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Memorandum

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To: Commissioner Jeffrey Byron, Presiding Member
Commissioner James D. Boyd, Associate Member

From: California Energy Commission – John Kessler, Project Manager
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: **STAFF'S SUPPLEMENTAL TESTIMONY – CUMULATIVE ANALYSIS OF SCE TRANSMISSION UPGRADES IVANPAH SOLAR ELECTRIC GENERATING SYSTEM (07-AFC-5) Exhibit 304**

Energy Commission staff is providing this supplement to its testimony addressing the Cumulative Analysis of Southern California Edison's Transmission Upgrades. Staff previously provided an abbreviated version of this analysis in the Cumulative Scenario section of the Final Staff Assessment/Draft Environmental Impact Statement (FSA/DEIS) published November 4, 2009 and beginning on page 5-19. Since publishing the FSA/DEIS, staff has been able to reflect and analyze information in Southern California Edison's Application to the California Public Utility Commission and the Proponents Environmental Assessment for the Ivanpah-El Dorado Transmission Project. While this represents a more comprehensive analysis, staff's conclusions have not changed since the FSA/DEIS.

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CUMULATIVE ANALYSIS OF SCE TRANSMISSION UPGRADES
IVANPAH SOLAR ELECTRIC GENERATING SYSTEM (07-AFC-5)
Exhibit 304
Prepared by Susan Lee

INTRODUCTION AND PURPOSE

Energy Commission staff has prepared this Appendix to the Staff Assessment for the Ivanpah Solar Electric Generating System (ISEGS) project to examine the potential indirect impacts of future transmission line, fiber optic, and substation construction, line removal, and other upgrades that may be required by Southern California Edison Company (SCE) as a result of the ISEGS project.

The SCE upgrades are a reasonably foreseeable event if the ISEGS project is approved and constructed. The California Environmental Quality Act (CEQA) requires examination of foreseeable subsequent projects that result from a project under consideration, so Energy Commission staff has analyzed the general impacts of the SCE project. Because the SCE project itself is not before the Energy Commission for approval and it is in the preliminary planning stages, the level of impact analysis presented for the SCE project is less detailed than that done for the ISEGS project itself. The purpose of this analysis is to inform the Energy Commission Committee, interested parties and the general public of the potential indirect environmental and public health effects that may result from the approval of the ISEGS project. This analysis examines the construction and operational impacts of the SCE transmission line, substation and telecommunications system upgrades, and the nature and scope of the probable impacts of the project, should it occur as a result of approval of the ISEGS project.

The California Public Utility Commission (CPUC) and Bureau of Land Management (BLM) will be the lead agencies for compliance with CEQA and the National Environmental Policy Act (NEPA), respectively. The CPUC and BLM have agreed to prepare a combined Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) presenting the proposed SCE project and evaluating impacts of the project on the existing environment. On May 28, 2009, SCE filed an application with the California Public Utilities Commission (CPUC) to construct the Eldorado-Ivanpah Transmission Line Upgrade Project (Application 09-05-027), and on July 23, 2009, the CPUC issued a Notice of Preparation.[1]. In addition, SCE has applied to the Bureau of Land Management (BLM) for a Right-of-Way Grant and the BLM published its Notice of Intent in the Federal Register on July 27, 2009.[2] SCE's PEA serves as the basis for the project description included in this analysis.

This analysis draws conclusions as to the likelihood that the SCE project could be accomplished with no significant environmental impacts, and identifies types of mitigation measures that could be enacted to reduce impacts or to ensure the project

[1] The CPUC Eldorado-Ivanpah project website is online at: http://www.cpuc.ca.gov/Environment/info/ene/ivanpah/Ivanpah.html

[2] Federal Register Volume 74, Number 142, page 37053-37054.

would not cause significant impacts. Because the potential for impacts in several technical areas would not occur, several of the areas normally studied in a Staff Assessment have been eliminated from this analysis. The areas not included are Facility Design, Power Plant Efficiency, and Power Plant Reliability.

PROPOSED PROJECT DESCRIPTION

SCE proposes to construct a new 220 kilovolt (kV) transmission line and a new 220 kV/115 kV substation in California near Primm, Nevada. The new double-circuit 220 kV transmission line would be approximately 35 miles long, and would be located between the existing Eldorado Substation in Nevada and the proposed new Ivanpah Substation in California. The Eldorado-Ivanpah portion of the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line would be removed and replaced with the 220 kV transmission line. The rest of the 115 kV line would remain unchanged west of the new Ivanpah Substation (SCE 2009).

The proposed new 220/115 kV Ivanpah Substation would be constructed to accommodate an ultimate 1120 MVA facility to be owned, operated and maintained by SCE to serve as a collector hub for the solar generation projects identified in the Ivanpah Dry Lake Area. The grading of the Ivanpah Substation site would be completed as a component of the early interconnect work activities and is already considered for each environmental discipline in the ISEGS Staff Assessment/DEIS. This component would include the 885-foot by 850-foot substation site, the 10-foot perimeter buffer and the area containing cut and fill slopes resulting from grading. In addition, it would include a 24-foot wide paved road to provide vehicular access to the substation, fencing, a portion of the 115 kV switchrack, the mechanical electrical equipment room (MEER) approximately 65 feet by 55 feet, and cable trenches. The remaining 115 kV switchrack, the 220 kV switchrack, transformer banks, and 180-foot-tall microwave tower would be installed as part of the Eldorado-Ivanpah Project and this is the only portion of the new Ivanpah Substation construction that is cumulatively considered in this Appendix.

Overall, the SCE project would also include the following components:

<u>Substation Construction and Upgrades</u>

- Construction of a new Ivanpah 220/115 kV Substation. The substation would be designed to allow up to four 220/115 kV transformer banks (three would be initially required to support 115 kV level interconnection requests) and would provide 220 kV expandability to support 220 kV voltage level generation tie-lines as well as future 220 kV network transmission lines (if and when required).
- Removal of an existing 220/115 kV transformer bank at Eldorado Substation.
- Installation of two new 220 kV positions at Eldorado Substation to support connection of new transmission lines. Upgrade of existing 220 kV switchrack and 500 kV series capacitor equipment.

<u>Transmission and Telecommunication Facilities</u>

- Removal of approximately 35 miles of a portion of the Eldorado leg of the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115 kV line (the existing 115 kV infrastructure cannot support transmission of greater capacity).
- Construction of a new approximately 35-mile double-circuit 220 kV transmission line with bundled 1590 aluminum conductor steel reinforced conductor, including optical ground wire to support a special protection system (SPS). The new double circuit 220 kV line would be constructed in mostly existing ROW with some minor rerouting for technical and environmental reasons.
- A new approximately 1-mile portion of the existing Baker-Cool Water-Dunn Siding-Mountain Pass 115 kV line connecting to the proposed Ivanpah Substation.
- Second telecommunication route to support WECC redundant telecommunication requirements for an SPS. The route consists of approximately 25-miles of optical ground wire (OPGW) installed on the existing Eldorado-Lugo 500 kV line; 5-miles of underground fiber optic cable in Hwy 164; and microwave radio from near the town of Nipton to the proposed Ivanpah Substation.

The following detailed description of project components (Chapter 2.1) and construction activities (Chapter 2.2) is based on information included in SCE's PEA (SCE 2009).

PROJECT COMPONENTS

Eldorado-Ivanpah 220 kV Transmission Line

The existing 115 kV line would not provide the power transmission capacity necessary for projected solar generation development in the Ivanpah area. A new 220 kV double circuit line would meet the necessary requirements and would be constructed within the existing 115 kV right-of-way (ROW), wherever feasible.

The proposed 220 kV line would be constructed on double-circuit lattice-steel towers (LST's) for most of the route. Where required, additional ROW and single-circuit steel H-frame structures would be used to facilitate the crossing of other transmission lines in the project area. The entire proposed project would span approximately 28 miles in Nevada and approximately 7 miles in California. The proposed location and route are shown in **Appendix A Figure 1**

Proposed Route Description

A portion of the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line would be removed and replaced with 220 kV double-circuit structures (the Eldorado-Ivanpah transmission line) mostly within the existing ROW between the existing Eldorado Substation in Nevada and the to be constructed Ivanpah Substation in California.

The proposed Eldorado-Ivanpah 220 kV transmission line route (**Appendix 1 Figure 1**) would begin at the existing Eldorado Substation. The line would exit the substation to the north and join the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line ROW. The line would head generally west on a 75-foot ROW and cross below five existing transmission lines (Eldorado-McCullough 500 kV, Mead-

Victorville 287 kV, McCullough-Victorville #1 500 kV, McCullough-Victorville #2 500 kV, and Intermountain-Adelanto 500 kV DC). The 75-foot ROW would be widened to 100 feet to accommodate 220 kV construction. At the crossing locations, a 250 foot ROW would be obtained for side-by-side single circuit 220 kV H-Frame structures.

At milepost (MP) 2.1 (tower 20), the line would make a sharp turn to the southwest along the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line 100 foot ROW for approximately 5.0 miles until it would turn due west and immediately cross below the Intermountain-Adelanto 500 kV DC line. At the crossing location, the 100 foot ROW would be widened to 250 foot for side-by-side single circuit 220 kV H-Frame structures. This may be difficult given the congestion in this area. Additional survey information would be evaluated to determine the optimum crossing alignment.

The line then would travel west for approximately 3.6 miles (MP 10.7, Tower 74) until it would cross below the existing Intermountain-Adelanto 500 kV DC transmission line twice at very steep angles. At both crossing locations, there is not adequate space to fit the 250-foot ROW between the existing 500 kV structures. Therefore, the new line would be rerouted for approximately 0.4 miles on the northern side of the 500 kV transmission line, eliminating the need for both of the crossings. The line then would parallel the Intermountain-Adelanto 500 kV DC transmission line for approximately 0.9 miles before crossing below the 500 kV transmission line again. Once again, the crossing occurs at a very steep angle and there is not adequate space to widen the existing ROW to 250 feet for the side-by-side 220 kV H-Frames. Therefore, the new line would be rerouted along the north side of the 500 kV transmission line, then turn 90 degrees to the south and cross below the 500 kV transmission line, then turn 90 degrees to the west and rejoin the existing ROW.

The line would continue southwest for approximately 13.0 miles (MP 24.8, tower 170) before crossing over one existing115 kV transmission line and below the McCullough-Victorville #1 and McCullough-Victorville #2 500 kV transmission line and the Mead-Victorville 287 kV transmission line. At the crossing of the second and third 500 kV transmission lines (McCullough-Victorville #2 500 kV transmission line and the Mead-Victorville 287 kV transmission line), there is not adequate space to widen the existing ROW for the standard SCE side-by-side 220 kV H-Frames. As required on the previous crossing, the new line would be rerouted along the north side of the McCullough-Victorville #2 500 kV transmission line, then would turn 90 degrees to the south and would cross below the Mead-Victorville 287 kV transmission line, then turn 90 degrees to the west and rejoin the existing ROW.

The line would continue on the existing Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV ROW for another 7.8 miles into the proposed Ivanpah Substation. This proposed route would terminate at the Ivanpah Substation.

Structures and Line Components

Details on structures and line components described are based on planning level assumptions and may change following completion of preliminary and final engineering, identification of field conditions, availability of labor, material, and equipment, and any environmental and permitting requirements. The proposed 220 kV transmission line would use two-bundled nonspecular 1590 kcmil aluminum conductor steel reinforced

(ACSR) "Lapwing" non-specular conductor on single and double-circuit LSTs and single-circuit tubular steel H-Frames. Approximately 2,360,620 feet of conductor would be strung.

For the proposed route, it is estimated that approximately 216 dulled galvanized double-circuit 220 kV LSTs and approximately 42 dulled galvanized 220 kV steel H-Frames structures would be installed. The double-circuit LSTs would range in height between 110 feet and 180 feet. The single circuit H-Frames would range in height between 45 feet and 75 feet. Most of the structure sites would require minor to substantial grading and new or re-developed access and spur roads.

Each four-legged LST would be built on four drilled poured-in-place concrete footings. Each steel H-Frame structure would be built on two drilled poured-in-place concrete footings. The dimensions of each footing are dependent on variables such as topography, structure height, span lengths, and soil properties. On average, a typical footing would have an above ground projection of approximately 1 to 4 feet.

The tangent and small angle 220 kV suspension hardware assembly would contain a single polymer insulator, one assembly per phase for six phases. On dead-end structures, the assembly would contain two polymer insulators, one assembly per phase for six phases.

The overhead ground wire (OHGW) would be located on the peaks of the transmission structures. The new 220 kV structures would have a single OHGW, approximately 0.7 inch in diameter. optical ground wire (OPGW) is the proposed material to be used.

As part of the diverse telecommunication route, approximately 25 miles of the existing SCE Lugo-Eldorado 500 kV transmission line will need to have one of the two existing 0.5-inch steel ground wires replaced with OPGW. It is estimated that approximately 45 structures along this route will require structural modifications either at the static peaks or mid to upper body or both to accommodate the replacement.

In order to maintain clearances to the ground and crossing conductors, the shield wire on the 220 kV Eldorado-Ivanpah circuits would not be installed in some locations where the 220 kV circuit would cross below 500 kV transmission lines. In these locations the optical communication circuit would be routed underground.

All existing 115 kV structures on the 35.5-mile Eldorado-Ivanpah portion of the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line would be removed.

Access Roads

Construction of a new transmission line requires access to each tower site for construction crews, materials, and equipment. The main access road follows the transmission right-of-way with spur roads branching off to each new tower site. Access and spur roads are generally a minimum of 14 feet wide dirt but may be wider depending on final engineering requirements and field conditions. Existing access roads would be used to construct the proposed upgrades, however, some of the structure sites would require new or re-developed spur roads. Spur roads would be an average of 200 feet long and would usually have turnaround areas near the structure locations. Longer or slightly wider spur roads may be needed in some locations. Approximately 1.2 miles of new spur roads would be required for the proposed route.

Wherever possible, existing streets and access roads would be used for construction of the proposed project. The existing access roads would be maintained so as to permit their being used by construction equipment. Some road modifications may be required to allow use of heavy equipment. After project construction, these roads would be used by maintenance crews and repair vehicles for access to each tower for inspection and maintenance activities.

At the end of project construction, existing roads would be left in a condition equal to or better than the condition that existed prior to the start of construction. Loose rock and slide material would be removed from existing roads and used to construct dikes, fill washouts, or flatten fill slopes. All washouts, ruts, and irregularities would be filled or obliterated. In determining the final location of new roads, vegetation and other natural features would be avoided to the greatest extent feasible. The intersection of a new access road with an existing public road would be constructed in accordance with the requirements of the agency having authority over the existing public road.

Road gradients would be leveled so that any sustained grade does not exceed 12 percent. Grades of 14 percent would be permitted when such grades do not exceed 40 feet in length and are located more than 50 feet from any other excessive grade or any curve. All curves would have a radius of curvature of not less than 50 feet, measured at the center line of the usable road surface. All dead-end spur roads over 500 feet long would include a Y-type or circle-type turnaround.

Ivanpah 220/115 kV Substation

The proposed 220/115 kV Ivanpah Substation would be constructed to accommodate an ultimate 1120 MVA facility to be owned, operated and maintained by SCE. This ultimate configuration requires a fenced area of 885 feet by 850 feet with a 10-foot wide perimeter buffer outside the fence, areas devoted to cut and fill side slopes to accommodate grading, and would total approximately 19 acres of disturbed land. Two areas measuring approximately 1,015 feet by 400 feet containing 9 acres each would be located to the westerly and easterly ends of the substation site and would provide access for the 220 kV and 115 kV lines into the substation. Ground disturbance within these areas would be limited to that needed for construction and access to the towers/poles located within the areas. The total substation site area would be approximately 1,650 feet by 1,015 feet or 38.5 acres.

The grading of the Ivanpah Substation site would be completed as a component of the early interconnect work activities and is already considered for each environmental discipline in the ISEGS Staff Assessment/Draft Environmental Impact Statement. This component would include the 885-foot by 850-foot substation site, the 10-foot perimeter buffer and the area containing cut and fill slopes resulting from grading. In addition a 24-foot wide paved road would be included to provide vehicular access to the substation, fencing, a portion of the 115 kV switchrack, an emergency generator, the mechanical electrical equipment room (MEER) approximately 65 feet by 55 feet, and cable trenches.

The ultimate configuration would include four 280 MVA 220/115 kV transformer banks, eight 220 kV and fourteen 115 kV positions. The initial configuration of the substation would include a total of three 280 MVA 220/115 kV transformer banks, five 220 kV and four 115 kV lines, and associated switchracks. The remaining 115 kV switchrack, the

220 kV switchrack and the transformer banks would be installed as part of the Eldorado-Ivanpah Project and this is the only portion of the Ivanpah Substation construction that is considered in this appendix. A 180-foot tall microwave tower would be installed as part of the Eldorado-Ivanpah Project.

Eldorado 500/220/115 kV Substation

The existing Eldorado Substation is located approximately fourteen miles southwest of Boulder City in the State of Nevada, The project would require installation of two 220 kV line positions to terminate the new Ivanpah No.1 and No.2 220 kV transmission lines. The installation of the two additional positions would require that the existing 220 kV switchyard be extended 165 feet to the west within the existing substation fence. No surface grading would be required for this extension. Upgrades to existing 220 kV circuit breakers and upgrades to 500 kV series capacitors within the existing substation fence may also be required, depending on electrical system requirements. An existing 220/115 kV transformer bank would be removed.

Telecommunications System

The proposed project would include construction of two fully diverse and redundant communication paths to support both a special protection system that would trip the Eldorado-Ivanpah 220 kV transmission line relays under specific outage contingencies as well as for the operating and monitoring of the substation and transmission line equipment. The paths would connect the Eldorado Substation to the proposed Ivanpah Substation. New telecommunication infrastructure would be installed to provide protective relay circuit, Supervisory Control and Data Acquisition (SCADA) circuit, data, and telephone services to the proposed Ivanpah substation. The following sections describe the proposed new telecommunication infrastructure.

Fiber Optic Cable Route

The communication link between the Eldorado Substation and the proposed Ivanpah Substation would consist of two different fiber optic cable paths (**Appendix 1 Figure 1**).

Path 1: The first telecommunication path from the Eldorado Substation to the proposed Ivanpah Substation would use new OPGW and is proposed to be constructed along the new 220 kV transmission line route from the Eldorado Substation to the Ivanpah Substation. The approximate length of the path is 35 miles.

Path 2: The second telecommunication path from the Eldorado Substation to the Ivanpah Substation consists of the following three sections:

- Section 1 would extend from the Eldorado Substation to a 500 kV tower of the Eldorado-Lugo 500 kV transmission line near Highway 164 intersection and the town of Nipton, California. Approximately 25 miles of the existing SCE Eldorado-Lugo 500 kV transmission line would have one of the two existing 0.5-inch steel OHGW replaced with OPGW. Approximately 45 of the existing structures along this route would require some form of structural modifications, either at the static peaks, or mid to upper body, or both, to accommodate the replacement of the OHGW with OPGW. The loading capacity of modified structures with the new OPGW would conform to the NESC's regulations (for the state of Nevada) and CPUC's General Order 95 (in California) loading criteria. The exact number of structures and the specific type of modifications would be determined once final engineering has been completed. All construction work for the structure modifications would be performed within the existing access road and ROW.

- Section 2 route would extend in an underground duct from a SCE Eldorado-Lugo 500 kV transmission line tower located approximately 4.8 miles east of the town of Nipton, on the north side of Highway 164, to the town of Nipton. The Section 2 route would parallel Nipton Road on the north side in an underground duct that would be installed along a new roadside ROW.
- Section 3 of this cable path would be 10 to 15 miles in length depending on the route selected. The preferred route (called Alternative 3A in SCE's PEA) from the town of Nipton to the Ivanpah Substation would be via a microwave transmission system over 12 miles of microwave path. A communication site northeast of the town of Nipton would be built to maintain an approximately 180-foot-tall microwave tower. The communication site would be approximately 100 feet by 100 feet. The Path 2-Section 2 fiber cable would extend from the town of Nipton in an underground duct that would terminate at the communication site. A distribution line would be extended from the town of Nipton to the communication site for power connection. At the Ivanpah Substation, a microwave tower approximately 180 feet tall would be built to link to the Nipton communication site via the air microwave path.

