Appendix A-1
Alternatives Screening Report

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APPENDIX A-1

Eldorado to Ivanpah Transmission Project EIR/EIS

Alternatives Screening Report

Lead Agencies:
California Public Utilities Commission

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Acronyms

AC	alternating current
ADSS	All Dielectric Self Supporting
AFC	Application for Certification
BLM	Bureau of Land Management
CAISO	California Independent System Operator Corporation
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CPUC	California Public Utilities Commission
CREZs	competitive renewable energy zones
DC	Direct Current
EAP	Energy Action Plan
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EITP	Eldorado–Ivanpah Transmission Project
EPAct	Energy Policy Act
GHG	greenhouse gas
IEPR	Integrated Energy Policy Report
kV	kilovolt
LADWP	Los Angeles Department of Water and Power
LGIP	Large Generator Interconnection Procedure
LSTs	lattice steel towers
MP	mile post
MW	megawatt
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
OHGW	overhead ground wire
OPGW	optical ground wire
PEA	Proponent's Environmental Assessment
PPA	Power Purchase Agreement
RETI	Renewable Energy Transmission Initiative
ROW	right-of-way
RPS	Renewable Portfolio Standards

SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison
SPS	Special Protection Systems
T/L	transmission line
TC	telecommunication
TSPs	tubular steel poles
USC	United States Code
WECC	Western Electricity Coordinating Council
WECC	Western Electricity Coordinating Council
WGA	Western Governors' Association
WREZ	Western Renewable Energy Zones

1. Introduction

1.1 Purpose of Alternatives Screening Report

On May 28, 2009, Southern California Edison (SCE) submitted Application A.09-05-027 seeking authorization by the California Public Utilities Commission (CPUC) for a Certificate of Public Convenience and Necessity for the Eldorado–Ivanpah Transmission Project (proposed project). Because the proposed project would traverse public land administered by the Bureau of Land Management (BLM), SCE will need right-of-way (ROW) authorization and special use permits from the BLM. This document describes the alternatives screening analysis that has been conducted for the proposed project, supplementing the detailed project description information presented in Chapter 2 of the Draft Environmental Impact Report (EIR)/Environmental Impact Statement (EIS). Under the direction of the CPUC as the lead California State agency, and the BLM as the lead federal agency, the EIR/EIS will be prepared to comply with the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

Alternatives to the proposed project were suggested by the CPUC, the BLM, and the California Independent System Operator Corporation (CAISO). Alternatives were also suggested by SCE as part of the Proponent's Environmental Assessment (PEA) and by the general public during the public scoping period (July 23 to August 26, 2009; SCE 2009a). This report summarizes how alternatives were screened and provides a record of the screening criteria and conclusions about alternatives carried forward for full EIR/EIS analysis. This report documents:

- the range of alternatives that have been suggested and evaluated,
- the approach and methods used in screening the feasibility of these alternatives according to guidelines established under CEQA and NEPA, and
- the results of the alternatives screening analysis and identifies those alternatives will be carried forward for full analysis in the EIR/EIS).

This Alternatives Screening Report is incorporated as Appendix A to the EIR/EIS, providing the basis and rationale for whether an alternative has been carried forward for full evaluation in the EIR/EIS. For each alternative that was eliminated from further consideration, this document explains in detail the rationale for elimination. Since full consideration of the No Project/No Action Alternative is required by CEQA and NEPA, and must automatically be considered fully in the EIR/EIS, this report does not address this alternative (it is defined in Chapter 2 of the EIR/EIS).

1.2 Background – Transmission Requirements and SCE's Service Profile

Several federal, state, and regional initiatives require creation of renewable energy generation and delivery mechanisms to meet energy demand and replace traditional fossil fuel sources of energy. The Eldorado–Ivanpah Transmission Project would assist with meeting the renewable energy objectives of the Energy Policy Act (EPAct) of 2005, Western Renewable Energy Zones (WREZ), California Renewable Portfolio Standards (RPS), Nevada RPS, and the Renewable Energy Transmission Initiative (RETI). These plans are summarized below.

In 2005, the EPAct was signed into law by President George W. Bush. Section 368 of the EPAct required, among other things, the designation of energy corridors on federal lands in 11 western states. Section 368 also directed federal agencies to take into account the need for upgraded and new infrastructure and to take actions to improve reliability, relieve congestion, and enhance the capability of the national grid to deliver energy (WECC 2009).

The Western Governors' Association (WGA) and U.S. Department of Energy launched the WREZ initiative in May 2008. The purpose of WREZ is to identify areas in the West with vast renewable resources to expedite the development and delivery of renewable energy to where it is needed. Renewable energy resources are being analyzed within 11 states, two Canadian provinces, and areas in Mexico that are part of the "Western

Interconnection." The WGA and the U.S. Department of Energy released a joint WREZ Phase 1 Report on June 15, 2009. The report identified "Western Renewable Energy Zones" as those areas throughout the Western Interconnection with the potential for large-scale development of renewable resources (at least 1,500 megawatts [MWs]) with low environmental impacts. The WREZ initiative also developed a publicly available modeling tool to allow load-serving entities, regional planners, renewable energy developers, state and provincial regulators, and other interested parties to estimate the relative economic attractiveness of delivering power from specific Western Renewable Energy Zones to existing load centers across the Western Interconnection.

The State of California and the State of Nevada have adopted RPS that require an increased use of renewable resources for generation of electricity. In order meet the state RPS goals and provide cost-effective, reliable, and renewable power to consumers, the electric transmission facilities will need to be upgraded in each state. California's RETI is a statewide, multi-stakeholder initiative designed to identify and quantify renewable resources that can provide cost-effective energy sources to meet the RPS requirements. RETI is also intended to identify the transmission investments necessary to ensure delivery of that energy to California consumers.

To date, RETI has finalized three reports. The RETI Phase 1A Report, accepted by the RETI Stakeholder Steering Committee on May 21, 2008, described the methodology, assumptions, and resource information to be used in Phase 1B of the RETI project. The RETI Phase 1B Report, updated March 4, 2009, is a high-level screening analysis that applies the resource valuation methodology developed in Phase 1A. Potential renewable energy projects were grouped into California Renewable Energy Zones, or CREZs, based on geographical proximity, development timeframe, shared transmission constraints, and additive economic benefits.

The RETI Phase 2A Final Report, dated September 2009, identified potential transmission projects that should be considered priorities for future study based on information about the potential for renewable development available at the time the report was written. Included in this listing is replacement of the existing 115-kilovolt (kV) Coolwater–Eldorado line with a new 500-kV Mountain Pass 1–El Dorado line (RETI 2009).[1]

Phase 3 of the RETI project will advance this plan into proposals for specific transmission projects that can be approved, financed, and built to provide renewable energy to customers across the state in the most cost-competitive and least environmentally harmful ways.

The RETI effort is being supervised by a coordinating committee comprised of the CPUC, California Energy Commission (CEC), CAISO, and publicly owned utilities including the Southern California Public Power Authority, the Sacramento Municipal Utility District and the Northern California Policy Area (RETI 2009). CAISO is also developing a framework for multiple projects within a transmission-constrained renewable resource area to share the costs of connecting to the grid. CAISO conducts an annual review of transmission upgrades that are needed to maintain North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) Reliability Criteria in the SCE service area.

SCE Service Profile

SCE provides energy to over 13 million people; the service area is 50,000 square miles in central, coastal, and southern California, excluding the city of Los Angeles and some other cities (SCE 2009b). Most of the SCE load is within the Los Angeles Basin; however, the highest load growth occurs in the Inland Empire area.

The SCE transmission system includes various 500-kV lines that are part of WECC Path 49 (East of River) and Path 46 (West of River) linking Southern California to Arizona and Southern Nevada. Most of the SCE area load is served

[1] Source: RETI Phase 2A Final Report, September 2009 – Appendix I List of Component Facilities, p. I-87.

by local generation that includes nuclear, Qualified Facilities[2], hydropower, and oil/gas-fired power plants. The remaining demand is served by power transfers into Southern California on alternating current (AC) and direct current (DC) transmission lines (T/Ls) from the Pacific Northwest and Desert Southwest (CAISO 2009).

The SCE system load peaked at 22,405 MW on June 20, 2008. The CEC's load forecast for the entire SCE is 400 MW per year, and for the Inland Empire area, it is 180 MW per year. The transmission system consists of 500-kV and 230-kV transmission facilities. The proposed project would include construction of new T/Ls to connect new renewable generation facilities in the Ivanpah area by 2013. This project would include construction of a new 230-kV/115-kV substation and a new double-circuit 230-kV T/L. This project was studied in the CAISO 2009 Transmission Plan. While it passed the initial CAISO screening process, additional information was requested and it was recommended for study as part of the 2010 Transmission Plan (CAISO 2009).

As part of California's RETI, the Ivanpah Dry Lake Area, mostly under BLM jurisdiction, has been identified to be a rich solar resource area in the State of California, and the construction of new T/Ls and facilities will be required to tap this potential solar resource. These new T/Ls and facilities, together with existing facilities, will be used to deliver the power produced from the Ivanpah Dry Lake Area to utility load centers.

1.3 Summary of the Proposed Project

SCE proposes to construct, operate, and maintain new and upgraded transmission facilities to deliver electricity from expected solar generation developments in the Ivanpah Dry Lake Area to accommodate projected load growth in the SCE service area in the Los Angeles region. The proposed project is described in detail in Chapter 2 of the Draft EIR/EIS. The project, as proposed by the applicant, generally includes:

- New Ivanpah Substation – Construction of a new Ivanpah Substation in San Bernardino County, California, to serve as a collector hub for the solar generation projects identified in the Ivanpah Dry Lake Area. The proposed Ivanpah Substation would include 230-kV and 115-kV switchracks.
- Replacement 230-kV Transmission Line – Replacement of 35 miles of the Eldorado–Ivanpah portion of the existing SCE Eldorado–Baker–Cool Water–Dunn Siding–Mountain Pass 115-kV T/L with double-circuit 230-kV lines connecting the new Ivanpah Substation to SCE's existing Eldorado Substation.
- Eldorado Substation Upgrades – Upgrades inside the existing Eldorado Substation to accommodate the new 230-kV T/Ls and support the connection of new T/Ls.
- New Telecommunication System – The proposed project also includes a new telecommunication system routed along two fully diverse and redundant paths to provide protective relay circuit, Supervisory Control and Data Acquisition (SCADA) circuit, data, and telephone services to the proposed Ivanpah Substation. The telecommunication system would also support a special protection system that would trip the SCE Eldorado–Ivanpah 230-kV T/L relays under specific outage contingencies, and would also support the operating and monitoring of the substation and T/L equipment. The paths would connect the Eldorado Substation to the proposed Ivanpah Substation.

  The proposed telecommunication system would consist of an optical ground wire (OPGW) and combined microwave system along two diverse telecommunication paths referred to as Path 1 and Path 2. Path 1 would be from the existing Eldorado Substation to the proposed Ivanpah Substation and would use new OPGW along the proposed Eldorado–Ivanpah 230-kV T/L alignment. Along Path 1, the proposed project would use OPGW on overhead transmission towers between the existing Eldorado Substation and the proposed Ivanpah Substation. Along Path 2, the proposed project would include OPGW placed on overhead transmission towers along an approximately 25-mile section of the existing SCE Eldorado-Lugo 500-kV T/L.

[2] Defined by the Federal Energy Regulatory Commission as smaller generating units that use renewable resources, such as solar and wind energy, or alternative technologies, such as cogeneration.

Approximately 5 miles of fiber optic cable would be placed in an underground duct from the Eldorado–Lugo T/L to the town of Nipton. This portion of the telecommunication system is referred to as Path 2, Sections 1 and 2. Path 2 would then follow a route from the town of Nipton to the proposed Ivanpah Substation on a microwave path referred to as Path 2, Section 3.

- Proposed Transmission Structures and Finish. The proposed project would include approximately 216 double-circuit 230-kV lattice steel towers (LSTs) and 42 steel H-Frame structures. The double-circuit LSTs would range between 110 and 180 feet in height. The single-circuit steel H-Frame structures would be between 45 and 75 feet tall. Tubular steel poles (TSPs) approximately 75 feet in height and would be installed near the proposed Ivanpah Substation. The project proposes to galvanize the transmission structures to protect against corrosion using a non-paint treatment applied at the factory.

The entire proposed project would span approximately 28 miles in Nevada and approximately 7 miles in California (Figure 1). It would start at the existing Eldorado Substation, located about 14 miles southwest of Boulder City in the State of Nevada. It would be located on BLM land and private lands and would generally follow SCE's existing ROW for the Eldorado–Baker–Coolwater–Dunn Siding–Mountain Pass 115-kV T/L. The line would head generally west and cross below the following five existing T/Ls:

- Eldorado–McCullough (500-kV T/L),
- Mead–Victorville (287-kV T/L),
- McCullough–Victorville 1 (500-kV T/L),
- McCullough–Victorville 2 (500-kV T/L), and
- Intermountain–Adelanto (500-kV Direct Current T/L).

The proposed 230-kV T/L would be constructed on double-circuit LSTs for most of the route (Figure 2). Where required, additional ROW and single-circuit steel H-frame structures would be used to facilitate the crossing of existing T/Ls noted above (Figure 3). In certain locations where the ROW is narrow or the T/L would need to cross existing T/Ls, SCE would use tubular steel structures (Figure 4). SCE's existing 75-foot ROW would be widened to 100 feet to accommodate installation of the proposed 230-kV T/L.

1.4 Project Objectives, Purpose, and Need

1.4.1 Purpose and Need for the Project

The purpose of the Eldorado–Ivanpah Transmission Project is to provide the electrical facilities necessary to integrate up to 1,400 MW of new solar generation in the Ivanpah Dry Lake Area. The proposed project consists of a new, approximately 35-mile double-circuit 230-kV T/L between the Ivanpah Dry Lake Area and the existing Eldorado Substation and construction of a new 230/115-kV Ivanpah Substation. As discussed below, the proposed project is needed to:

1. Comply with the state-mandated RPS (20% renewable by year 2010 per California Senate Bill 107[3]) in an orderly, rational, and cost-effective manner, while also considering the need for maintaining reliable electric service during the upgrade and/or construction of new facilities.
2. Integrate planned renewable generation resources,[4] including up to 1,400 MW from the Ivanpah Dry Lake Area, with a Power Purchase Agreement (PPA) executed by a CPUC-jurisdictional private transmission

3 SB 107; Chapter 464, Statutes of 2006. SB 107 amends pertinent provisions in Public Resources Code Sections 25740 through 25751 and Public Utilities Code Sections 399.11 through 399.16.

owners group in a manner that minimizes potential environmental impacts and impacts to existing and planned residences, where feasible, by maximizing the use of existing transmission corridors in order to:

a. maximize the use of existing, previously disturbed T/L ROW to minimize effects on previously undisturbed land and resources,

b. select route and tower locations with the lowest potential for environmental impacts while still meeting proposed project objectives, and

c. select the shortest feasible route that minimizes environmental impacts and proposed project costs.

