2. Project Alternatives

CEQA and CEQA Guidelines Section 15126.6(a) require consideration of a reasonable range of alternatives to a proposed project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. CEQA Guidelines Section 15126.6(d) requires that sufficient information about each alternative be included to allow meaningful evaluation, analysis, and comparison with the proposed project. In addition, CEQA Guidelines Section 15126.6(e) requires the evaluation of a "no project" alternative (No Project Alternative) to compare the impacts of approving the proposed project with the impacts of not approving the proposed project.

The following sections describe the methodology and screening system for development of alternatives. Alternatives developed by these methodologies are analyzed for their ability to meet the project objectives.

2.1 System Alternatives

The following sections provide information about how System Alternatives were developed, evaluated, and selected.

2.1.1 System Alternative Screening Methodology

SCE follows a four-step process to develop System Alternatives. These steps are summarized below:

Step 1. Perform technical engineering analyses to determine whether modifying the existing electrical infrastructure would safely and reliably accommodate the forecasted peak demand requirements in the Electrical Needs Area.

Step 2. If the forecasted peak demand requirements in the Electrical Needs Area cannot be accommodated by modifying the existing electrical infrastructure, then develop System Alternatives by considering feasible upgrades or additions to the existing electrical infrastructure.

Step 3. Evaluate each System Alternative in consideration of the following criteria:

- The extent to which a System Alternative would substantially meet the project objectives; and
- The feasibility of a System Alternative considering capacity limits, ability to upgrade the system on existing utility property, and economic viability.

Step 4. If a System Alternative is not feasible then it is no longer considered. If a System Alterative is feasible, that System Alternative is retained for analysis in the PEA, as required by CPUC General Order 131-D.

If it is determined that a new electrical infrastructure upgrade or addition is required, then siting alternatives are considered, as described later in this chapter.

2.1.2 System Alternatives Discussion

Projected electrical loads indicate that forecasted electrical peak demand in the Electric Needs Area in a 1-in-10-year heat storm would exceed the Planned Maximum Operating Limit at Downs 33/12 kV Substation by 2011. To address this issue, SCE considered three System Alternatives to determine whether any would meet the forecasted demand within the Electrical Needs Area as well as meet the project objectives.

- **Alternative 1. No Project Alternative.** Under the No Project Alternative, no action would be taken. The No Project Alternative would involve no construction of new facilities and no modifications to the existing system.

- **Alternative 2. Upgrade Inyokern Substation.** Upgrade Inyokern Substation by adding additional transformation capacity to increase its capacity rating from approximately 12 MVA to 28 MVA. The upgrade would include adding two new 12 kV circuits to transfer a portion of load from the existing Downs 33/12 kV Substation to Inyokern Substation. A 56 MVA 115/33 kV transformer would be added to Inyokern Substation. The 115 kV, 33 kV, and 12 kV switchracks would also be rebuilt. Acquisition of additional real property adjacent to the existing Inyokern Substation would be required to facilitate expansion of the substation.

- **Alternative 3. Increase Capacity at the Existing Downs and Inyokern Substations.** Increase the capacity at the existing Downs Substation by replacing the two existing 22.4 MVA transformers and the spare 14 MVA transformer with three 28 MVA transformers. The increase would also include the addition of a 115/33 kV transformer at Inyokern Substation. SCE would rebuild Inyokern Substation 115 kV and 33 kV switchracks and construct a new 33 kV underground distribution circuit from Inyokern Substation to the existing Downs Substation. The upgrades would include the reconstruction of the Downs 33 kV switchrack. Portions of the existing 33 kV circuits from Inyokern Substation to Downs Substation would be re-conductored. SCE would also construct a second new 33 kV circuit between Inyokern Substation and Downs Substation. This new 33 kV circuit would include segments located on existing overhead facilities and segments of new underground construction. Additional real

property located adjacent to Downs Substation and Inyokern Substation would be required to facilitate this System Alternative.