Ivanpah Substation Communication Room

A dedicated communications room would be included within the larger Ivanpah Substation MEER to house communication equipments. The communication room would be equipped with AC power, batteries and a battery charger, an overhead cable tray, redundant air conditioners, and conduits for connection to fiber optic cables. For the telecommunication circuits, fiber terminating shelves, fiber optic transport terminals, channel equipment shelves, communications alarm/switch, and one DC power system would be installed in the communication room.

Mountain Pass Substation Communication Enclosure

Dedicated communication enclosures would be included within the Mountain Pass Substation, located 6.0 miles southwest of the proposed Ivanpah Substation, to house communication equipments. This communication equipment are required as a repeater to re-generate the optical signals from/to Eldorado Substation via Path 2-Section 3 (Alternative 1) (see **Appendix 1 Figure 1**). The communication enclosures would be equipped with AC power interface, batteries and battery chargers, air conditioners, and conduits for connection to fiber optic cables from distribution pole lines.

115 kV Subtransmission Line

An approximately 600- to 800-foot-long new section of looped 115 kV line consisting of 653.9 ACSR and two 3/8-inch-high strength galvanized shield wire would be strung from a connection point (Milepost 34) on the existing SCE Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass 115 kV line to a new rack position at the proposed Ivanpah Substation. From the connection point (Milepost 34) south for approximately one mile, seven existing H-frame lattice structures would be removed and replaced with one TSP and six light-weight steel (LWS) H-frames. In addition, six new LWS H-frames would have to be interset at mid-span of these structures to meet current requirements as well. Existing 4/0 ACSR conductor would be transferred and new structures would include two 3/8-inch-high strength shield wires. Structure heights are approximately 60 to 75 feet above ground with a span length of 150 to 450 feet, depending on topography. An estimated 300 feet of new spur roads would be required.

Initial work activities would consist of removing 250 existing structures of various construction designs as presented in **Appendix 1 Table 1** below. Removal would include line and bisector anchors, concrete footings and caps. Steel Lattice tower footings, concrete caps and anchors would be cut/removed 1 to 2 feet below ground level.

APPENDIX 1 TABLE 1
STRUCTURE TYPES AND NUMBERS TO BE REMOVED

Structure Type	**# of Structures Removed**
Lattice H-Frame suspension/dead end	**150**
Lattice H-Frame concrete footings	**1**
Lattice H Frame w/storm guys	**2**
Lattice H-Frame concrete footings & storm guys	**4**
Lattice H-Frame with 4 storm guys	**19**
Lattice H-Frame concrete footings with 4 storm guys	**26**
Lattice H-Frame with 6 storm guys	**5**
Lattice H-Frame concrete footings with 6 storm guys	**1**
4-Legged lattice tower	**13**
Wood Pole H-Frame set in CMP	**23**
3-Pole Wood Structures set in CMP	**5**
Single Pole Berry	**1**

Source: SCE 2009.

33 kV Distribution Line

A 33 kV distribution system would be constructed to provide light and power to the Ivanpah Substation. The station light and power would be contained in approximately 400 feet of new ducts and one run of 4/0 Cross-link Polyethylene (CLP) from the Nipton 33 kV circuit to the location of the new station light and power transformer in the Ivanpah Substation. The location of the transformer would be decided by substation engineering.

About 1 mile of new underground 33 kV circuitry and two new Remote Control Switches (RCS) would be installed to close the loop in the Nipton 33 kV circuit. The addition would consist of two ducts and one run of 4/0 CLP. The proposed work would be done next to Densmore Drive Road. One of the RCS would be located south of the Ivanpah Substation and the second RCS would be located next to the Primm Golf Course.

Pole upgrade for ADSS under build

Information regarding this component of the project will be provided by SCE in its PEA and is not available at this time.

CONSTRUCTION ACTIVITIES

Eldorado-Ivanpah 220 kV line

Work activities would commence upon approval of the proposed project by the CPUC, BLM and other permitting agencies with a target operating date of July 2013. Construction is currently scheduled to commence in the last quarter of year 2011 and take approximately 19 months to complete, including time to inspect and test the project. To facilitate renewable interconnections, SCE has stated that efforts would be made to accelerate the operating date through shorter agency decision time and compressed procurement and construction schedules.

SCE has stated that in populated areas, it would post notices on the right-of-way or at other sites where the public would be affected by construction activities. Notices would be posted approximately one month prior to commencing work. At ROW ingress and egress points, postings would be placed along the ROW and at work sites approximately two weeks prior to the closing of public access.

Proposed Construction and Restoration Measures

Total estimated land disturbance during construction would be approximately 425.1 acres. Following construction, an estimated 386.1 acres would be restored and 38.9 would be permanently disturbed. APMs dealing with general construction procedures, as well as those dealing with environmental resources and site-specific mitigation measures developed as the result of SCE's environmental analysis of the project, are presented in SCE's PEA (SCE 2009). In addition, the CPUC and BLM will also develop mitigation measures for the proposed project.

Labor and Equipment

Tower details and hardware used for construction are discussed in the sections below. Construction of the proposed project is planned to be performed by contract personnel with SCE responsible for project administration and inspection. The estimated number of persons required for each phase of construction on the proposed project is listed below. Standard construction equipment would be used and a list of the specific types of equipment are included in SCE's PEA (SCE 2009). At some stages of the project, multiple locations would be under construction simultaneously. This may involve independent construction teams. The workforce estimates by activity to construct the 220 kV transmission line are as follows:

- Survey (4 personnel; 35.5 miles);
- Marshalling Yard (4 personnel);
- Roads and Landing Work (5 personnel; 18 miles & 258 pads);
- Guard Structure Installation (6 personnel; 16 structures);
- Remove Existing Conductor & OHGW (14 personnel; 35.5 miles);

- Remove Existing Structures (6 personnel; 221 structures);
- Remove Existing Foundations (8 personnel; 208 LSH-frames & 13 LSTs);
- Remove Existing Wood Poles (6 personnel; 23 H-frames & 6 poles);
- Install LST Foundations (9 personnel; 216 LSTs);
- LST Steel Haul (12 personnel; 216 LSTs);
- LST Steel Assembly (28 personnel; 216 LSTs);
- LST Erection (16 personnel; 216 LSTs);
- Install Tubular Steel Foundations (7 personnel; 42 H-frames);
- Tubular Steel H-Frame Haul (4 personnel; 42 H-frames);
- Tubular Steel H-Frame Assembly (8 personnel; 42 H-frames);
- Tubular Steel H-Frame Erection (8 personnel; 42 H-frames);
- Install Conductor & OPGW (32 personnel; 71 circuit miles);
- Guard Structure Removal (6 personnel; 16 miles); and
- Restoration (7 personnel; 35.5 miles).

Siting

For siting, a detailed survey would be conducted, additional ROW acquired, and detailed engineering designs started. A control centerline would be established, based on field survey measurements. Control monuments, consisting of 2-inch-diameter iron pipes sealed with a stamped brass cap would be set at maximum intervals of approximately 2.0 miles. Visual reference points parallel and perpendicular to the control line would be established so that photogrammetric profiles of the area's topography could be compiled. Approximate structure locations would be spotted on the profiles according to the engineering design criteria. Once approximate structure locations have been selected, exact positions would be field surveyed.

During this phase of the work, site adjustments would be made to avoid an environmental sensitivity or to maintain structure integrity and sustainability. Generally, these site adjustments would only be a few feet. Structure location approval and clearance procedures are discussed in the following section. Survey crews would also locate spur road centerlines, grades, and soil boring locations. Final determinations of road location curvature, cuts and fills, grades and drainage, and necessary erosion controls would be made in accordance with design standards and practices and/or landowner requirements.

Tower Location Approval and Clearance Procedure

An SCE team made up of SCE personnel and their contractors would visit each proposed structure site following the completion of preliminary engineering and prior to the commencement of detailed, final engineering of the structures. Each tower site and associated spur road would be reviewed by the team to assess the suitability of the site and a buffer area along each spur road and around each tower site would be inspected. If no environmental sensitivities are identified and there are no other issues affecting construction, maintenance, or real estate, the site would be marked as approved and the team would move to the next tower site and spur road. Final engineering would proceed on that tower at the approved location. If an environmental sensitivity is identified, SCE would move the proposed structure site in-line to avoid the sensitivity (in general, towers would not be moved side to side, but only in-line). In most cases, SCE would be able to move a tower site away from sensitivities to a new site.

Typically, this could be accomplished with a move of 50 feet or less. The recommended new tower site would then be inspected by the team. If no environmental sensitivities and no construction, maintenance or real estate issues are identified, preliminary engineering for this new site would be checked and the new tower site and associated spur road route would be approved by the team. Once proposed structure sites are approved, final detailed engineering would proceed. During detailed engineering, no further tower site adjustments would occur without consultation with the interdisciplinary team.

The foundations for the 220 kV towers could require up to four drilled, cast-in-place concrete piles or foundations. Lattice steel towers require four piles, and H-frame towers require two piles. The size of the excavation would depend on the type of structure and soil conditions at each tower site. With excavations for structure foundations, tower sites may, on rare occasion, need to be moved due to excavation difficulties or discovery of some new sensitivity. During this phase of the work, site adjustments would be made only if necessary to avoid an environmental sensitivity or to maintain structure integrity and sustainability. Generally, these site adjustments would only be a few feet.

Construction Yards

Construction of the project transmission line would begin with the establishment of approximately seven temporary construction yards located at strategic points along the route. Two of these construction yards would be in California, while five would be in Nevada and most would be located on previously disturbed land.

Each yard would be used as a reporting location for workers, and for vehicle and equipment parking and material storage. The yards would have offices for supervisory and clerical personnel. Normal maintenance of construction equipment would be conducted at these yards. The maximum number of workers reporting to any one yard would not be expected to exceed approximately 100 workers at any one time. Each yard would be approximately 2 to 28 acres in size, depending on land availability and intended use. Construction of the Ivanpah Substation would not require a temporary laydown area outside the substation fenced area.

At peak construction, most of the vehicles could occupy the seven yards. Approximately 80 private commuting vehicles would also be parked at the yard. Crews would load materials onto work trucks and drive to the line position being worked. At the end of the day, they would return to the yard in their work vehicles and depart in their private vehicles.

Materials stored at the construction yards would include:

- Conductor
- Wood Poles
- OPGW wire
- Hardware
- Construction Equipment
- Steel

- Insulators
- Signage
- Consumables, such as fuel and joint compound
- Stormwater Pollution Prevention Plan materials, such as straw wattles, gravel, and silt fences
- Waste materials for recycling or disposal.

Guard Structures

Guard structures may be installed at transportation, flood control, and utility crossings. Guard structures are temporary facilities designed to stop the movement of a conductor should it momentarily drop below a conventional stringing height. Temporary netting could be installed to protect some types of under-built infrastructure. Typical guard structures are standard wood poles, 60 to 80 feet tall, and depending on the width of the conductor being constructed, the number of guard poles installed on either side of a crossing would be between two and four. The guard structures would be removed after the conductor is clipped into place. In some cases, the wood poles could be substituted with the use of specifically equipped boom-type trucks with heavy outriggers staged to prevent the conductor from dropping.

Public agencies differ on their policies for preferred methods to public safety during conductor stringing operations. For highway and open channel aqueduct crossings, SCE would work closely with the applicable jurisdiction to secure the applicable ministerial permits to string conductor across the applicable infrastructure. For major roadway crossings, typically one of the following four methods is employed to protect the public:

- Erection of a highway net guard structure system;
- Detour of all traffic off a highway at the crossing position;
- Implementation of a controlled continuous traffic break while stringing operations are performed; or
- Strategic placement of special line trucks with extension booms on the highway deck.

Based on a review of the number of road crossings that would be needed along the currently proposed route, SCE has estimated that approximately 16 guard structures would be installed to facilitate construction across existing distribution lines, Dirt Road, I-15, Lotto Shore Road, Fashion Outlet Way, E. Primm Boulevard, and the Union Pacific Railroad. The types of guard structures that would be required for crossings and the number of crossings necessary would be field verified upon completion of final design.

Dismantle and Removal of Existing 115 kV Transmission Facilities

The construction of a portion of the proposed project would require the removal of existing transmission line. Transmission line equipment to be removed would include 208 existing 115 kV lattice steel H-frames, 13 existing 115 kV lattice steel towers, 23 wood pole H-frames, 6 wood poles and associated hardware (i.e., cross arms, insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires), as well as the transmission line conductor.

SCE proposes to remove the existing 115 kV structures through the following activities:

- **Set Up**: Existing access routes would be used to reach structure sites, but some rehabilitation work on these routes may be necessary before removal activities begin. In addition, grading may be necessary to establish temporary crane pads for tower removal.
- **Structure Removal**: For each type of structure, a crane truck or rough terrain crane would be used to support structure during removal; a crane pad of approximately 50 feet by 50 feet may be required to allow a removal crane to be setup at a distance of 60 feet from the structure center line. The crane rail would be located transversely from the structure locations.
- **Footing Removal**: The existing LST and H-frame footings would be removed to a depth of 2 feet. Holes would be filled and compressed to 90 percent compaction, and then the area would be smoothed to match surrounding grade.

SCE proposes to remove the existing 115 kV conductor through the following activities:

- **Wire Pulling Locations**: Wire-pulling locations would be sited no more than every 15,000 feet along the utility corridor, and would include dead-end towers and turning points. It is anticipated that many of the same locations would be used for installation of the new 220 kV lines that would be used for the removal of existing lines. Wire-pulling equipment would be placed intermittently along utility corridor.
- **Pulling Cable:** A 3/8-inch pulling cable would replace the old conductor as it is being removed, this allows complete control of the conductor during its removal. The 3/8-inch line would then be removed under controlled conditions to minimize ground disturbance, and all wire-pulling equipment would be removed.
- **Breakaway Reels:** The old conductor wire would be wound onto “breakaway” reels as it is removed. The old conductor would be transported to a marshalling yard where it would be prepared for recycling.

Access Roads and Spur Roads

No new main access roads are expected to be required for the proposed route. Where overland vehicle travel would not be possible, upgrades to main access roads and extensions to existing spur roads would be needed to allow passage of construction vehicles. Such upgrades may require vegetation clearing and grading based on site conditions. There are approximately 35 miles of existing main access roads.

Approximately 1.2 miles of new spur roads would be needed for the proposed route, disturbing approximately 2.1 acres. New spur roads would be constructed and would be a minimum of 14 feet wide. It is anticipated that most of the spur roads constructed to accommodate new construction would be left in place to facilitate future access for operations and maintenance purposes.

Site Preparation

The new structure pad locations would first be graded and/or cleared to provide a reasonably level and vegetation-free surface for footing construction. Sites would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the tower footings. The graded area would be compacted, and would be capable of supporting heavy vehicular traffic.

Assembly of LSTs and steel H-frame structures typically would require a laydown area of approximately 200 feet by 200 feet. In locations where the terrain in the laydown area is already reasonably level (for example, at an existing tower location), only vegetation removal would occur to prepare the site for construction. In locations where a level surface is not present (for example, a new tower site), both vegetation clearing and grading would be necessary to prepare the laydown area for construction.

Erection of the LSTs and tubular steel H-frames may also require establishment of a crane pad to allow an erection crane to set up 60 feet from the centerline of each structure. The crane pad would be located transversely from each applicable structure location. The crane pad would be located within the laydown area used for structure assembly. The pad would be cleared of vegetation and also graded as necessary to provide a level surface for crane operation.

In mountainous areas, benching may be required to provide access for footing construction, assembly, erection, and wire-stringing activities during line construction. It would be used minimally to help ensure the safety of personnel during construction activities.

Foundation Installation

The Eldorado-Ivanpah 220 kV transmission line would require the construction of 216 new lattice steel towers and 42 H-frame towers. Each structure would require multiple drilled, poured-in-place, concrete footings that form the structure foundation. The maximum depth below ground level for the various types of structures is expected to be approximately 45 feet. Actual footing depths for the structure foundation would depend on the soil conditions and topography at each site and would be determined during final engineering.

Foundations in soft or loose soil and that extend below the groundwater level may be stabilized with casings or drilling mud slurry. Mud slurry would be placed in the hole after drilling to prevent the sidewalls from sloughing. The concrete for the foundation would then be pumped to the bottom of the hole, displacing the mud slurry. The mud slurry brought to the surface would typically be collected in a pit adjacent to the foundation, and then pumped out of the pit to be reused or discarded. Structure foundations for each LST would consist of four concrete footings, and structure foundations for each steel H-frame structure will consist of two concrete footings. The foundation process would start with the drilling of the holes for each type of structure. The holes would be drilled using truck or track-mounted excavators with various diameter augers to match the diameter requirements of the structure type. LSTs typically require an excavated hole of 3 to 4 feet in diameter and 20 to 45 feet deep. Steel H-frame structures typically require an excavated hole of up to 6 feet in diameter and up to 40 feet deep. On average, each footing for an LST and steel H-frame structure would project approximately 1 to 4 feet above ground level.

Following excavation of the foundation footings, steel reinforced cages and stub angles would be set, survey positioning would be verified, and concrete would then be placed.

Steel reinforced cages and stub angles would be assembled at laydown yards and delivered to each structure location by flatbed truck. Typically, LSTs would require 25 to 100 cubic yards of concrete delivered to each structure location, depending upon the type of structure being constructed. Typically steel H-frame structures would require 80 to 120 cubic yards of concrete delivered to each structure location.

Concrete samples would be drawn at time of pour and tested to ensure engineered strengths were achieved. A normally specified SCE concrete mix typically would take approximately 20 working days to cure to an engineered strength. This strength would then be verified by controlled testing of sampled concrete. Once this strength has been achieved, crews would be permitted to commence erection of steel.

During construction, existing concrete supply facilities would be used where feasible. If concrete supply facilities do not exist in certain areas, a temporary concrete batch plant would be set up. If necessary, approximately 2 acres of property would be sub-partitioned from a marshalling area for a temporary concrete batch plant. Equipment would include a central mixer unit (drum type); three silos for injecting concrete additives, fly ash, and cement; a water tank; portable pumps; a pneumatic injector; and a loader for handling concrete additives not in the silos. Dust emissions would be controlled by watering the area and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

Conventional construction techniques would generally be used as described above for new footing installation. In certain cases, equipment and material may be deposited at structure sites using helicopters or by workers on foot, and crews may prepare the footings using hand labor assisted by hydraulic or pneumatic equipment, or other methods. Prior to drilling for foundations in California, SCE would contact Underground Service Alert to identify any underground utilities in the construction zone. In Nevada, a similar organization would be contacted for the same purpose.

Structure Assembly and Erection

At the structure fabrication plant, structural members would be bundled and shipped by rail or truck to the construction yards, and then trucked to the individual sites. LSTs would be assembled at laydown areas at each site, and then erected and bolted to the foundations. Tower assembly would begin with the hauling and stacking bundles of steel at tower location per engineering drawing requirements. This activity requires use of several tractors with 40-foot trailers and a rough terrain forklift. After steel is delivered and stacked, crews would proceed with assembly of leg extensions, body panels, boxed sections and the bridges. The steel work would be completed by a combined erection and torquing crew with a lattice boom crane. The construction crew may opt to install insulators and wire rollers (travelers) at this time. Ground disturbance would generally be limited to the laydown areas, which would typically occupy an area of 200 feet by 200 feet.