3. Interconnect and deliver energy up to 1,400 MW of renewable resources located in the Ivanpah Dry Lake Area in a way that complies with all applicable NERC/WECC Planning Standards, and in a manner that minimizes T/L crossings.
4. Support the State of California Greenhouse Gas Reduction Program.
5. Assist the BLM in meeting the federal directive to develop 10,000 MW of renewable generation.[5]

Compliance with California's Renewable Portfolio Standard

The California RPS was established in 2002 by Senate Bill 1078.[6] The RPS requires investor-owned utilities, including retail sellers of electricity such as SCE, to increase their sale of electricity produced by renewable energy sources (such as wind and solar) by at least 1% per year so that by the year 2017, at latest, 20% of its total retail sales are procured from renewable sources. These requirements were accelerated by the passage of Senate Bill 107[7] to be consistent with the Energy Action Plan (EAP). The EAP adopted by the CPUC, the CEC, and the now-defunct California Power Authority pledged that the agencies would accelerate RPS implementation to meet the 20% goal by 2010 instead of 2017. In order for investor-owned utilities (including retail sellers of electricity such as SCE) to satisfy these target goals, new transmission facilities will be required to interconnect remote areas of high renewable generation concentration. One of these remote areas is referred to as the Ivanpah Dry Lake Area.

The CEC's 2006 Integrated Energy Policy Report (IEPR) Update Report (January 2007) encourages development of additional transmission infrastructure to interconnect and deliver renewable resources. The IEPR Update Report identified the lack of transmission infrastructure to access remote renewable resources as the most critical barrier to meeting California's 20% target by 2010. Furthermore, the IEPR Update Report states that achieving the state's RPS is an essential component of California's greenhouse gas (GHG) emission reduction targets.

Integration of Planned Renewable Generation Resources

Under Sections 210 and 212 of the Federal Power Act (16 U.S.C § 824 [i] and [k]) and Section 25 of the CAISO's[8] Tariff, SCE is obligated to interconnect and integrate power generation facilities into its electric system. As of April 22, 2009, there were eight active interconnection requests in the Ivanpah Dry Lake Area totaling 1,677 MW of new renewable generation interconnections. Table A-1 lists planned solar and wind energy projects in the Ivanpah Valley Area awaiting CAISO evaluation in the CAISO queue.

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[4] Under Sections 210 and 212 of the Federal Power Act (16 U.S.C § 824 [i] and [k]) and Section 25 of the California Independent System Operator's (CAISO) Tariff, Southern California Edison (SCE) is obligated to interconnect and integrate power generation facilities into its electric system.

[5] Executive Order 13212, Actions to Expedite Energy-Related Projects, requires federal agencies to expedite review of energy project applications; and the Energy Policy Act of 2005 (Title II, Sec. 211) requires the Department of Interior to approve at least 10,000 MW of renewable energy on public lands by 2015 (CEQ 2001).

[6] SB1078 (Stats. 2002, Ch. 516), adding Article 16 (California RPS Program) to the CPUC § 399.11, et seq. (2004) (SB 1078).

[7] SB 107, Chapter 464, Statutes of 2006. SB 107 amends pertinent provisions in Public Resources Code Sections 25740 through 25751 and Public Utilities Code Sections 399.11 through 399.16

[8] CAISO plans and operates the California transmission grid.

Table A-1 Ivanpah Dry Lake Area New Generation Interconnection Requests

CAISO Queue Position	Type	Size (MW)
CAISO Queue #11	New Wind Project	63
CAISO Queue #131[1]	New Solar Project	100
CAISO Queue #162[1]	New Solar Project	114
CAISO Queue #233[1]	New Solar Project	200
Total Continuing under LGIP Serial Approach		477
CAISO Queue #163	New Solar Project	300
CAISO Queue #234	New Solar Project	400
CAISO Queue #382	New Solar Project	270
CAISO Queue #467	New Solar Project	230
Total Continuing under Transitional Queue Cluster Approach		1,200
GRAND TOTAL INTERCONNECTION REQUESTS		1,677

Notes:
[1]Currently under review at the California Energy Commission (Docket 07-AFC-05)
Key:
CAISO = California Independent System Operator's (CAISO) Tariff
LGIP = Large Generator Interconnection Procedure
MW = Megawatt

SCE understands that PG&E has executed a PPA with two of the eight active projects, and SCE recently executed a PPA with one of the active projects. The eight anticipated projects have a combined generation output in excess of 1,400 MW.

On August 31, 2007, an Application for Certification (AFC) with the CEC was filed for the three projects with CPUC-approved PPAs (Docket 07-AFC05). The AFC indicates that the three plants (projects) would be developed in concert, and a joint environmental assessment by the BLM and the CEC is underway. Consequently, the proposed project will enable California utilities to access renewable generation in the Ivanpah Dry Lake Area, and thus satisfy SCE's obligation to interconnect and integrate power generation facilities into the electric grid.

Compliance with NERC/WECC Reliability Planning Criteria

T/Ls must be constructed in accordance with reliability planning criteria, including criteria developed by the CAISO, WECC, and NERC. These criteria require that the potential loss of T/Ls (proposed and existing) be analyzed and the transmission system be designed to continue to function if a loss occurs. To the extent that simultaneous loss of two or more T/Ls occurs within the same transmission corridor and impacts system reliability, SCE must use acceptable mitigation measures such as Special Protection Systems (SPS) or construction of additional facility upgrades.

Support California's Greenhouse Gas Reduction Program

With the recent signing of Assembly Bill 32 (Nuñez), Chapter 488, Statutes of 2006, California will embark on an ambitious program to reduce GHG emissions. The 2006 IEPR Update states that "achieving the state's Renewable Portfolio Standard goals is an essential component of California's greenhouse gas emission reduction targets."

Consequently, the proposed project will enable California to integrate renewable resources (such as solar) with no GHG emissions, which could help the state achieve GHG emissions reduction targets.

Support Federal Renewable Energy Mandates

Executive Order 13212 – Actions to Expedite Energy-Related Projects requires federal agencies to expedite review of energy project applications (CEQ 2001). In addition, the Energy Policy Act of 2005 (Title II, Sec. 211) requires the Department of Interior to approve at least 10,000 MW of renewable energy on public lands by 2015.

1.4.2 Project Objectives

1.4.2.1 Lead Agency Objectives

The project objectives reflect the stated purpose and need of the project and will be considered in the comparison of alternatives, as required under both NEPA and CEQA. The CPUC and BLM developed the following three objectives for the project:

- To connect renewable energy sources in the Ivanpah Valley area in compliance with Executive Order 13212, the Energy Policy Act of 2005, the Federal Power Act, California Senate Bill 1078, and California Senate Bill 107;
- To improve reliability in compliance with applicable standards including NERC, WECC, CAISO, and Southern California Edison standards; and
- To maximize the use of existing ROW and designated utility corridors to minimize impacts to environmental resources.

1.4.2.2 Applicant's Project Objectives

In its PEA, SCE identified the following seven objectives for the project:

- Reliably interconnect new solar generation resources in the Ivanpah Dry Lake Area and help enable SCE and other California utilities to comply with California's RPS in an expedited manner
- Comply with all applicable reliability planning criteria required by NERC, WECC, and the CAISO;[9]
- Construct facilities in an orderly, rational, and cost-effective manner to maintain reliable electric service by minimizing service interruptions during construction;
- Maximize the use of existing T/L ROWs in order to minimize effects on previously undisturbed land and resources;
- Minimize environmental impacts through selection of routes, tower types, and locations;
- Where existing ROW is not available, use the shortest feasible route that minimizes environmental impacts; and
- Meet project needs in a cost-effective and timely manner.

1.5 Organization of the Alternatives Screening Report

The remainder of this Alternatives Screening Report provides an overview of the alternative evaluation process (Section 2), detailed determinations on individual alternatives (Section 3), and a summary of the alternative screening results (Section 4).

2. Overview of Alternatives Evaluation Process

The range of alternatives in this report was identified through the CEQA/NEPA scoping process and through supplemental studies and consultations that were conducted during this analysis. The range of alternatives considered in the screening analysis encompasses:

[9] Includes provision of a telecommunications system to support a special protection system (SPS) and a second telecommunication route to support WECC redundant telecommunication requirements for an SPS.

- Alternatives identified by SCE as part of the PEA;
- Alternatives requested by the CEQA Lead Agency (CPUC) or the NEPA Lead Agency (BLM); and
- Alternatives identified by the general public during the 30-day public scoping period (July 23 to August 22, 2009) held in accordance with CEQA and NEPA requirements.

2.1 Alternatives Screening Methodology

Evaluation of the alternatives used a screening process with three steps:

Step 1 Clarify the description of each alternative to allow comparative evaluation.

Step 2 Evaluate each alternative in comparison with the proposed project, using CEQA/NEPA criteria (defined below).

Step 3 Based on the results of Step 2, if the alternative met the CEQA/NEPA criteria it was retained for full analysis in the EIR/EIS. If the alternative did not meet the CEQA/NEPA criteria, it was eliminated from further consideration.

As noted above for Step 2, the advantages and disadvantages of alternatives were carefully weighed with respect to CEQA and NEPA criteria for consideration of alternatives. These criteria are discussed in the following section.

2.2 CEQA and NEPA Requirements for Alternatives

Both CEQA and NEPA provide guidance on selecting a reasonable range of alternatives for evaluation in an EIR and EIS. The CEQA and NEPA requirements for selection and analysis of alternatives are similar, thereby allowing the use of an alternatives screening and evaluation process that satisfies both state and federal requirements. The CEQA and NEPA requirements for selection of alternatives are described below.

2.2.1 CEQA Alternative Requirements

An important aspect of EIR preparation is identification and assessment of reasonable alternatives that have the potential to avoid or minimize the impacts of a proposed project. In addition to mandating consideration of the No Project Alternative, the State CEQA Guidelines (Section 15126.6(e)) emphasize selection of a reasonable range of feasible alternatives and adequate assessment of these alternatives to allow for a comparative analysis for decision makers to consider. The State CEQA Guidelines (Section 15126.6(a)) state that:

> *An EIR shall describe a reasonable range of alternatives to the 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, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation.*

To comply with CEQA's requirements, each alternative that has been suggested or developed for this project has been evaluated in three ways:

- Does the alternative accomplish all or most of the basic project objectives?
- Is the alternative feasible (from economic, environmental, legal, social, and technological standpoints)?

- Does the alternative avoid or substantially lessen any significant effects of the proposed project (including consideration of whether the alternative itself could create significant effects potentially greater than those of the proposed project)?

2.2.1.1 Consistency with Project Objectives

A project's statement of objectives (required by CEQA) and purpose of and need for action (required by NEPA) describe the underlying purpose of the project and the reasons for undertaking the project. The purpose and need statement is used to identify a range of reasonable alternatives to be analyzed in the EIR/EIS. To fulfill this requirement, the project proponent must define its objectives for the project and provide a description of the need for the project. The purpose and need for the proposed project, and the applicant's project objectives, are presented in Section 1.4.1 and 1.4.2 of this report, respectively.

The State CEQA Guidelines require consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of project objectives" (Section 15126.6(b)). Therefore, it is not required that each alternative meet all of the project objectives.

2.2.1.2 Feasibility

The State CEQA Guidelines (Section 15364) define feasibility as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

The alternatives screening analysis is largely governed by what CEQA terms the "rule of reason," meaning that the analysis should remain focused not on every possible eventuality but rather on the alternatives necessary to permit a reasoned choice. Furthermore, of the alternatives identified, the EIR/EIS is expected to fully analyze those alternatives that are feasible, while still meeting most of the project objectives.

According to the State CEQA Guidelines (Section 15126.6(f)(1)), among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or other regulatory limitations, jurisdictional boundaries, and proponent's control over alternative sites in determining the range of alternatives to be evaluated in the EIR. For the screening analysis, the feasibility of potential alternatives was assessed considering the following factors:

- Technical Feasibility. Is the alternative feasible from a technological perspective, considering available technology? Are there any construction, operation, or maintenance constraints that cannot be overcome?
- Legal Feasibility. Do legal protections on lands preclude or substantially limit the feasibility of permitting a high-voltage T/L? Do regulatory restrictions substantially limit the feasibility or successful permitting of a high-voltage T/L? Is the alternative consistent with regulatory standards for transmission system design, operation, and maintenance?
- Economic Feasibility. Is the alternative so costly that implementation would be prohibitive?

The State CEQA Guidelines require consideration of alternatives capable of eliminating or reducing significant environmental effects even though they may "impede to some degree the attainment of project objectives or would be more costly" (Guidelines Section 15126.6(b)).

2.2.1.3 Potential to Eliminate Significant Environmental Effects

A key CEQA requirement for an alternative is that it must have the potential to "avoid or substantially lessen any of the significant effects of the project" (State CEQA Guidelines Section 15126.6(a)). At the screening stage, it is not possible to evaluate all of the impacts of the alternatives compared with the proposed project with absolute certainty, and it may not be possible to quantify impacts. However, it is possible to identify elements of an alternative that are likely to be the sources of impact and to relate them, to the extent possible, to general conditions in the subject area.

Table A-2 presents a summary of the potential significant effects of the proposed project. This impact summary was prepared prior to completion of the EIR/EIS analysis, so it may not include everything in the detailed analysis that will be included in the EIR/EIS. The impacts stated below are based on a preliminary assessment of potential project impacts and were used to determine whether an alternative met the CEQA requirement to reduce or avoid potentially significant effects of the proposed project. Resources that are not anticipated to be significantly impacted are agriculture, air quality, mineral resources and soils, hazards and hazardous materials, hydrology and water quality, land use and planning, population and housing, public services, recreation, transportation and traffic, and utilities and service systems. These resource areas are not included in Table A-2.

