpah 3.

In addition to safety and aesthetic impacts from the mirror arrays and solar receivers, concern was expressed in EIS scoping over potential nighttime light pollution impacts of construction or other project night lighting (NPCA, 2008a). Under the Mitigated Ivanpah 3 Project, construction and building night lighting would remain as under the proposed project. Staff thus continues to recommend Condition of Certification **VIS-5,** Temporary and Permanent Exterior Lighting Measures. With these measures, shielding of all project lighting, including construction lighting, to prevent upward-directed illumination would be required. However, FAA-required aircraft safety lighting, which is anticipated to include bright strobe lighting atop the project solar towers, would be substantially reduced under the Mitigated Ivanpah 3 Project. By reducing the number of tower strobe lights from 7 to 3, this impact would be reduced to less than half that of the proposed project. In the absence of an identifiable measure or threshold for identifying this impact, staff did not identify it as potentially significant in the FSA/DEIS.

Indirect Impacts

In the FSA/DEIS, staff concluded that by substantially lowering the prevailing visual quality of its local viewshed, the Ivanpah Valley, the project could have the indirect effect of encouraging additional subsequent development of similar character. Because the relatively intact existing landscape would appear highly compromised after introduction of the ISEGS, the incremental additional impact of other future projects could appear to be less significant than if they were occurring in the current landscape without ISEGS. This would continue to be the case under the Mitigated Ivanpah 3 Project.

Closure and Decommissioning Impacts and Mitigation

After the end of the project's useful life, it would be decommissioned as described in the Applicant's Draft Closure, Revegetation, and Rehabilitation Plan (CH2ML2009q). The facility would be removed to a depth of three feet below grade, original contours restored, and the site revegetated. However, the removal of the existing facility would leave a very prominent visual impact over the entire site due to the strong color contrast created between graded, disturbed soil areas and undisturbed soil areas in the vicinity of the project site. In addition, revegetation of areas in this desert region are difficult and generally of limited success. Thus, visual recovery from land disturbance of closure and decommissioning would likely occur only over a very long period of time. These effects, though slightly reduced in overall area, would also apply to the Mitigated Ivanpah 3 project.

NO PROJECT/NO ACTION ALTERNATIVE

Conclusions on the No Action Alternative would be as discussed in the FSA/DEIS.

CUMULATIVE IMPACTS AND MITIGATION

In the FSA/DEIS, staff concluded that the anticipated visual impacts of the ISEGS project in combination with past and foreseeable future local projects in the Ivanpah Valley, and past and foreseeable future region-wide projects in the southern California desert would be cumulatively considerable and potentially significant. Visual changes

under the Mitigated Ivanpah 3 Project would not alter or substantially affect either of these conclusions.

COMPLIANCE WITH APPLICABLE LORS

Staff concludes the Mitigated Ivanpah 3 project would conform with applicable LORS. The project would be sited entirely on BLM-managed public lands, under federal (BLM) jurisdiction, and subject to BLM's California Desert Conservation Area (CDCA) Plan of 1980. Staff noted in the FSA/DEIS that the project would not conform with applicable visual resource goals and policies of the San Bernardino County General Plan Conservation and Open Space Elements. However, after reviewing applicable legal requirements, Staff concludes that San Bernardino County jurisdiction only extends to off-site infrastructure installation and maintenance activities outside the BLM boundaries, which would exclude the ISEGS site located within BLM boundaries. Therefore, the Mitigated Ivanpah 3 project would conform with all applicable LORS.

NOTEWORTHY PUBLIC BENEFITS

No noteworthy public benefits in the area of visual resources were identified.

CONCLUSIONS AND RECOMMENDATIONS

Staff concludes that despite a somewhat lower level of visual impact compared to the proposed project, the Mitigated Ivanpah 3 Project would nevertheless result in similar overall impacts as the proposed project. The Mitigated Ivanpah 3 proposal would not change Energy Commission staff's FSA/DEIS conclusions regarding significant and unavoidable adverse impacts on existing scenic resource values as seen from several Key Observation Points in the Ivanpah Valley and Clark Mountains, including:

- The Primm Valley Golf Course;
- Middle-ground-distance viewpoints on Highway I-15 (roughly three miles distance or less);
- Viewpoints in the Mojave National Preserve, throughout the east face of Clark Mountain; and
- Viewpoints in the Stateline Wilderness Area, including the Umberci Mine and vicinity.

