CALIFORNIA DESERT CONSERVATION AREA PLAN AMENDMENT / FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

IVANPAH SOLAR ELECTRIC GENERATING SYSTEM

FEIS-10-31

JULY 2010

BLM

BLM/CA/ES-2010-010+1793

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Needles Field Office
1303 South U.S. Highway 95
Needles, CA 92363
www.ca.blm.gov/needles

In Reply Refer To:

In reply refer to:
1610-5.G.1.4
2800lCACA-48668

Dear Reader:

Enclosed is the proposed California Desert Conservation Area Plan Amendment and Final Environmental Impact Statement (CDCA Plan Amendment/FEIS) for the Ivanpah Solar Electric Generating System (ISEGS) project. The Bureau of Land Management (BLM) prepared the CDCA Plan Amendment/FEIS for the ISEGS project in consultation with cooperating agencies and California State agencies, taking into account public comments received during the National Environmental Policy Act (NEPA) process. The proposed plan amendment adds the Ivanpah Solar Electric Generating System project site to those identified in the current California Desert Conservation Area Plan, as amended, for solar energy production. The decision on the ISEGS project will be to approve, approve with modification, or deny issuance of the rights-of-way grants applied for by Solar Partners I, 11, IV, and VIII.

This CDCA Plan Amendment/FEIS for the ISEGS project has been developed in accordance with NEPA and the Federal Land Policy and Management Act of 1976. The CDCA Plan Amendment is based on the Mitigated Ivanpah 3 Alternative which was identified as the Agency Preferred Alternative in the Supplemental Draft Environmental Impact Statement for ISEGS, which was released on April 16,2010. The CDCA Plan Amendment/FEIS contains the proposed plan amendment, a summary of changes made between the DEIS, SDEIS and FEIS for ISEGS, an analysis of the impacts of the proposed decisions, and a summary of the written and oral comments received during the public review periods for the DEIS and for the SDEIS, and responses to comments.

The BLM will be accepting additional public comment on the CDCA Plan Amendment/FEIS within 30 days after the Environmental Protection Agency publishes the Notice of Availability in the Federal Register. Comments can be sent to: George Meckfessel, Planning and Environmental Coordinator, Needles Field Office, 1303 South Highway 95, Needles, CA 92363, or email caisegs @ blm.gov.

Pursuant to the BLM's planning regulations at 43 CFR 1610.5-2, any person who participated in the planning process for the CDCA Plan Amendment and has an interest that is or may be adversely affected by the proposed plan amendment may protest approval of the plan amendment within 30 days from the date the Environmental Protection Agency (EPA) publishes the Notice of Availability in the Federal Register. For further information on filing a protest, please see the accompanying protest regulations in the page that follows (labeled as Attachment 1). The regulations specify the required elements in a protest. Protesting parties should take care to

document all relevant facts and, as much as possible, reference or cite the planning documents or available planning records (e.g., meeting minutes or summaries, correspondence, etc.).
All protests must be in writing and mailed to the following address:

Regular Mail:	Overnight Mail:
Director (210)	Director (210)
Attention: Brenda Williams	Attention: Brenda Williams
P.O. Box 66538	1620 L Street, N.W., Suite 1075
Washington, D.C. 20035	Washington, D.C. 20036

Before including your address, phone number, e-mail address, or other personal identifying information in your protest, be advised that your entire protest - including your personal identifying information - may be made publicly available at any time. While you can ask us in your protest to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

All protests must be received by the Director by the close of the protest period to be accepted as valid. Protests that are postmarked by the close of the protest period but received by the Director after the close of the protest period will only be accepted as valid if the protesting party also provides a faxed or e-mailed advance copy before the close of the protest period. To provide the BLM with such advance notification, please fax protests to the attention of Brenda Hudgens-Williams- BLM protest coordinator at 202-912-7129, or e-mail protests to: Brenda-Hudgens-Williams @ blm.gov.

The BLM Director will make every attempt to promptly render a decision on each valid protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior. Responses to protest issues will be compiled in a Director's Protest Resolution Report that will be made available to the public following issuance of the decisions.