Table A-2 Summary of Preliminary Significant Impacts of the Proposed Project

Issue Area	Impact
Aesthetics/Visual Resources	• Permanent impacts may result related to visual contrast, alterations in existing scenic integrity, blocked or partially blocked views, and the introduction of industrial-like facilities and new sources of light and glare due to the placement of towers, new or expanded substations, and new access and spur roads in all project segments, including scenic vistas and other designated scenic resources. • Construction-related activities would result in temporary degradation of existing visual character and quality in all project segments, including scenic vistas and other designated scenic resources. • Potential conflicts with federal, state, and local plans, regulations, or standards applicable to the protection of visual resources. • Long-term changes in the visual character would result from the addition of lattice steel towers, associated conductors, microwave tower, telecommunications system, the Ivanpah Substation, and vegetation clearing.
Biological Resources	• Construction activities and project facilities would result in temporary and permanent loss of wildlife and habitat of state and/or federal sensitive species. • Construction and operation of the project could disturb wildlife and cause changes in wildlife behavior. • Construction activities may conflict with local policies or ordinances protecting biological resources. • The proposed project would result in permanent loss of sensitive vegetation communities, and some sensitive plant and animal species. • The entire project area is within the range of the desert tortoise, and most of the area provides some suitable habitat. Portions of the project would be located within Desert Tortoise Critical Habitat in the Ivanpah Recovery Unit. • Areas of potential impact to bighorn sheep include the proposed transmission line route through the McCullough Mountains and the telecommunication route segment in the southern portion of the Eldorado Valley between the Highland Range and the Southern McCullough Mountains. • Four sensitive species of bats could occur within the project area in the Nevada segment. • The portion of the proposed telecommunication route (Path 2) located on the Eldorado-Lugo 500-kV transmission line passes through a historic mining area at the south end of the

Table A-2 Summary of Preliminary Significant Impacts of the Proposed Project

Issue Area	Impact
	McCullough Mountains. Old mine adits and shafts in the area may provide suitable roosting habitat for the California leaf-nosed bat and/or Townsend's big-eared bat. • Vegetation clearing for access to tower sites and at tower sites has the potential to remove plants that may provide forage and cover for some wildlife species. • Removal of vegetation will increase the potential for post-construction erosion. • Removal of vegetation and ground-disturbing activities may impact burrowing owls' nests and habitat. • New access and spur roads could increase public access to desert tortoise habitat. • The project could have potentially significant impacts on species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or United States Fish and Wildlife Service. • The project could interfere substantially with the movement of native or migratory fish or wildlife species.
Cultural and Paleontological Resources	• The project would remove several wooden poles along a segment of the Boulder Dam 115-kV transmission line (36-10315), which has been deemed to contribute to the Southern Sierras Power Company Boulder Line Historic District. • Construction of new towers and access roads could damage or destroy historic and archaeological sites, traditional cultural properties, or areas containing paleontological resources. • Temporary use of staging areas and conductor pull sites could damage or destroy historic and archaeological sites, traditional cultural properties, or areas containing paleontological resources.
Geology	• Construction and maintenance of access roads could contribute to runoff water that causes minor erosion and to wind erosion with re-deposition of sand away from the roads. • The project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project and potentially result in a landslide, lateral spreading, subsidence, liquefaction or collapse.

Source: E & E 2009.
Key:
kV = Kilovolt.

Reliability

In addition to the above feasibility considerations, the reliability of the transmission system must also be considered, including planning criteria developed by the CAISO, WECC, and NERC.

2.2.2 NEPA Alternative Requirements

According to the Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR 1502.14), the EIS must present the environmental impacts of the proposed action and alternatives in forms that can be readily compared, defining the issues and providing a clear basis for choice by decision-makers and the public. The alternatives section must:

- Rigorously explore and objectively evaluate all reasonable alternatives, and, for alternatives that were eliminated from detailed study, briefly discuss the reasons for their elimination.
- Devote substantial treatment to each alternative considered in detail including the proposed action so reviewers may evaluate their comparative merits.

- Include reasonable alternatives not within the jurisdiction of the lead agency.
- Include the alternative of no action.
- Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternatives in the final statement unless another law prohibits the expression of such a preference.
- Include appropriate mitigation measures not already included in the proposed action or alternatives.

The CEQ has stated that "[r]easonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense rather than simply desirable from the standpoint of the applicant" (CEQ 1983). In order to comply with NEPA's requirements, each alternative that has been suggested or developed for this project has been evaluated in two ways (Bass et al. 2001):

- Does the alternative meet the statement of purpose and need?
- Is the alternative feasible?

2.2.2.1 Consistency with Purpose and Need

NEPA (40 CFR 1502.13) and CEQA (State CEQA Guidelines Section 15124[b]) both explain that an agency's statement of objectives or purpose and need should describe the underlying purpose of the proposed project and reasons for undertaking the project. The purpose and need for the proposed project, and the lead agency and the applicant's project objectives, are presented in Sections 1.4.2.1 and 1.4.2.2 of this report, respectively.

2.2.2.2 Feasibility

The environmental consequences of the alternatives, including the proposed action, are to be discussed in the EIS per CEQ NEPA Regulations (40 CFR 1502.16). The discussion shall include "possible conflicts between the proposed action and the objectives of federal, regional, state, and local…land use plans, policies and controls for the area concerned." Other feasibility factors to be considered may include cost, logistics technology, and social, environmental, and legal factors. The feasibility factors are substantially the same as described for CEQA in Section 2.3.1.2.

2.2.3 Summary of CEQA and NEPA Screening Methodology

Unlike CEQA's requirements, NEPA does not screen out alternatives based on avoiding or lessening significant environmental effects. However, to assure that the alternatives considered for the EIR/EIS would meet the requirements of both CEQA and NEPA, a reasonable range of alternatives has been considered and evaluated as to whether or not they (1) meet most of the project objectives/purpose and need, (2) are feasible, and (3) would avoid or minimize any adverse effects of the proposed project.

3. Alternative Descriptions and Determinations

3.1 Introduction

The alternatives screening process has culminated in the identification and screening of 19 potential alternatives or combinations of alternatives. This section considers alternatives in the transmission system, transmission routing, telecommunication, and technology. Each category of alternative is described below, but not all options described below are analyzed in detail in the EIR/EIS.

This section includes detailed descriptions of each alternative considered and detailed explanations of why each was selected or eliminated. After initial screening, if a potential alternative was unable to meet the project objectives, purpose, and need, or it was proven infeasible, or if it did not appear to reduce or avoid adverse effects (NEPA) and potentially significant impacts (CEQA) of the proposed project without creating additional adverse effects of its own, then it was eliminated from full evaluation. The alternatives that have been determined to meet the CEQA/NEPA alternatives screening criteria have been retained for full analysis in the EIR/EIS.

3.2 System Alternatives

This section addresses the four system alternatives to the proposed project. The transmission system alternatives that were considered are:

- Non-Transmission System Alternative (System Alternative 1)
- Reconductoring Alternative (System Alternative 2)
- Lower Voltage Alternative – New 115-kv Transmission Line (System Alternative 3)
- Higher Voltage Alternative – New 500-kV Transmission Line (System Alternative 4)
- Single Circuit Alternative – New 230-kV Transmission Line (System Alternative 5)

The discussions below explain why each potential alternative was eliminated or retained for full analysis.

3.2.1 Non-Transmission System Alternative (System Alternative 1)

Alternative Description

This system alternative was suggested by SCE in its PEA (System Alternative 1). It includes the development of in-basin generation, such as new solar, wind, and/or geothermal power plants, instead of developing new and upgraded transmission facilities to interconnect solar generation from the Ivanpah Dry Lake Area. In addition, demand-side management and energy efficiency programs would be implemented.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The Non-Transmission System Alternative would not meet the project objective of providing an interconnection for solar resources in the Ivanpah Dry Lake Area because no transmission system upgrades to the existing Eldorado–Baker–Cool Water–Dunn Siding–Mountain Pass 115-kV T/L would be constructed. In addition, this alternative would not comply with Sections 210 and 212 of the Federal Power Act (16 United States Code [USC] § 824 [i] and [k]) and Sections 3.2 and 5.7 of the CAISO Tariff that requires SCE to interconnect and integrate power generation facilities into its electric system.

Feasibility

This alternative would be feasible from a technical, legal, and regulatory perspective. However, new sources of in-basin generation would need to be identified, evaluated, and constructed and would result in environmental impacts in the areas where the projects would be developed.

Environmental Advantages

The Non-Transmission System Alternative would avoid impacts to resources in the vicinity of the proposed project. However, these impacts would be transferred to the areas where in-basin generation would be developed. In

addition, upgrades to SCE's existing transmission system could be required to integrate up to 1,400 MW of new power generation within its service area.

Environmental Disadvantages

New sources of in-basin generation would result in site-specific impacts associated with construction and operation of new power plants. This could result in air quality, biology, cultural resource, land use, noise, and visual impacts, among others.

Alternative Conclusion

ELIMINATED. The Non-Transmission System alternative would not provide an interconnection for new solar resources, it would not integrate generation resources in the Ivanpah Dry Lake Area, and it would not enable SCE to comply with California's RPS. This alternative does not meet the project's purpose, need, and objectives. Also, because it would require development of new energy resources within the SCE service area, it might not avoid the adverse effects of the proposed project, including those potentially significant. Therefore, this alternative was eliminated from further consideration.

3.2.2 Reconductoring Existing 115-kV Line Alternative (System Alternative 2)

Alternative Description

"Reconductoring" refers to the installation of new, higher capacity conductors, generally on existing towers. Reconductoring of the existing 115-kV Eldorado–Baker–Cool Water–Dunn Siding–Mountain Pass 115-kV T/L between the Ivanpah Dry Lake Area and the existing Eldorado Substation would involve replacing the existing low capacity conductor with a new higher capacity conductor. This alternative was suggested by SCE in its PEA (System Alternative 2).

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

Under Sections 210 and 212 of the Federal Power Act (16 USC § 824 [i] and [k]) and Sections 3.2 and 5.7 of the CAISO Tariff, SCE is obligated to interconnect and integrate power generation facilities into its electric system. The total amount of generation interconnection requests received in the Ivanpah Dry Lake Area would exceed the amount of transmission capacity made available under a reconductoring alternative.[10]

Also, SCE is obligated to interconnect generation as requested. The Reconductoring Alternative would not provide the needed capacity to integrate up to 1,400 MW of new generation in the Ivanpah Dry Lake Area. It would not meet the project objective of providing an interconnection for solar resources in the Ivanpah Dry Lake Area.

Feasibility

This alternative would be a "feasible" alternative from a technical, legal, and economic standpoint. There are no construction, operation, or maintenance constraints for this alternative that could not be overcome. There are no legal protections on lands that would preclude or substantially limit permitting this alternative, nor is it anticipated that the implementation costs would be prohibitive. However, it would not meet a basic objective of the project.

[10] E&E submitted a data gap request to SCE (No. 2.35) requiring additional information on capacity of this alternative. Per data gap response received on 10-05-2009, the capacity of conductor installed on the existing Eldorado–Baker–Cool Water–Dunn Siding–Mountain Pass 115-kV transmission line is rated at 83 MVA, which would be insufficient to support future generation interconnection. The engineering constraints of reconductoring the existing line by installing a higher capacity conductor on the existing tower infrastructure is currently unknown by the applicant.

Environmental Advantages

The Reconductoring Alternative would avoid or minimize the potentially significant construction-related environmental adverse effects identified for the proposed project because it would replace low capacity conductors with higher capacity conductors on the existing towers. However, potential impacts from operations and maintenance would be similar to those of the proposed project since the 115-kV lines would be retained within the existing ROW.

Environmental Disadvantages

Reconductoring of the 115-kV would result in minor, temporary, construction-related impacts.

Alternative Conclusion

ELIMINATED. The Reconductoring Alternative would not provide an interconnect for new solar generation in the Ivanpah Dry Lake Area. This alternative does not meet the project's purpose, need, and objectives. Therefore, this alternative was eliminated from further consideration.

3.2.3 Lower Voltage Alternative – New 115-kV Transmission Line (System Alternative 3)

Alternative Description

Construction of a new 115-kv T/L would involve construction of lower voltage transmission facilities between the Ivanpah Dry Lake Area and the existing Eldorado Substation. Under this alternative, SCE's standard 115-kV conductor would provide up to 217 megavolt amperes of capacity. Within the existing ROW, the maximum number of 115-kV lines that can be accommodated is two sets of double-circuit structures or four individual 115-kV lines. This would limit the maximum amount of generation that can be accommodated to no more than 80 MW. The alternative was addressed in SCE's PEA as System Alternative 3.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The use of a lower voltage transmission system alternative would not meet the project's purpose, need, and objectives because it would result in an undersized method of service and would not interconnect and integrate up to 1,400 MW of generation resources in the Ivanpah Dry Lake Area. Because it would not maximize the amount of energy that could be transmitted within the current ROW, this alternative does not meet the project objective of maximizing the use of existing ROW and corridors.

Feasibility

Replacement of the existing 115-kV line is technically, financially, and economically feasible, however, it would not substantially increase the capacity of the existing line.

Environmental Advantages

Construction impacts would be similar to those identified for the proposed project.

Environmental Disadvantages

Construction impacts would be similar to those identified for the proposed project.

Alternative Conclusion

ELIMINATED. The Lower Voltage System Alternative would not accommodate interconnection and integration of up to 1,400 MW of generation resources in the Ivanpah Dry Lake Area. It would not avoid or minimize the construction-related adverse effects identified for the proposed action, nor would it maximize the transmission capacity of the existing ROW. Therefore, this alternative was eliminated from further consideration.

3.2.4 Higher Voltage Alternative – New 500-kV Transmission Line (System Alternative 4)

Alternative Description

The Higher Voltage Alternative would include construction of new 500-kV transmission facilities between the Ivanpah Dry Lake Area and the existing Eldorado Substation and was addressed in SCE's PEA as System Alternative 4.

The use of the Higher Voltage Alternative would require expansion of the existing 100-foot-wide ROW. The amount of ROW expansion would depend on the construction design. If a single-circuit design standard were selected, the maximum amount of generation that could be interconnected would be limited by the CAISO single contingency maximum generation tripping limit to 1,150 MW. The use of a double-circuit 500-kV design standard would increase the maximum amount of generation that could be interconnected to 1,400 MW according to CAISO.

To further increase the amount of generation that could be interconnected, additional transmission not currently defined would be needed. In addition, although the number of towers required could be reduced, this alternative could require taller and wider towers with a greater physical separation compared with that of the proposed project (Harries 2009).

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The Higher Voltage Transmission Alternative would meet the project objectives, purpose, and need in that it would facilitate the interconnection and integration of new solar power in the Ivanpah Dry Lake area. While expansion of the existing ROW could be required to accommodate the Higher Voltage Alternative, this alternative would not increase the generation interconnection capacity above that identified for the proposed project.