Moreover, staff concludes that these visual impacts would be significant in terms of the four criteria of CEQA Appendix G, and in terms of the context and intensity of the effects in general. Regarding the latter, the context of the project is one directly adjoining a national park and two designated wilderness areas, and a land-sailing site of regional or greater importance. Intensity of potential effects involve the unique scenic characteristics of the local landscape as indicated by the national park and wilderness designations of portions of the project viewshed; concerns expressed by public commentors to date; a degree of uncertainty as to the level of discomfort or disability

glare from the solar tower receivers; and concern over cumulative visual effects of renewable projects on the southern California desert as a whole.

Staff found that with recommended conditions of certification, potentially significant visual impacts at the Primm Valley Golf Course (KOPs 1 and 2) could be mitigated to less than significant levels in the long term.

However, staff has concluded that potentially significant visual impacts at the other locations cited above could not be mitigated to less than significant levels and would thus result in significant and unavoidable impacts.

Staff also conducted an independent review of potential glare impacts of the project. This review is summarized in detail in the **Traffic and Transportation** section of this FSA/DEIS. That review focused primarily on potential glare-related hazards. From a purely aesthetic standpoint, the potential for substantial nuisance glare to the public from the brightly lit solar receiver units atop the power towers is difficult to quantify or predict. However, the staff review of glare impacts, based upon analysis of data provided by the applicant, suggested that this glare, while not representing a hazard, could represent a strong, potentially visually dominant feature as seen from the viewpoints named above. This glare would contribute to the strong overall level of contrast experienced from those KOPs.

Staff concludes that solar radiation and light reflected from proposed project heliostats under the Mitigated Ivanpah 3 Project, though less than under the proposed project, could nevertheless continue to cause a significant human health and safety hazard to observers in vehicles on adjacent roadways or air traffic flying above the site, and could cause a distraction of drivers on I-15 that would lead to road hazards and to pilots of aircraft flying over the site. Staff has proposed Condition of Certification **TRANS-3** in the **Traffic and Transportation** section to ensure solar radiation and light from the heliostats does not impair the vision of motorists or pilots traveling near the site and that the potential for exposure of observers does not cause a human health and safety hazard. With this measure these adverse effects could be avoided.

Staff also concludes that solar radiation and light reflected from proposed project power tower receivers, though considerably less than under the proposed project, could nevertheless continue to cause a potential distraction of drivers on I-15 that would lead to road hazards. Staff has proposed Condition of Certification **TRANS-4** to ensure glare from power tower receivers does not impair the view of motorists or pilots traveling near the site and that the potential for exposure of observers to light reflected from the power tower receivers is minimized to the maximum extent possible.

With these conditions, the anticipated level of nuisance glare of the solar receiving units, however, would remain conspicuous under the Mitigated Ivanpah 3 Project. This remaining level of glare could detract from the public's enjoyment of views of Clark Mountain from the valley floor. The extent of this impact on views would be reduced, particularly in the direction of Ivanpah 3, but would remain significant.

Staff concludes that the project would conform with applicable LORS.

Additionally, staff concludes that the proposal in combination with foreseeable future projects would not change Energy Commission staff's FSA/DEIS conclusions regarding significant and unavoidable cumulative visual impacts of two kinds:

1. Cumulative impacts within the immediate project viewshed, essentially comprising foreseeable future projects in the Ivanpah Valley; and

2. Cumulative impacts of foreseeable future solar and other renewable energy projects within the southern California Mojave Desert.