For tubular steel H-frames, steel work would consist of hauling the tubular steel poles in sections to their designated sites using semi-trucks with 40-foot trailers and rough terrain cranes. At the site, the poles would be set on the foundations (and only once the proper cure time for the concrete foundation had been attained). The poles could either be assembled into a complete structure or set one piece at a time by stacking and jacking them together. This would depend largely on the terrain and available equipment. Laydown areas would be established for the assembly process and would generally occupy an area of 200 feet by 100 feet at each structure location.

Where road access is available, assembled sections would be lifted into place with a minimum 80-ton crane. The crane pad would be would be located transversely and set up approximately 60 feet from the centerline of each structure. The crane would move along the ROW for structure erection purposes.

Where structure sites would be located in terrain inaccessible by a crane, it is anticipated that a helicopter may be used for installation of structures. Helicopter use is expected only in the McCullough Pass area and for line stringing. The final decision on helicopter use would be made by SCE and the construction contractor. The use of helicopters for the erection of structures would be in accordance with SCE specifications and would be similar to methods detailed in Institute of Electrical and Electronic Engineers (IEEE) 951-1996, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction.

Use of helicopters for installation eliminates land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for steel delivery to structure sites. All construction work in remote work sites would be completed by hand with the assistance of portable compressors, portable hydraulic accumulators, and portable concrete mixers that would be flown into the tower sites.

The operations area of the helicopters would be limited to helicopter staging areas near construction locations that are considered safe locations for landing. Final siting of staging areas would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size and number of structures to be installed. Staging areas would likely change as work progresses.

Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor’s fuel truck, would be supervised by the helicopter fuel service provider, and SWPPP measures would be followed, as applicable. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

Grounding

Transmission structures located within the substation boundary would be grounded to the substation ground grid. Foundation for a 220 kV structure located more than 700 feet from a substation would meet the foundation to ground resistance criteria with dry soil conditions of 30 ohms or less.

If the 30 ohms foundation to ground resistance criteria cannot be met with ground rods, a counterpoise system would be installed per the following: (1) two counterpoise would be installed diagonally opposite if the foundation to ground resistance is less than 100 ohms; (2) four counterpoise would be installed (one on each leg of a four-leg structure) if the foundation to ground resistance is greater than 100 ohms.

Stringing Activities

Prior to stringing activities, bucket trucks, wood pole guard structures, or temporary protective netting systems that were erected at the crossings for roads, streets, railroads, highways, or other transmission, distribution, or communication facilities, for 115 kV conductor removal would be inspected or reinstalled. The stringing of conductor and overhead ground wire on new transmission lines typically would commence once a number of structures had been erected and inspected.

Wire-stringing includes all activities associated with the installation of conductors onto the structures. This activity includes the installation of primary conductor and OPGW or ground wire, vibration dampeners, weights, spacers, and suspension and dead-end hardware assemblies. Insulators and stringing sheaves (rollers or travelers) would be attached as part of the wire-stringing activity if the work is a part of a reconductoring effort; otherwise they are typically attached during the steel erection process.

Wire-stringing activities would be conducted in accordance with SCE specifications, which is similar to process methods detailed in IEEE Standard 524-2003, Guide to the Installation of Overhead Transmission Line Conductors. A standard wire-stringing plan includes a sequenced program of events starting with determination of wire pulls and wire pull equipment set-up positions. Advanced planning by supervision determines circuit outages, pulling times, and safety protocols needed for ensuring that safe and quick installation of wire is accomplished.

Typically, wire pulls occur every 15,000 to 18,000 feet on flat terrain or less in rugged terrain. Wire splices typically occur every 7,500 to 9,000 feet on flat terrain or less in rugged terrain. “Wire pulls” are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected, where possible, based on availability of dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment setups. In some cases, it may be preferable to select an equipment setup position between two suspension towers. Anchor rods would then be installed to provide dead-ending capability for wire sagging purposes, and also to provide a convenient splicing area.

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

The following four steps describe the wire installation activities proposed by SCE:

- **Step 1: *Sock Line; Threading***: A helicopter would fly a lightweight sock line from tower to tower, which would be threaded through the wire rollers in order to engage a cam-lock device that would secure the pulling sock in the roller. This threading process would continue between all towers through the rollers of a particular set of spans selected for a conductor pull.
- **Step 2: *Pulling***: The sock line would be used to pull in the conductor pulling cable. The conductor pulling cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel. A piece of hardware known as a running board would be installed to properly feed the conductor into the roller; this device keeps the bundle conductor from wrapping during installation.

- **Step 3: *Splicing, Sagging, and Dead-ending***: After the conductor is pulled in, all mid-span splicing would be performed. Once the splicing has been completed, the conductor would be sagged to proper tension and dead-ended to towers.
- **Step 4: *Clipping-in, Spacers***: After conductor is dead-ended, the conductors would be attached to all tangent towers; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

As noted above, the threading step of wire installation would require helicopter use. While only one small helicopter is needed, additional helicopters may be used to shorten the time for this phase. On average, each helicopter would operate 6 hours per day during stringing operations.

The operations area of the small helicopter would be limited to helicopter staging areas and are considered safe locations for landing. Final siting of staging areas for the proposed project would be conducted with the input of the helicopter contractor, and affected private landowners and land management agencies. The size of each staging area would be dependent upon the size and number of towers to be removed and installed. Staging areas would likely change as work would progress along the transmission lines.

Helicopter fueling would occur at staging areas or at a local airport using the helicopter contractor's fuel truck, and would be supervised by the helicopter fuel service provider. The helicopter and fuel truck would stay overnight at a local airport or at a staging area if adequate security is in place.

The dimensions of the area needed for the stringing setups associated with wire installation are variable and depends upon terrain. The minimum size needed for tensioning equipment set-up sites would require an area of 150 feet by 500 feet, the minimum size needed for pulling equipment set-up sites would require an area of 150 feet by 200 feet, the minimum size needed for splicing equipment set-up sites would require an area of 150 feet by 100 feet; however, crews would be able work from within slightly smaller areas when space is limited. Each stringing operation would include one puller positioned at one end and one tensioner and wire reel stand truck positioned at the other end. Splicing sites would be strategically located to support the stringing operations; splicing sites include specialized support equipment such as skidders and wire crimping equipment.

The puller, tensioner, and splicing set-up locations would be used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each tower. They would be necessary since the permanent splices that join the conductor together cannot travel through the rollers. For stringing equipment that cannot be positioned at either side of a dead-end transmission tower, field snubs (i.e., anchoring and dead-end hardware) would be temporarily installed to sag conductor wire to the correct tension.

The puller, tensioner, and splicing set-up locations require level areas to allow for maneuvering of the equipment. When possible, these locations would be located on existing level areas and existing roads to minimize the need for grading and cleanup.

The puller, tensioner, and splicing set-up locations associated with the proposed project would be temporary and the land would be restored to its previous condition following completion of pulling and splicing activities. The number and locations of the puller, tensioner, and splicing sites would be determined by the final engineering for the proposed project and the construction methods chosen by SCE or its Contractor.

An overhead OPGW would be installed on the transmission line for shielding and communication purposes. The OPGW would be installed in the same manner as the conductor; it is typically installed in continuous segments of 19,000 feet or less if installed in conjunction with the conductor, depending upon various factors, including line direction, inclination, and accessibility. Following installation of the OPGW, the strands in each segment would be spliced together to form a continuous length from one end of a transmission line to the other. At a splice location, the fiber cables would be routed down a structure leg where the splicing occurs. The splices would be housed in a splice box (typically a 3-foot by 3-foot by 1-foot metal enclosure) that would be mounted to one of the structure legs some distance above the ground. On the last structure at each end of a transmission line, the overhead fiber would be spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation. Construction activities regarding overhead OPGW installation is also discussed under the Telecommunication System Construction below for the Eldorardo-Lugo 500 kV line.

Housekeeping and Site Cleanup

During construction, water trucks may be used to minimize the quantity of airborne dust created by construction activities. Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by project activities (including material staging yards, pull and tension sites, and splicing sites) to preconstruction conditions following the completion of construction. Restoration would include grading and restoration of sites to preconstruction contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of offsite.

SCE would conduct a final survey to ensure that cleanup activities are successfully completed.

115 kV Subtransmission Line Construction

Seven existing LST H-frame structures (121-0 through 121-6) will be removed and replaced with one single-circuit engineered TSP and six light weight steel pole (LWSP) H-frames within the existing right-of-way at the transition point going north into the Ivanpah Substation. In addition, six LWSP H-frames will be installed at mid-span of the replaced structures to meet current requirements.

Approximately three single-circuit engineered TSPs would be installed and looped in to the proposed Ivanpah 115 kV rack position. The engineered TSPs would require concrete footings. The LWSP H-frames would be direct buried and backfilled with native soils. One circuit of 653.9 ACSR conductors, one conductor per phase, three phases per circuit, and two 3/8-inch-high strength shield wires will be placed on the new poles.

A total of 6.3 acres of temporary disturbance and 1.0 acre of permanent disturbance is estimated to occur with construction of the 115 kV system. The workforce estimates by activity to construct single-circuit 115 kV transmission line are as follows:

- Survey (4 personnel; 1.0 mile);
- Roads and Landing Work (5 personnel; 0.5 miles & 16 pads);
- Remove Existing H-Frame Poles (6 personnel; 7 steel poles);
- Remove Existing H-frame Foundations (4 personnel; 7 steel poles);
- Install TSP Foundations (7 personnel; 4 TSPs);
- Tubular Steel Pole/Light Weight Steel H-Frame Haul (4 personnel; 16 steel poles);
- Tubular Steel Pole/Light Weight Steel H-Frame Assembly (8 personnel; 16 steel poles);
- Tubular Steel Pole/Light Weight Steel H-Frame Erection (8 personnel; 16 steel poles);
- Install Conductor (16 personnel; 0.15 circuit miles);
- Restoration (7 personnel; 1.0 miles)

33 kV Distribution Line Construction

A 33 kV distribution system would be constructed to provide auxiliary power to the Ivanpah Substation. The station light and power would be served from approximately 400 feet of new ducts and one run of cable from the Nipton 33 kV circuit to the location of the new station light and power transformer in the Ivanpah Substation. The location of the transformer would be determined during final engineering.

Approximately 1 mile of new underground 33 kV circuitry and two new RCSs will be built in order to close the loop in the Nipton 33 kV circuit. The addition would consist of two ducts and one run of cable. The proposed work would be done next to Densmore Drive Road. The first RCS would be located south of Ivanpah Substation and the second RCS would be located next to the Primm Golf Course.

Approximately 4,300 feet of new 12 kV overhead line would be constructed between the town of Nipton and the new microwave site, northeast of Nipton. An overhead transformer would be installed with underground service to the microwave site. The line would be installed along the side of an existing dirt road.

A total of 0.34 acres of temporary disturbance and no permanent disturbance would occur with construction of the 33 kV system. The workforce estimates required for construction of the 33 kV project system would be as follows:

- Trenching, Structure, Excavation (4 personnel);
- Overhead Line (4 personnel);
- Underground Cable Pulling (4 personnel);
- Underground Cable Makeup (8 personnel)

Pole Upgrade for Nipton 33 kV All Dielectric Self Supporting Installation. As discussed above (see Section 2.1), the fiber optic path (Path 2-Section 3) from Nipton to the Ivanpah Substation would include the installation of fiber cables on existing Nipton 33 kV distribution line wood poles. Distribution line poles would be replaced if the poles do not meet wind load requirement with the addition of fiber cable. A hole about 8 feet deep would be drilled next to the existing pole, and a new pole would be erected. The conductor would be transferred from the existing pole to the new pole. The old pole would be removed.

Ivanpah Substation

Site Preparation

The grading of the Ivanpah Substation site and an access road to the site are analyzed in this Staff Assessment/Environmental Impact Statement for the proposed ISEGS project. This component would include the 885-foot by 850-foot substation site, the 10-foot perimeter buffer, and the area containing cut and fill slopes resulting from grading. The overall substation location would also require two transmission line access areas measuring approximately 1,015 feet by 400 feet or approximately 9 acres each. These areas are intended to provide room for the 115 kV and 220 kV transmission lines to turn into the station from the adjacent ROWs. Land disturbance would be limited to the actual structure erection locations, staging/pulling areas, and unpaved access roads.

The overall substation area is rectangular shaped measuring 1,650 feet by 1,015 feet consisting of approximately 38.5 acres, and is bounded by the existing SCE 115 kV ROW on the southeastern side and open BLM land on the other three sides. The following elements of site preparation would be required for the Ivanpah Substation and are included in the ISEGS analysis:

- Grade the entire 17-acre substation pad
- Grade the cut and fill side slopes to blend the existing terrain with the new pad
- Grade an earthen berm along the upslope pad boundaries to protect the substation from storm water runoff
- Grade and install the substation access roads
- Grade and install surface flow diversion/control measures

The following elements of site preparation would be required for the Ivanpah Substation and are included as part of the proposed SCE upgrades:

- Perform final grading;
- Install approximately 3,500 feet of 8-foot-high perimeter fence with barbed wire surrounding the entire substation pad and one 30-foot-wide rolling gate; and
- Install new 4/0 copper conductor ground grid to cover the entire pad.

The substation construction workforce would involve a: survey crew (2 personnel); grading crew (5 personnel); civil crew (7 personnel); and an electrical crew (8 personnel).

Earthwork Quantities Resulting from Foundation Excavation

Approximately 145 foundations of various sizes would be constructed throughout the substation pad to support equipment and steel structures. In addition, a network of partially buried concrete trenches and a buried grounding grid would be installed. Excavations of these foundations and trenches would commence following the completion of grading and other yard improvements, and would continue for several weeks. The estimated total volume of soil that would need to be excavated for foundation and trenches is 1,250 cubic yards and would be spread on a portion of the substation property.

Drainage

Since site drainage is an integral component of grading, potential mitigation measures for the control and diversion of existing surface flow are mentioned in the heading Grading and Earthwork. During final engineering measures to control drainage off the improved pad would be developed that would be in compliance with regulations regarding the alteration of natural drainage patterns. All new site drainage installations shall be consistent with the National Pollution Discharge Elimination System (NPDES) and the Storm Water Pollution Prevention Plan (SWPPP) prepared for the site. Typical drainage improvements shall consist of concrete swales, ditches and culverts.

Access

The substation access would provided by a new 24-foot wide, approximately 1,500 foot long asphalt concrete paved road. This road would originate from the existing Colosseum Road to a point west of the northeast corner of the substation pad. The roadway would include a 24-foot wide asphalt concrete paving over a compacted aggregate base over compacted sub-grade with a 3-foot wide compacted shoulder on each side. The substation entry gate would be a 30 foot wide electrically operated rolling gate near the northeast corner of the pad.

Geotechnical Testing

Soils testing shall be conducted and analyzed by a professional, licensed Geotechnical Engineer or Geologist, to determine existing soil conditions. Borings in a sufficient quantity to adequately gather variations in the site soils shall be conducted to remove sample cores for testing. The type of soils, soil pressure, relative compaction, resistively and percolation factor are among the items that will be tested for. If contaminants are encountered, special studies and remediation measures in compliance with environmental regulations will be implemented by qualified professionals

The results of the Geotechnical investigation shall be applied as needed by various engineering disciplines during the course of final engineering design.

Paving

Asphalt concrete paving would be applied to all designated internal driveways over an aggregate base material and a properly compacted sub-grade as recommended by the geotechnical investigation during final engineering. Asphalt concrete paving would be installed after all major construction had been completed.

Rock Surfacing

All areas within the substation perimeter that are not paved or covered with concrete foundations or trenches would be surfaced with a 4-inch layer of untreated, 0.75-inch nominal crusher run rock. The rock would be applied to the finished grade surface after all construction has been completed.

Spill Prevention Control and Countermeasures (SPCC)

The presence of oil in a quantity greater than 1,320 gallons invokes SPCC regulations. The quantity of oil contained in any one of the planned 220/115 kV transformers would be in excess of the minimum quantity required by law.

The control of oils spills through secondary containment would be designed by a licensed California Registered Professional Engineer. The permanent or temporary SPCC measures would be in place prior to the delivery of transformers to the site. Improvements may consist of, but not be limited to, trenches, holding areas, retention basins and curbs.

An SPCC plan would be prepared and maintained onsite. Substation operating personnel would be trained in the execution of the plan.

Storm Water Pollution Prevention Plan (SWPPP)

During construction activities, measures would be in place to insure that contaminates are not discharged from the construction site.

An SWPPP shall be developed that would define areas where hazardous materials such as concrete are to be stored; where trash will be placed; where rolling equipment shall be parked, fueled and serviced and where construction materials such as reinforcing bars and structural steel members are staged.

Erosion control during grading of the unfinished site and during subsequent construction shall he in place and monitored as specified by the SWPPP. A silting basin(s) shall be established to capture silt and other materials which might otherwise be carried from the site by rainwater surface runoff.

Approximately 20 percent of the completed substation would consist of impervious materials such as concrete foundations and asphalt concrete paving.

Perimeter Security

The entire substation area would be be enclosed by perimeter gates and fencing. Perimeter chain link fencing would conform to the requirements for electrical substations and have a minimum height of 8 feet above the adjacent finished grade to the outside of the substation. All perimeter fences and gates would be fitted with barbed wire. A motion sensing system would be attached to the fence chain link fabric to detect attempted unauthorized entry.

Eldorado Substation

The project would require two 220 kV line positions to terminate the new Ivanpah No.1 and No.2 220 kV transmission lines. The installation of the two additional positions would require that the existing 220 kV switchyard be extended 165 feet to the west within the existing substation fence. Upgrades to existing 220 kV circuit breakers and upgrades to 500 kV series capacitors within the existing substation fence may also be required, depending on electrical system requirements. An existing 220/115 kV transformer bank would be removed.

Telecommunication System Construction

Construction Activities for Installation of Optical Ground Wire on the Eldorado-Lugo 500 kV Transmission Line

The proposed telecommunication system would be composed of two paths. The first telecommunication path (Path 1) from the Eldorado Substation to the proposed Ivanpah Substation (also discussed above) would use new OPGW proposed to be constructed along the new 220 kV transmission line route from the Eldorado Substation to the Ivanpah Substation. The approximate length of the path is 35 miles. Path 1 would have 0.16 acres of temporary disturbance and no permanent disturbance.

The second telecommunication path (Path 2) from the Eldorado Substation to the Ivanpah Substation consists of three sections. The Section 1 route extends from the Eldorado Substation to a 500 kV tower (M152-T2) of the existing Eldorado-Lugo 500 kV transmission line near the intersection of Highway 164 and the 500 kV ROW. Approximately 25 miles of the existing Lugo-Eldorado 500 kV transmission line would need to have one of the two existing half-inch steel OHGW replaced with OPGW. It is estimated that approximately 45 of the existing structures along this route would require some form of structural modifications to accommodate the replacement of the OHGW with OPGW. The exact number of structures and the specific type of modifications would be determined once final engineering has been completed.

Path 2-Section 1 would have 17.0 acres of temporary disturbance and 10.8 acres of permanent disturbance. Path 2-Section 2 would have 1.21 acres of temporary disturbance and 0.02 acre of permanent disturbance. Finally, Path 2-Section 3A (preferred route) would have 0.23 acres of temporary disturbance and 0.23 acres of permanent disturbance.

Modifications of the existing Eldorado-Lugo 500 kV towers may include the static peaks, structure body reinforcement, body extension, installation of horizontal diaphragms, and structure legs reinforcement. Detail drawings and procedures for each of the structure modifications would be developed for fabrication and installation. The modifications to be performed on each structure would be identified by bundles. Each bundle would contain those components necessary to complete the required modifications, such as new steel angles to form back to back angles to the existing leg diagonals, redundant braces to the longitudinal and transverse faces, oblique braces between leg diagonals, and a new horizontal diaphragm. New redundant members would also be designed and installed at the ground peaks to support the OPGW clip-in hardware. The loading capacity of the upgraded structure structures would be able to support the loads for the new OPGW installation and meet the requirements of CPUC General Order 95 (for the state of California) and NESC (for the state of Nevada). Final structure modification and associated construction activities would be determined once final engineering is completed by the contractor. A list of the estimated work force and construction equipment required for construction of Paths 1 and 2 is included in SCE's PEA (SEC 2009).