Feasibility

This alternative would be feasible from a regulatory and technical perspective. However, the higher voltage transmission alternative would not result in additional interconnection capability as compared with a 230-kV system and would require a greater land disturbance associated. A higher voltage transmission line would require the use of a wider ROW (150 to 250 feet) to accommodate the required transmission structures, and the construction and operation and maintenance of new 500/230/115-kV substations to interconnect renewable resources locating in Nevada and seeking interconnection to the CAISO-controlled grid.

Environmental Advantages

None identified.

Environmental Disadvantages

Greater impacts to sensitive resources may occur as a result of increased ROW and land to accommodate additional substations and switching stations. Visual impacts may increase due to construction of structures to accommodate the 500-kV line, especially if the transmission structures are taller, wider, or bulkier than those required for a 230-kV line construction.

Alternative Conclusion

ELIMINATED. The construction of 500-kV transmission, instead of 230-kV, would require greater amounts of ROW for interconnecting up to the same amount of generation resources that could be interconnected with the proposed project at 230-kV. The maximum amount of interconnection in this area with a new transmission facility regardless of voltage design standard is limited by the CAISO Spinning Reserve Criteria to no more than 1,150 MW if only one line is built and 1,400 MW if constructed as a double-circuit facility or two single circuit facilities in a common ROW. The need to implement an SPS to trip generation in the Ivanpah Dry Lake Area under simultaneous outage of the new Eldorado–Ivanpah T/Ls is the basis for the limitation as provided in the CAISO Grid Planning Standard (in ISO G4) under Section IV (ISO

Grid Planning Guides for New Generator Special Protection Systems). Therefore, this alternative would not meet the project's purpose, need, and objectives and has been eliminated from further consideration.

3.2.5 New Single-Circuit 230-kV Transmission Line (System Alternative 5)

Alternative Description

This Alternative would be identical to the proposed project except that it would include only one 230-kV transmission line instead of two. This Alternative would only allow for integration of up to 1150 MW of new generation resources in the Ivanpah Valley instead of 1400 MW provided by the proposed Project.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The use of a single-circuit 230-kV transmission system alternative would not meet the project's purpose, need, or objectives because it would not interconnect and integrate up to 1,400 MW of generation resources in the Ivanpah Dry Lake Area. Because it would not maximize the amount of energy that could be transmitted within the current ROW, this alternative does not meet the project objective to maximize use of existing ROW and corridors.

Feasibility

This transmission alternative would be feasible from a technical and regulatory perspective because it would increase the transmission capacity. However, the use of 230-kV single-circuit design would not achieve the most efficient use of land for energy within the existing transmission corridor.

Additional Note on Meetings with the CAISO Regarding System Alternative 5

The CPUC was made aware of this Alternative though a meeting with the CAISO on September 28, 2009. Normally the CAISO planning process occurs before the CEQA/NEPA process, but for this project they are concurrent and therefore holding a meeting to discuss the simultaneous processes was appropriate. The CAISO engineering team noted that to maximize the *transmission capacity coming out of Ivanpah Valley an additional project would be necessary. If, in addition to building System Alternative 5 mentioned above, an additional single-circuit 230-kV transmission line were built to connect the proposed Ivanpah substation to another new substation in the Nipton area and this system was connected to the existing network, then the CAISO rating for the combined system would be 3000 MW due to the enhanced reliability that would be achieved through physical separation of two different 230-kV transmission lines. The CAISO suggested this as a way to increase transmission capacity for the SCE transmission network throughout the Ivanpah Valley Area beyond the 1400 MW proposed for this project if enough new renewables projects were eventually built to warrant this level of capacity.*

The need for 3,000 MW of capacity rather than 1,400 MW is not currently demonstrated by the CAISO queue. Additionally, CAISO participated in the preparation of the Renewable Energy Transmission Report (RETI) along with

the CPUC, the CEC, and the public owned utilities. The report is a cooperative effort to identify areas with potential for renewable energy generation development and develop and rank a conceptual transmission plan to provide those areas interconnection with the statewide electric transmission grid. The report considers a combination of factors including the likely scope of renewable generation development, potential environmental concerns, and regulatory or legislative restrictions. The Ivanpah Valley area is within the Mountain Pass California Renewable Energy Zone (CREZ), however, the report does not identify the need for a new a transmission line or substation in the Nipton area as part of its conceptual transmission plan.

Further, the BLM noted that no ROW or designated corridor currently exists between the proposed Ivanpah substation and Nipton. If an application for a new transmission project was filed with the BLM to connect the proposed Ivanpah Substation with a new substation in Nipton an amendment to the California Desert Conservation Area Plan (CDCA), as amended, would be required. A CDCA plan amendment is not required for the proposed Project since it is already in a BLM designated corridor.

In addition, the BLM, jointly with the Department of Energy, published the West-wide Energy Corridor Programmatic Environmental Impact Statement (WWEC PEIS) in January 2009. The report establishes energy corridors on public lands in the western United States and serves as an amendment to existing management plans, including the CDCA Plan and the Las Vegas Resource Management Plan. Energy corridors established by the WWEC PEIS were developed by federal agency staff and informed by the public involvement and met specific criteria, including location on federal lands, ability to establish connectivity with the energy grid, feasibility, legal and regulatory compliance, and compatibility with local BLM land use plans. The corridors were established using information provided by local government officials, resource specialists, stakeholder groups, and the public; an approach designed in part to ensure avoidance of potential environmental issues with corridor siting. A second 230-kV transmission line to another new substation in the Nipton area would not be located within one of the Section 368 corridors. This area between the proposed Ivanpah substation and Nipton is also known to include critical habitat for Desert Tortoise.

Because a new ROW and new substation in the Nipton area would be located outside of energy corridors established through public vetting processes with the involvement of multiple government agencies that were designed to service anticipated generation while minimizing environmental impacts, environmental impacts related to pursuing a separate project such as this to further increase the capacity of the network coming out of the Ivanpah Valley would be formidable as compared to the proposed Project.

Alternative Conclusion

ELIMINATED. This alternative would not meet the project's purpose, need, and objectives, and would also result in greater impacts than those identified for the proposed action. Therefore, this alternative has been eliminated from further consideration.

3.3 Transmission Line Routing Alternatives

This section describes the five T/L routing alternatives, which are minor routing adjustments to SCE's proposed 230-kV route. Each routing alternative would replace a specific segment of the proposed T/L alignment, as shown in Figure 5.

The transmission system alternatives that were considered are:

- Parallel to Los Angeles Department of Water and Power (LADWP) Corridor Alternative (Transmission Alternative A)
- North of Eldorado Alternative (Transmission Alternative B)
- North Dry Lakes Reroute Alternative (Transmission Alternative C)

- South Dry Lakes Reroute Alternative (Transmission Alternative D)
- South Dry Lakes Bypass Alternative (Transmission Alternative E)
- New ROW Alternative (Transmission Alternative F)

A summary of the T/L route alternatives is provided in Table A-3.

Table A-3 Summary of Transmission Line Route Alternatives

	Proposed T/L Route	Alt. Route A	Alt. Route B	Alt. Route C	Alt. Route D	Alt. Route E
Dimensions						
Length of Line (miles)	34.7	33.8	38.4	35.4	35.1	35.1
Alternate Route Segment Length (miles)	N/A	5.0	5.7	5.5	3.5	3.0
Portion of Proposed Route that Alternate Route Replaces (miles)	N/A	6.0	2.0	4.5	3.0	2.5
New Permanent Area Occupied (acres)						
Structure Footings – Proposed and Complete Alternate Routes[1]	36.8	35.5	41.3	37.9	36.9	37.0
Alternate Route Segment	N/A	4.9	7.4	5.3	3.2	2.9
Area Difference in Structure Footing Area Compared to the Proposed Route	N/A	-1.3	+4.5	+1.1	+0.1	+0.2
Access Roads	0	0	0	1.6	0	0
Spur Roads	2.1	3.6	1.0	1.1	0.7	0.6
Ivanpah Substation[2]	0	0	0	0	0	0
Eldorado Substation[3]	0	0	0	0	0	0
115-kV Subtransmission	1.0	1.0	1.0	1.0	1.0	1.0
33-kV Distribution	0.4	0.4	0.4	0.4	0.4	0.4
Telecommunication[3/4/5/6]	0/0.3/0.1/0.1	0/0.3/0.1/0.1	0/0.3/0.1/0.1	0/0.3/0.1/0.1	0/0.3/0.1/0.1	0/0.3/0.1/0.1
Total Permanent Area Occupied[4/5/6/7]	40.3/40.6/ 40.4/40.4	40.5/40.8/ 40.6/40.6	43.7/44.0/ 43.8/43.8	42.0/42.3/ 42.1/42.1	39.0/39.3/ 39.1/39.1	39.0/39.3/ 39.1/39.1
New Temporary Area Occupied (acres)						
T/L Structures, Proposed and Complete Alternate Routes[1]	256.8	273.7	305.0	286.6	282.0	282.0
Alternate Route Segments	N/A	29.4	41.3	31.2	19.3	17.4
Area Difference in T/L Structures Compared with the Proposed Route	N/A	-7.4	+23.9	+5.5	+0.9	+0.9
Construction Yards, Pulling/Splicing and Batch Plant Areas, Proposed and Complete Alternative Routes	141.9	141.5	171.4	150.9	144.9	144.9
Substation[2,3]	0	0	0	0	0	0
115-kV Subtransmission	7.3	7.3	7.3	7.3	7.3	7.3
33-kV Distribution	2.0	2.0	2.0	2.0	2.0	2.0
Telecommunication[3,4,5,6]	0.2/18.4/ 21.4/21.2	0.2/18.4/ 21.4/21.2	0.2/18.4/ 21.4/21.2	0.2/18.4/ 21.4/21.2	0.2/18.4/ 21.4/21.2	0.2/18.7/ 21.4/21.2
Total Temporary Area Occupied (acres; rounded to 0.5 acre)	408.0/ 426.0/ 429.0/429.0	425.0/443.0/ 446.0/446.0	486.0/504.0/ 507.0/507.0	447.0/465.0/ 468.0/468.0	436.0/454.0/ 457.0/457.0	436.0/455.0/ 458.0/458.0
Number of Structures (approximate)						
New Double-Circuit LSTs	216	30	33	34	21	19
New Single-Circuit H-Frame Structures	42	4	24	0	0	0
Overall Difference in Structure Count Compared with the Proposed Route	N/A	-7	+31	+6	+1	+1
Total	258	34	57	34	21	19

Table A-3 Summary of Transmission Line Route Alternatives

	Proposed T/L Route	Alt. Route A	Alt. Route B	Alt. Route C	Alt. Route D	Alt. Route E
Land Ownership[8] (miles)						
Land Ownership (miles), Alternate Route Segment						
Federal, BLM – California	N/A	0.0	0.0	3.2	1.4	0.0
Federal, BLM – Nevada	N/A	0.0	0.0	1.8	1.3	0.1
Private – California	N/A	0.0	0.0	0.0	0.0	0.0
Private – Nevada[9]	N/A	5.0	5.8	0.3	0/6	0.4
Federal, BLM - California	6.1	6.1	6.1	6.5	6.3	6.3
Federal, BLM – Nevada	20.3	20.0	20.0	21.4	21.0	21.0
Private – California	0.0	0.0	0.0	0.0	0.0	0.0
Private – Nevada[9]	8.6	7.7	12.3	7.5	7.8	7.8
Total	35	33.8	38.4	35.4	35.1	35.1
ROW (miles)						
Existing T/L ROW	35	2.7	0.0	0.0	0.0	0.0
New T/L ROW	35	5.0	5.6	5.2	3.2	0.7
Number of Crossings						
Primary Highways	1	0	0	1	1	1
Secondary Highways	8	0	0	0	2	2
Rivers and Streams	0	0	0	0	0	0
Railroads	1	0	0	0	0	0

Source: SCE 2009.

Notes:

[1]Does not include overlapping area between structure removal and new structure installation.

[2]The grading and other ground-disturbing activities of the Ivanpah Substation site would be approved under the application of BrightSource with the California Energy Commission for its solar power generation facility.

[3]All work will be done within the existing fence line.

[4]Proposed telecommunication system Path 1.

[5]Proposed Telecommunication System Path 2

[6]Mountain Pass Telecommunication System.

[7]Golf Course Telecommunication System

[8]There is no land under the jurisdiction of the states of California or Nevada.

[9]Located in Boulder City jurisdiction.

BLM = Bureau of Land Management.
LST = Lattice steel tower.
OPGW = Optical ground wire.
ROW = Right-of-way.
T/L = Transmission line.

3.3.1 Parallel to Los Angeles DWP Corridor Alternative (Transmission Alternative Route A)

Alternative Description

The purpose of the Parallel to Los Angeles DWP Corridor Alternative is to bypass a segment of the proposed project route where the proposed project would deviate from designated transmission corridors and would cross an approximately 0.8-mile segment within the Boulder City Conservation Easement. Although this 0.8-mile ROW currently contains the existing 115-kV line, as stated above, it falls outside of the BLM-designated corridors. Therefore, the applicant may need to obtain Clark County and City of Boulder City approval to widen the ROW to the 100 to 130 feet required for the upgraded 230-kV line. Transmission Alternative Route A would bypass this segment by heading north from the Eldorado Substation following existing designated transmission corridors.

This alternative begins at the Eldorado Substation and would deviate from the proposed T/L alignment between MP 1 and MP 7 using a new ROW adjacent to the existing LADWP's transmission corridor. It would head generally west for approximately 5 miles on a new 130-foot ROW, cross three LADWP T/Ls (McCullough–Victorville 1 500-kV T/L; McCullough–Victorville 2 500-kV T/L; and the Mead–Victorville 287-kV T/L). It would then turn north for approximately 1,000 feet before crossing the LADWP Marketplace–Adelanto 500-kV T/L and joining the existing ROW at MP 7.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

This alternative would meet the project objectives, purpose, and need and would eliminate several difficult utility crossovers near the Eldorado Substation. This alternative would fall within a designated BLM utility corridor.

Feasibility

This alternative is feasible from a regulatory, technological, and economic standpoint. This route would be shorter than the segment of the proposed alignment it replaces and would require fewer transmission structures, which would likely reduce construction costs. The reduction, however, could be offset by the need to acquire additional ROW.

Environmental Advantages

This alternative would reduce impacts to cultural resources, as none were identified for this alternative. In addition, this route would cross fewer intermittent streams.

Environmental Disadvantages

This route would cause greater habitat disturbance than the proposed project because the construction area west of the existing Eldorado Substation consists of previously undisturbed desert habitat. As a result, there could be a greater impact to tortoises, tortoise habitat, other wildlife, rare plant species, and desert vegetation.