Finally, staff notes the following:

As in the analysis of the proposed project in the FSA/DEIS, staff believes the analysis of the Mitigated Ivanpah 3 Project clearly establishes that the project, despite limited improvements over the proposed project, would represent a substantial change and impairment of a natural landscape that is largely intact. However, it may also be worthwhile to note that within an urban frame of reference, not all viewers would find the project disagreeable or unattractive; indeed, many viewers could find the project interesting to view due to its novelty. Overall, it would exhibit a moderate level of visual quality and would leave scenic views of Clark Mountain unobstructed physically, though strongly impaired by glare. Within an urban frame of reference, where existing visual quality is lower and preservation of natural landscapes is not a primary goal, this level of impact might be considered acceptable.

This fact may be relevant within the context of the cumulative impact scenario foreseen within the Ivanpah Valley, since development of any of the proposed renewable energy projects, or a preponderance of other foreseeable projects, would result in such an urbanized setting. If a number of the foreseeable cumulative projects are developed, the Ivanpah Valley landscape would, with or without the ISEGS project, quickly reach a point at which the level of scenic intactness is impaired to a *de facto* VR Class IV, low visual quality and sensitivity condition, becoming an urbanized environment, in apparent conflict with the area's Multiple-Use Class L status under the CDCA Plan and the County of San Bernardino's scenic highway policies.

As stated previously, staff concluded that the project would have significant unavoidable adverse impacts. However, if the Commission approves the project, staff recommends that all proposed conditions of certification be adopted in order to minimize impacts to the greatest feasible extent.

MITIGATION MEASURES/PROPOSED CONDITIONS OF CERTIFICATION

Staff recommends the same conditions of certification for the Mitigated Ivanpah 3 Project as recommended in the FSA/DEIS.

REFERENCES

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USDOI, 2008b. Mojave National Preserve Visitor Data, 1997 – 2007.

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VISUAL RESOURCES - FIGURE 17

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 - Umberci Mine Simulated Project View (KOP 9)

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

VISUAL RESOURCES - FIGURE 18

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 - Benson Mine Simulated Project View (KOP 10)

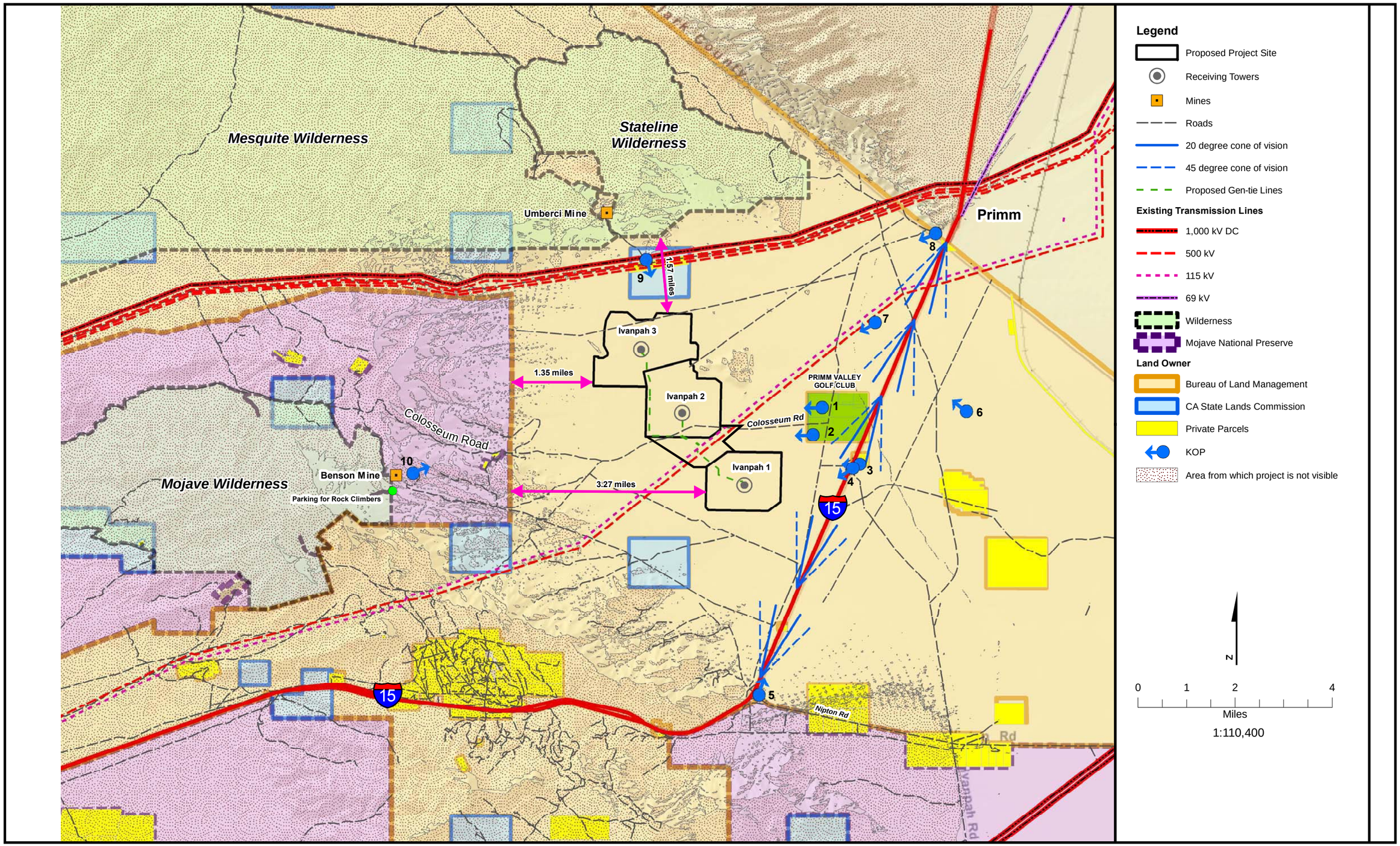
CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