Typical Telecommunication Construction Activities

Optical Ground Wire Installation on Structures

An OPGW would be installed on the existing transmission line for proposed project communication purposes. The OPGW would be installed in the same manner as the conductor. It is typically installed in continuous segments of 19,000 feet or less depending upon various factors including line direction, inclination, and accessibility.

Following installation of the OPGW, the strands in each segment are spliced together to form a continuous length from one end of a transmission line to the other. At a splice structure, the fiber cables are routed down a structure leg where the splicing occurs. The splices are housed in a splice box (typically a 3-foot x 3-foot x 1-foot metal enclosure) that is mounted to one of the structure legs some distance above the ground. On the last tower at each end of a transmission line, the overhead fiber is spliced to another section of fiber cable that runs in underground conduit from the splice box into the communication room inside the adjacent substation.

All Dielectric Self Supporting Installation on Poles

The overhead fiber optic cable would be installed by attaching cross arms on distribution poles. This would require the use of a bucket truck. One 4-man crew and two trucks would be used. A crew can install up to 2,000 feet of cable in 1 day. A crew can complete three splices in 1 day. Overhead fiber optic cable stringing would include all activities associated with the installation of cables onto cross arms on existing wood pole structures. This activity would include the installation of vibration dampeners, and suspension and dead-end hardware assemblies. Stringing sheaves (rollers or travelers) would be attached during the framing process. A standard wire stringing plan would include a sequenced program of events starting with determination of cable pulls and cable pulling equipment set-up positions. Advanced planning by supervision would determine pulling locations, times, and safety protocols needed for ensuring that safe and quick installation of cable is accomplished.

Fiber optic cable pulls typically occur every 10,000 feet to 20,000 feet over flat or mountainous terrain. Fiber optic cable splices would be required at the ends of each cable pull. Fiber optic cable pulls would be the length of any given continuous cable installation process between two selected points along the existing overhead or underground structure line. Fiber optic cable pulls would be selected, where possible, based on availability of pulling equipment and designated dead-end structures at the ends of each pull, geometry of the line as affected by points of inflection, terrain, and suitability of fiber optic cable stringing and splicing equipment set ups. The dimensions of the area needed for stringing set ups varies depending upon the terrain; however, a typical stringing set up is 40 feet by 60 feet. Where necessary due to space limitations, crews would be able to work from within a smaller area.

Installation in Conduit

For the installation of the fiber optic cable in existing and new underground conduit, a high-density polyethylene smooth-wall innerduct would be used. Innerduct would facilitate the installation of the fiber optic cable, provides protection, and would help identify the cable. The innerduct would be installed first inside the conduit. The fiber optic cable would then be installed inside the innerduct.

For splicing OPGW cables, special Outside Plant Splicing Lab Vehicles and Foreman Trucks would be used to travel to various splicing locations. Two crews including six splicers would be deployed for OPGW splicing work. Each 3-man crew would consist of two Splicing Lab Vehicles and one Foremen Truck. Each crew would complete one OPGW splice per day. The work space required would be a 30-foot by 40-foot area. The crew would bring the OPGW cable ends into the Splice Labs and splice together the two ends. After the cables are spliced, the splice case would be placed inside the OPGW splice cabinet. The slack loop would be coiled around the back of the cabinet.

Distribution line poles would be replaced if the pole does not meet wind load requirement with addition of fiber cable. Replacing distribution line pole would require a 5-man crew, 1 pole trailer truck, 1 pole digger truck, and 1 crew truck. An approximate 30-foot by 40-foot work area is required for the work. A hole approximately 8 feet in depth would be drilled next to the existing pole, and a new pole would be erected. A conductor would be transferred from the existing pole to the new pole and the old pole would be cut or removed.

Connecting the OPGW with the substation would require several steps. The splice box would be mounted 20 feet to 30 feet above ground on the last transmission structure closest to the substation fence line. About 25 feet of 5-inch vertical riser conduit would be installed to reach the splice box from ground. A trench would be dug from the structure to the substation fence line. The trench would be dug about 3 feet deep and 1.5 feet wide. A 5-inch conduit would be placed inside the trench from the structure to the substation fence line. A layer of slurry would be poured over the conduit for additional protection, and the dug up soil would be used to backfill the trench. At the fence line, the conduit would be connected to the conduit/trench inside the substation. Optical Fiber Nonconducting Riser (OFNR) type fiber cable would be pulled from the substation MEER through the substation trench/conduit and the last structure interface buried conduit and riser conduit to the splice box on the structure.

After the OPGW cable and OFNR cable are spliced, the splice case would be placed inside. The splice box and the slack loop would be coiled around the back of the box. About 40 feet by 60 feet of work area would be required for this job, two splice trucks with pulling equipment and a 4-man crew would be required to do the cable installation. Two splice trucks and a 3-man crew would be required to complete the fiber optic splicing.

Installation of Microwave Tower/Communication Site

An approximate 100-foot by 100-foot area would be required for a new communication site. Perimeter chain link fence would be built around the communication site. Typical communication sites consist of a communication building, microwave tower, and generator/fuel tank. A typical communication building is either a block wall-type building to be constructed on-site or **a** prefabricated building to be delivered to the job site.

The prefabricated building would be set on a concrete foundation using a crane. The typical building size is 36 feet by 12 feet; it consists of a generator room and an equipment room. The generator room is to house emergency backup generator and manual/automatic AC switch equipment. Microwave equipment, DC power equipment, and other telecom equipment would be installed in the equipment room. A separate concrete pad with 10-foot separation from the communication building would be constructed for fuel tank installation.

The required area for a typical free-standing, 4-legged lattice steel communications tower is 25-feet by 25-feet; the tower would be built outside the communication room or next to the MEER in the substation. Concrete footings would be installed to support the tower. Heavy equipment needed for construction includes ready-mixed concrete trucks for the footings and a crane for tower erection and antenna installation. Tractor-trailer vehicles would be used to transport steel tower components. A six- to eight-man crew may be on-site at any given time for tower construction and antenna installation.

Construction would consist generally of the following steps:

- Site preparation;
- Erect temporary fencing area;
- Set the foundations;
- Install prefab building, fuel tanks, and emergency generator;
- Erect the antenna tower (where necessary);
- Install telecommunications equipment and/or antennas;
- Erect permanent fencing; and
- Site cleanup.

It typically would take approximately 6 months to construct a new communication site.

OPERATION AND MAINTENANCE

Following the completion of project construction, operation and maintenance of the new lines would commence. Inspection and maintenance activities would include the following:

- Routine line patrols by both aircraft and truck;
- Routine, patrol identified, tower and wire maintenance;
- Routine line washing;
- Routine, patrol identified, earth and sand abatement from footings; and
- Routine right-of-way road maintenance.

The frequency of inspection and maintenance would depend on various conditions, including length of the line and weather effects. Inspection and maintenance activities typically include senior patrolman, foreman, lead lineman, journeyman lineman, apprentices, groundmen, helicopter pilots, equipment operators, and laborers. If the magnitude of repairs identified by routine patrols is substantial, other specialized employees such as surveyors, engineers, clerical personnel, and technicians would be attached to maintenance crews, as required, to address any unique problem that may arise due to such variables as substantial storm damage or vandalism.

SCE operates two types of helicopters for patrols of transmission lines: American Eurocopter AS-350D (B-2) (B-3) and Hughes 500. During a typical patrol, a helicopter would fly at or near the elevation of the point of support of the conductor. In populated areas, patrols would fly at higher elevations or away from the centerline of the transmission lines, in order to avoid flying close to houses or penned animals.

In cases where flying near a populated area cannot be avoided, the patrolman would use gyrobinoculars so as to increase the inspection distance between the structures and the helicopter to the greatest extent possible. In rural areas, unless designated otherwise, proximity to the ground is not restricted with the exception of safety and environmental concerns.

The entire Eldorado-Ivanpah transmission line corridor would be patrolled every year. The yearly patrol alternates each year between helicopter and truck. In one year, the patrol would be by helicopters and would take approximately one day (8 hours) to accomplish. The next year, the patrol would be performed by truck and would take five days. A yearly patrol is a minimum patrol requirement. Increases in pollution and population density in the vicinity of the proposed transmission line corridor may cause SCE to increase the patrol frequency of the line. Currently, there is no consistency between helicopter and truck patrol for these additional patrols, although patrols are handled by each approximately 50 percent of the time. In some cases crews prefer to use a helicopter and in other cases, the preference is to use a patrol truck. This decision would be made based on availability of resources and criticality of time.

Starting approximately 15 years after the operational date, maintenance on the proposed line would be expected to increase. Initial additional corridor maintenance would be due principally to weather and vandalism to the new line. As insulators and steel age on the line, the frequency of lattice steel tower hardware maintenance activities such as bolt torquing would increase. However, no significant increase in patrols or grading would be required.

REMOVAL AND RESTORATION

Prior to removal or abandonment of the facilities that would be permitted to be constructed on BLM lands or within a reasonable time following termination of the BLM ROW grant, SCE would prepare a removal and restoration plan. The removal and restoration plan would address removal of SCE facilities from the permitted area, and any requirements for habitat restoration and revegetation. The removal and restoration plan would then be approved by the BLM before implementation.

AIR QUALITY

Environmental Setting

California and Nevada

The SCE 220 kV transmission upgrades would occur in San Bernardino County, California (7 miles) and in Clark County, Nevada (28 miles). The transmission upgrades would cross BLM lands including the Ivanpah Dry Lake and some private land. These areas are largely open space, recreation, and some minimal private development within the Primm, Nevada region. The proposed route would be southwest of Las Vegas, where ozone, particulate matter, and carbon monoxide levels violate ambient standards, despite the very low population density outside of Las Vegas itself. The SCE electrical upgrades and telecommunications installations would be located within the Mojave Desert Air Basin, administered by the Mojave Desert Air Quality Management District.

Environmental Impacts

The construction and structure removal activities caused by the project would generate emissions at the locations of the work along the transmission line and telecommunication right of way (ROW) and at substation sites. The impacts would principally consist of exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment (*e.g.,* ozone precursors, Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOC), other criteria pollutants, such as CO and PM10, and toxic diesel particulate matter emissions) and fugitive particulate matter (dust) from travel on unpaved surfaces. Beyond the boundaries of the ROW and substations, exhaust emissions would also be caused by workers commuting to and from the work sites, from trucks hauling conductor, pole segments, and other equipment and supplies to the sites, and crew trucks (*e.g.,* derrick trucks, bucket trucks, pickups).

Odors of diesel exhaust from construction equipment would be reduced by the California's requirements for mandatory use of either low-sulfur or ultra-low-sulfur fuel. No substances used or activities involved with the project would have the capability to produce offensive odors. As such, the impacts of odors would be less than significant.

Once construction and structure removal is complete, operational emissions would result from vehicle and helicopter use for periodic maintenance, repair, and inspection of the system components. These mobile source emissions would be the only direct source of emissions related to project operation, and they would be minor. System monitoring, control, and inspections would induce light and medium-heavy duty truck traffic and periodic helicopter use. The air quality impact caused by emissions from project vehicular traffic for maintenance activities would be less than significant.

Mitigation

Construction phase emissions are generally short-term in duration. Effective and comprehensive control measures would be needed to reduce equipment emissions to the extent feasible. Implementing appropriate dust control measures would eliminate the possibility of emissions during project construction to potentially violate air quality standards or contribute substantially to existing violations.

Water trucks may be used to minimize the quantity of airborne dust created by construction activities. Energy Commission staff recommends that dust emissions from any concrete batch plants be mitigated by watering the area around the plants and by sealing the silos and transferring the fine particulates pneumatically between the silos and the mixers.

The project would be required to comply with Mojave Desert Air Quality Management District rules and portable equipment rules, which would dictate how the equipment could be operated. Finally, with effective and comprehensive control measures such as those recommended by Energy Commission staff for the proposed ISEGS project, dust and equipment exhaust impacts could likely be reduced to a less than significant level.

Conclusion

The construction and structure removal activities associated with SCE's upgrades would cause emissions due to heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) emissions from activity on unpaved surfaces. With effective and comprehensive control measures such as those recommended by Energy Commission staff for the proposed ISEGS project, dust and equipment exhaust impacts could likely be reduced to a less than significant level.

BIOLOGICAL RESOURCES

Environmental Setting

California

The SCE transmission line upgrade would be located in California for approximately 7 miles. The existing SCE 115 kV transmission line is located in the southeastern portion of the Northern and Eastern Mojave Planning Area (NEMO) in the desert region of San Bernardino County. The desert regional habitat of San Bernardino County includes soils that are predominantly sandy gravel, and include major dune formations, desert pavement, and dry alkaline lake beds (SB County 2007). The Mojave Desert region is characterized by arid conditions with low precipitation. The entire NEMO planning region is crossed by expansive alluvial washes.

Vegetation Communities

The project would occur along an alluvial fan that extends eastward from the Clark Mountains to the Ivanpah Dry Lake. The alluvial fan's topography slopes gradually and the fan is dissected by several desert washes. The predominant vegetation is the Mojave creosote bush scrub and is typical of the arid Mojave Desert region (BSE2007A). Mojave creosote bush scrub is composed of evergreen and drought-deciduous shrubs, cacti and yucca (BSE2007A). Creosote bush (*Larrea tridentata)* is the dominant species in this region. Other vegetation types include the burrobush (*Ambrosia dumosa)*, cheesebush (*Hymenoclea salsola)*, Nevada ephedra (*Ephedra nevadensis)*, and Mojave yucca (*Yucca schidigera)* (BSE2007A). Mojave creosote bush scrub habitat supports high densities of barrel cactus (*Echinocactus polycephalus* and

Ferocactus cylindraceus var. *lecontei)*. The transmission line also would traverse the Ivanpah Dry Lake. Dry lake beds support a vegetation community of primarily fleshy salt-tolerant plants such as iodine bush and seepweed (SB County 2006). The density and variety of plants found in such regions are naturally low. Please see the **Biological Resources** section within this Staff Assessment for a complete list of the common vegetation species that are expected to occur within the Ivanpah Valley region.

Wildlife species

Wildlife of the Mojave Desert scrub occurs at low densities and is highly specialized for the arid environment. It includes several rare, unusual, or protected species, including the desert tortoise (*Gopherus agassizii*). The desert tortoise, which occurs throughout most of San Bernardino County's deserts, is fully protected by the California Endangered Species Act, and the federal Endangered Species Act. Numerous other common wildlife species were observed or are expected to occur at the ISEGS site, and as such would be expected along the corridors and substation sites. Please see the Biological Resources section within this Staff Assessment for a complete list of the common wildlife species that are expected to occur within the Ivanpah Valley region.

Nevada

The SCE transmission upgrades would be located in Nevada for approximately 28 miles beginning at Eldorado Substation. The existing Eldorado Substation and SCE 115 kV transmission line are located in the southwestern portion of Clark County, Nevada. Clark County is located within the Sonoran Basin and Range Province or Mojave Desert Shrub Biotic Communities. The regional habitat of Clark County includes soils that are predominantly Entisols, located in areas where soils are actively eroding (such as on steep slopes) or receiving new soil materials (such as alluvial fans), and Aridisols, often associated with desert pavement (LVMP 1998). The Mojave Desert region is characterized by arid conditions with low precipitation. The climate of Southern Nevada has an average precipitation of four to eight inches at lower elevations and from 12 to 20 inches at higher elevations. Maximum precipitation falls between November and March.

Vegetation Communities

The SCE 115 kV to 220 kV transmission upgrade is located within the Mojave Desert Shrub Biotic communities with hot, dry summers and mild winters. Southern Nevada has a high percentage of sunny days per year (LVMP, 1998). According to generalized vegetation mapping of the Las Vegas Resource Management Plan, the SCE 115 kV transmission upgrade would traverse Southern desert shrub and Mojave desert shrub communities. The Southern desert shrub occurs primarily at elevations below 4,000 feet, with annual rainfall averaging less than six inches and temperatures ranging from over 100 degrees Fahrenheit in the summer to 25 degrees in the winter (LVMP 1998). Creosote bush (*Larrea tridentate)* is the dominant species, and may occur with yucca (*Yucca schidigera)* depending on elevation. Additional vegetation found in the Southern desert shrub includes white bursage (*Ambrosia dumosa)*. Catclaw acacia (*Acacia greggii)* is found in dry washes at lower elevations.

Mojave desert shrub is made up of a mixture of shrubs characteristic of mid-elevation Mojave desert. The species occur on tuff or alluvial deposits at elevations between

4,000 and 5,000 feet (LVMP, 1998). Joshua tree (*Yucca brevifolia)* is one of the dominant species of the overstory. Common shrubs include horsebrush (*Tetradymia glabrata),* spiny menodora (*Menodora spinescens),* burrobrush (*Hymenoclea salsola)*, box thorn (*Lycium andersonii)*, green ephedra, green rabbitbrush (*Chrysothamnus viscidiflorus),* Mormon tea (*Ephedra nevadensis)*, and four-wing saltbush. Blackbrush (*Coleogyne ramossissima)* and sagebrush (*Artemisia* sp.) become the dominant shrubs at higher elevations. Cacti species are also part of this community including cottontop barrel cactus (*Echinocactus polycephalus),* prickly pear (*Opuntia echinocarpa*), and various cholla species (*Opuntia* sp.) (LVMP 1998).

Pinyon-Juniper Woodland is found in the McCullough range south of the SCE 115 kV transmission upgrade. The singleleaf pinyon pine (*Pinus monophylla)* and Utah juniper (*Juniperus osteosperma)* are the dominant components of this community.

The SCE upgrades would be located in between the North McCullough Mountain Wilderness Area and the South McCullough Mountain Wilderness Area in an already designated transmission line corridor.

Wildlife Species

According to the Las Vegas Management Plan, the SCE 220 kV transmission line upgrade would cross desert bighorn sheep (*Ovis canadensis nelsoni)* habitat, quail (*callipepla gambelli)* habitat, and would be north of mule deer (*Odocoileus hemionus)* winter rangeland; all of which are considered species of concern. The upgrades would be located north of the Piute-El Dorado desert tortoise Desert Wildlife Management Area (DWMA).

The following non-listed, special status animal species have moderate to high potential to occur along the 220 kV transmission line upgrade: chuckwalla (BLM sensitive) and gila monster (State of Nevada protected).

Environmental Impacts

Potential impacts to biological resources caused by the project could occur as a result of construction disturbance at or near the construction work sites that would be established for the project components. These sites include the pull and tensioning sites used to pull the new conductors onto the towers and potential sites for staging or marshalling yards. Temporary construction yards would be established in both California and Nevada along the route. Generally these yards range in size from a few acres to up to approximately 30 acres. Construction of the Ivanpah Substation would require a temporary laydown area located at or near the existing roadway at the site. Upgrades at Eldorado Substation would be within the existing substation property, and construction of the remaining 115 kV switchrack, the 220 kV switchrack and the transformer banks at Ivanpah Substation would be on already-disturbed/graded land that was analyzed as part of this Staff Assessment.

For the proposed 220 kV route, new dulled galvanized 220 kV lattice steel towers (LSTs) and H-frame structures would be installed in the existing and new ROWs. Permanent loss of habitat would occur at each of these structure sites.