Alternative Conclusion

RETAINED. Use of the Parallel to Los Angeles DWP Corridor Alternative would meet the project objectives, purpose, and need and would be a feasible alternative. It would reduce impacts to cultural resources, avoid several utility crossings, and cross fewer intermittent streams. Therefore, this alternative was retained for further consideration.

3.3.2 North of Eldorado Alternative (Transmission Alternative Route B)

Alternative Description

The purpose of the North of Eldorado Alternative is to bypass a segment of approximately 0.8 miles where the proposed project would deviate from existing designated transmission corridor and would cross lands administered by the City of Boulder (Boulder City Conservation Easement). Transmission Alternative Route B was created to bypass these segments by heading southwest from the Eldorado Substation to join the existing ROW. The alternative would involve deviating from the proposed route near the Eldorado Substation.

The North of Eldorado Alternative begins at the existing Eldorado Substation and would replace MP 1 to MP 2 of the proposed route (Figure 5). The line exits the substation to the north and parallels the Eldorado–Mead 230-kV T/L within the existing ROW for approximately 2.5 miles before turning southwest. It then extends for approximately 2.8 miles and rejoins the proposed route at MP 2. To reach this point, there are numerous utility T/L crossings. Several of these overhead utility lines may have to be modified or relocated to accommodate this alternative.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The North of Eldorado Alternative would meet the project objectives, purpose, and need.

Feasibility

This alternative is feasible from a technical and regulatory perspective. The North of Eldorado Alternative is only approximately 4 miles longer than the portion of the proposed route it is replacing, and would not be expected to require a longer project schedule.

Environmental Advantages

This alternative would not impact cultural resources as none were identified within this segment. Potential impacts to intermittent streams would be lessened due to fewer stream crossings than the proposed project would have.

Environmental Disadvantages

There is a greater potential for ground disturbance because an additional 5.3 miles of new T/L ROW would be required for the project.

Alternative Conclusion

RETAINED. The use of the North of Eldorado Alternative would meet the project objectives, purpose, and need. It would avoid cultural resource impacts, but the addition 5.3 miles of new ROW could result in greater ground disturbance. Nonetheless, this alternative will be retained for further analysis.

3.3.3 North Dry Lakes Reroute Alternative (Transmission Alternative Route C)

Alternative Description

Transmission Alternative C was suggested by BLM to minimize impacts to Ivanpah Dry Lake by rerouting a portion of the T/L. The T/L would be routed off the existing SCE transmission ROW at MP 27, just before entering the Ivanpah Dry Lake. It would head north around the dry lake on new ROW and would extend a total of 5.3 miles. The alternative would then reconnect with the proposed alignment at a point northeast of Primm near MP 35.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The use of the alternative route would meet the objectives, purpose, and need of the proposed project and would be consistent with the plan of service.

Feasibility

This alternative is feasible from a technical, regulatory, and economic perspective. It would avoid impacts to Ivanpah Dry Lake and would not likely require a longer project construction schedule.

Environmental Advantages

This alternate route would completely avoid Ivanpah Dry Lake. It would have a reduced visual impact than the proposed project and would involve the removal and relocation/re-route of the existing T/L. It would not be visible from nearby residential uses. In addition, there would be reduced impacts to paleontological resources, and fewer intermittent streams would be crossed.

Environmental Disadvantages

There would be a greater potential for erosion and ground disturbance due to development of new access roads and new T/L ROW, which could cause impacts to sensitive plants and animal species. There would be a greater potential for impacts to rare plants and desert tortoise because this route traverses higher quality desert tortoise habitat than does the proposed route.

There would be a greater potential for impacts to cultural resources. Specifically, the Arrowhead Trail Highway (36-7689) and associated artifacts have not been evaluated; if evaluated as eligible during the Section 106/PA process, construction of this route could result in a substantial adverse change to this historical resource. Finally, there would be a greater potential for erosion, landslides, unstable soil, and fault rupture due to ground-disturbing activities such as construction of access and spur roads and towers, additional pulling and tensioning sites, and construction of 5.2 miles of new T/L ROW.

Alternative Conclusion

RETAINED. This alternative would generally meet the project objectives, purpose, and need and provide an interconnection of solar generation resources in the Ivanpah Dry Lake Area. While it could result in greater environmental impacts than the proposed project would, it would avoid impacts to Ivanpah Dry Lake. Therefore, this alternative was retained for further analysis.

3.3.4 South Dry Lakes Reroute Alternative (Transmission Alternative Route D)

Alternative Description

Alternative Route D would reduce the overall transmission footprint, since the EITP towers would follow to the extent feasible the existing LADWP 500-kV ROW.. Where feasible, Alternative Route D would parallel structure-for-structure the existing LADWP Marketplace–Adelanto 500-kV T/L through the Ivanpah Dry Lake. Alternative Route D would begin at the Eldorado Substation and follow the proposed route to the northeastern edge of the Ivanpah Dry Lake (MP 27, Tower 184). The line would then be re-routed west and southwest on new 130-foot ROW around Ivanpah Dry Lake for approximately 3.3 miles before rejoining the existing ROW at MP 30, Tower 203. The line would parallel the LADWP Marketplace–Adelanto 500-kV T/L as it crossed through the Ivanpah Dry Lake (Figure 5).

In summary, Transmission Alternative D has the following features:

- Avoids impacts to Ivanpah Dry Lake.
- Replaces MP 28 to MP 30 of the existing route.
- Requires 3.3 miles of 130-foot new ROW east of the Ivanpah Dry Lake toward the existing LADWP AC transmission corridor.
- Requires expansion of the existing LADWP Marketplace–Adelanto 500-kV ROW until the line joined the existing SCE ROW.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The route would meet the objectives, purpose, and need of the proposed project and is consistent with the plan of service.

Feasibility

This alternative is feasible from a technical, regulatory, and economic perspective. It would avoid impacts to Ivanpah Dry Lake and would not likely require a longer project construction schedule.

Environmental Advantages

This route would reduce the overall transmission footprint, since the EITP towers would follow to the extent feasible the existing LADWP 500-kV ROW. There would be a reduced visual impact since it would relocate/re-route the existing T/L away from the sensitive viewer at the Desert Oasis Apartments (Key Observation Point 4 [KOP 4]) where it would no longer be visible. The route would be closer to the recreational viewer at Ivanpah Lake (KOP 5) but would not be more prominent than the proposed line. There would be a lower presence of sensitive wildlife or plant species occurring within the limits of this alternative and impacts to sensitive species and habitat would be reduced. There would be a reduced potential for landslides and unstable soil and a reduced impact to intermittent streams due to fewer crossings.

Environmental Disadvantages

There could be greater potential impacts to cultural resources due to greater ground disturbance for new access roads and approximately 3.3 miles of new ROW. In addition, there could be impacts to sensitive species that could occur in the area.

Alternative Conclusion

RETAINED. This alternative would generally meet the project objectives, purpose, and need and provide an interconnection of solar generation resources in the Ivanpah Dry Lake Area. It would reduce the overall transmission footprint, since the EITP towers would follow to the extent feasible the existing LADWP 500-kV ROW and could also reduce visual impacts since a segment of the T/L would be routed away from sensitive viewers at the Desert Oasis Apartments. Therefore, this alternative was retained for further analysis.

3.3.5 South Dry Lakes Bypass Route Alternative (Transmission Alternative Route E)

Alternative Description

The South Dry Lakes Bypass Route Alternative would reduce the overall transmission footprint, since the EITP towers would follow to the extent feasible the existing LADWP 500-kV ROW and was addressed in the PEA as Transmission Alternative Route E. This alternative is a sub-alternative of Alternative D, and would replace the northernmost portion of the Alternative D route, as shown in Figure 5.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

Alternative E is a minor subalternative to Alternative D and would meet the objectives of the project and the purpose and need.

Feasibility

Alternative E is a minor subalternative to Alternative D; therefore, impacts would be similar.

Environmental Advantages

Alternative E is a minor subalternative to Alternative D; therefore, the environmental advantages would be similar.

Environmental Disadvantages

Alternative E is a minor subalternative to Alternative D; therefore, the environmental disadvantages would be similar.

Alternative Conclusion

RETAINED. This alternative would generally meet the project objectives, purpose, and need and provide the critical interconnection of solar generation resources in the Ivanpah Dry Lake Area to comply with California's RPS.

3.3.6 New ROW for the 230-kV Transmission Line (Alternative F)

Alternative Description

This alternative would create an entirely new ROW for the 230-kV T/L between the proposed Ivanpah Substation and the existing Eldorado Substation at a distance of at least 2,000 feet on either side of the existing SCE 100-foot corridor. The width of the new, separate ROW would be at least 100 feet or greater.

In summary, Transmission Alternative F has the following features:

- The ROW could accommodate a 230-kV;
- The ROW would be between the proposed Ivanpah Substation and the existing Eldorado Substation;
- The ROW would be at least 2,000 feet from either side of the existing ROW; and
- ROW width would be at least 100 feet or greater.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

This alternative would not improve system reliability because there is currently no risk of simultaneous outage of T/Ls contained within a common transmission corridor beyond the proposed project. However, placement of the new 230-kV T/L in a new, separate ROW would require new access roads. The width of the new, separate ROW would be at least 100 feet. This alternative would not maximize the use of existing ROW and would therefore result in greater environmental effects and costs than the proposed project.

Feasibility

This alternative is technically feasible; however, there may be greater environmental impacts associated with construction within a new and/or expanded ROW.

Environmental Advantages

None identified.

Environmental Disadvantages

The new ROW would create greater visual impacts due to the new location, which would be 2,000 feet from the existing SCE ROW. Greater ground disturbance could occur due to wider ROW requirements. There could be greater impacts to sensitive resources for any area that is undisturbed/undeveloped. The structures associated with this system could increase the potential for avian collision/electrocution with the addition of new T/Ls and poles.

Alternative Conclusion

ELIMINATED. This alternative would not maximize the use of the existing ROW and would result in greater environmental effects than would the proposed project route. Therefore, this alternative was eliminated from further consideration.

3.4 Telecommunication Alternatives

As described in Section 1.3, the proposed project includes a new telecommunication system consisting of an optical ground wire (OPGW) system on overhead transmission towers, combined with a microwave system, routed along two fully diverse and redundant paths. Path 1 would use the overhead OPGW along the proposed T/L route. Along Path 2, the proposed project would include overhead OPGW along an approximately 25-mile section of the existing SCE Eldorado–Lugo 500-kV T/L, followed by an approximately 5-mile segment of underground fiber optic cable from the Eldorado–Lugo line to the town of Nipton. This portion of the telecommunication system is referred to as Path 2, Sections 1 and 2. The last segment of Path 2 (referred to as Path 2, Segment 3) would consist of a microwave system from the town of Nipton to the proposed Ivanpah Substation.

Three telecommunication system alternatives were considered. The first two telecommunication alternatives would replace the microwave system within Path 2, Segment 3. The rest of the telecommunication system included in the proposed project would remain the same. The final telecommunication system alternative considered would be a replacement of the entire telecommunication system included in the proposed project, Paths 1 and 2.

3.4.1 Golf Course Telecommunication Alternative

Alternative Description

This alternative to Path 2, Section 3, would consist of OPGW and overhead ground wire (OHGW) that would be aboveground and underground from the town of Nipton, past the Primm Golf Course, to the proposed Ivanpah Substation (Figure 6).

The Golf Course Telecommunication Alternative is a 10-mile segment that proceeds from the town of Nipton to I-15 (MP 1 to MP 10) along the north side of Nipton Road, parallel to the northern boundary of the Mojave National Preserve. This 10-mile segment consists of 1 mile of All Dielectric Self Supporting (ADSS) fiber cable installed on the existing Nipton 33-kV distribution line immediately west of the town of Nipton, on the north side of Nipton Road. A number of poles could need replacement to meet the new loading requirement of the ADSS fiber cable. In addition, approximately 9 miles of fiber optic cable would be installed in an underground duct on the north side of Nipton Road.

Another 10-mile segment would stretch from I-15 to Primm Golf Course to the Ivanpah Substation (MP 1 to MP 8). This segment would parallel I-15 in a northerly direction on existing Nipton 33-kV distribution line poles, cross over I-15 near the Primm Golf Course, and then cross the golf course in an underground duct. After the segment left the golf course, it would continue overhead on existing Nipton 33-kV distribution line poles to a point approximately 1.0 mile from the Ivanpah Substation where a cable would be installed in an underground duct for approximately 1.0 mile to enter the north side of the Ivanpah Substation.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The proposed project requires construction of two fully diverse and redundant communication paths that would (1) support a special protection system that would trip the SCE Eldorado-Ivanpah 230-kV T/L relays under specific outage contingencies, and (2) allow operating and monitoring of the substation and T/L equipment. The paths would connect the Eldorado Substation to the proposed Ivanpah Substation.

Feasibility

This alternative is technically, legally, and economically feasible and would meet most of the project objectives, as well as the purpose and need. However, underground construction could involve additional environmental adverse effects and extend the time needed to repair and maintain this alternative.

Environmental Advantages

Visual impacts may be reduced for certain portions of the telecommunication line located underground or out of line-of-sight of sensitive viewers.

Environmental Disadvantages

The underground construction would cause greater ground disturbance and potential impacts to sensitive habitat, cultural, and paleontological resources. There would also be an increased potential for hazards and hazardous impacts since there would be construction of 20 miles of additional telecommunication lines from the town of Nipton to the proposed Ivanpah Substation.

Alternative Conclusion

RETAINED. This telecommunication alternative meets the project purpose, need and objectives. While placing a portion of the telecommunication system underground would cause greater ground disturbance and increase potential impacts to sensitive habitat, cultural, and paleontological resources, visual impacts would be reduced. Therefore, this alternative will be retained for further evaluation.

3.4.2 Mountain Pass Telecommunication System Alternative

Alternative Description

This telecommunication path would consist of OPGW that would be located partially aboveground and partially underground from Nipton to Mountain Pass to the Ivanpah Substation. This alternative route would include a 10-mile segment that would begin at Highway 164 near Nipton and continue to I-15 (MP 1 to MP 10) along the north side of Nipton Road, parallel to the northern boundary of the Mojave National Preserve. This segment would consist of a combination of ADSS fiber cable on existing Nipton 33-kV wood pole lines and underground fiber cable. This 10-mile segment would include 1 mile of ADSS fiber cable and would be installed on the existing Nipton 33-kV distribution line immediately west of Nipton, on the north side of Nipton Road. An unknown number of poles may need to be replaced to meet the new loading requirement of the ADSS fiber cable, and 9 miles of fiber optic cable would be installed in an underground duct along on the north side of Nipton Road in new ROW to the intersection of Nipton Road and I-15 (undergrounding would start at the westernmost pole on the Nipton line before it crosses Nipton Road to the south).