VISUAL RESOURCES - FIGURE 19

Ivanpah Solar Electric Generating System - Mitigated Ivanpah 3 - Viewshed Map



VISUAL RESOURCES

MARCH 2010

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, MARCH 2010

SOURCE: CH2MHill/BrightSource Energy - Biological Mitigation Proposal (Mitigated Ivanpah 3) - February 2010

Final Staff Assessment Addendum, March 2010

DECLARATION OF
Brenner Munger

I**, Brenner Munger,** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as an **Air Resources Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Addendum to Air Quality** for the **Ivanpah Solar Energy Generating System** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

RESUME

RAYMOND BRENNER MUNGER

PROFESSIONAL EXPERIENCE

Licensed Mechanical Engineer in California, Colorado and Hawaii with over 35 years of experience in a variety of technical and management positions in the environmental and power generation areas.

EDUCATION

Bachelor of Science in Mechanical Engineering
University of California, Santa Barbara, Graduated with honors, June 1970

Master of Science in Engineering
University of California, Irvine, December 1972

Doctor of Philosophy in Engineering
University of California, Irvine, December 1981

EXPERIENCE

Dates: January 2010 to Present
Title: Air Resources Engineer
Siting, Transmission and Environmental Protection Division
California Energy Commission, 1516 9th Street, Sacramento, CA 95814

Duties: Conducts staff assessments of air quality impact analyses prepared by project applicants in support of certification process for thermal power plant projects over 50 MW in California. Reviews compliance reports for power plants.

Dates: September 2004 to December 2009
Title: Manager
Power Supply Engineering Department (PSED)
Hawaiian Electric Company, Inc., 820 Ward Avenue, Honolulu, HI 96814

Duties: Responsible for generation capital improvement programs, generation asset management programs and generation unit addition projects. Responsible for ~50 engineers and support personnel to provide design engineering, project engineering, project management and field engineering support for the capital improvement program (~$32 million annual capital budget) for the existing power generation assets of Hawaiian Electric Company. Also responsible for the project management support for the generation unit additions for Hawaiian Electric Company, Maui Electric Company and Hawaii Electric Light Company. From 2004 to 2009, provided project management and engineering support for the completion of five major generation unit addition projects for HELCO, MECO and HECO totaling over $480 million. Procured engineering consultants for generation unit additions through competitive bidding processes and managed consultant contracts for design engineering, project management, major equipment procurement, construction management and commissioning support for these major generation unit addition projects.