Upon resolution of all land use plan protests, the BLM will issue a Record of Decision (ROD) adopting the Approved CDCA Plan Amendment and making a decision regarding issuance of the right-of-way grant. Copies of the ROD will be mailed or made available electronically to all who participated in this NEPA process and will be available to all parties through the Needles Field Office website (http://www. blm.gov/ca/st/en/fo/needles/nefo-nepa. html), or by mail upon request.

Sincerely,

Raymond C. Lee
Field Manager, Needles

Attachment 1

Protest Regulations

[CITE: 43CFR1610.5-21

TITLE 43--PUBLIC LANDS: INTERIOR
CHAPTER II--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR
PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents
Subpart 161 0--Resource Management Planning
Sec. 161 0.5-2 Protest procedures.

(a) Any person who participated in the planning process and has an interest which is or may be adversely affected by the approval or amendment of a resource management plan may protest such approval or amendment. A protest may raise only those issues which were submitted for the record during the planning process.

(1) The protest shall be in writing and shall be filed with the Director. The protest shall be filed within 30 days of the date the Environmental Protection Agency published the notice of receipt of the final environmental impact statement containing the plan or amendment in the Federal Register. For an amendment not requiring the preparation of an environmental impact statement, the protest shall be filed within 30 days of the publication of the notice of its effective date.

(2) The protest shall contain:

(i) The name, mailing address, telephone number and interest of the person filing the protest;
(ii) A statement of the issue or issues being protested;
(iii) A statement of the part or parts of the plan or amendment being protested;
(iv) A copy of all documents addressing the issue or issues that were submitted during the planning process by the protesting party or an indication of the date the issue or issues were discussed for the record; and
(v) A concise statement explaining why the State Director's decision is believed to be wrong.

(3) The Director shall promptly render a decision on the protest.

(b) The decision shall be in writing and shall set forth the reasons for the decision. The decision shall be sent to the protesting party by certified mail, return receipt requested. The decision of the Director shall be the final decision of the Department of the Interior.

ABSTRACT

ENVIRONMENTAL IMPACT STATEMENT

IVANPAH SOLAR ELECTRIC GENERATING SYSTEM PROJECT

( ) Draft (X) Final

Lead Agency: The United States Department of the Interior, Bureau of Land Management Needles Field Office

Location: San Bernardino County, California

Address Protests on this Proposed Plan Amendment to:

Regular Mail:	**Overnight Mail:**
Attn: Brenda Williams	Attn: Brenda Williams
Director (210)	Director (210)
PO Box 66538	1620 L Street NW Suite 1075
Washington, DC 20035	Washington, DC 20036

Address Comments on this EIS to: Bureau of Land Management Attention: George Meckfessel, Planning and Environmental Coordinator, 1303 S. Hwy. 95, Needles, CA 92363

or Email: caisegs@blm.gov

Comment Deadline: 30-days from date of EPA Notice of Availability.

The Bureau of Land Management (BLM) has received a proposal from Solar Partners I, II, IV, and VIII, limited liability corporations formed by BrightSource Energy (BrightSource), to construct and operate a solar thermal electric generating facility in San Bernardino County, California. The project would generate up to 400 megawatts (MW) of electricity using solar thermal technology.

The proposed project was analyzed in a Draft Environmental Impact Statement that was published on November 13, 2009. The proposed project consists of three separate solar generating facilities, each consisting of a field of heliostats (mirrors) reflecting solar radiation to the top of a 459-foot tall power tower received unit. Heated fluid within the power tower receivers would be used to boil water to generate steam, which would turn a turbine and generate electricity. The permanent ROW required for the heliostat fields and power towers would occupy approximately 3,670 acres. An additional 377 acres would be used to support a Construction Logistics Area, and for shared facilities such as an administration building, maintenance warehouse, substation, and groundwater supply wells. Approximately 24 acres would be used for a natural gas supply pipeline ROW, and for access roads. The proposed project would cause the surface disturbance of approximately 4,073 acres during construction.