Another 15-mile segment would begin at I-15 and go to the town of Mountain Pass and then to the Ivanpah Substation. This route would parallel I-15 in an underground duct for approximately 1.0 mile and then continue overhead on the existing Nipton 33-kV distribution line poles west to Mountain Pass. The route would continue north to the Mountain Pass Substation. From the Mountain Pass Substation, the cable route would turn northeast and proceed on the existing Nipton 33-kV distribution line poles toward the Ivanpah Substation. At the last Nipton Line Pole, 500 feet of underground conduit would be installed and the cable would enter on the south side of the Ivanpah Substation.

Another component to this system would be a dedicated communication enclosure within the Mountain Pass Substation located 6.0 miles southwest of the Proposed Ivanpah Substation to house communication equipment (MP 8). This communication equipment is required as a repeater to re-generate the optical signals from/to Eldorado via telecommunication. 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 (Figure 7).

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The proposed project requires construction of two fully diverse and redundant communication paths to (1) support a special protection system that would trip the SCE Eldorado-Ivanpah 230-kV T/L relays under specific outage contingencies, and (2) operate and monitor the substation and T/L equipment. The paths would connect the Eldorado Substation to the proposed Ivanpah Substation. This alternative would be consistent with the project objectives and the purpose and need.

Feasibility

This alternative is technically feasible; however, it could involve additional adverse environmental impacts associated with underground construction.

Environmental Advantages

Visual impacts may be reduced for certain portions of the telecommunication line located underground or out of line-of-sight of sensitive viewers.

Environmental Disadvantages

There would be a greater potential for ground disturbance and impacts to sensitive habitat and cultural and paleontological resources. There would also be an increased potential for hazards and hazardous impacts since there would be construction of 20 miles of additional telecommunications lines between the Nipton Road-UPRR intersection and the proposed Ivanpah Substation, which would result in an increase in the routine transport, use, or disposal of hazardous materials and the potential for reasonably foreseeable upsets and accidents involving releases of hazardous materials.

Alternative Conclusion

RETAINED. This telecommunication alternative meets the purpose and need and most of the project objectives. Therefore, this alternative will be retained for further evaluation.

3.4.3 Microwave-Only Telecommunication Alternative (Microwave Towers Only)

Alternative Description

In brief, the Microwave Towers Only system would consist of the following components:

- Six microwave towers,
- Four new communication buildings, and
- One passive reflector site.

Consideration of CEQA/NEPA

Project Objectives, Purpose, and Need

This telecommunication alternative meets the purpose and need. However, this alternative could result in increased environmental impacts and a longer construction period and higher costs for transport of materials and installation of towers and development of new access roads and communication buildings.

Feasibility

This alternative is technically feasible; however, there may involve additional environmental impacts associated with construction of six new microwave towers and four communication buildings and one passive reflector site as well as new access roads for these facilities.

Environmental Advantages

Construction of the microwave towers would avoid the use of overhead or underground wires. Visual impacts could be lower than those of the proposed project.

Environmental Disadvantages

There could be a greater potential for ground disturbance and impacts to sensitive habitat and cultural and paleontological resources due to development of access roads that would be needed for construction and maintenance of the microwave towers. There could be adverse visual impacts depending on height and location of the microwave towers. All of these sites would require helicopter transport to deliver large items. Helicopter transport requires a large staging area for helicopter pick-up, resulting in significant land disturbance. The alternate option for transport to these microwave sites is to widen and improve the roadways to these sites, but this would cause even more land disturbance. The microwave sites identified have may require significant grading for access roads, foundations for the towers, and communication buildings.

Alternative Conclusion

ELIMINATED. This telecommunication alternative meets the purpose and need, and most of the project objectives. This alternative would result in development of more communication buildings, access roads, and microwave towers and could result in greater potential for ground disturbance and impacts to sensitive habitat and cultural and paleontological resources; therefore, this alternative will be eliminated from further consideration.

3.5 Technology Alternatives

This section addresses the five technology/construction alternatives for the proposed project. The technologies that were considered are as follows:

- Composite Core Conductor (Tech 1 – Alternative to Standard Core Conductor)
- Painted Structures (Tech 2 – Alternative to Galvanized Structures)
- Underground Construction (Tech 3 – Alternative to Overhead)
- All Tubular Steel Poles (Tech 4 – Alternative to LST)

The discussions below explain why each potential alternative was eliminated or retained for full analysis.

3.5.1 Composite Core Conductor (Technology Alternative 1 – Alternative to Standard Core Conductor)

Alternative Description

This alternative involves replacing the standard conductor between the Ivanpah Dry Lake Area and the Eldorado Substation with a composite core conductor. The composite core conductor alternative is a new commercial technology.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

Because composite core conductors are a new technology, their use has several drawbacks compared with standard core conductors, While the U.S. Department of Energy Technical Review Committee on Composite Core Conductors has deemed several composite core conductors "commercial products," the technology is not supported by sufficient field experience; therefore, its reliability in long-term use is unknown. Furthermore, the amount of generation requesting interconnection significantly exceeds the amount of transmission capacity that can be gained with the use of a composite core conductor, so the alternative would be short-lived. Therefore, this alternative would not reduce environmental impacts as well as the retained project alternatives would. In addition, implementation of this alternative would increase the cost of the proposed project, because the need to remove the existing 115-kV line to upgrade corridor capability would not be eliminated.

Feasibility

This alternative would meet the project purpose and need; however, it would not meet the project objectives. This alternative is technically feasible; however, it may be more fragile and more expensive than the standard core conductor.

Environmental Advantages

Same as the proposed project.

Environmental Disadvantages

Same as the proposed project.

Alternative Conclusion

ELIMINATED. The composite core conductor may not be as durable or reliable for long-term use and therefore would not meet the project objectives, whereas the standard conductor technology is older and more reliable and economical technology. In addition, it provided no environmental advantage over the proposed project. Therefore, the composite core conductor alternative was eliminated for use on the proposed project.

3.5.2 Painted Structures Alternative (Technology Alternative 2 – Alternative to Galvanized Structures)

Alternative Description

Under this alternative, the proposed galvanized structures, which do not require painting after construction, would not be used, and the transmission structures would be painted after construction to protect the steel surfaces. Paint treatments can range from light to dark.

In brief, the paint coatings for transmission structures have the following features:

- Steel surfaces would be protected;
- Application to structures would occur on site after construction; and
- Structures could be painted to blend in with the surrounding area.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

The paint alternative meets the purpose and need; however, it would not meet some project objectives. Painting or powder-coating of steel lattice structure elements prior to assembly impedes the continuous electric path because it creates an insulator between the elements. Therefore, paint applications for lattice steel structures would need to be applied in the field *after* assembly of the individual pieces into a tower, which could increase environmental hazards related to spills or impacts to air quality. This would not meet the objective of minimizing environmental impacts. This option may increase the time for construction and operation, which would not meet the objective of proceeding in a cost-effective, timely manner.

Feasibility

From a practical perspective, SCE can paint structures in the field and has done so for very specific, limited purposes. However, painting in the field could present additional safety concerns, higher operating and maintenance costs, and more long-term environmental effects associated with ongoing maintenance than galvanizing, including emission and inadvertent paint spills.

Environmental Advantages

The paint alternative may reduce aesthetic impacts since colors ranges from light to dark. In addition, paint provides a durable method of shading transmission structures and protecting them from corrosion.

Environmental Disadvantages

The paint alternative may result in a reduced aesthetic quality over time since structures are exposed to the weather elements and paint may peel or chip. There could be greater impacts to air quality due to painting in the open air where volatile organic compound emissions would occur and paint spills could occur. There is the potential for greater ground disturbance since equipment is painted after construction/installation. Additionally, there are increased safety concerns associated with mobilizing personnel and equipment because re-painting of structures may occur over the life of the proposed project.

Alternative Conclusion

ELIMINATED. Although the paint alternative would provide a durable method of shading transmission structures and protecting them from corrosion and it would protect steel surfaces, this alternative may require more time and resources and involve increased worker safety risks since color applications would need to take place on a frequent basis after construction in order to preserve the continuous electrical path for the sake of safety and reliability.

3.5.3 Underground Construction (Technology Alternative 3 – Alternative to Overhead Construction)

Alternative Description

This alternative would allow undergrounding of transmission cables with voltages up to 500 kV. Trenching and tunneling would occur in order to place T/Ls underground.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

Underground construction would partially meet the project purpose and need; however, undergrounding would not minimize environmental impacts and construction could take longer and be more expensive.

Feasibility

Underground construction of the T/L facilities is technically feasible; however, this method of construction could result in greater land disturbance, a longer construction period, and specialized manufacturing and construction requirements that could not be economically or technically feasible to implement in the proposed project area. In addition, underground technologies in geographic areas with active fault zones have a greater potential, compared with overhead construction, to result in prolonged service interruptions, because sections requiring repair would be more difficult to identify and would take longer to repair. While overhead T/Ls can be repaired within days, underground cables might take months to repair.

Environmental Advantages

Undergrounding of T/Ls would reduce avian impacts with wires and electrocution. In addition, visual impacts could be reduced since there would be fewer wires or structures aboveground.

Environmental Disadvantages

Trenching and tunneling for underground construction would result in several resource impacts. There could be greater land disturbance due to construction activities. A greater potential could exist for long-term impacts to air quality, biological resources, traffic, noise, and geology/soils (erosion) that could result from maintenance problems or system failures, which could require re-excavation to replace underground cables. There could be impacts to air quality from emissions from construction equipment and an increase in dust generation during construction and the use of unpaved access roads. There may be greater disturbances of habitat, soils, surface water, and cultural and paleontological resources due to trenching and tunneling. Finally, there could be temporary increases in noise and vibration due to tunneling, potentially affecting nearby structures and protected species.

Alternative Conclusion

ELIMINATED. Installation of T/Ls underground is a feasible alternative that would achieve some of the project objectives and would reduce visual impacts of overhead wires. However, this alternative would result in greater impacts than those identified for the proposed project; therefore this alternative has been eliminated from further consideration..

3.5.4 All Tubular Steel Poles (Technology Alternative 4 – Alternative to Lattice Steel Poles)

Alternative Description

TSPs are relatively new structures used by utilities. TSPs are steel poles manufactured in long sections that taper in cross-sections from the base of the pole to top of the pole. Most new transmission structures would be LSTs approximately 113 to 180 feet in height. In certain locations where the ROW is narrow or the T/L would need to cross under other lines, SCE has proposed to use tubular steel structures.

Consideration of CEQA/NEPA Criteria

Project Objectives, Purpose, and Need

TSPs meet the purpose and need and partially meet the project objectives. The use of TSPs can offer an advantage over LSTs in certain types of applications, such as locations where ROW width is constrained or space for structure installation is limited—for example, in developed urban areas. Since TSPs require large footings and are manufactured in long sections, they would require the use of long-bed trucks for transportation and heavy cranes that can lift and stack the TSP sections for assembly, which can make them more expensive to install. Because TSPs are long and heavy they cannot be transported by helicopter and new/additional access roads could be necessary for truck transport of the TSPs to the site.

Feasibility

TSPs would be viable for use in the proposed project where the ROW is constrained (i.e., site-specific locations) and where construction equipment can be mobilized to the area.

Environmental Advantages

They could reduce land use impacts since they can be placed in "site specific" locations where ROW width is constrained.

Environmental Disadvantages

Installation of TSPs may result in greater disturbances of habitat, soils, groundwater, cultural and paleontological resources, and hazardous waste such as mining waste, since they would require deeper footing and increased construction activities including possible drilling for large footings, long-bed trucks for transportation, and heavy cranes to lift and stack the TSP sections for assembly. TSPs are sometimes used to reduce visual impacts due to the fact that they have a more streamlined appearance than LSTs; however, in an undeveloped, desert setting, LSTs appear less visible than TSPs because they are less consolidated and appear less prominent.

Alternative Conclusion

ELIMINATED. The use of TSPs can offer an advantage over LSTs in certain types of applications, such as locations where ROW width is constrained or space for structure installation is limited. However, due to the increased ground disturbance and impacts to visual resources, this technology alternative has been eliminated from further consideration.

4. Summary of Alternative Screening Results

Proposed alternatives identified by the applicant (SCE), the CEQA lead agency (CPUC), the NEPA lead agency (BLM), the EIR/EIS team, and the public are listed in Table A-4 according to the determination made for EIR/EIS analysis (i.e., whether or not each is analyzed in the EIR/EIS or eliminated from further analysis). Section 3 described each of the listed alternatives in detail and presented the rationale for elimination of each alternative that is not analyzed. This section presents a summary of the conclusions of Section 3, identifying alternatives that were eliminated and those that are carried forward for full EIR/EIS analysis.

Criterion 1: Project Objectives, Purpose, and Need

Several of the alternatives described in Section 3 are modifications to SCE's proposed T/L route between the Eldorado and Ivanpah Substations. All of these alternatives would meet the basic project objectives, purpose, and need and may be considered as mitigation measures to the proposed project.