Dates: July 1995 to September 2004
Title: Manager
Power Supply Planning & Engineering Department
Hawaiian Electric Company, Inc., 820 Ward Avenue, Honolulu, HI 96814

Duties: Responsible for ~50 engineers, planners and technical support personnel providing long range resource planning (Integrated Resource Planning and Generation Planning) in addition to the traditional engineering functions required for the capital improvement programs for power generation facilities. The scope of the planning and engineering support covered HECO, MECO and HELCO. The engineering support included the design engineering, project engineering and project management support for the capital improvement program for the existing power generation assets of Hawaiian Electric Company. Also responsible for the project management support for the generation unit additions for HECO, MECO and HELCO. For the IRP effort, served as Chair for the Supply-side Resource Advisory Group which consisted of representatives from government, environmental groups, academia, and industry.

Dates: June 1988 to June 1995
Title: Manager
Engineering Department
Hawaiian Electric Company, Inc., 820 Ward Avenue, Honolulu, HI 96814

Duties: Managed department of ~80 engineers and support personnel to provide design engineering, project engineering and project management support for the capital improvement program for the power generation, transmission, substation and communications assets of Hawaiian Electric Company. Also responsible for the project management support for the generation unit additions for Hawaiian Electric Company, Maui Electric Company and Hawaii Electric Light Company. Procured consultants through competitive bidding processes and managed consultant contracts for design engineering, project management, major equipment procurement, construction management and commissioning support for these major generation, transmission and substation addition projects. Program responsibilities included the corporate renewable energy program and the corporate program for membership in the Electric Power Research Institute (Manager of EPRI Technology Transfer - METT).

Dates: August 1984 to June 1988
Title: Manager
Environmental Department
Hawaiian Electric Company, Inc., 820 Ward Avenue, Honolulu, HI 96814

Duties: Responsible for overall environmental management programs for Hawaiian Electric Company (HECO), Maui Electric Company (MECO) and Hawaii Electric Light Company (HELCO). Managed ~16 engineers, environmental scientists and support personnel to provide air quality permitting, water quality permitting, compliance audits and assessments, ambient air quality monitoring, emissions source testing, water quality monitoring, noise monitoring, and laboratory support for HECO, MECO and HELCO. Topical areas of responsibility included air, water, hazardous wastes, noise and PCBs. Augmented in-house personnel with contractors and consultants on an on-going basis to manage work load and meet critical deadlines. Interfaced regularly with state and federal regulatory agencies on permitting, compliance monitoring and reporting, regulation development and enforcement matters. Reviewed state legislation and provided testimony to state legislative committees.

Dates: August 1981 to July 1984
Title: Senior Engineer and Program Manager
Environmental Research & Technology (ERT), Inc., Newbury Park, CA 91320

Duties: Responsible for management and technical direction of project teams for a variety of studies and projects including: air quality impact assessments for cogeneration projects, resource recovery facilities and marine tanker operations using microscale (Gaussian-based) and regional photochemical air quality models; statistical analysis of aerometric and emissions data for source reconciliation determinations; development of modeling systems for emergency response systems for atmospheric releases of hazardous materials; and analytical evaluations of technical basis for proposed modifications of gasoline lead content regulations and nonattainment designations in California.

Dates: January 1973 to July 1981
Title: Air Pollution Research Specialist, Associate Air Resources Engineer and Assistant Engineering Specialist
California Air Resources Board, Sacramento, CA 95814

Duties: Held several positions with increasing responsibilities. In final position (Air Pollution Research Specialist), responsible for the regional and microscale air quality modeling components of the nonattainment planning program for Sacramento Valley and San Joaquin Valley air basins. Conducted air quality modeling studies in support of regulation and model rule development by other ARB divisions and the evaluation of regulations proposed by other agencies. Assessed air quality impacts of specific projects using currently available Gaussian and numerical air quality models. Provided support and direction to local agency staff in air quality studies of specific projects. Prepared an air quality modeling guidelines document which identified air quality models and modeling procedures acceptable to the ARB in support of the NSR and PSD programs. As an Air Resources Engineer in the Planning Division, authored portions and edited all of a report titled "Emissions and Air Quality Assessment", ARB Report No. ARB/EP-76001.