- **Alternative 4. Upgrade the Existing Downs 33/12 kV Substation.** Upgrades at the existing Downs Substation would include the addition of a new 115/12 kV unattended, automated 56 MVA low-profile substation (with a 28 MVA N-1 reserve bank). The proposed Downs Substation capacity would have the potential to expand to 112 MVA as necessary. The upgrades would be integrated into SCE's existing 115 kV subtransmission system by utilizing the existing Inyokern-McGen-Searles No. 2 115 kV subtransmission line located adjacent to the substation. A new fiber optic telecommunication route would be installed between the existing McGen 115 kV Substation, the Searles 115 kV Substation, the Inyokern 115 kV Substation, and the upgraded Downs 115 kV/12 kV Substation.

These System Alternatives are described in more detail below.

System Alternative 1. No Project Alternative

The No Project Alternative would involve no construction and no modification to the existing Downs Substation or Inyokern Substation.

System Alternative 2. Upgrade Inyokern Substation

System Alternative 2 proposes an upgrade to the existing Inyokern Substation and the construction of two new 12 kV circuits. This upgrade would transfer a portion of load from the existing Downs Substation to the 33/12 kV electrical equipment located within Inyokern Substation.

Inyokern Substation would remain unstaffed and would include the following elements:

- Replacement of two 6 MVA transformers with two 14 MVA transformers.
- Addition of one 12 kV bank position, bus tie position, and three line positions, including circuit breakers, disconnect switches, and circuit breaker foundations.
- Addition of one 12 kV, 4.8 MVAR capacitor bank.
- Installation of relay protection equipment: relays for each line position, bank, and bus tie position.

- Construction of approximately 8 miles of a new 12 kV underground distribution ductbank and structures for two new 12 kV circuits, for a total of 16 circuit miles.

- Installation of a third 56 MVA transformer for the 115 kV electrical system located at Inyokern Substation, together with a 33 kV capacitor and ground bank.

- Upgrade of the 12 kV, 33 kV, and 115 kV switchracks at Inyokern Substation.

- Acquisition of real property adjacent to the existing Inyokern Substation as required to facilitate the expansion of Inyokern Substation footprint.

System Alternative 2 would provide the following benefits:

- Provide a limited additional 10 MVA of capacity needed to serve the Electrical Needs Area.

- Meet N-1 source and line criteria.

System Alternative 3. Increase Capacity at the Existing Downs and Inyokern Substations

System Alternative 3 proposes to increase the capacity at the existing Downs Substation and Inyokern Substation. This System Alternative includes the following elements:

- Replacement of two 22.4 MVA transformers and the spare 14 MVA transformer with three 28 MVA transformers and additional 12 kV capacitors at Downs Substation.

- Reconstruction of the 33 kV switchrack at the existing Downs Substation to accommodate a third subtransmission source line.

- Installation of a third 56 MVA transformer for the 115/33 kV electrical system at Inyokern Substation.

- Installation of an additional 33 kV capacitor and ground bank at Inyokern Substation.

- Upgrading of the existing 33 kV and 115 kV switchracks at Inyokern Substation.

- Construct a new 33 kV circuit, approximately 8.7 miles in length, between Inyokern Substation and Downs Substation. Approximately 6.2 miles of this circuit would be constructed

underground. Approximately 2.5 miles of this circuit would be constructed on existing overhead electrical facilities.

- Construction of an additional new underground 33 kV circuit, approximately 7.6 miles in length, from Inyokern Substation to Downs Substation.

- Replacement of approximately 10 miles of overhead conductor for the existing 33 kV circuits from Inyokern Substation to Downs Substation for additional line capacity.

- Acquisition of real property adjacent to the existing Inyokern Substation as required to facilitate the expansion of the Inyokern Substation footprint.

System Alternative 3 would provide the following benefits:

- Provides 56 MVA of 12 kV capacity needed to serve the Electrical Needs Area.

- Meets N-1 source and line criteria.