Two additional alternatives were considered in detail in the Supplemental Draft Environmental Impact Statement (SDEIS), which was published by BLM on April 16, 2010. SDEIS analyzed a reduced acreage alternative called the Mitigated Ivanpah 3 Alternative, and a reconfigured alternative called the Modified I-15 Alternative. The facility evaluated in each of these alternatives is a solar thermal electric generating facility with a generating capacity of 370 MW.

The Mitigated Ivanpah 3 Alternative is identified as the agency preferred alternative in this EIS.

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LIST OF ACRONYMS

$\mu g/m^3$	micrograms per cubic meter
AAQS	ambient air quality standards
AB	Assembly Bill
AC	alternating current
ACC	air cooled condensers
ACEC	Area of Critical Environmental Concern
AED	automatic external defibrillator
AFY	acre-feet per year
AFC	Application for Certification
AML	Appropriate Management Levels
amsl	above mean sea level
ANSI	American National Standards Institute
AO	Authorized Officer
APLIC	Avian Powerline Interaction Committee
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
ARB	Air Resource Board
ARMR	Archaeological Resource Management Report
ARRA	American Recovery and Reinvestment Act of 2009
ASME	American Society for Material Engineering
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
AUM	animal unit months
BA	Biological Assessment
BACT	Best Available Control Technology
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
BMP	best management practice
BNSF	Burlington Northern Santa Fe
BO	Biological Opinion
BOE	Board of Equalization
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
BVUSD	Baker Valley Unified School District
CAA	Clean Air Act
CAISO	California Independent System Operator
Cal-ARP	California Accidental Release Program
CAM	crassulacean acid metabolism
CAPCOA	California Air Pollution Control Officers Association
CBO	Chief Building Official
CBSC	California Building Standards Code

CCDOA	Clark County Department of Aviation
CCR	California Code of Regulations
CCSD	Clark County School District
CCTV	Closed Circuit TV
CDCA	California Desert Conservation Area
CDD	California Desert District
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDMG	California Department of Water Resources
CDPH	California Department of Public Health
CEMS	continuous emissions monitoring system
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFATS	Chemical Facility Anti-Terrorism Standard
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CHP	California Highway Patrol
CHRIS	California Historical Resources Information System
CLA	Construction Logistics Area
CMP	Congestion Management Plan
CNDDB	California Department of Fish and Game Natural Diversity Database
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide
COC	Condition of Certification
CPM	Construction Project Manager
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CRM	Cultural Resource Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resource Report
CRS	Cultural Resources Specialist
CSP	Concentrated Solar Power
CSS	Construction Safety Supervisor
CUPA	Certified Unified Program Authority
CVC	California Vehicle Code
CWA	Clean Water Act
DEHS	Department of Environmental Health Services
DEIS	Draft Environmental Impact Statement
DEM	digital elevation model
DESCP	Drainage Erosion and Sediment Control Plan
DHS	U.S. Department of Homeland Security
DOE	U. S. Department of Energy

DOI	U. S. Department of Interior
DOT	U.S. Department of Transportation
DPA	Desert Protection Act
DPM	Diesel Particulate Matter
DPR	Department of Parks and Recreation
DRP	Demand Response Program
DTRO	Desert Tortoise Recovery Office
DTRPAC	Desert Tortoise Recovery Planning Assessment Committee
DTSC	Department of Toxic Substances Control
DWMA	Desert Wildlife Management Area
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EITL	Eldorado-Ivanpah Transmission Line
EITP	Eldorado-Ivanpah Transmission Project
EMF	electric and magnetic field
EMS	emergency medical services
EPA	U.S. Environmental Protection Agency
EPAct	Energy Policy Act of 2005
EPS	Emission Performance Standard
ERC	emission reduction credit
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDOC	Final Determination of Compliance
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FGR	flue gas recirculation
FHWA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
fps	feet per second
FSA	Final Staff Assessment
FTA	Federal Transit Administration
GHG	Greenhouse Gas
GPS	global positioning system
GWh	gigawatt-hours
H_2S	hydrogen sulfide
HAER	Historic American Engineering Record
HAP	Hazardous Air Pollutant
HARP	Hotspots Analysis and Reporting Program
HDP	Heritage Documentation Program
HFC	hydrofluorocarbon
HI	Hazard Index
HMA	Herd Management Area
HMBP	Hazardous Materials Business Plan