LICENSES AND ORGANIZATIONS

Registered Mechanical Engineer in California - ME16427
Registered Professional Engineer in Colorado - No. 16333
Registered Professional Engineer in Hawaii – No. 6127
Associate Member, American Society of Mechanical Engineers

E-mail: bmunger@energy.state.ca.us

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

APPLICATION FOR CERTIFICATION FOR THE *IVANPAH SOLAR ELECTRIC GENERATING SYSTEM*	**DOCKET NO. 07-AFC-5**
PROOF OF SERVICE (Revised 3/11/10)	

APPLICANT
Solar Partners, LLC
John Woolard,
Chief Executive Officer
1999 Harrison Street, Suite #500
Oakland, CA 94612

Todd A. Stewart, Project Manager
Ivanpah SEGS
sdeyoung@brightsourceenergy.com
E-mail Preferred

Steve De Young, Project Manager
Ivanpah SEGS.
1999 Harrison Street, Ste. 2150
Oakland, CA 94612
tstewart@brightsourceenergy.com

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

COUNSEL FOR APPLICANT

Jeffery D. Harris
Ellison, Schneider
& Harris L.L.P.
2600 Capitol Avenue, Ste. 400
Sacramento, CA 95816-5905
jdh@eslawfirm.com

INTERESTED AGENCIES
California ISO
e-recipient@caiso.com

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

Raymond C. Lee, Field Manager
Bureau of Land Management
1303 South U.S. Highway 95
Needles, CA 92363
Raymond_Lee@ca.blm.gov

Becky Jones
California Department of
Fish & Game
36431 41st Street East
Palmdale, CA 93552
dfgpalm@adelphia.net

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

Western Watersheds Project
Michael J. Connor, Ph.D.
P.O. Box 2364
Reseda, CA 91337-2364
mjconnor@westernwatersheds.org

Gloria Smith, Joanne Spalding
Sidney Silliman, Devorah Ancel
Sierra Club
85 Second Street, 2nd Fl.
San Francisco, CA 94105
E-mail Service Preferred
gloria.smith@sierraclub.org
joanne.spalding@sierraclub.org
gssilliman@csupomona.edu
devorah.ancel@sierraclub.org

*indicates change

INTERVENORS CONT.

Joshua Basofin, CA Rep.
Defenders of Wildlife
1303 J Street, Ste. 270
Sacramento, CA 95814
E-mail Service Preferred
jbasofin@defenders.org

Basin and Range Watch
Laura Cunningham
Kevin Emmerich
P.O. Box 70
Beatty, NV 89003
atomictoadranch@netzero.net

Center for Biological Diversity
Lisa T. Belenky, Sr. Attorney
Ileene Anderson, Public Lands Desert Director
351 California Street, Ste. 600
San Francisco, CA 94104
E-mail Service Preferred
lbelenky@biologicaldiversity.org
ianderson@biologicaldiversity.org

California Native Plant Society
Greg Suba, Tara Hansen & Jim Andre
2707 K Street, Suite 1
Sacramento, California, 95816-5113
E-mail Service Preferred
gsuba@cnps.org
thansen@cnps.org
granites@telis.org

County of San Bernardino
Bart W. Brizzee, Deputy Co. Counsel
385 N. Arrowhead Avenue, 4th Fl.
San Bernardino, California, 92415
bbrizzee@cc.sbcounty.gov

ENERGY COMMISSION

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

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

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

John Kessler
Project Manager
jkessler@energy.state.ca.us

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

Jennifer Jennings
Public Adviser
publicadviser@energy.state.ca.us

*indicates change

DECLARATION OF SERVICE

I, Maria Santourdjian, declare that on March 16, 2010, I served and electronically filed copies of the attached, Final Staff Assessment Addendum for Ivanpah Solar Electric Generating System dated, March 16, 2010. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[www.energy.ca.gov/sitingcases/ivanpah].

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

(*Check all that Apply*)

FOR SERVICE TO ALL OTHER PARTIES:

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

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

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

OR

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

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 07-AFC-5
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Originally Signed by
Maria Santourdjian

*indicates change