- Improves reliability of the Electrical Needs Area by providing proper protection of the existing Downs Substation.

- Operational flexibility is enhanced by re-configuring the 33 kV circuits out of Inyokern 115/33 kV Substation.

System Alternative 4. Upgrade the Existing Downs Substation

System Alternative 4 proposes an upgrade to the existing Downs Substation to include 115/12 kV electrical equipment. Upon completion of the upgrade, Downs Substation would operate primarily at 115/12 kV.[14] The Downs Substation would remain unstaffed and would include the following elements:

- Create the new Downs-McGen-Searles 115 kV and Downs-Inyokern 115 kV subtransmission lines by looping in the existing Inyokern-McGen-Searles No. 2 115 kV subtransmission line.

[14] The 33 kV electrical equipment would remain on site, but would no longer serve 12 kV load. Instead, the 33 kV system would continue to serve 33 kV load.

- Upgrade 115 kV subtransmission relays and associated protection equipment, as required, at Inyokern, McGen, and Searles Substations.

- Install telecommunication equipment between Inyokern, Downs, McGen, and Searles Substations, as required, for automation and protection. This installation would include approximately 58 miles of fiber optic telecommunication cable to be under built on the existing Inyokern-McGen-Searles No. 1 115 kV and Inyokern-McGen-Searles No. 2 115 kV subtransmission lines.

- Downs Substation:
  - Removal of two existing 22.4 MVA, 33/12 kV transformers and one spare 14 MVA, 33/12 kV transformer
  - Upgrade existing Downs Substation control power from 48 volt direct current (VDC) to 125 VDC
  - Extension of the 12 kV switchrack to allow for the installation of two 3,500 amp circuit breakers
  - Addition of a new 115 kV switchrack to support at least three 28 MVA, 115/12 kV transformer banks and the incoming 115 kV subtransmission lines
  - Installation of a new Mechanical and Electrical Equipment Room (MEER)
  - Installation of a new 4.8 MVA 12 kV capacitor bank

System Alternative 4 would provide the following benefits:

- Meets long term projected load requirements by providing 56 MVA of 12 kV capacity needed to serve the Electrical Needs Area.

- Provides Downs Substation with the ability for future expansion up to 145.6 MVA.

- Improves safety and reliability in the Electrical Needs Area.

- Meets N-1 source and 115 kV subtransmission line criteria.

- Transfers the load served by Downs Substation off of the 33 kV distribution circuits and onto 115 kV subtransmission lines to increase the operability and capacity of the 33 kV distribution system.

- Brings new telecommunication facilities into the Electrical Needs Area, which supports flexibility for future additions to the electrical system.

- Improves reliability of Electrical Needs Area by providing proper protection of the proposed Downs 115/12 kV Substation.

- Provides more reliable protection for the Inyokern-McGen-Searles No. 1 and Inyokern-McGen-Searles No. 2 115 kV subtransmission lines.

2.1.3 System Alternatives Eliminated from Further Consideration

System Alternative 1 (No Project Alternative) is not a viable option to address the capacity and reliability constraints at Downs Substation. The No Project Alternative is projected to result in rolling blackouts to customers in the Electrical Needs Area. Therefore, System Alternative 1 is eliminated from further consideration in this PEA.

System Alternative 2 (Upgrade Inyokern Substation) would provide approximately 10 MVA of distribution circuit capacity to relieve the existing Downs Substation. However, it does not provide the long-term projected capacity needed for the area, improve system reliability, or enhance operational flexibility. Therefore, it does not meet the project objectives and is eliminated from further consideration in the PEA.

System Alternative 3 (Increase Capacity at the Existing Downs and Inyokern Substations) would provide sufficient capacity to meet the most current 10-year peak demand forecast through 2019. However, SCE's current data indicate that economic growth, which is not reflected in the most recent (2009) SCE forecast, is occurring in the Electrical Needs Area. As a result, SCE anticipates that the near-term 10-year peak demand forecasts will show substantial increases in demand. Because of this, Alternative 3 would delay, but not eliminate, the need for System Alternative 4 (Upgrade the Existing Downs Substation), which would allow for expansion and provide more capacity.