hp	horsepower
HSC	Health and Safety Code
IEEE	Institute of Electrical and Electronics Engineers
IEPR	Integrated Energy Policy Report
IIPP	Injury and Illness Prevention Program
IM	Instruction Memorandum
ISC	Interruptible Service Contract
ISEGS	Ivanpah Solar Electric Generating System
ISO	Independent System Operator
IVAB	Ivanpah Valley Air Basin
IVGB	Ivanpah Valley Groundwater Basin
KOP	Key Observation Point
KRGT	Kern River Gas Transmission Company
kV	kilovolt
kW	kilowatt
lb	pound
LID	Low-Impact Development
LOS	Level of Service
LRP	Load Reduction Program
LVMPD	Las Vegas Metropolitan Police Department
m	meter
MBTA	Migratory Bird Treaty Act
MCL	Maximum Contaminant Levels
MCLB	Marine Corps Logistics Base
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District
MEER	mechanical and electrical equipment room
mG	milligauss
mg/l	milligrams per liter
MLD	Most Likely Descendent
MMBtu/hr	million British thermal units per hour
MNP	Mojave National Preserve
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPE	maximum permissible exposure
mph	miles per hour
MSA	Metropolitan Statistical Area
MT	metric tons
MTCO2E	metric tons of CO_2 equivalent
MUC	Multiple-Use Class
MVA	megavolt-ampere
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission

NCA	Noise Compatibility Area
NEMO	Northern and Eastern Mojave
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NFWF	National Fish and Wildlife Foundation
NH_3	ammonia
NHPA	National Historic Preservation Act
NIOSH	National Institute of Safety and Health
NO	nitric oxide
NO_2	nitrogen dioxide
NO_3	nitrates
NOA	Notice of Availability
NOI	Notice of Intent
NOx	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places
NSPS	New Source Performance Standards
NSR	New Source Review
NTP	Notice to Proceed
O&M	operations and maintenance
O_3	ozone
°C	degrees Celsius
OCA	Off-site Consequence Analysis
OEHHA	Office of Environmental Health Hazard Assessment
OHV	off-highway vehicle
OLM	Ozone Limiting Method
ORV	off-road vehicle
OSHA	Occupational Safety and Health Administration
OTC	once-through cooling
PAH	Polynuclear Aromatic Hydrocarbon
PAO	Public Adviser’s Office
PAR	Property Analysis Record
PCF	paid-call firefighters
PDOC	Preliminary Determination of Compliance
PEA	Proponent’s Environmental Assessment
PEIS	Programmatic Environmental Impact Statement
PFC	perfluorocarbon
PM	Particulate Matter
PMAP	Particulate Matter Attainment Plan
PMI	point of maximum impact
POD	Plan of Development
PPE	personal protective equipment

ppm	parts per million
PRC	Public Resources Code
PRM	Paleontological Resource Monitors
PRMMP	paleontological resources monitoring and mitigation plan
PRR	Paleontological Resources Report
PRS	paleontological resource specialist
PSA	Preliminary Staff Assessment
PSD	Prevention of Significant Deterioration
PTO	Permit to Operate
PTZ	pan, tilt, and zoom
PUP	Pesticide Use Proposal
PV	photovoltaic
PVMRM	Plume Volume Molar Ratio Method
PYFC	Potential Fossil Yield Classification
QFER	Quarterly Fuel and Energy Report
RC	Resource Conservation
RCRA	Resource Conservation Recovery Act
REAT	Renewable Energy Action Team
RETI	Renewable Energy Transmission Initiative
RMP	Resource Management Plan
ROD	Record of Decision
ROW	right-of-way
RPS	Renewables Portfolio Standard
RWQCB	Regional Water Quality Control Board
SAC	Science Advisory Committee
SANBAG	San Bernardino Associated Governments
SB	Senate Bill
SBAIC	San Bernardo Archeological Information Center
SBCFD	San Bernardino County Fire Department
SCADA	Supervisory Control and Data Acquisition
SCE	Southern California Edison
SDEIS	Supplemental Draft Environmental Impact Statement
SEGS	Solar Electric Generating System
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Officer
SMARA	Surface Mining and Reclamation Act
SO_2	sulfur dioxide
SO_4	sulfates
SOx	sulfur oxide
SPCC	spill prevention, control, and countermeasures
STG	steam turbine-generator
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resource Control Board