Table A-4 Alternatives Retained for EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
TRANSMISSION LINE ROUTING ALTERNATIVES			
Parallel to LADWP Line Segment Alternative (Transmission Alternative Route A)	Meets project purpose and need and objectives.	Feasible.	Advantages • Route would fall within BLM-designated utility corridor • Would eliminate several transmission crossovers near the Eldorado Substation by using a new ROW adjacent to the LADWP AC transmission corridor. • Reduced impacts to cultural resources. None were identified for Alternative A. • Reduced impacts to intermittent streams due to fewer crossings. Disadvantages • Potential for greater habitat disturbance since the construction area west of the existing Eldorado Substation consists of previously undisturbed desert habitat. • Potential for greater impact to tortoise habitat, other wildlife, rare plant species, and desert vegetation.
North of Eldorado Alternative (Transmission Alternative Route B)	Meets project purpose and need and objectives.	Feasible.	Advantages • Reduced impact to cultural resources. None were identified for this alternative route. • Reduced impacts to intermittent streams due to fewer crossings. Disadvantages • Would require 5.3 miles of new transmission line ROW. • Greater potential for ground disturbance from new transmission line ROW.
North Dry Lakes Reroute Alternative (Transmission Alternative Route C)	Meets project purpose and need and objectives.	Feasible.	Advantages • Avoids crossing Ivanpah Dry Lake. • Reduced visual impact compared with the proposed project; existing transmission line would be removed and relocated and it would not be visible from nearby residential use. • Reduced impacts to paleontological resources. • Reduced impacts to intermittent streams due to fewer crossings. Disadvantages • Potential for greater impacts to desert tortoise and its habitat since this alternative has a higher quality desert tortoise habitat than proposed route does. • Potential for greater impacts to cultural resources associated with disturbance of

Table A-4 Alternatives Retained for EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
			Arrowhead Trail Highway. • Would require 5.3 miles of new 130 foot ROW north of the Ivanpah Dry Lake and Primm, Nevada.
South Dry Lakes Reroute Alternative (Transmission Alternative Route D)	Meets project purpose and need and objectives.	Feasible.	Advantages • Reduces overall transmission footprint on the Ivanpah Dry Lake. • Reduced visual impact compared with the proposed project; existing transmission line would be removed and relocated and it would not be visible from nearby residential use. This route would be closer to the recreational viewer at Ivanpah Lake but proposed facilities would not be more prominent than the proposed line. • Reduced potential for the presence of other sensitive wildlife or plant species occurring within the limits of this alternative. • Reduced impacts to intermittent streams due to fewer crossings. Disadvantages • Potential for greater impacts to cultural resources. • Potential for greater ground disturbance for new access roads. • Would require approximately 3.3 miles of new ROW.
South Dry Lakes Bypass Alternative (Transmission Alternative Route E)	Meets project purpose and need and objectives.	Feasible.	Advantages • Similar to those identified for South Dry Lakes Reroute Alternative (Transmission Alternative Route D). Disadvantages • Similar to those identified for South Dry Lakes Reroute Alternative (Transmission Alternative Route D).
TELECOMMUNICATION ALTERNATIVES			
Golf Course Telecommunication Alternative	Meets purpose and need. Meets most project objectives. The underground portion would have a greater project cost, longer construction period, and longer repair time.	Feasible.	Advantage • Visual impacts may be reduced for certain portions of the telecommunication line that is located underground. Disadvantage • Potential for greater ground disturbance and impacts to paleontological resources for portion of TC line that would be placed underground. • Underground construction has potential for greater impacts to sensitive habitat, cultural and paleontological resources.

Table A-4 Alternatives Retained for EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
Mountain Pass Telecommunication Alternative	Meets purpose and need. Partially meets project objectives. The underground construction would have a longer construction period and longer repair time.	Feasible.	Advantage • Visual impacts may be reduced for certain portions of the telecommunication line that is located underground or out of line-of-sight of sensitive viewers. Disadvantage • Greater potential for ground disturbance and impacts to paleontological resources for portion of TC line that would be placed underground. • Potential for greater construction-related hazards due to transport, use, or disposal of hazardous materials and for upsets or accidents involving releases of hazardous materials.
TECHNOLOGY ALTERNATIVES			
No Technology Alternatives were retained.			

Source: E & E 2009.

Key:

AC = Alternating current.
BLM = Bureau of Land Management.
LADWP = Los Angeles Department of Water and Power.
ROW = Right-of-way.
TC = Telecommunication.
TSPs = Tubular steel poles.

Criterion 2: Feasibility

The alternatives vary in their ability to meet economic, environmental, legal, social, and technical feasibility criteria described in Section 2 above. Technical feasibility issues for alternatives are primarily related to physical constraints, such as engineering/design limitations for construction on steep slopes. Other alternatives had legal feasibility problems related to consistency with regulatory standards for operational reliability.

Criterion 3: Environmental Effects

The preliminary potentially significant environmental impacts of the proposed project are summarized in Table A-2. Each alternative is evaluated on its overall ability to reduce or avoid significant effects of the proposed project. In some cases, an alternative may reduce or eliminate a proposed project effect, but create a new significant effect in a different discipline or geographic area. In these cases, the aggregate environmental effects of the proposed project segment and the alternative segment have been compared to determine whether the alternative meets the overall CEQA/NEPA requirements.

4.1 Alternatives to be Analyzed in the EIR/EIS

The alternatives listed in Table A-4 have been chosen for detailed analysis in the EIR/EIS through the alternative screening process. These alternatives are described in Section 3.

4.2 Alternatives Eliminated from EIR/EIS Consideration

The alternatives eliminated from detailed EIR/EIS consideration are listed in Table A-5.

Table A-5 Alternatives Eliminated from EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
TRANSMISSION SYSTEM ALTERNATIVES			
Non-Transmission System Alternative (System Alternative 1)	Would not meet purpose and need and objectives since it would not interconnect solar resources in the Ivanpah Dry Lake area with the SCE transmission system. In addition, new sources of in-basin generation would need to be identified, evaluated, and built.	Feasible.	Advantages • Would avoid impacts to resources in the vicinity of the EITP. However, upgrades to SCE's existing transmission system could be required to integrate up to 1,400 MW of new power generation within its service area. Disadvantages • New sources of in-basin generation would result in site-specific impacts associated with construction and operation of new power plants. This could result in air quality, biology, cultural resources, land use, noise, and visual impacts, among others. • Transmission upgrades may also be required to integrate new in-basin generation sources into the transmission system.
Reconductoring Alternative (System Alternative 2)	Would not meet the project purpose and need since it would not provide sufficient capacity, nor would it meet the project objective of providing an interconnect for planned solar resources in the Ivanpah Dry Lake area.	Feasible.	Advantages • Reconductoring alternative would avoid and/or lessen construction-related environmental impacts identified for the proposed project because it would replace low capacity conductors with higher capacity conductors on the existing towers. Operation impacts would be similar to existing conditions. Disadvantages • None identified.
Lower Voltage Alternative – New 115-kv Transmission Line (System Alternative 3)	Would not meet the project's purpose, need, or objectives because it would not interconnect and integrate up to 1,400 MW of generation resources in the Ivanpah Dry Lake Area. It would not meet the objective of maximizing the use of existing ROW and corridors.	Feasible.	Advantages • Construction-related impacts would be similar to those of the proposed project if new poles would be installed. Disadvantages • Construction-related impacts would be similar to those of the proposed project if new poles would be installed.
Higher Voltage Alternative – New 500-kV Transmission Line (System Alternative 4)	Would not meet the project's purpose and need or objectives.	Feasible.	Advantage • None identified. Disadvantage • Potential for greater visual impacts than proposed project because

Table A-5 Alternatives Eliminated from EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
			existing transmission structures (towers) would be replaced with structures that are taller, wider, and bulkier than those of proposed project. • Would potentially require a wider ROW to accommodate the 500-kV replacement line.
230-kV Single Circuit Transmission Line (System Alternative 5)	Would not meet purpose and need. Would only provide capacity for interconnection maximum of 1,150 MW. Would not meet the purpose and need of providing transmission capacity for 1,400 MW.	Feasible.	Advantages • Potential reduction in aesthetic impacts due to use of fewer wires. Disadvantages • None identified.
TRANSMISSION LINE ROUTING ALTERNATIVES			
New ROW for 230-kV Transmission Line Alternative (Transmission Alternative F)	Would not meet the purpose and need of providing transmission capacity for 1,400 MW. Would require new ROW that is 2,000 feet away from existing SCE 100-foot corridor. Therefore, it would not meet the objective of maximizing the use of the existing ROW.	Feasible.	Advantages • None identified. Disadvantages • Would require new ROW that would be 100 feet or greater in width and located at least 2,000 feet on either side of the existing SCE 100-foot corridor. • Potential for greater visual impacts would occur due to introduction of additional set of transmission facilities within the project area. • Potential for greater ground disturbance may occur due to wider right-of-way requirements. • Potential for greater impacts to sensitive resources for any area that is undisturbed or undeveloped.
TELECOMMUNICATION SYSTEM ALTERNATIVES			
Microwave Tower Only – Telecommunication Alternative	Meets purpose and need, but would not meet the project objective of minimizing environmental Impacts	Feasible.	Advantage • Construction of the microwave towers would avoid the use overhead or underground wires. There could be reduced visual impacts compared with those of the proposed project. Disadvantage • Potential for greater ground disturbance and impacts to sensitive biological, cultural, visual, and other resources from construction of six new microwave towers.

Table A-5 Alternatives Eliminated from EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
			• Potential for greater visual impacts compared with proposed project, depending on height and location of six new microwave towers.
TECHNOLOGY ALTERNATIVE			
Composite Core Conductor Alternative (Technology Alternative 1)	Meets purpose and need. The composite core is more expensive and fragile than the standard core conductor. Would not meet the project objective of providing reliability.	Feasible.	Advantages • Same as the proposed project. Disadvantages • Same as the proposed project.
Painted Structures Alternative – Alternative to Galvanized Structures (Technology Alternative 2)	Meets purpose and need. Partially meets project objectives. Painting would take longer and increase potential for spills and hazards.	Feasible.	Advantages • Reduces aesthetic impacts since colors range from light to dark. Disadvantages • Aesthetic quality may be reduced over time as structures are exposed to weather and paint may peel or chip and become unsightly. • Increased air quality impacts due to painting in the open air where volatile organic compound emissions would occur and paint spills could occur. • Increased safety concerns associated with mobilizing personnel and equipment since re-painting of structures may occur over the life of the project.
Underground Construction (Technology Alternative 3)	Underground construction would meet the project purpose and need; however, it would only meet some of the project objectives. Undergrounding would not minimize environmental impacts and construction could take longer and be more expensive.	Feasible	Advantages • Reduces avian impacts with wires and electrocution. • Visual impacts could be reduced since there would be fewer wires or structures aboveground. Disadvantages • Greater land disturbance due to construction activities. • Greater potential for long-term impacts to air quality, biological resources, traffic, noise, and geology/soils (erosion) due to higher incidence of maintenance problems or system failures, which could require re-excavation to replace underground cables. • Greater impacts to air quality from emissions from construction equipment and an increase in dust generation during construction and

Table A-5 Alternatives Eliminated from EIR/EIS Consideration

Alternative	Project Objective, Purpose, and Need	Feasibility	Environmental Advantages/Disadvantages Compared with Proposed Project/Action
			the use of unpaved access roads. • Greater disturbances of habitat, soils, surface water, and cultural and paleontological resources due to trenching and tunneling. • Temporary increases in noise and vibration due to tunneling, potentially affecting nearby structures and protected species.
All Tubular Steel Poles Alternative (Technology Alternative 4)	Meets purpose and need. However, the use of TSP for all transmission structures would have greater project costs due to special manufacturing and construction requirements.	Feasible.	Advantages • Reduced impacts to ROW since TSPs can be placed in "site specific" locations where ROW width is constrained. Disadvantages • Potential for greater disturbances of habitat, soils, and surface water, cultural and paleontological resources, hazardous waste (e.g., mining waste) due to construction activities including possible drilling for the large footings, long-bed trucks for transportation, heavy cranes needed to lift and stack the TSP sections for assembly.

Source: E & E 2009.
Key:
EITP = Eldorado–Ivanpah Transmission Project.
MW = Megawatt.
SCE = Southern California Edison.

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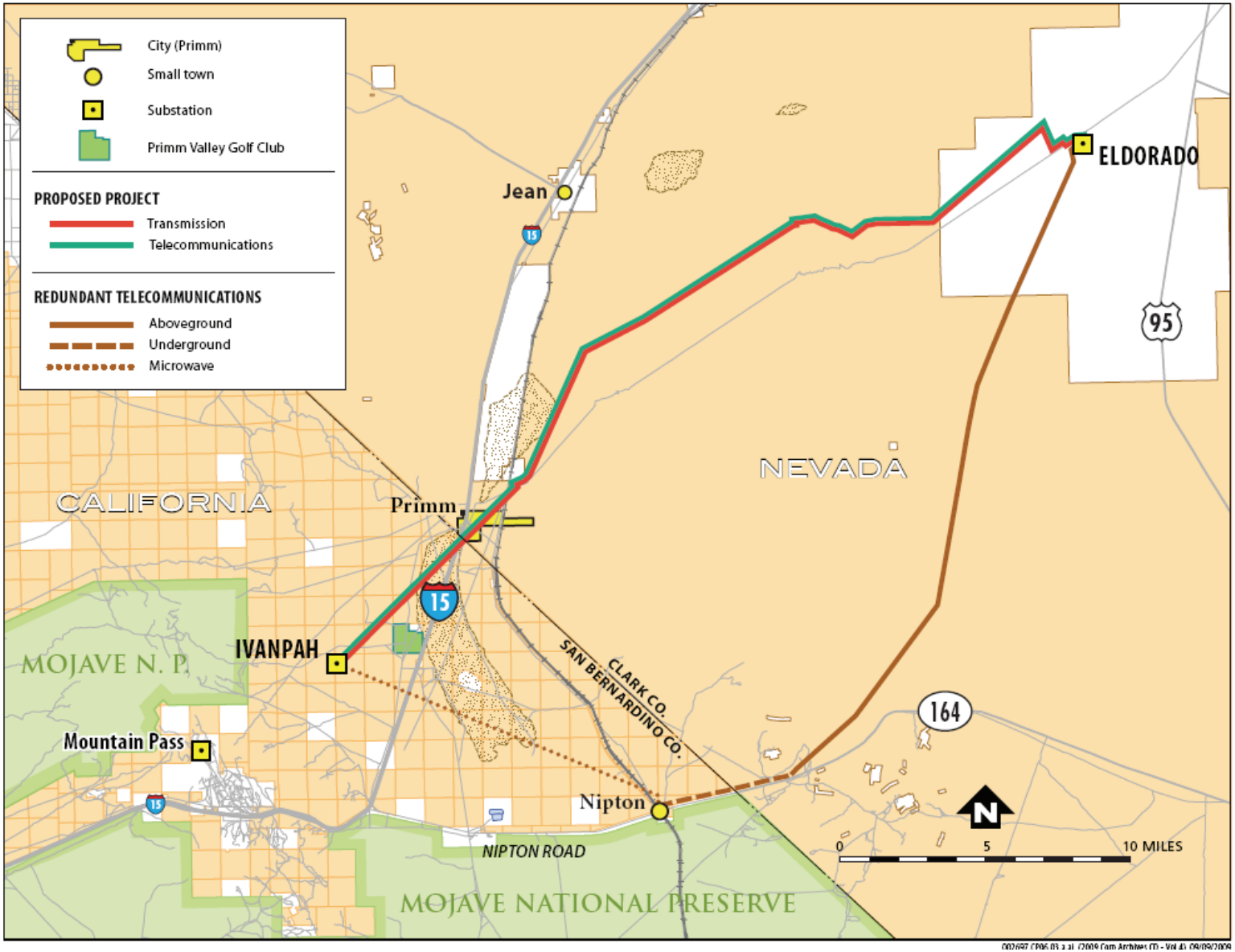