Few main access roads are expected to be required for the proposed route, because it would largely follow an existing transmission corridor; however, spur roads to individual towers would be required. Where overland vehicle travel is not possible, upgrades to main access roads and extensions to existing spur roads would be needed to allow passage of construction vehicles. Such upgrades may require vegetation clearing and grading based on site conditions. During transmission line construction, most of the spur roads built to accommodate new construction are usually left in place to facilitate future access for operations and maintenance purposes. Thus for the purposes of this analysis, the disturbance is assumed to be permanent.

Impacts that could occur include disturbance of habitat caused by movement of the construction equipment, disturbance of nesting activities caused by construction noise and movement of machinery, and potential take of listed species caused by construction activities at the structure locations. Therefore, the project could potentially impact special status species and sensitive habitats. Recommended mitigation measures would be needed to avoid, eliminate, reduce to a less-than-significant level or compensate for those impacts.

Mitigation

Approximately 24 to 48 hours prior to construction equipment being moved on to an individual site, a team of biologists should inspect each site to detect and remove desert tortoises. If a tortoise burrow is detected, it would be cleared of tortoises that could be inside and then closed to prevent additional tortoises from entering the burrow. This should be accomplished consistent with U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) incidental take authorizations.

Energy Commission staff recommends mitigation such that breeding birds would be avoided by limiting construction periods or by installing noise attenuation on construction equipment. Vehicle use would be limited in areas where sensitive habitats are located. If the aforementioned means of impact avoidance were found to be infeasible at the time of construction, a helicopter could be used to minimize ground disturbances. Use of helicopters for installation would eliminate land disturbance associated with crane pads, structure laydown areas, and the trucks and tractors used for steel delivery to structure sites.

Further, construction activities would need to be monitored by qualified personnel. However, no formal construction plan would be developed until SCE submits its application to the CPUC and BLM and they conduct their own environmental review of the project, which could require implementation of mitigation measures for any identified potentially significant impacts. With implementation of measures that would address potential impacts specific to this upgrade project on a tower-by-tower basis for the 220 kV line upgrade and for each individual project component, it is likely that impacts to biological resources would be reduced. However, before mitigation can be proposed, the project and its potential impacts must be clearly defined, including exact identification of work site locations.

As mentioned above Energy Commission staff recommends mitigation that includes identification of and avoidance of critical habitat and endangered species. Construction activities would be limited during the nesting season in compliance with the Migratory Bird Treaty Act and recommendations to avoid electrocution by maintaining optimal phase separation between new phase conductors or a phase conductor and grounded hardware/conductor would be implemented. An additional biological survey should also be conducted prior to initiation of the project to ensure there are no nesting birds on subtransmission or 115 kV towers or conductors that are being removed. Finally, the following general measures, should be implemented during construction to minimize impacts to sensitive biological resources.

- ***Establish Environmentally Sensitive Areas.*** Additional direct and indirect impacts to sensitive biological resources throughout the project corridors should be avoided or minimized by designating these features outside of the construction impact area as environmentally sensitive areas (ESAs) on project plans and in project specifications. Information related to the locations of ESAs and their treatment should be shown on contract plans and discussed in the Environmental Awareness Training. ESA provisions should include, but are not limited to, the use of temporary high-visibility orange fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, and to delineate and exclude sensitive resources from potential construction impacts. Contractor encroachment into ESAs should be restricted (including the staging/operation of heavy equipment or casting of excavation materials). ESA provisions should be implemented as a first order of work, and remain in place until all construction activities have been completed.
- ***Biological Monitor*****.** A qualified biologist should monitor all construction activities. Construction activities should not proceed without presence of a biological monitor. The biological monitor should have the authority to stop construction, if necessary, to avoid impacts to special status species or sensitive habitats.
- ***Environmental Awareness Training.*** All construction personnel working in the project corridor should be required to attend environmental awareness training. At a minimum, the training should include: (1) an overview of the regulatory requirements for the project components, (2) descriptions of the special-status species in the project area and the importance of these species and their habitats, (3) the general measures that are being implemented by SCE to minimize environmental impacts, and (4) the boundaries within which equipment and personnel would be allowed to work during construction. SCE should maintain a record of all workers who have completed the program.
- ***Limit Vegetation Removal*****.** Vegetation removal should be limited to the absolute minimum amount required for construction.
- ***Erosion Control.*** Temporary erosion control devices should be installed on slopes where erosion or sedimentation could degrade sensitive biological resources.
- ***Construction Clean-up*****.** All temporary fill and construction debris should be removed from the project site after completion of construction activities.
- ***Construction Scheduling.*** Construction should be timed to minimize potential impacts to sensitive biological resources.

Conclusion

Because it appears some of the construction work would occur in or near sensitive species, habitats, and/or waters of the U.S., Energy Commission staff concludes that the upgrades could adversely impact sensitive biological resources in and/or adjacent to the transmission line corridor and substation sites. Potential impacts include construction noise effects on nesting activities, and construction activity physical effects on habitats.

It is Energy Commission staff's opinion that impact avoidance measures would help reduce potentially significant biological impacts to levels less than significant. However, there would also be permanent habitat disturbances at tower locations, at the Ivanpah Substation and with the construction of new access and spur roads.

Energy Commission staff recommends that after construction plans are finalized, a complete project description (including results of all sensitive species surveys, and a revised assessment of potential impacts) be developed as part of the CPUC EIR and BLM EIS.

Activities associated with upgrading the transmission line, substations and telecommunication facilities would require compliance with applicable Federal, State and local laws, ordinances and regulations, including: Federal and State Endangered Species Acts, Federal Migratory Bird Treaty Act, and Federal and State Clean Water Acts. Specific agency permits would be required before any work could commence. To determine which permits may be applicable to the upgrades, Energy Commission staff recommends that SCE should consult with applicable local, state and federal agencies.

Even if the upgrades work complies with all applicable laws, ordinances, regulations and standards (LORS), absent biological survey information, Energy Commission staff conservatively concludes that the SCE upgrades may create significant impacts to biological resources due to the permanent loss of habitat and the disturbance to sensitive plant and wildlife species during construction.

CULTURAL RESOURCES

Environmental Setting

California

The regional setting for archaeological resources in the Ivanpah Valley is presented in the **Cultural Resources** section of this Staff Assessment. Prior to CEQA and NEPA permitting, cultural surveys would need to be conducted along the proposed 220 kV ROW within California and Nevada, as well as along the telecommunications facilities pathways and at the substation sites.

Nevada

All prehistoric Native Americans in southern Nevada, in the vicinity of the project, used hunting and gathering methods to acquire at least some of their foods. Hunters-gatherers moved seasonally within a series of environmental zones, and the adaptation to arid land resources is placed by archaeologists in the period called the Archaic

(LVMP 1998). Heaviest use of the southern Nevada region is thought to have occurred within the last 5,000 years. Southern Nevada was used by three distinct groups (Lower Colorado, Virgin Anasazi, and Southern Paiute peoples). Lower Colorado tribes such as the Mojave conducted floodwater farming along the Colorado River south of the Las Vegas Valley and exploited resources in the surrounding ranges and valleys. The Lower Colorado people lived in open camps and rancherias, making their archaeological record similar to that of the Archaic hunter-gatherers (LVMP 1998). The Virgin Anasazi tribes are characterized by use of agriculture (maize, gourds, and possibly cotton), pit structures and aboveground masonry structures, possibly the use of kivas, and ceramics. They lived in isolated villages. The southern Paiute are considered descendants of the Archaic hunter-gatherers in southern Nevada and lived in temporary brush structures, foraging among the diverse environmental zones of the region (LVMP 1998).

Historic use of southern Nevada began with the exploration of routes such as the *Old Spanish Trail/Mormon Road* (1844 to the early 1900s). Potosí mine, the first mine in the region, dates to 1861 and ranching was underway in the late 1800s. Historic foundations such as mining sites, ranches, and quarries are found within southern Nevada.

Environmental Impacts

Ground disturbance, the presence of vehicles driving over the top of sites and the installation of new towers could damage archaeological resources. After the work area is defined and after archaeological and historic surveys are complete in any areas that have not been protocol-level surveyed previously by SCE, archaeological sites or historic resources within the built environment may be identified. Depending on when they were built, if the existing SCE 115 kV line or the Eldorado Substation are determined eligible for the National Register of Historic Places (NRHP), the upgrades and removal effort would result in an impact to historical resources. Whether the impact is significant would need to be determined after the line or substations are evaluated.

Some new underground and overhead lines would be installed in places where there previously were none, and some existing overhead lines would have poles replaced or new poles installed along the existing line. The trench for undergrounding would normally be excavated within or adjacent to a roadway, and trenching would not come within 12 inches from any existing fence, wall, or outbuilding associated with an adjacent property. Therefore, there would be no potential to adversely impact the physical condition of existing above-ground cultural resources. The only potential to adversely impact existing above-ground cultural resources would arise from a change in the visual setting of the property due to the addition of taller poles or new poles, new overhead lines, and new substation equipment depending on the location in the project area.

Any potential for the project to impact cultural resources would be limited to undiscovered below-ground cultural deposits. It is possible that buried cultural deposits could be encountered during ground disturbing project activities including trenching for the installation of underground fiber optic cables, during ground disturbance associated with the replacement or installation of new poles, or ground disturbance associated with the construction at the substations.

Mitigation

During the CEQA/NEPA environmental permitting process, cultural resources sites would likely be identified and then would be avoided by vehicles and construction activities.

Energy Commission staff recommends that after the construction area has been identified, and after work for Section 106 has been completed, that archaeological sites be evaluated for eligibility for listing in the NRHP or Califorina Register of Historic Resources (CRHR) if it appears that any would be affected by the project. Sites that have been evaluated as “not eligible” would warrant no further consideration and avoidance would not be required. Sites that have not been evaluated and sites that are considered “potentially eligible” should be treated as eligible resources pending formal evaluation.

Data recovery should be conducted as a recommended mitigation measure for archaeological sites that are recommended as eligible to the CRHR or NRHP and would be impacted by the project. Monitoring of project-related excavation within an archaeological site is not appropriate mitigation and may destroy the site. SCE should comply with provisions of the National Historic Preservation Act and should consult with a California State Historic Preservation Officer regarding appropriate mitigation should any cultural materials be encountered during construction or other ground-disturbing activities.

Conclusion

While SCE would avoid effects to known cultural sites, it is possible that the corridors have sensitive cultural resources that could be affected. Energy Commission staff believes that it will be possible to mitigate all impacts to cultural resources to less than a significant level through the Section 106 process and implementation of recommended measures that apply to cultural resources. Known sensitive areas would be avoided, construction activities would be monitored and other appropriate mitigation similar to the conditions of certification identified in the **Cultural Resources** section of the Staff Assessment would be implemented.

GEOLOGY AND PALEONTOLOGY

Environmental Setting

California

The regional setting for the geological and paleontological resources in the Ivanpah Valley is presented in the **Geology and Paleontology** section of this Staff Assessment.

Nevada

The topography of Clark County is characteristic of the Basin and Range Province, with internally draining basins separated by ranges, hills, and mesas. The Las Vegas Valley cuts diagonally across Clark County following a north-trending ridge (LVMP 1998). The mountain ranges are primarily composed of exposed bedrock, are steep and cut by deep valleys. The geologic history of southern Nevada includes periods of deposition, uplift, igneous activity and erosion since the Paleozoic time (LVMP 1998). Marine sedimentary deposits accumulated during Paleozoic and Mesozoic times. Approximately 50 million years ago, volcanic materials extruded over much of the region, then were uplifted and deformed by faulting (LVMP 1998). Since this period, southern Nevada has been geologically calm, with largely depositional and erosional forces.

No active or potentially active faults are known to cross the transmission line corridor (USGS 2008). The USGS National Seismic Hazards Maps – 2008, predicts a peak ground acceleration with a 10 percent probability of exceedance in 50 years of between 5% and 7% for the project corridor.

According to the BLM Las Vegas Management Plan, a minimal amount of paleontological research has been conducted in this region although fossilized vertebrae bones and invertebrate fossils have been uncovered in the southern Nevada region.

Environmental Impacts

Energy Commission staff recommends that that soils testing should be conducted and analyzed by a professional, licensed Geotechnical Engineer or Geologist, to determine existing soil conditions. Borings in a sufficient quantity to adequately gather variations in the site soils should be conducted to remove sample cores for testing. The type of soils, soil pressure, relative compaction, resistively and percolation factor are among the items that should be tested. The results of the Geotechnical investigation would then be applied to the project's engineering design and this would ensure that potential impacts associated with problematic soils and slope instability are reduced to less than significant levels.

Excavation and grading for structure foundations, work areas, access roads, and spur roads could loosen soil and accelerate erosion. In addition, the potential disturbance of desert pavement areas is a special concern in the desert areas along the proposed route. Desert pavement is a unique geologic/soil feature that takes thousands to tens of thousands of years to form and protects the underlying silty and sandy soils from excessive wind and water erosion. Damage to desert pavement could result in an extreme acceleration of erosion. Depending on the soil associations along the proposed route and whether desert pavement is present along the project corridor, mitigation would be recommended to protect desert pavement.

There are no known active faults crossing the proposed route and the area is considered to have a low potential for seismic hazard. Therefore, there would not likely be any impacts related to fault rupture, liquefaction, strong groundshaking, or earthquake-induced landslides. The structures would be constructed to comply with all applicable LORS.

Construction of the transmission line could also destroy or disturb significant paleontological resources located within the project area with construction-related ground disturbances, such as the building or improvement of access and spur roads, borehole drilling, trenching, excavating, grading, and vegetation removal.

Mitigation

Implementation of mitigation measures discussed under Soils and Water in Chapter 3.9 of this Appendix would reduce the amount of erosion that would result from construction. In addition, compliance with a Stormwater Pollution Prevention Plan (SWPPP) would limit erosion from the construction site. If desert pavement is located along the proposed route, mitigation would be recommended by Energy Commission staff to protect desert pavement through avoidance or use of temporary mats. With implementation of measures and best management practices that would ensure proper re-vegetation, erosion control, and drainage, among other requirements, SCE's project upgrades would create a less than significant impact to geology and paleontology.

Impacts to paleontological resources that may exist would be potentially significant. Energy Commission staff recommends mitigation that would provide for a paleontological resources inventory after final project design, pre-construction planning for monitoring and treatment of paleontological resources, and for monitoring during construction. The mitigation should require a qualified paleontological monitor and qualified paleontologist to monitor for significant subsurface fossils and then collect, analyze and curate any significant fossils found. Implementation of this suggested paleontological mitigation would reduce project impacts to paleontological resources to a less than significant level.

Conclusion

SCE would comply with applicable LORS as related to the identified upgrades project. No significant geologic or paleontologic resources have been identified in the project area; however, technical investigations/surveys have not yet been performed. The upgraded lines and substation equipment would be designed and constructed in accordance seismic requirements of SCE's Construction Standards and CPUC General Order 95. The project would have no adverse impact with respect to geologic and paleontologic resources if it implements the recommended mitigation and complies with applicable LORS.

HAZARDOUS MATERIALS MANAGEMENT

Environmental Setting

California and Nevada

The SCE transmission and telecommunication upgrades would be located in northeastern San Bernardino County, California and southwest Clark County, Nevada predominantly on undeveloped BLM desert. Expansive, primarily undeveloped desert and mountainous areas characterize this portion of the Mojave Desert. Interstate 15 and Highway 95 are the primary highways providing vehicular access throughout this region. The threading step of wire installation, some tower installation, and maintenance patrols would require helicopter use. Helicopter staging would occur at staging areas or at local airports and would be supervised by the helicopter fuel service provider.

A number of hazardous chemicals would be used during construction of the SCE transmission upgrades in small quantities. Proposed safeguards and measures to greatly reduce the opportunity for, or the extent of, exposure to hazardous materials or other hazards would be put in place.

Location of Exposed Populations and Sensitive Receptors

The general population includes many sensitive subgroups that may be at a greater health risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a large bearing on health risk. There are no sensitive receptors along the California portion of the SCE transmission upgrades. The nearest residences along the Nevada portion of the SCE transmission upgrades would be located in Primm, Nevada.

Environmental Impacts

Hazardous materials such as fuels, oils, and other vehicle and equipment maintenance fluids would be used during the construction phase of the project and stored at the project substation sites and construction staging areas. Improperly maintained vehicles and equipment could leak fluids during construction activities and while parked. There would be a potential for incidents involving release of gasoline, diesel fuel, oil, hydraulic fluid, and/or lubricants from vehicles or other equipment at the staging areas and/or the project sites. Spills and leaks of hazardous materials during construction activities could potentially result in soil or groundwater contamination. Improper handling of hazardous materials could expose project workers or the nearby public to hazards.

In addition, although Polychlorinated biphenyls (PCB) have been banned from use with electrical distribution and substation transformers by the U.S. EPA since 1985 (U.S. EPA, 2005), some older pieces of electrical equipment within SCE's system may still contain PCBs. There is a likelihood that some PCB containing equipment would need to be removed from some of the project locations during the construction of the project and removal of the existing line. Therefore, there would be a potential for a PCB release to contaminate the environment in the event of a spill while handling and transporting PCBs.

Excavation required to construct the components of the project would primarily be limited to areas at existing and proposed tower, pole, and H-frame structure locations, at underground fiber optic trench locations, and at the existing Eldorado Substation and proposed Ivanpah Substation locations. A contamination site record search would need to be conducted to determine existing known contaminated sites in the project vicinity. Therefore, it is possible that subsurface construction activities could accidentally disturb documented contamination sites, potentially mobilizing soil and/or groundwater contamination.

Finally, previously undocumented soil and or groundwater contamination could be encountered during tower and pole installation, trenching, grading, or other excavation related activities, particularly at the existing Eldorado Substation, despite the steps taken to identify and avoid contamination.

The presence of oil in a quantity greater than 1,320 gallons invokes Spill Prevention Control and Countermeasures (SPCC) regulations. The quantity of oil contained in any one of the planned 220/115 kV transformers would be in excess of the minimum quantity that requires such regulations.

Mitigation

To identify and avoid documented contamination sites relative to the project sites, record searches specifically for the project locations would need to be conducted. Implementation of mitigation measures should require identification and avoidance of documented contamination sites, thus ensuring that the potential impacts caused by documented contaminated sites would be reduced to less than significant levels.

Energy Commission staff recommends that soils testing should be conducted and analyzed by a professional, licensed Geotechnical Engineer or Geologist, to determine existing soil conditions. Borings in a sufficient quantity to adequately gather variations in the site soils should be conducted to remove sample cores for testing. The type of soils, soil pressure, relative compaction, resistivity, and percolation factor are among the items that should be tested for. If contaminants are encountered, special studies and remediation measures in compliance with environmental regulations should be implemented by qualified professionals.

During trenching, grading, or excavation work for the project, mitigation measures should be developed that would require the contractor to observe the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during construction, Energy Commission staff recommends that the contractor should be required to stop work until the material is properly characterized and appropriate measures are taken to protect human health and the environment. The contractor would also have to comply with the all local, State, and federal requirements for sampling and testing, and subsequent removal, transport, and disposal of hazardous materials.

Helicopter fueling should occur at staging areas or at a local airport using the helicopter contractor’s fuel truck, should be supervised by the helicopter fuel service provider, and Storm Water Pollution Prevention Plan (SWPPP) measures should be followed, as applicable. The helicopter and fuel truck would likely stay overnight at a local airport or at a staging area if adequate security is in place.

Ivanpah Substation

SCE would follow SPCC regulations and the control of oils spills through secondary containment would be designed by a licensed California Registered Professional Engineer. Permanent or temporary SPCC measures should be in place prior to the delivery of transformers to the site. Improvements may consist of, but not be limited to, trenches, holding areas, retention basins and curbs. An SPCC plan would be prepared and maintained on-site. Substation operating personnel will be trained in the execution of the plan.

Conclusion

Implementing mitigation measures similar to the conditions of certification that are proposed in the Staff Assessment for construction of the ISEGS, and implementation of SWPPP and a SPCC plans would avoid potential significant hazard impacts from work associated with the SCE upgrades.