TAC	toxic air contaminant
TCP	Traffic Control Plan
TDS	total dissolved solids
TUC	Transportation Utility Corridor
UPRR	Union Pacific Railroad
USACE	U.S. Army Corps of Engineers
USCS	Unified Soils Classification System
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
V/C	volume-to-capacity
VMT	vehicle miles travelled
VOC	volatile organic compound
VR	Visual Resource
VRI	Visual Resource Inventory
VRM	Visual Resource Management
WA	Wilderness Area
WEAP	Worker Environmental Awareness Program
WEC	wave energy conversion
WECC	Western Electricity Coordinating Council
WIU	Wilderness Inventory Units
WWTP	Wastewater Treatment Plant

1.0 Executive Summary

1.1 Introduction

The proposed action evaluated within this Environmental Impact Statement (EIS) is the construction and operation of the Ivanpah Solar Electric Generating System (ISEGS) project, a proposed solar-thermal electricity generation facility located on public lands managed by the Bureau of Land Management (BLM) in San Bernardino County, California. The EIS represents the environmental review document developed by the BLM to evaluate potential impacts associated with the proposed action. The EIS also functions as the environmental evaluation of a proposed amendment to BLM's California Desert Conservation Area (CDCA) Plan, which would identify the ISEGS site within the Plan.

Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC, which are subsidiaries of BrightSource Energy, Inc. (applicant or BrightSource Energy), filed an Application for Certification (AFC) (07-AFC-5) for the proposed ISEGS. The proposed ISEGS project and related facilities are under the Energy Commission's jurisdiction and require certification by the California Energy Commission to operate the facility. As the proposed project would be located on public land, BrightSource Energy has also filed an application to BLM for a land use Right-of-Way pursuant to the Federal Land Policy and Management Act (FLPMA). Under FLPMA Title V (Rights-of-Way), the Secretary of Interior is authorized to grant rights-of-way for the purpose of allowing systems for generation, transmission, and distribution of electric energy. BrightSource Energy has also applied to the U.S. Department of Energy (DOE) for a loan guarantee pursuant to Title XVII of the Energy Policy Act. The project would be developed in three phases, known as Ivanpah 1, 2, and 3. The application for a loan guarantee for Ivanpah 1 was made in November 2008, and the application for Ivanpah 2 and 3 was made in February 2009. BrightSource Energy has also applied to the U.S. Treasury Department for Payments for Specified Energy Property in Lieu of Tax Credits under §1603 of the American Recovery and Reinvestment Act of 2009 (Public Law 111-5). This program offers a grant (in lieu of investment tax credit) to receive funding for 30% of the total capital cost at such time as a project achieves commercial operation (currently applies to projects that begin construction by December 31, 2010 and begin commercial operation before January 1, 2017). Pursuant to Treasury Department guidance ("Payments for Specified Energy Property in Lieu of Tax Credits under the American Recovery and Reinvestment Act of 2009", U.S. Treasury Department Office of the Fiscal Assistant Secretary, July 2009/ Revised March 2010) a Section 1603 payment with respect to specified energy property does not make the property subject to the requirements of National Environmental Policy Act (NEPA) and similar laws.

This EIS examines the environmental and public health and safety aspects of the proposed project, based on the information provided by the applicant, that received through public comment, and that received from other sources available at the time the EIS was prepared. The EIS contains analyses required as part of an EIS prepared under the NEPA.