Figure 1 Proposed Project Map

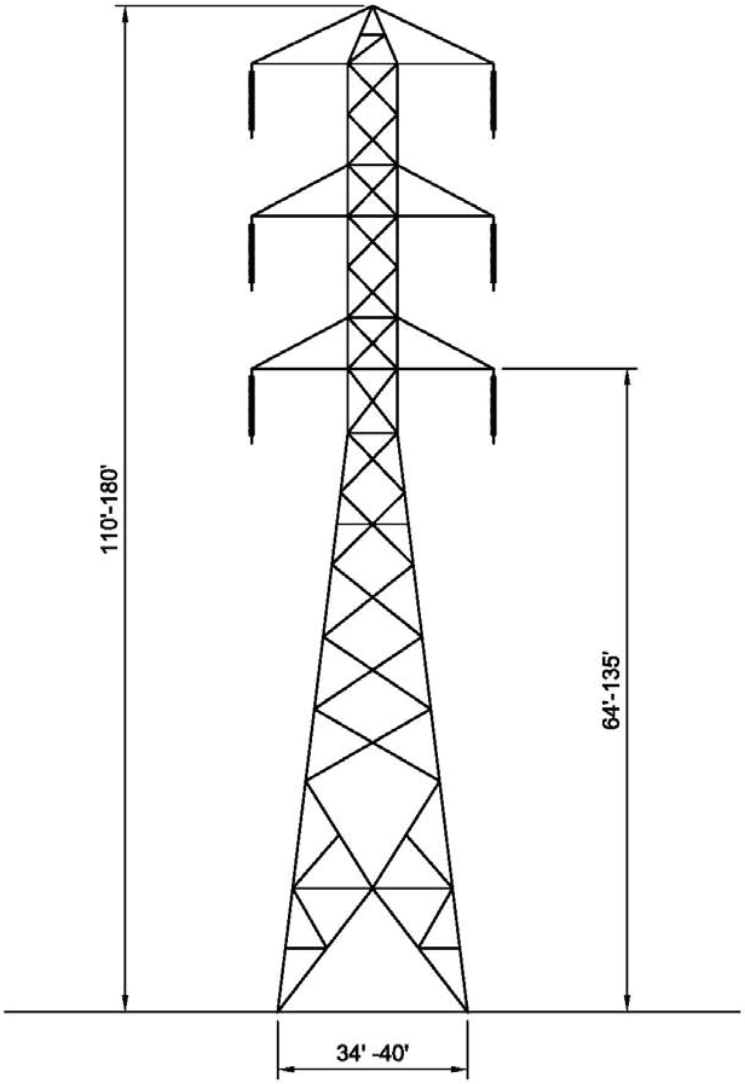

Figure 2 230-kV Double-Circuit Lattice Steel Tower

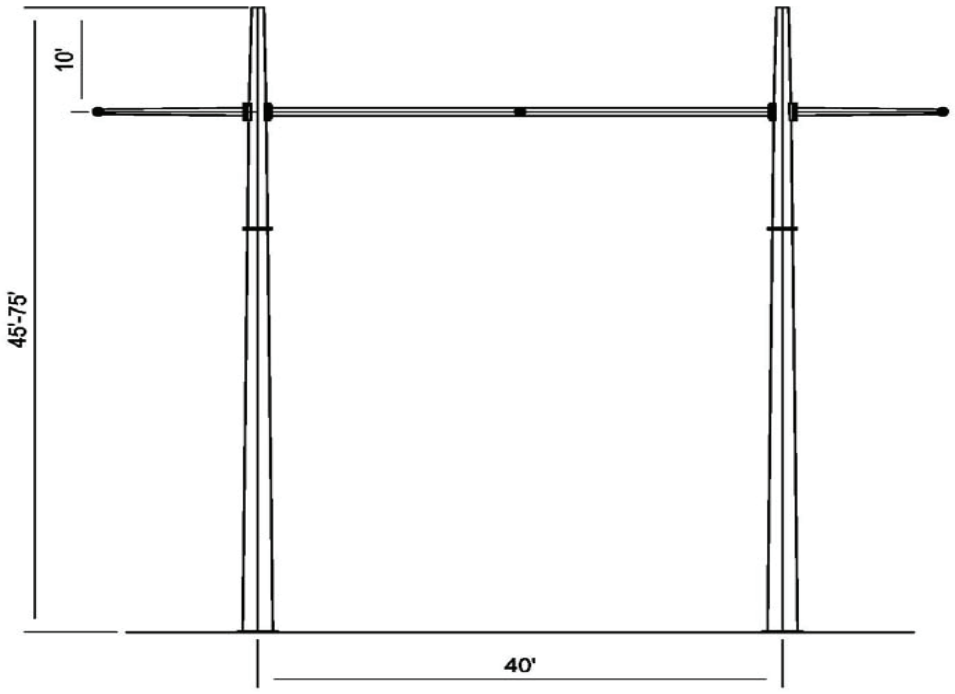

Figure 3 230-kV Single-Circuit H-Frame Steel Poles

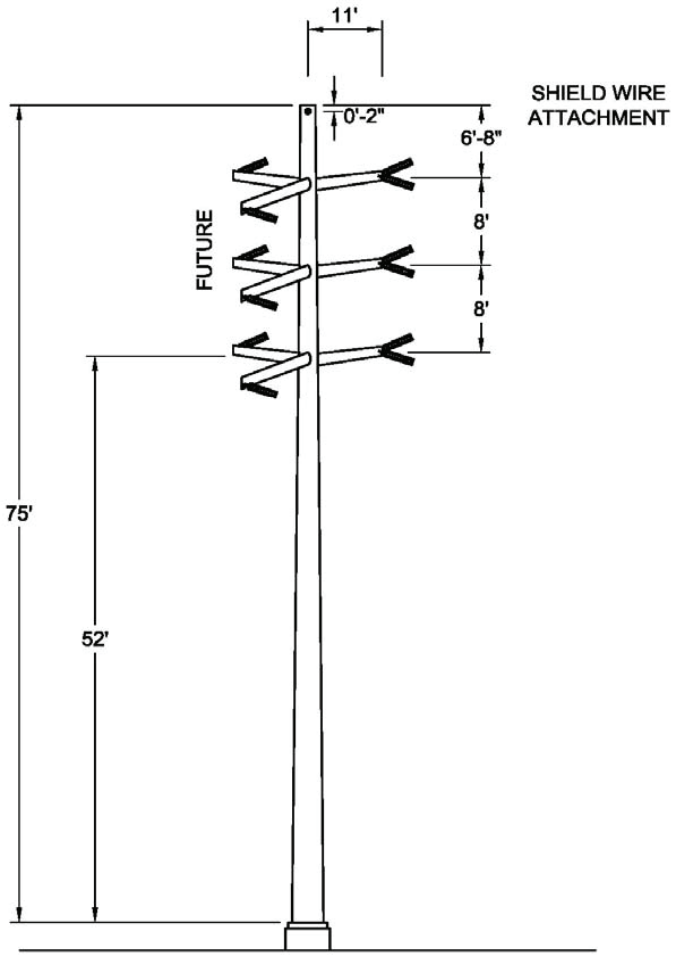

Figure 4 115-kV Single-Circuit Tubular Steel Poles

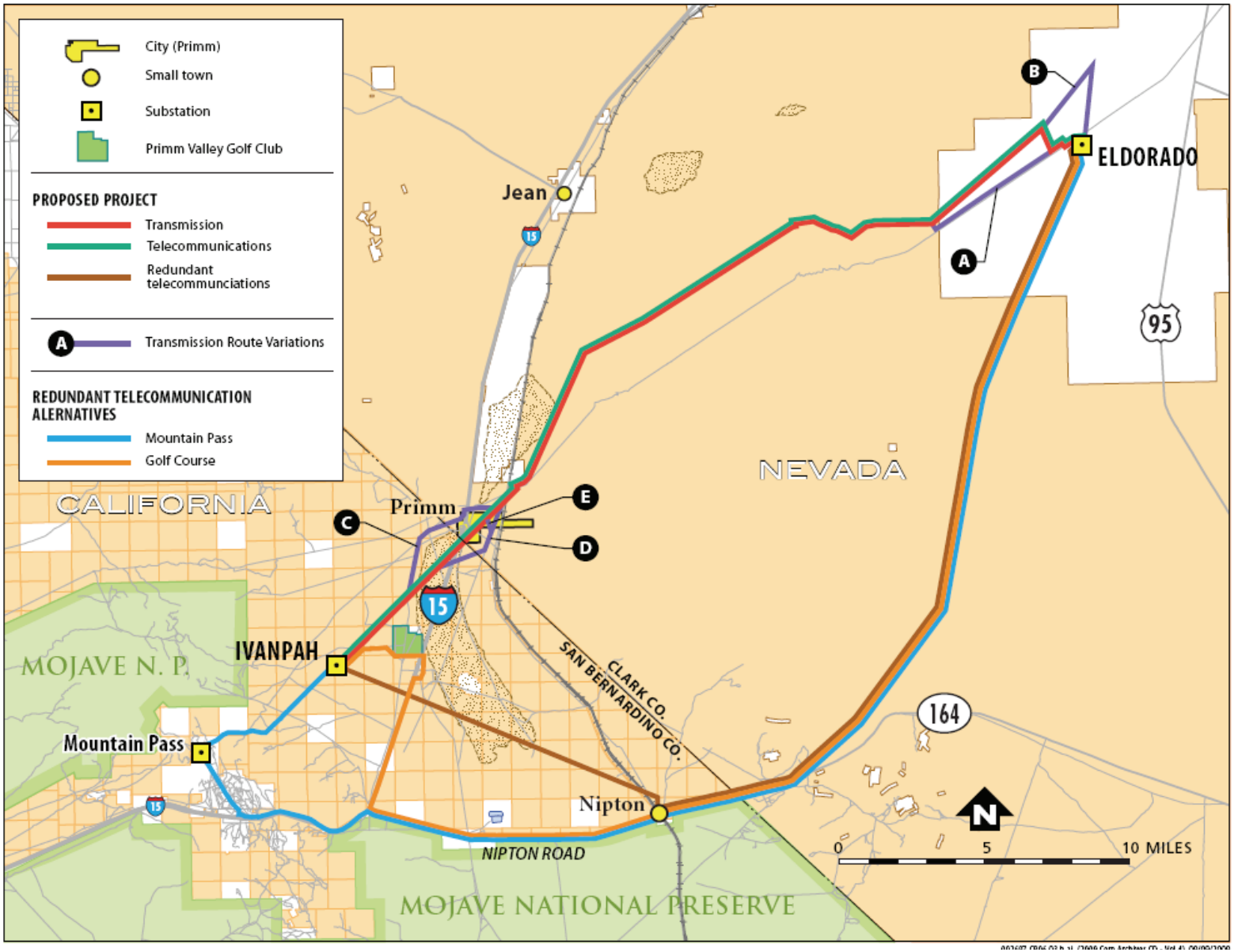

Figure 5 Transmission Line Routing Alternatives

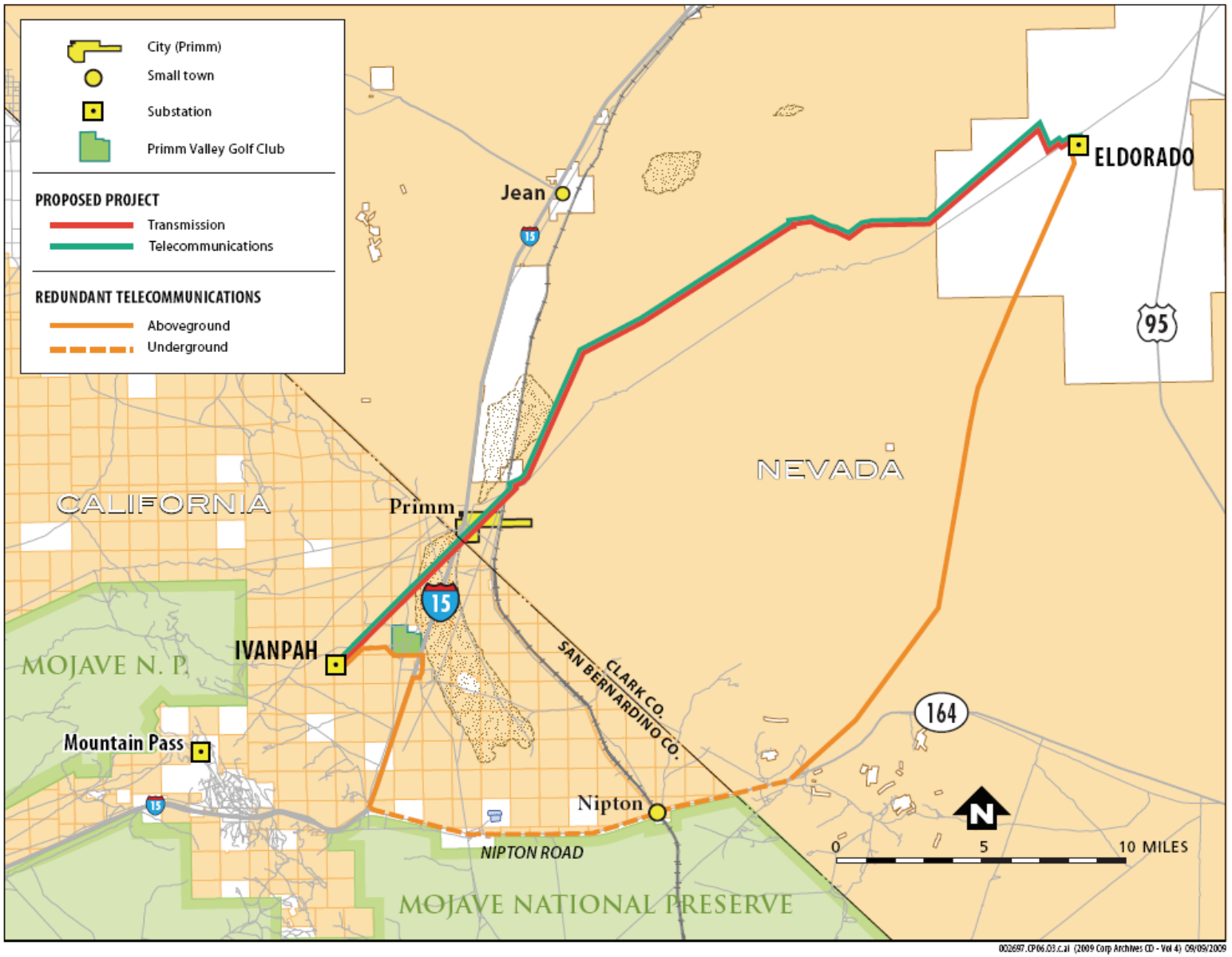

Figure 6 Golf Course Telecommunication Alternative

Figure 7 Mountain Pass Telecommunication Alternative