LAND USE

Environmental Setting

California

As stated in the **Land Use** Section of this Staff Assessment, the Ivanpah Valley area has approximately 37,280 acres of land bounded by the Mojave National Preserve at Nipton Road on the south and southwest, a power line road parallel to and south of I-15 across Ivanpah Dry Lake on the northwest and north, and the Nevada border on the east. It is also adjacent to the Stateline and Mesquite Wilderness Areas.

The SCE upgrades would be located in the Ivanpah Valley, in the Mojave Desert (San Bernardino County) and the 220 kV line would run approximately 7 miles northeast entirely on federal land managed by the BLM. The 220 kV transmission line would be located entirely on federal land in California and would be under federal jurisdiction and would be located within or parallel to an existing expanded transmission ROW. There are no schools, day-care facilities, convalescent centers, or hospitals within the immediate vicinity of the project study area in California. The project would cross the I-15 ROW; I-15 provides access from southern California to Nevada.

Recreation

The 220 kV transmission line would run approximately 0.5 mile northwest of the Primm Valley Golf Club at its closest point and a remote control switch (RCS) associated with the 33 kV distribution line upgrades would be installed underground next to the golf course as well. The golf course is affiliated with the Primm Valley Casino Resorts located in Las Vegas, Nevada and is a public course. The SCE existing 115 kV transmission line also crosses the Ivanpah Dry Lake, which covers approximately 35 square miles. This area is open to non-motorized vehicles and is a popular destination for recreational activities such as land sailing, archery, and kite demonstrations and it is estimated that the Ivanpah Dry Lake receives approximately 5,000 visitors annually. The transmission line upgrade would be located in the NEMO boundaries. The California desert, including the NEMO planning area, offers multiple recreational opportunities such as casual vehicle touring, nature studies, hiking, camping, and lakebed activities as mentioned previously.

Nevada

The SCE 220 kV transmission line upgrade would traverse BLM land in Clark County for approximately 20 miles and would traverse private land in Clark County for approximately seven miles until reaching the Eldorado Substation. Immediately upon crossing the California/Nevada boundary, the transmission line would run just south of developed, private land in Primm, Nevada. The majority of the BLM land is undeveloped open space.

The existing SCE 115 kV transmission line crosses the Union Pacific Railroad ROW in Nevada approximately two miles from the Nevada/California border. As stated above, at the Nevada/California border the transmission line would be located just east of Primm, Nevada and would be adjacent to the Primm Outlet Mall, an existing shopping outlet with over 100 stores owned by MGM Mirage, and the Primm Valley Resort and Casino.

Upon entering Nevada, the transmission line would traverse or be adjacent to the Jean Lake and Hidden Valley Grazing Allotments and would be adjacent to or cross numerous other transmission lines.

Recreation

Much of the BLM land in southern Nevada is dedicated to recreation, however the SCE 220 kV transmission line would not cross or be adjacent to any designated recreational lands. The transmission line would pass approximately 1 mile south of the Sloan Canyon National Conservation Area, including the North McCullough Wilderness Area, and approximately 1 mile north of the South McCullough Wilderness Area, both used frequently for recreational purposes, including historic cultural resources, camping, and rock climbing.

Environmental Impacts

Most of the project components would be within existing utility corridors, existing roadways and substation sites. This transmission system upgrade would not involve changing existing or planned land uses in California or Nevada. The construction yards would be temporary and most disturbance impacts to land use would be short-term during construction.

The upgrades would also require access to the existing transmission line ROW by construction vehicles and equipment, which would use existing access roads where possible. However, SCE would need to acquire rights for any new spur roads. Any additional impacts to land use would be temporary and confined to the work areas. There would be no displacement of any existing land use. The development of spur roads along an existing ROW would not be considered a significant impact to land uses in the area. Furthermore, since the utility corridor and the substation sites are established land uses, upgrading of the Ivanpah-Eldorado line and installing the 115/220 kV switchrack are not expected to conflict with applicable LORS, including the General Plans of Clark or San Bernardino Counties or Primm, Nevada.

The noise and presence of heavy equipment associated with project construction may temporarily reduce visitation to recreational areas. Recreationists may cancel or schedule their visits to avoid construction periods thereby resulting in temporarily reduced visitation, especially to Ivanpah Dry Lake, where construction could pose a safety hazard to land sailors and other recreationists. However, due to the size of the dry lake, it is assumed that recreationists would not be precluded from those non-motorized activities.

Mitigation

Energy Commission staff recommends that SCE should post notices on the ROW or at other sites where the public would be affected by construction activities. Notices should be posted approximately one month prior to commencing work. At ROW ingress and egress points, postings should be placed along the ROW and at work sites approximately two weeks prior to the closing of public access. Energy Commission staff also recommends mitigation that would require SCE to identify and provide a public liaison person before and during construction to respond to public concerns about construction disturbances.

Energy Commission staff recommends mitigation measures that would require SCE to coordinate construction activities and the project construction schedule with the authorized BLM officer for the Ivanpah Dry Lake area, and require SCE to identify alternative recreation facilities that may be used by the public during construction.

Conclusion

The SCE upgrades would not cause a change in land use except there may be a slight change in land use designation in areas where the corridor would be widened. Once construction is completed, there would not be a change in access for recreation in and across the corridor. Since the line and telecommunication upgrades would mostly be within or parallel to an existing and established, yet widened, ROW, on existing towers, or would be underground, the project components would not disrupt or divide the physical arrangement of an established community. Also for these reasons, the upgraded transmission line would not restrict existing or future land uses along the route.

NOISE

Environmental Setting

SCE's ROW for the Eldorado-Ivanpah portion of the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line corridor is 75 feet, and would be widened for the new line. At crossing locations, an even larger ROW would be required for side-by-side single circuit 220 kV H-frame structures. SCE would remove the existing structures and the new structures would be installed.

California

The entire area within the ROW is undeveloped, with the exception of the crossing of I-15, approximately 0.5 mile before the California/Nevada border. There are a no residences within 500 feet of the transmission line ROW. The Primm Valley Golf Club is located 0.5 miles northeast of the ISEGS project. The SCE transmission line upgrade would cross 0.5 miles north of the golf club and the 33 kV distribution line upgrades may be installed underground next to the golf course as well.

As stated in the **Noise and Vibration** section of this Staff Assessment, the Primm Valley Gold Club is considered a less noise-sensitive land use. SCE would use existing ROW access roads to complete the work wherever possible, and minimal new access roads would be constructed. Where needed, the existing access roads would be improved to support heavy construction equipment. New spur roads to the structure sites would need to be constructed.

The SCE transmission line would cross the Ivanpah Dry Lake, used for recreational purposes. Because once construction is completed recreational users of Ivanpah Dry Lake would have unrestricted public access to areas within and at the edge of the SCE transmission line ROW, the nearest noise-sensitive locations are from recreational users at the edge of the ROW.

The upgrades to the SCE Eldorado-Ivanpah transmission line would require operation of heavy equipment to remove and replace the existing structures, and at pull and tensioning sites. There is potential for heavy equipment operation to disturb adjacent noise-sensitive land uses during construction of the SCE 220 kV transmission line upgrade.

Nevada

The entire area within and adjacent to the ROW is undeveloped, with the exception of the private development at Primm, Nevada immediately adjacent to the California/Nevada border. The 220 kV transmission upgrade would be located within 100 feet of the Primm Valley Casino Resort along Fashion Outlet Way and the existing ROW is located approximately 150 feet of houses in Primm for approximately 0.2 miles.

Upgrading the SCE Eldorado-Ivanpah transmission line would require operation of heavy equipment to remove and replace the existing structures, and at pull and tensioning sites. There is potential for heavy equipment operation to disturb adjacent noise-sensitive land uses during construction of the SCE 220 kV transmission line upgrade.

Environmental Impacts

Construction of the project and tower removal would require short-term use of heavy-duty equipment such as trenchers, excavators, drill rigs, cranes, and trucks. A few residences lie within 500 feet of the transmission line ROW in Primm and the closest residence is approximately 150 feet from the line. In general, construction work within 200 feet of any location would cause noise levels averaging around 65 dBA, with intermittent peaks up to about 88 dBA. This would be a noticeable (more than five dBA) temporary increase in the ambient noise levels near the work that would fade into quiet background noise at distances over one-quarter mile. Although construction noise would be required to comply with local ordinances, it may still be disruptive.

After installation of the new line is complete and the line operational, there may be a change in corona noise levels. Corona noise is a function of the line voltage and the condition of the line. The voltage would be increased, but the condition of the line would be improved, so the net change in corona noise may minor.

Mitigation

Energy Commission staff recommends implementation of mitigation measures similar to the proposed conditions of certification from the ISEGS Staff Assessment to minimize potential impacts. These conditions would require notification of affected residents of impending construction, establishing a noise complaint resolution process, and limiting noisy construction to daytime hours.

Energy Commission staff also recommends implementation of mitigation that would require all vehicles and equipment to be equipped with exhaust noise abatement devices and would require landowner notification. To minimize disturbance, mitigation should also be implemented that would limit work to daytime hours, as specified in Condition of Certification **NOISE-6** for ISEGS.

Conclusion

Implementing mitigation measures similar to the conditions of certification that are proposed in the Staff Assessment for construction of the ISEGS would avoid potential significant noise impacts from work associated with the SCE upgrades.

SOCIOECONOMICS

Environmental Setting

California and Nevada

The SCE transmission line upgrades would be located in the Ivanpah Valley in San Bernardino County, California and in southern Clark County, Nevada. The regional setting for Socioeconomics, including demographics, utilities, school districts, wastewater, law enforcement and fire protection, for both San Bernardino County, California and Clark County, Nevada is presented in the Socioeconomics section of this PSA.

The construction activity that would likely require the largest workforce would be the installation of the conductors and OPGW. In addition, at some stages of the project, multiple locations would be under construction simultaneously. This may involve independent construction teams throughout the project area, and so the overall peak number of workers may be greater.

Environmental Impacts

Because few, if any, workers are expected to relocate to the area, no new housing would be needed for the project, no housing would be displaced, and no new competition for existing housing would likely occur. Construction employees would likely already live within commuting distance to the project area in Primm, Nevada, the Las Vegas area, less than 40 miles to the north, or San Bernardino County in California. Even if new permanent housing was required, if new permanent employees are hired, it would not affect the housing market in the area. Temporary accommodations may also be needed during construction, but with numerous hotels and motels in the area, impacts are expected to be less than significant, and mitigation measures are not required.

The addition of project-related children to schools that are at or over capacity may increase costs in terms of supplies, equipment, and/or teachers but the impact would be minimal. Even so, this worst-case scenario is unlikely to occur since any non-local construction workers would not likely relocate family members for the relatively short duration of construction and very few if any new permanent employees would be hired by SCE for operation of the project.

Likewise impacts to law enforcement and public utilities would be minimal. Water and wastewater discharge is discussed in the **Soil and Water Resources** section of this Staff Assessment and solid waste removal is discussed in the **Waste Management** section of this Staff Assessment. Because of the on-site security during construction and operation and other safety procedures described in the **Worker Safety and Health** section of the this Staff Assessment, Energy Commission staff concludes that the emergency medical services resources would be adequate to meet the needs of the proposed upgrades project during construction and operation.

Energy Commission staff does not expect the construction or operation workforces to have a significant adverse impact on parks and recreation because of the number and variety of parks within the regional project area. In addition, construction workers are unlikely to bring their families to a work site, and therefore, impact existing park services would be less than significant.

Mitigation

Compliance with LORS discussed in the **Soil and Water Resources**, **Worker Safety and Fire Protection**, **Waste Management**, and **Reliability** sections of this Staff Assessment would ensure that impacts from SCE upgrades would be less than significant. No additional mitigation is recommended.

Conclusion

All impacts to socioeconomics resources would be less than significant.

SOIL AND WATER RESOURCES

Environmental Setting

California

The project would occur along an alluvial fan that extends eastward from the Clark Mountains to the Ivanpah Dry Lake. The alluvial fan's topography slopes gradually and the fan is dissected by several desert washes.

The transmission line ROW would be located within the existing BLM Clark Mountain Allotment Grazing Lease (Clark Mountain, allocation #09003), a 97,560 acre allotment used for cattle grazing (BLM 2002).

The regional setting for soil and water resources in the Ivanpah Valley is presented in the **Soil and Water Resources** section of this Staff Assessment.

Nevada

Throughout the Clark County region, there is a sharp contrast between the mountainous areas and the lowlands. The SCE transmission upgrades would be located both on relatively flat lands such as near the Roach Lake, and would traverse mountainous locals such as within the McCullough Range. Because of the arid conditions throughout the majority of Southern Nevada, there is little downward leaching (LVMP 1998). Because of the climate, rocks tend to disintegrate rather than decompose and are then swept by rain and storms into ravines and valleys, creating alluvial fans. Clark County includes soils that are predominantly Entisols, located in areas where soils are actively eroding (such as on steep slopes) or receiving new soil materials (such as alluvial fans), and Aridisols, often associated with desert pavement (LVMP 1998). The Mojave Desert region is characterized by arid conditions with low precipitation. The climate of Southern Nevada has an average precipitation of four to eight inches at lower elevations and from

12 to 20 inches at higher elevations. Maximum precipitation falls between November and March.

Several mines and/or mine workings are located in the vicinity of the alignment. The land is primarily BLM or private undeveloped land. The transmission line ROW would be located within the existing Roach Lake Allotment (allocation #15421) Grazing Lease, a cattle allotment of 20,752 acres, and the existing Jean Lake Allotment (allocation #15416), a cattle grazing allotment for approximately 141,000 acres (LVMP 1998 and BLM 2008).

According to the Las Vegas Management Plan (1998), the transmission line would cross soils with low and moderate erosion susceptibility with shallow-very shallow gravelly course texture and shallow – moderately deep rocky-gravelly coarse texture.

Environmental Impacts

For the proposed 220 kV route, new dulled galvanized 220 kV lattice steel towers (LSTs) and H-frame structures would be installed in the existing and new ROW. Most of the structure sites would likely require minor to substantial grading and new or re-developed access and spur roads. A portion of the completed Ivanpah Substation would consist of impervious materials such as concrete foundations and asphalt concrete paving.

Construction activities would involve earth disturbance that would increase the potential for erosion. Construction activities associated with new LSTs, tubular steel poles and H-frame structures would not occur within any watercourses; therefore, impacts to water quality for construction and operation of the transmission lines would be less than significant. Implementation of mitigation for temporary erosion control measures would ensure less than significant impacts to soils associated with new structure construction.

Work sites using larger truck-mounted equipment would likely be limited to areas near angle and/or dead-end towers. Temporary pull and tensioning sites would require an area of about 100 by 200 feet (0.5 acre) for equipment setup. Typically, wire pulls occur every 15,000 to 18,000 feet on flat terrain or less in rugged terrain. Wire splices typically occur every 7,500 feet on flat terrain or less in rugged terrain. These temporary sites would be susceptible to erosion from minor soil disturbance and compaction as a result of the vehicular traffic and hilly terrain.

There are two grazing allotments on BLM lands within the transmission corridor. Construction activities may disrupt grazing activities, which could result in the temporary reduction of agricultural productivity. However, once the project is completed, cattle would be free to graze within and across the corridor.

Mitigation

Storm Water Pollution Prevention Plan (SWPPP). The Clean Water Act (CWA) (33 U.S.C. Section 1251 *et seq.*), formerly the Federal Water Pollution Control Act of 1972, regulates discharges through the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). Pursuant to NPDES permit requirements, SCE would be required to prepare and adhere to a SWPPP that would minimize construction erosion. During construction activities, measures would be in place to insure that contaminates would not be discharged from the construction site. The SWPPP would define areas where hazardous materials, such as concrete, would be stored; where trash would be placed; where rolling equipment would be parked, fueled and serviced and where construction materials such as reinforcing bars and structural steel members would be staged. Erosion control during grading of the unfinished site and during subsequent construction would be in place and monitored as specified by the SWPPP. A silting basin(s) would be established to capture silt and other materials which might otherwise be carried from the site by rainwater surface runoff.

In addition to conformance with SCE's SWPPP, for temporary disturbance areas, Energy Commission staff recommends similar mitigation measures to the following:

- On completing the work, all work areas except access trails should be scarified or left in a condition that would facilitate natural or appropriate vegetation, provide for proper drainage, and prevent erosion.
- Disturbance and removal of soils and vegetation should be limited to the minimum area necessary for access and construction.
- Vehicles should be inspected daily for fluid leaks before leaving the staging area.
- All spills of fuel or hydraulic fluid should be cleaned up immediately according to SCE's guidelines for hazardous waste handling.
- Nonbiodegradable debris should not be deposited in the ROW.

The additional the following suggested mitigation measures or similar should be implemented for earth disturbance activities associated with work on tower footings:

- All soil excavated for structure foundations should be backfilled and tamped around the foundations, and used to provide positive drainage around the structure foundations.
- Use of ground-disturbing mechanical equipment to remove vegetation should be avoided on slopes over 40 percent, unless the threat of erosion would be minimal because of bedrock, or reseeding would be performed.
- All activity should be minimized during winter and other wet periods to prevent damage (excessive rutting, unacceptable erosion of fines from road surface, excessive soil compaction).
- Where soil has been severely disturbed and the establishment of vegetation is needed to minimize erosion, appropriate measures, as approved by the land manager, should be implemented to establish an adequate cover of grass or other vegetation as needed. Soil preparation, seeding, mulching, and fertilizing should be repeated as necessary to secure soil stabilization and revegetation acceptable to the land manager.
- Grading should be minimized to the extent possible. When required, grading should be conducted away from watercourses/washes to reduce the potential for material to enter the watercourse.

- Should SCE need to relocate or construct a structure or access/spur road, SCE should consult with the United States Army Corps of Engineers (USACE) to locate all new structures and access roads outside floodplains to the extent feasible.
- Sediment control devices, such as placement of native rock, should be used at all dry wash crossings.
- Run-off control structures, diversion ditches, and erosion-control structures should be cleaned, maintained, repaired, and replaced whenever necessary.
- All discharge water created by construction (e.g., concrete washout, pumping for work area isolation, vehicle wash water, drilling fluids) should be treated before discharge.

The following mitigation measures should be implemented for construction activities in and around any water bodies or desert washes associated with the new tower footings, if necessary:

- Any discharge of material (displaced soils and, in certain circumstances, vegetation debris) within waters of the United States may be subject to USACE regulations under the Clean Water Act.
- If wet areas cannot be avoided, SCE should use wide-track and/or balloon tire vehicles and equipment and or timber mats.
- All fill or rip-rap placed within a stream or river channel should be limited to the minimum area required for access or protection of existing SCE facilities.

Energy Commission staff also recommends that SCE should be required to coordinate with grazing operators to ensure that agricultural productivity and animal welfare are maintained both during and after construction to the maximum extent feasible. Coordination efforts should address issues including, but not necessarily limited to:

- Interference with access to water (e.g., provide alternate methods for livestock access to water)
- Impairment of cattle movements (e.g., provide alternate routes; reconfigure fencing/gates)
- Removal and replacement of fencing (e.g., during construction install temporary fencing/barriers, as appropriate, and following construction restore equal or better fencing to that which was removed or damaged)
- Impacts to facilities such as corrals and watering structures, as well as related effects such as ingress/egress, and management activities (e.g., replacement of damaged/removed facilities in kind; provide alternate access)

During operation cattle would likely be free to move across the transmission ROW and thus impacts to agricultural resources during operation would be less than significant.

Conclusion

Significant environmental impacts to soil and water resources would be avoided by implementing best management practices, the SWPPP, and/or similar mitigation, as listed above. The project would not cause a displacement of agricultural land use, and neither construction nor operation of the transmission line would cause a significant impact to agricultural resources.