BLM is the lead agency for the NEPA review of the proposed Right-of-Way and associated CDCA Plan Amendment. In August, 2007, the California Energy Commission (Energy Commission) and BLM California State Office entered into a Memorandum of Understanding (MOU) to jointly develop the environmental analysis documentation for solar thermal projects which are under the jurisdiction of both agencies. The purpose of the MOU is to avoid duplication of the agency efforts, share the agency's expertise and information, promote intergovernmental coordination, and facilitate public review. On November 4, 2009, the BLM and California Energy Commission (Energy Commission) staff jointly prepared the Final Staff Assessment (FSA)/Draft Environmental Impact Statement (DEIS) and Draft CDCA Plan Amendment for the ISEGS project. The Notice of Availability of the DEIS was published on November 10, 2009; the 90-day public review and comment period ended on February 11, 2010.

After publication of the DEIS, additional information regarding two of the alternatives identified and evaluated in the DEIS (the Reduced Acreage Alternative and the I-15 Alternative) was obtained by BLM through the Energy Commission public hearing and BLM public comment processes. Based on the receipt of these additional data, BLM concluded that the rationale for eliminating the Reduced Acreage and I-15 Alternatives in the DEIS was insufficient, and that these two alternatives merited more detailed evaluation in a Supplemental DEIS (SDEIS). The Notice of the Availability of the SDEIS was published on April 16, 2010; the 45-day public review and comment period ended on June 1, 2010.

In support of its Right-of-Way and CDCA Plan Amendment processes, the BLM has the responsibility to evaluate the environmental impacts of the proposed action, the No Action alternative, and other alternative actions that may meet the purpose and need for the proposed project. The Final EIS (FEIS) will be available for public review for 30-days before the BLM issues a Record of Decision (ROD). The decision regarding the ROW grant is appealable to the Interior Board of Land Appeals upon issuance of the ROD. The plan amendment decision is not an appealable decision but may be judicially challenged in Federal District Court.

1.2 Project Location and Description

The applicant has proposed to locate the ISEGS project in the Mojave Desert, near the Nevada border in San Bernardino County, California, on land administered by BLM. The proposed project site is located 4.5 miles southwest of Primm, Nevada and 0.5 mile west of the Primm Valley Golf Club which is located just west of the Ivanpah Dry Lake. Access to the site is from the Yates Well Road Interchange on I-15 via Colosseum Road.

The proposed ISEGS project is a solar concentrating thermal power plant, which is comprised of fields of heliostat mirrors focusing solar energy on boilers located on centralized power towers. Each mirror will track the sun throughout the day and reflect the solar energy to the receiver boiler. In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheats steam from the solar reheater. The solar field and power generation equipment would be put into operation each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops. Electricity would be produced by each plant's solar receiver boiler and the steam turbine generator.

The applicant proposes to develop the ISEGS project in three phases which are designed to generate a total of 400 MW of electricity. The first two phases of the project, Ivanpah 1 and 2, are designed to provide 100 MW of electricity and would occupy approximately 914 acres and 921 acres respectively; the 200 MW phase, Ivanpah 3, would require occupy approximately 1,836 acres. All three phases would be share an administration building, an operation and maintenance building, and substation which would be located in between Ivanpah 1 and 2 requiring an additional area of approximately 25 acres. Linear facilities, including re-routing of Colosseum Road, and natural gas, water, and transmission lines would require an additional 56 acres. Another 321 acres is needed for construction staging activities. ISEGS total project footprint amounts to approximately 4,073 acres (approximately 6.4 square miles).

The detailed description of the proposed project is documented within the applicant's Application for Certification to the Energy Commission (CH2M Hill 2007), as well as numerous applicant-submitted documents, responses to Data Requests, and management plans. These documents are all publicly available on the Energy Commission website at http://www.energy.ca.gov/sitingcases/ivanpah/index.html. These documents are referenced throughout the text of this FEIS where applicable, but are not otherwise attached as appendices to this FEIS.

Solar Power Plant Equipment and Facilities

Heliostats

Each heliostat would be configured with two mirrors hung in the portrait position. Each mirror would be 7.2 feet high by 10.5 feet wide, providing a reflective surface of 75.6 square feet (7.04 m^2) per mirror or 14.08 m^2 per heliostat (See Figure 3-4). The heliostats would be connected with communication cables strung aboveground between each heliostat. The communications cables would transmit signals from a computer-programmed aiming control system that would direct the movement of each heliostat to track the movement of the sun (CH2M Hill 2009a). The number of heliostats described under the Optimized Project Design (55,000 each for Ivanpah 1 and 2, and 104,000 for Ivanpah 3) represents the maximum number of heliostats that would be constructed; however, all of them may not be constructed.