Adding additional capacity at a 33 kV substation that already has a transformation capacity of 44.8 MVA is not a measure recommended by SCE, because 33 kV systems are generally much less efficient than 115 kV systems for serving the projected load requirements from a kilowatt-hour (kwh) loss standpoint. The 33 kV system would also require additional circuitry to carry the additional current, and additional rights-of-way would be needed to support this circuitry. For these reasons, SCE does not recommend the use of new 33 kV additions to the SCE system as provided for in Alternative 3.

Finally, SCE estimates that System Alternative 3 could cost up to three times more to construct than System Alternative 4.

For the reasons stated above, System Alternative 3 does not meet the project objectives and does not provide the same level of benefits as System Alternative 4. Therefore, it is eliminated from consideration in this PEA.

System Alternative 4 (Upgrade Downs Substation) meets all of the project objectives and is the most feasible project. System Alternative 4 is therefore the Proposed Project. The Proposed Project would not require the installation of new 115 kV subtransmission lines, which would help minimize environmental impacts. Additionally, this project would use existing 12 kV distribution circuits that originate at Downs 33/12 kV Substation. As a result, SCE would have no need to build additional 12 kV circuits as part of the Proposed Project to serve the forecasted load. The new fiber optic telecommunication system, required to upgrade SCE's existing protective equipment and communication channels to current SCE standards, would be required of any future area 115 kV subtransmission project, whether or not it is done as a part of this project.

2.2 Proposed Project

The project objectives and benefits include meeting long-term projected electrical load requirements to serve the Electrical Needs Area, construction of a substation with the ability to expand in accordance with SCE criteria and guidelines to provide safe and reliable electrical service, minimizing environmental impacts while meeting project objectives, and restoring capacity reserve and operation flexibility to the existing 33 kV distribution network. SCE recommends System Alternative 4, Upgrade the Existing Downs Substation, as the preferred System Alternative (Proposed Project) because it satisfies all of the objectives.

Because there are no System Alternatives that would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, no other System Alternatives are being considered.

In addition, no alternative locations are discussed further in this PEA because no alternative locations could reasonably be expected to allow for the expansion of Downs Substation as feasibly as the proposed location while also reducing environmental impacts. For example, the existing Downs Substation is already in operation at the current location, so development of an expanded Downs Substation at another location would require additional work associated with the transfer of existing equipment from the current location to the new location. That additional work would necessarily cause additional environmental impacts, including impacts associated with

additional truck trips (such as traffic congestion and air emissions) that would not be associated with the Proposed Project if constructed at the current Project Area/SCE-owned property.

Similarly, the current Downs Substation is located immediately adjacent to the existing Inyokern-McGen-Searles No. 2 115 kV subtransmission line, so looping that line into the proposed expanded Downs Substation would require construction of only approximately 1,000 circuit feet of new lines. In contrast, if the Proposed Project were to be constructed at another location, looping in a 115 kV subtransmission line could require potentially longer circuits if the new location is not immediately adjacent to an existing 115 kV subtransmission line. The construction of longer circuits would also consequently produce increased environmental impacts compared to the current location.

In addition, because SCE already owns the entirety of the property on which the expanded Downs Substation would be constructed, construction of the Proposed Project at the Project Area / SCE-owned property would be more feasible from an economic perspective than would construction of the Proposed Project at an alternative location. For example, acquisition of a new location large enough to house the expanded Downs Substation could require a substantial capital outlay and a potential condemnation action, all while rendering the already-developed portions of Project Area / SCE-owned property needlessly obsolete. In contrast, because SCE already owns the entire location on which the current Proposed Project would be constructed, the Proposed Project would be more feasible at the current location. For these reasons, no alternative locations for the Proposed Project are further considered in this PEA.