TRAFFIC AND TRANSPORTATION

Environmental Setting

California and Nevada

The existing SCE 115 kV transmission lines are situated within an established 75-foot ROW. The existing transportation network that would be affected by the SCE transmission upgrades would be located in San Bernardino County in California and in Clark County in Nevada. The environmental setting for the **Traffic and Transportation** section of this Staff Assessment gives detailed information regarding the local and regional roadways that would be used to reach the construction areas, including the traffic conditions of I-15. At this location I-15 consists of two lanes in each direction. As stated in the Traffic and Transportation section, although I-15 operates at LOS C or better most days of the week (Monday through Thursday), northbound I-15 experiences increased traffic volumes on Friday afternoons, because of commuter and tourist traffic from California to Las Vegas, Nevada. Once in Nevada, the SCE 220 kV transmission corridor would not cross any roadways other than access roads.

An active Union Pacific Railroad (UPRR) line exists approximately one mile south of I-15 (BNSF2005). The SCE transmission upgrades would cross the UPRR railroad ROW approximately two miles northeast of the California/Nevada border in Nevada, and the telecommunication facilities upgrades would cross and potentially parallel UPRR for 2.5 miles southwest of the California/Nevada border in California.

About 1 mile of new underground 33 kV circuitry and two new Remote Control Switches (RCS) would be built in order to close the loop in the Nipton 33 kV circuit. The proposed work would be done next to Densmore Drive Road. In addition, depending on the route selected portions of the fiber optic cable installation may also be located underground in roadways.

Environmental Impacts

The reconductoring project could affect the level of service (LOS) for transportation facilities under the jurisdiction of Caltrans, Nevada Department of Transportation, and the local communities. On most days, as presented in **TRAFFIC AND TRANSPORTATION Table 3** in this Staff Assessment, I-15 experiences approximately 60,000 ADT—or an hourly average of approximately 1,200 trips per lane. However, on Fridays from approximately 12 p.m. to 10 p.m., northbound I-15 experiences an hourly average of approximately 2,000 trips per lane and operates at LOS F (BSE2007A).

The construction activity that would require the largest workforce would likely be the installation of the conductors and optical ground wire (OPGW). In addition, at some stages of the project, multiple locations would be under construction simultaneously. This may involve independent construction teams throughout the project area, and so the overall peak number of workers may be greater. The area’s roadways would also be used for transportation of equipment and access to the temporary staging areas and the transmission and telecommunication corridors. Finally, the movement of heavy machinery or the possible need to use rail lines, such as the UPRR tracks that bisects the project area, to deliver equipment or materials to the project site could also affect the surrounding transportation system.

It is assumed that some workers would carpool, and not all workers would be commuting from the project site on northbound I-15, however, at the end of the work day on Fridays, an estimated additional 30 personnel on I-15 northbound would only represent a 0.75 percent increase in peak traffic volume (between 12 p.m. and 10 p.m.). The number of vehicles added to northbound I-15 on Friday afternoons as a result of the project would be minor compared to the number of vehicles traveling on northbound I-15 during the same time.

However, the project would exacerbate existing congestion on I-15 and may result in potentially significant impacts to traffic flow. In addition, large vehicles delivering materials and oversized vehicles used in the construction process may affect traffic flow on one or more of the roadways, resulting in a safety hazard. These potential impacts can be avoided through mitigation, which is discussed below. In addition, there is potential for unexpected damage to roads by vehicles and equipment (overhead line trucks, crew trucks, concrete trucks, etc.) that would be entering and leaving roads within the project area.

Helicopters would be used to support construction during stringing activities, in areas where access is limited (e.g., no suitable access road, limited pad area to facilitate onsite structure assembly area), where there are environmental constraints to accessing the project area with standard construction vehicles and equipment, and periodically for maintenance during operation. Project activities potentially facilitated by helicopters may include delivery of construction laborers, equipment and materials to structure sites, structure placement, hardware installation, and wire stringing operations. The operations area of the helicopters would be limited to helicopter staging areas near construction locations that are considered safe for landing. Final siting of staging areas for the SCE project would be conducted with the input of the helicopter contractor, affected private landowners and land management agencies.

Mitigation

Because northbound I-15 is already highly congested on Friday afternoons, and project-related construction traffic would exacerbate congestion, project impacts on northbound I-15 on Fridays are considered potentially significant. To limit SCE's project's contribution to existing congestion on northbound I-15 on Friday afternoons, Energy Commission staff recommends implementation of mitigation similar to Condition of Certification **TRANS-1** in this Staff Assessment, which would require development and Energy Commission staff approval of a traffic control plan that must include methods to substantially reduce the project's impact on I-15 traffic, such as staggering the departure of construction workers from the project area on Friday afternoons and/or establishing a carpool/vanpool incentive program. Energy Commission staff believes that with proper implementation of the traffic control plan, the project's direct impact during construction can be reduced to a less than significant level.

Temporary guard structures should be constructed across roads and other potentially inhabited areas to protect those areas in the unlikely event that a conductor breaks and the line falls to the ground. This safety precaution would reduce the potential for construction materials falling on any intersecting roadways during the tensioning/cable pulling process. The following possible locations would be where guard structures may be installed to facilitate construction crossings: existing distribution lines, dirt roads, I-15, Lotto Shore Road, Fashion Outlet Way, E. Primm Boulevard, and the UPRR. The types of guard structures that would be required for crossings and the number of crossings necessary should be field verified upon completion of final design. Installation of guard structures would also help to ensure that access for emergency service providers is maintained to the maximum extent feasible.

All access and spur road improvements and construction, whether on or off of the ROW, would comply with applicable permits and approvals, and SCE has preliminarily stated that any damage to existing roads as a result of construction would be repaired once construction is complete.

The use of helicopters for the erection of LSTs, tubular steel H-frame structures, or tubular steel poles would be in accordance with SCE specifications and would be similar to methods detailed in IEEE 951-1966, Guide to the Assembly and Erection of Metal Transmission Structures, Section 9, Helicopter Methods of Construction. The upgrades, including all helicopter construction activities, would also be required to comply with all appropriate regulations of the Federal Aviation Administration (FAA), such as restrictions on helicopter flights within 1,500 feet of residential dwellings. To offset potential impacts from helicopter use, Energy Commission staff recommends that helicopter use be included in the Traffic Management Plan, which should be developed as part of the mitigation similar to Condition of Certification **TRANS-1** in this Staff Assessment.

Conclusion

The intersection of a new access road with an existing public road would be constructed in accordance with the requirements of the agency having authority over the existing public road. Any activity that would need to occur outside of the existing transmission line ROW would require landowner notification and permission for access. Since the majority of the upgrade activities would take place in undeveloped areas on BLM land, it is projected that the activities would have minimal impact on the traffic level of service for the roadways in the project vicinity, except during Friday afternoons. Movement of heavy machinery on local roads would occur intermittently, but infrequently over the construction period. Based on the temporary nature of the construction activities and the minor staffing and equipment expected to be required compared to the traffic volumes on I-15, coupled with implementation of mitigation measures similar to conditions of certification concerning peak hour traffic would ensure that any potential impacts of SCE’s upgrades to traffic and transportation would be less than significant.

TRANSMISSION LINE SAFETY AND NUISANCE

Environmental Setting

California and Nevada

In addition to subtransmission and distribution line upgrades, the SCE transmission upgrades would require approximately seven miles of an upgraded transmission line in San Bernardino County, California and approximately 28 miles of an upgraded transmission line in Clark County, Nevada. The transmission upgrades would be located primarily on undeveloped BLM land paralleling a major existing transmission line corridor. The nearest community is Primm, Nevada, with a population of 436 people. The transmission line upgrade would be located approximately 150-feet from the nearest residence for 0.2 mile at Primm. The City of San Bernardino is approximately 145 miles southwest and the Edwards Air Force Base is approximately 145 miles west-southwest of the project. All portions of the line located within the State of California are designed to CPUC General Order 95 standards. All portions of the line located within the State of Nevada are designed to National Electric Safety Code (NESC) standards.

Environmental Impacts

Since the upgraded 220 kV line would be operated at a higher voltage than the existing 115 kV line, the magnitude of the electric field along the line route would increase. The magnetic field may also change, because its intensity depends directly on current levels, however, phasing with the other existing lines in the corridor can actually reduce magnetic fields in some instances. SCE would prepare an Electric and Magnetic Field (EMF) Management Plan as part of its project application to the CPUC that would include changes in EMF levels associated with the upgrades.

There remains a lack of consensus in the scientific community in regard to public health impacts due to EMF at the levels expected from electric power facilities. Since the work would largely be within existing corridors, the upgrade-related increases in EMF intensity would lead to corresponding increases in human exposure to the line’s magnetic fields. The nearest residences to the line are approximately 150 feet away. Line workers would also be exposed to EMF in close proximity to the lines; however, this type of short-term exposure is not significantly related to the present health concern.

There are no federal or State standards limiting human exposure to EMFs from transmission lines or substation facilities in California or Nevada. For those reasons, EMF is not considered in this appendix as a CEQA/NEPA issue and no impact significance is presented.

Other potential impacts related to electric power facility projects, are both safety and nuisance issues, and include: radio/television/electronic equipment interference; induced currents and shock hazards and potential effects on cardiac pacemakers.

Mitigation

Because there is no agreement among scientists that exposure to EMF creates any potential health risk, and because CEQA and NEPA do not define or adopt any standards to address the potential health risk impacts of possible exposure to EMFs, this analysis does not consider magnetic fields in the context of CEQA/NEPA and determination of environmental impacts.

However, recognizing that public concern remains, the CPUC does require, pursuant to GO 131-D, Section X.A, that all applications for a Certificate of Public Convenience and Necessity (CPCN) include a description of the measures taken or proposed by the utility to reduce the potential for exposure to EMFs generated by the project. The CPUC has developed an interim policy that requires utilities, among other things, to identify the no-cost measures undertaken, and the low-cost measures implemented, to reduce the potential EMF impacts. The benchmark established for low-cost measures is four percent of the total budgeted project cost that results in an EMF reduction of at least fifteen percent (as measured at the edge of the utility ROW). Therefore, SCE would need to incorporate specific field-reducing measures into the design of the 220 kV upgraded line prior of its submittal of its CPCN application to the CPUC.

Other public concerns related to electric power facility projects, are both safety and nuisance issues, and include: radio/television/electronic equipment interference; induced currents and shock hazards and potential effects on cardiac pacemakers. SCE is under jurisdiction of the CPUC and the upgraded facilities would be designed and operated according to CPUC General Order 95 in California.

The NESC specifies that transmission lines be designed to limit short circuit current from vehicles or large objects near the line to no more than 5 milliampere (mA). CPUC General Order 95 and the NESC also address shock hazards to the public by providing guidelines on minimum clearances to be maintained for practical safeguarding of persons during the installation, operation, or maintenance of overhead transmission lines and their associated equipment.

Energy Commission staff's recommended conditions of certification in the ISEGS Staff Assessment are intended to ensure compliance with CPUC policy as related to field strengths, perceivable field effects, electric shocks, and human exposure. Energy Commission staff would expect that the line would be operated according to SCE's guidelines, which would be in compliance with the applicable (non-EMF) health and safety LORS.

Conclusion

The upgraded 220 kV transmission line would be designed, built and operated (largely within the existing ROW) according to SCE's requirements, reflecting compliance with the health and safety (non-EMF) LORS of concern to Energy Commission staff. Therefore, Energy Commission staff would not expect its operation to pose a significant health and safety hazard to individuals in the area.

TRANSMISSION SYSTEM ENGINEERING

Environmental Setting

Construction activities would occur in a manner that complies with applicable safety and reliability standards in order to increase transmission capacity. At MP 28.6 (near tower

195), the new ROW would cross from Clark County, Nevada into San Bernardino County, California. As stated above, all portions of the line located within the State of California are designed to CPUC General Order 95 standards and all portions of the line located within the State of Nevada are designed to NESC standards. Specific documents that will be presented in SCE's Application and PEA to the CPUC will give specifications for the transmission line, including engineering drawings and construction guidelines. Plan and Profile drawings and Technical Specifications will also be part of the supplement documents.

Environmental Impacts

During construction, applicable safety and reliability LORS must be met following SCE's Construction Standards, which reflect CPUC and NESC requirements. SCE would schedule any outages in a manner such that maintains system reliability. Applicable LORS also include North American Electric Reliability Council (NERC) Planning Standards, Western Electric Coordinating Council (WECC) Reliability Criteria, which insure continuity of load service and protection of the interconnected grid, and the NESC 1999 standards.

All of SCE's electrical and telecommunication upgrades would result in local system benefits, in that they would provide considerably greater flexibility in routing power in the regional transmission network, even if ISEGS is not built. The SCE project would ensure that ISEGS could generate at its rated capacity as it would mitigate overloads on the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line between Eldorado and Ivanpah Substations.

Mitigation

To mitigate potential safety and reliability impacts, the above-stated LORS, CPUC and NESC regulations and SCE scheduling protocols would be used. SCE would need to assure conformance with the above safety and reliability requirements.

Conclusion

Conformance with applicable safety and reliability is required by several LORS, and would be successful in mitigating any safety or reliability implications of the upgrades.

VISUAL RESOURCES

Environmental Setting

California and Nevada

As stated in the **Visual Resources** analysis in the ISEGS Staff Assessment, the regional landscape is part of the Great Basin section of Fenneman's Basin and Range physiographic province, a vast desert area of the western U.S. extending from eastern Oregon to western Texas, characterized by periodic mountain ranges separated by desert plain (Fenneman, 1931). It is also located within the Mojave Desert, immediately north and east of the northernmost portions of the Mojave National Preserve. Locally, the site is situated within the Ivanpah Valley, notable for the level playa or dry lakebed of Ivanpah Lake. Steeply rising, barren slopes and ridges of the Clark, Spring, and

Ivanpah Mountains to the south, west, and north, and the Lucy Gray, McCullough, and New York Mountains to the east, define the Ivanpah Valley in the project vicinity.

The transmission line would be located approximately 30 miles south of the City of Las Vegas, and would cross within several hundred feet of Primm, Nevada, and along I-15 becoming increasingly urbanized and less scenically intact as one progresses northward. However, upon leaving Primm, Nevada, the transmission line upgrades would be located on undeveloped BLM land. The transmission line upgrades would be located approximately one mile south of the Red Rock Canyon National Conservation Area that is managed primarily for its visual resources. However, the transmission line upgrades would occur within an existing transmission line corridor adjacent as many as five additional transmission lines. Thus, in a regional context, the site is located at the outer edge of urban influence of the City of Las Vegas metropolitan area. I-15 adjacent to the project site is the principal travel route for visitors to Las Vegas from southern California. There are no California Officially-Designated or Eligible State Scenic Highways in the project vicinity (Caltrans 2008).

Environmental Impacts

For the proposed 220 kV route, new dulled galvanized 220 kV LSTs and H-frame structures would be installed in the existing and new ROW. Double-circuit LSTs generally range in height between 100 feet and 200 feet. Single-circuit H-frame structures generally would be less than 100 feet tall. Most of the structure sites would likely require minor to substantial grading and new or re-developed access and spur roads.

The project would require temporary staging areas for equipment and materials storage along the transmission line route in both California and Nevada. Generally these yards range in size from a few acres to up to approximately 30 acres. Construction of the Ivanpah Substation would likely require a temporary laydown area located at or near the existing roadway at the site. Materials stored at the construction yards would include:

- Hardware
- Steel
- Insulators
- Signage
- Consumables, such as fuel and joint compound
- SWPPP materials, such as straw wattles, gravel, and silt fences
- Waste materials for recycling or disposal.

Conductor pulling and tensioning equipment would be located at various sites along the transmission line ROW. Depending on the terrain and the number of angles and dead-end sites, numerous pull sites would likely be needed.

Construction equipment and activities would be visible to motorists on I-15 and other local roadways, as well as to residents living near the construction activities in Primm, Nevada. Due to temporary duration of the project construction, the adverse visual impacts that would occur during construction would not be significant. This conclusion assumes that construction areas and the ROW would be restored to their pre-project conditions, as discussed below.

However, the upgrades would include the construction of new permanent spur and access roads to the individual structure sites and Ivanpah Substation, which could create permanent visual scars across the undeveloped landscape.

Construction of the 220 kV line would be largely within an existing, but widened ROW across undeveloped BLM lands, and would parallel a major existing utility corridor with up to five existing transmission lines for its length. Because the existing transmission lines and towers are an established part of the setting and the project would include removal of the existing 115 kV line and poles, the adverse visual impacts that would occur due to installation of the new line, and any incremental changes in tower height or design, would likely not be significant. This conclusion assumes that the new wires and towers would incorporate typical measures to mitigate potentially significant adverse visual impacts, such as those listed below.

Mitigation

With the inclusion of mitigation measures similar to those listed below, visual impacts from construction activities related to the upgrades would likely not be significant:

- During project construction, the work site should be kept clean of debris and construction waste. Material and construction storage areas should be selected to minimize views from public roads, trails, and nearby residences.
- For areas where excavated materials would be visible from sensitive viewing locations, excavated materials should be disposed of in a manner that is not visually evident and does not create visual contrasts.
- Maintenance operations work should be conducted in a manner that limits unnecessary scarring or defacing of the natural surroundings to preserve the natural landscape to the extent possible.
- The project owner should revegetate disturbed soil areas to the greatest practical extent. In particular, the area of disturbed soils used for laydown, project construction, and siting of the substation and other ancillary operations and support structures should be revegetated. This measure is included in Condition of Certification **VIS-4** within this Staff Assessment.

With the inclusion of the mitigation measures similar to those listed below, and because the new lines would follow existing utilities corridors or be located within existing substation properties, operation of the facilities would likely not cause significant adverse visual impacts:

- Non-specular and non-reflective conductors should be used in order to reduce conductor visibility and visual contrast;
- Insulators should be non-reflective and non-refractive; and
- Any surface coatings on structures should be applied to new or replacement structures that are visible from sensitive viewing locations with appropriate colors,

finishes, and textures to most effectively blend the structures with the visible backdrop landscape. For structures that are visible from more than one sensitive viewing location, if backdrops are substantially different when viewed from different vantage points, the darker color shall be selected, because dark colors tend to blend into landscape backdrops more effectively than lighter colors, which may contrast and produce glare.

Conclusion

Construction of the SCE upgrades project would require temporary disturbance during construction (i.e., heavy equipment, tensioning, and pull sites). After rehabilitation of temporary construction yards and pulling sites, as required by the suggested mitigation, the transmission line would appear largely as it does now, except for the construction of new and permanent spur and access roads, which would permanently scar the fragile desert landscape.

The SCE upgrades project would have the potential to cause adverse long-term visual impacts, such as through the use of reflective conductors and/or insulators that would make existing or new structures more dominant in the existing viewshed, and through the construction of new and larger structures. However, project design features and feasible mitigation measures would be available that would ensure that visual impacts of the project would be reduced. With use of non-specular conductors and non-reflective and non-refractive insulators, potential long-term impacts associated with this activity would be reduced as well. Because the upgrades would be in a largely undeveloped area on BLM land, would parallel an existing utility corridor or be on/within existing facilities, and would include removal of the existing line, it is expected that visual impacts would be reduced to less than significant.

WASTE MANAGEMENT

Environmental Setting

The transmission lines and related facilities would be routed mostly through undeveloped publicly-owned desert and mountainous land with relatively few activities that could generate the hazardous wastes or contaminated areas that are of specific concern in this analysis. Specific site surveys for contamination sites would be required prior to any permitting, which are discussed in the Hazardous Materials Management section.

As stated in Chapter 2 of this Appendix, all existing 115 kV structures on the 35.5-mile Eldorado-Ivanpah portion of the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line would be removed. Transmission line equipment to be removed would include existing 115 kV lattice steel H-frame structures, LSTs, wood pole H-frame structures, wood poles, and associated hardware (i.e., cross arms, insulators, vibration dampeners, suspension clamps, ground wire clamps, shackles, links, nuts, bolts, washers, cotters pins, insulator weights, and bond wires), as well as the transmission line conductor. Steel lattice tower footings, concrete caps and anchors would likely be cut/removed below ground level. Holes would be filled and compressed, and then the area would be smoothed to match surrounding grade. The disposal of or recycling of these structures would occur at permitted facilities.

In addition, at the transition point going north into the Ivanpah Substation, existing subtransmission structures may be removed and replaced as well. At the Ivanpah Substation, any excavated soil would likely be spread on a portion of the substation property. At the end of construction, all construction materials and debris would be removed from the area and recycled or properly disposed of offsite.

California

The closest landfill within San Bernardino County, California, is Baker Medium Volume Transfer Processing, which allows a maximum of 25 tons/day and accepts Metals, Mixed Municipal, and Tires. Other landfills include the Newberry Springs Med. Vol. T/P Facility in Newberry Springs (108 miles from Primm), which allows Mixed Municipal waste, and the Barstow Sanitary Landfill, which is approximately 117 miles from Primm along I-15, allows a maximum permitted throughput of 750 tons/day and has a remaining capacity of 924,401 cubic yards. The Barstow Sanitary Landfill accepts the following waste types: Agricultural, Construction/demolition, Industrial, Mixed municipal, Other designated, and Sludge (BioSolids) (CIWMB 2008). There are also two landfills in Fort Irwin (Fort Irwin Sanitary Landfill and Fort Irwin Composting Facility), which are located about 117 miles west-southwest of Primm, NV.

Nevada

The following permitted and operating Southern Nevada Health District Class I and Class III solid waste facilities are located near the project area in Nevada (NDEP 2008):[3]

- ***Las Vegas area*** (~40 miles north-northeast of the project area): Wells Cargo Class III Landfill, Timet J-2 Class III Landfill, Boulder City Class I Landfill, Southern Nevada Water Authority Class III Landfill, Nellis AFB Class III Landfill, Apex Class I Landfill;
- **Laughlin/*Bullhead City area***: (~75 miles southeast of the project area): Laughlin Class I Landfill, and SCE Mojave Generating Station Class III Landfill; and
- **Pahrump** (~90 miles northwest of the project area): Pahrump Valley Class I Landfill.

Environmental Impacts

Construction would generate waste largely in the form of soil from structure excavation, concrete from existing foundations, utility line cable, and scrap metal/wood from the replacement of existing structures. Chapter 3.5 (Hazardous Materials Management) in this Appendix discusses impacts in the event contaminated soil is encountered. Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility.

[3] NAC 444.5705 "Class I site" defined. (NRS 444.560) "Class I site" means a disposal site which: (1) Is comprised of at least one municipal solid waste landfill unit including all contiguous land and structures, other appurtenances and improvements on the land used for the disposal of solid waste; and (2) Is not a Class II or Class III site.
NAC 444.5715 "Class III site" defined. (NRS 444.560) "Class III site" means a disposal site which accepts only industrial solid waste.

The wood, lattice, and H-frame structures, insulators, cross arms and all other associated hardware would be disposed of at an offsite location. Because wood poles are treated, they may need to be disposed of at a facility that accepts treated wood.

Due to the number and capacity of landfills serving the project area, capacity for materials generated from construction of the upgrades would be available. Because the exact amount of material recycling is unknown, the total amount of waste requiring landfill disposal is unknown. Recycling activities would greatly reduce the quantity of construction-related materials transported to local landfills.

As the waste generated by the upgrades would occur over the entire construction period and could be dispersed among the various landfills serving the entire project area, the daily waste exported off site would be a fraction of the maximum daily throughput for any of the landfills in the area. Therefore, construction waste generated by the project would not substantially affect the remaining capacities of local landfills to serve local demands.

Mitigation

Mitigation is recommended that would ensure that all construction materials and debris would be removed from the area and recycled or properly disposed of offsite. Although impacts to solid waste facilities and waste management would not be significant and no mitigation measure would be required, to further reduce adverse effects of the overall volume of waste from all of the project components, mitigation that would require SCE to recycle construction waste where feasible is recommended for implementation by Energy Commission staff to ensure that maximum recycling activities would occur over the course of the entire project.

SCE would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees, in accordance with state and federal hazardous waste management requirements. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. To help ensure and facilitate ongoing project compliance with LORS, Energy Commission staff recommends mitigation similar to the conditions of certification included in the **Waste Management** section of the ISEGS Staff Assessment.

Conclusion

Energy Commission staff concludes that the SCE transmission upgrades would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both project construction and operation. Energy Commission staff recommends that in addition to the conditions of certification included in the **Waste Management** section of this Staff Assessment, SCE should be required to recycle construction waste where feasible.

WORKER SAFETY AND FIRE PROTECTION

Environmental Setting

California and Nevada

Fire support services along the SCE transmission upgrades would be under the jurisdiction of the San Bernardino County Fire Department (SBCFD) in California and under Clark County Fire Department (CCFD) in Nevada. Station #53 is 40 miles from the ending point of the transmission upgrades site at the ISEGS project site, located at 65 Kingston Circle, Baker, California, and would be the first responder in California, with a response time of approximately 45 minutes. Station #53 has a Type 1 engine and a brush patrol vehicle. It has three staff on duty at all times (a captain, an engineer, and a firefighter). San Bernardino County Fire Department also has a Mutual Aid Agreement with Clark County (Nevada) Fire Department for responses requiring more assistance. Station #87, located at 20400 S. Las Vegas Blvd. in Clark County, would be the nearest fire station (Clark County 2008).

As stated in the PSA, in San Bernardino County, hazardous materials permits and spills are handled and investigated by San Bernardino County. Because of the highly remote and rural area of ISEGS, services are limited and spread out. San Bernardino County firefighters receive specialized training to address emergency responses to industrial hazards. The response time to the project site, with full resources capabilities, would be three to four hours. There are roughly 150 members (10 Registered Environmental Health Specialists and the rest, firefighters), and the organization is a full Level A response team capable of handling all types of chemical, biological, radiological, and nuclear responses. Hazardous materials service is provided out of the county station in Fontana, Station #78.

In Clark County, hazardous spills are reported to the police or fire department and are handled and investigated by the Clark County Office of Emergency Management. Hazardous materials are regulated according to Clark County Code, Chapter 3.04 (Clark County 2008).

Environmental Impacts

Industrial environments are potentially dangerous during both construction and operation. Workers at the project site would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress. Workers may sustain falls, trips, burns, lacerations, and other injuries. They may be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks or electrocution. It is important that SCE has well-defined policies and procedures, training, and hazard recognition and control to minimize these hazards and protect workers. If the project complies with all LORS, workers would be adequately protected from health and safety hazards.

During construction and operation of the upgrades there is the potential for both small fires and major structural fires. Electrical sparks; combustion of fuel oil, hydraulic fluid, mineral oil, insulating fluid at the substations, or flammable liquids; explosions; and overheated equipment may cause small fires. Major structural fires are unlikely along transmission lines and at substations. Fires and explosions of flammable gasses or liquids are rare. Compliance with all LORS would be adequate to ensure protection from all fire hazards.

The project would rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the SBCFD and/or the CCFD depending on the location of the fire in the project area. Both would be called upon if needed and as available through a Mutual Aid Agreement between SBCFD and CCFD (BSE2007a).

Mitigation

Energy Commission staff recommends mitigation similar to the conditions of certification in the **Worker Safety and Fire Protection** of this Staff Assessment that would require SCE to provide a project construction safety and health program and a project operations and maintenance safety and health program.

To ensure the safety of workers and the public, SCE has stated that safety devices such as traveling grounds, guard structures, and radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire-stringing activities.

In mountainous areas, benching may be required to provide access for footing construction, assembly, erection, and wire-stringing activities during line construction. It would be used minimally to help ensure the safety of personnel during construction activities.

Construction of the project and construction equipment may impede emergency access through the area. Energy Commission staff recommends implementation of mitigation that would require SCE to coordinate construction schedules, lane closures, and other activities associated with installation of the project with emergency and police services to ensure minimal disruption to response times and access for these services. As is discussed in Chapter 3.10 (Traffic and Transportation) of this Appendix, because guard structures would be installed over roadway crossings such impacts would also be reduced. Therefore, impacts to emergency access and/or public services and facilities would be less than significant.

Conclusion

Incorporation of the measures discussed above and the Conditions of Certification included in the **Worker Safety** section of this Staff Assessment would ensure adequate levels of industrial safety and would comply with applicable LORS. Energy Commission staff also concludes that the project would not have significant impacts on local emergency and fire protection services.

CONCLUSION

Chapters 2 and 3 of this Appendix describe the project and the potential impacts of SCE's electric and telecommunication upgrades. This study was undertaken to inform the Energy Commission and the general public of the potential indirect environmental and public health effects caused by the approval of the ISEGS project.

The environmental and engineering disciplines can be divided into two groups: those with the potential for significant impacts that would require mitigation, and those in which impacts are easily mitigable or clearly less than significant. This analysis determined that impacts in the following areas would likely be less than significant for this upgrades project (some with implementation of standard mitigation measures): Facility Design, Power Plant Efficiency, and Power Plant Reliability.

Although implementation of mitigation may reduce potential impacts to less than significant levels, the disciplines where potential impacts are of most concern are Air Quality, Biological Resources, Cultural Resources, and Visual Resources. The conclusions of these analyses are described below.

AIR QUALITY

The construction and structure removal activities associated with SCE's upgrades would cause emissions due to heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) emissions from activity on unpaved surfaces. With effective and comprehensive control measures such as those recommended by Energy Commission staff for the proposed ISEGS project, dust and equipment exhaust impacts could likely be reduced to a less than significant level.

BIOLOGICAL RESOURCES

Because some of the construction work would occur in or near sensitive species and/or habitats and would result in the permanent loss of vegetation at structure locations and new spur roads, Energy Commission staff concludes that project activities could adversely impact sensitive biological resources in and/or adjacent to the transmission/distribution line corridor. Impact avoidance measures would help reduce potentially significant biological impacts to less than significant levels. Energy Commission staff recommends that after construction plans are finalized, a complete project description (including results of all sensitive species surveys, and a revised assessment of potential impacts) be submitted as part of SCE's PEA to the CPUC/BLM, which would ensure the upgrades comply with applicable federal, State and local laws, ordinances and regulations. Energy Commission staff also recommends consultation with applicable federal, state and local agencies to identify potential impacts and develop additional mitigation measures that would avoid, eliminate, reduce to a less-than-significant level or compensate for those impacts. Even if the upgrades work complies with all applicable LORS, absent biological survey information, Energy Commission staff conservatively concludes that the SCE upgrades may create significant impacts to biological resources due to the permanent loss of habitat associated with new structures and roads, and the temporary disturbance to sensitive plant and wildlife species during construction.

CULTURAL RESOURCES

Prior to construction, a data search and field surveys should be performed to identify known cultural resources that may be adversely impacted. In the absence of this information, it should be assumed that the areas of upgrades would be sensitive for cultural resources, and some of the resources may be impacted as a result of the construction activities. Energy Commission staff believes that it would be possible to mitigate all impacts to cultural resources to less than a significant level through the Section 106 process and implementation of measures that apply to cultural resources. Known sensitive areas would be avoided, construction activities would be monitored and other appropriate mitigation similar to the conditions of certification identified in the **Cultural Resources** section of the Staff Assessment would be implemented.

GEOLOGY AND PALEONTOLOGY

Geotechnical and paleontological investigations for geologic or paleontologic resources have not yet been performed in the project area; however, fossilized vertebrae bones and invertebrate fossils have been uncovered in the southern Nevada region. There are no known active faults crossing the proposed route and the area is considered to have a low potential for seismic hazard. Therefore, there would not likely be any impacts related to fault rupture, liquefaction, strong groundshaking, or earthquake-induced landslides. The structures would be constructed to comply with all applicable LORS. With implementation of measures and best management practices that would ensure proper re-vegetation, erosion control, and drainage, among other geologic and paleontologic requirements, SCE's project upgrades would create a less than significant impact to geology and paleontology.

HAZARDOUS MATERIALS MANAGEMENT

Spills and leaks of hazardous materials during construction activities could potentially result in soil or groundwater contamination. Improper handling of hazardous materials could expose project workers or the nearby public to hazards and/or known or previously undocumented soil and or groundwater contamination could be encountered during ground disturbing activities. Implementing mitigation measures similar to the Conditions of Certification that are proposed in the Staff Assessment for construction of the ISEGS, as well as implementation of SWPPP and SPCC plans, would avoid potential significant hazard impacts from work associated with the SCE upgrades.

LAND USE

The SCE 220 kV transmission upgrades project would parallel an established and major utility corridor across BLM land. Generally all of the upgrades would parallel existing utility or transportation corridors and so they would not disrupt or divide the physical arrangement of an established community. Also for these reasons, the SCE upgrades would not restrict existing or future land uses along the route. To reduce recreation impacts, Energy Commission staff recommends mitigation measures that would require SCE to coordinate construction activities and the project construction schedule with the authorized BLM officer for the Ivanpah Dry Lake area, and require SCE to identify alternative recreation facilities that may be used by the public during construction.

NOISE

The entire area within the ROW is undeveloped, with the exception of a few roads that pass underneath the transmission line. There are a few residences within 500 feet of the transmission line ROW in the area of Primm, NV at the California/Nevada state line.

Short-term noise impacts to these residences may occur during the construction from operation of heavy equipment throughout the project area. SCE would largely use existing ROW access roads to complete work, but they would also need improvement and construction of new spur and access roads. Implementing mitigation measures similar to the conditions of certification that are proposed in the Staff Assessment for construction of the ISEGS would avoid potential significant noise impacts from work associated with the proposed project. After the construction work is complete and the line operational, there may be a change in corona noise levels in portions along the new corridor.

SOCIOECONOMICS

Because few, if any, workers are expected to relocate to the area, no new housing would be needed for the project, no housing would be displaced, and no new competition for existing housing would likely occur. Construction employees would likely already live within commuting distance to the project area in Primm, Nevada, the Las Vegas area, which is less than 40 miles to the north, or San Bernardino County in California. Since any non-local construction workers would not likely relocate family members for the relatively short duration of construction and very few, if any, new permanent employees would be hired by SCE for operation of the project, impacts to schools, public services, and recreational facilities would be less than significant.

SOIL AND WATER RESOURCES

Construction activities would not occur within the watercourses; therefore, impacts to water quality for construction and operation of the transmission lines would be less than significant. Implementation of SWPPP and recommended mitigation, such as temporary erosion control measures, and best management practices or similar mitigation would ensure less than significant impacts to soils and water resources. The SCE project would cross three grazing allotments located along the transmission line corridor in California and Nevada, however, with the implementation of mitigation, neither construction nor operation of the transmission line would cause a significant impact to agricultural resources.

TRAFFIC AND TRANSPORTATION

Since the majority of construction activities would take place in largely rural areas, it is projected that the activities would have minimal impact on the traffic level of service for the roadways in the vicinity of the activities. In addition, the movement of heavy machinery on local roads would occur intermittently, but infrequently throughout the project area over the construction period. However, on Fridays from approximately 12 p.m. to 10 p.m., northbound I-15 experiences an hourly average of approximately 2,000 trips per lane and operates at LOS F. Regardless, the number of vehicles added to northbound I-15 on Friday afternoons as a result of the project would be minor compared to the number of vehicles traveling on northbound I-15 during the same time. Based on the temporary nature of the construction activities and the generally undeveloped nature of the area, coupled with implementation of traffic mitigation measures similar to conditions of certification in the ISEGS Staff Assessment, such as scheduling during non-peak hours, would ensure that any potential traffic and transportation impacts would be less than significant.

TRANSMISSION LINE SAFETY AND NUISANCE

Since the upgraded 220 kV line would be operated at a higher voltage than the existing 115 kV line, the magnitude of the electric field along the line route would increase. The magnetic field may also change, because its intensity depends directly on current levels, however, phasing with other existing lines can actually reduce magnetic fields in some instances. SCE would prepare an EMF Field Management Plan as part of its project application to the CPUC that would include changes in EMF levels associated with the upgrades. The upgraded 220 kV transmission line would be designed, built and operated (largely within the existing ROW) according to SCE's requirements, reflecting compliance with the health and safety (non-EMF) LORS of concern to Energy Commission staff. Therefore, Energy Commission staff would not expect its operation to pose a significant health and safety hazard to individuals in the area.

TRANSMISSION SYSTEM ENGINEERING

To mitigate potential safety and reliability impacts, the LORS, CPUC and NESC regulations and SCE scheduling protocols would be used. SCE would need to assure conformance with the safety and reliability requirements. All of SCE's electrical and telecommunication upgrades would result in local system benefits, in that they would provide considerably greater flexibility in routing power in the regional transmission, subtransmission and telecommunication networks, even if the ISEGS is not built. The project would ensure that the ISEGS could generate at its rated capacity as it would mitigate overloads on the existing Eldorado–Baker–Coolwater-Dunn Siding-Mountain Pass 115 kV transmission line between Eldorado and Ivanpah Substations.

VISUAL RESOURCES

Construction of the SCE upgrades project would require temporary disturbance during construction (i.e., heavy equipment, tensioning, and pull sites). After rehabilitation of temporary construction yards and pulling sites, as required by the suggested mitigation, the transmission line would appear largely as it does now, except for the construction of new and permanent spur and access roads, which would permanently scar the fragile desert landscape.

The SCE system upgrades would result in the construction of new industrial equipment in the viewsheds across the project area. Construction of the 220 kV line would be largely within a widened, but existing ROW across undeveloped BLM lands, and would parallel a large existing utility corridor with up to five existing lines for its length. Because the existing transmission line and towers are an established part of the setting and the project would include removal of the existing 115 kV line and poles, the adverse visual impacts that would occur due to installation of the new line and any incremental changes in tower height or design would likely not be significant. This conclusion assumes that the new wires and towers would incorporate typical recommended measures to mitigate potentially significant adverse visual impacts.

WASTE MANAGEMENT

Construction would generate waste largely in the form of soil from structure excavation, concrete from existing foundations, utility line cable, and scrap metal/wood from the removal/replacement of existing structures, which would be disposed of at an offsite location. Due to the number and capacity of landfills serving the project area, capacity for materials generated from construction of the upgrades would be available. Recycling activities would greatly reduce the quantity of construction-related materials transported to local landfills. To help ensure and facilitate ongoing project compliance with LORS, Energy Commission staff recommends mitigation similar to the conditions of certification included in the **Waste Management** section of this Staff Assessment. Energy Commission staff also recommends that SCE should be required to recycle construction waste where feasible.

WORKER SAFETY AND FIRE PROTECTION

Workers at the project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress. Workers may sustain falls, trips, burns, lacerations, and other injuries. During construction and operation of the upgrades there is also the potential for both small fires and major structural fires. Energy Commission staff recommends mitigation similar to the Conditions of Certification in the **Worker Safety and Fire Protection** section of this Staff Assessment that would require SCE to provide a project construction safety and health program and a project operations and maintenance safety and health program. These measures would ensure adequate levels of industrial safety and would comply with applicable LORS. Energy Commission staff also concludes that the project would not have significant impacts on local fire protection services.

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

DOCKET NO. 07-AFC-5
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(Revised 11/23/09)

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DECLARATION OF SERVICE

I, Mineka Foggie, declare that on __January 04, 2010, I served and filed copies of the attached, Staff's Supplemental Testimony –Cumulative Analysis Of Sce Transmission Upgrades Ivanpah Solar Electric Generating System (07-AFC-5) Exhibit 304
dated, __January 4, 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;

__x__ by personal delivery or by depositing in the United States mail at Sacramento, California with first-class postage thereon fully prepaid and addressed as provided on the Proof of Service list above to those addresses NOT marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

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

OR

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

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

Originally Signed By
Mineka Foggie

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