Solar Power Towers

The site design would include one power tower for each Ivanpah 1 and 2 and five towers within Ivanpah 3, with heights of 459 feet each. The central power tower of Ivanpah 3 would include the power block with one steam turbine-generator (STG) supplied superheated steam by the five power tower boilers. Steam from the four quadrant solar power tower boilers would be conveyed by above-ground pipeline. Each solar power tower would be a metal structure designed specifically to support the boiler and efficiently move high-quality steam through a STG at its base. The power tower support structure would be about 120 meters high (approximately 393 feet). The receiving boiler (which sits on top of the support structure) would be 20 meters tall (approximately 66 feet) including the added height for upper steam drum and protective ceramic insulation panels (See Figure 3-5). Additionally, a Federal Aviation Administration (FAA)-required lighting and a lightning pole would extend above the top of the towers approximately 10 feet. The height of the power towers allows heliostats from significant distances to accurately reflect sunlight to the receiving boiler. The receiving boiler is a traditional high-efficiency boiler positioned on top of the power tower. The boiler converts the concentrated energy of the sun reflected from the heliostats into superheated steam. The boiler's tubes are coated with a material that maximizes energy absorbance. The boiler has steam generation, superheating, and reheating sections and is designed to generate superheated steam at a pressure of 160 bars and a temperature of 550 degrees Celsius (°C).

Power Block

Each solar power plant (Ivanpah 1, 2 and 3) would have a power block located in the approximate center of the power plant area. The power block would include a solar power tower, a receiver boiler, a STG set, air-cooled condensers, and other auxiliary systems. Each of the three solar-thermal plants would include the following equipment and facilities in their power block:

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

Related Equipment and Facilities

Natural Gas Pipeline

The solar heat used in the boiler (steam) process would be supplemented by burning natural gas to heat a partial load steam boiler when solar conditions are insufficient. Each power plant within the project would include a small package, natural gas-fired start-up boiler to provide additional heat for plant start-up and during temporary cloud cover. Natural gas would be supplied to the site through a new, proposed six-mile long distribution pipeline ranging from 4 to 6 inches in diameter. From the Kern River Gas Transmission pipeline, the pipeline would extend 0.5 miles south to the northern edge of Ivanpah 3. The line would then run east along the northern edge, and then south along the eastern edge, of Ivanpah 3 to a metering station near the southeast corner of Ivanpah 3. From there, a supply line would extend northwest into the Ivanpah 3 power block. The main pipeline would continue along the eastern edge of Ivanpah 2 to another metering station at its southeastern corner. Again, a branch supply line will extend northwestwards into the center of the Ivanpah 2 power block. From that station, the pipeline would follow the paved access road from Colosseum Road past the administration/warehouse building to the Ivanpah 1 power block. A new tap metering station of approximately 100 feet by 150 feet in area would be located at the Kern River Gas Transmission Line.

Air Pollution Control

Air pollution emissions from the combustion of natural gas in the start-up boiler would be controlled using best available control technology. Each boiler would be equipped with low-Nitrogen Oxide (NOx) burners for NOx control. Carbon Monoxide (CO) would be controlled using good combustion practices such as burner and control adjustment based on oxygen continuous monitoring, operator training and proper maintenance. Particulate and Volatile Organic Compounds (VOC) emissions will be minimized through the use of natural gas as the fuel.

Water Supply and Discharge

The facilities would require a water source to support operations, including process water consisting of make-up water for the steam system and wash water for the heliostats, and potable water for domestic water needs. Groundwater would be supplied from one of two wells that would be constructed at the northwest corner of Ivanpah 1, just outside the perimeter fence but within the construction logistics area. Each of the three power blocks would be connected to the groundwater wells by underground water pipelines. The applicant estimates project water consumption would not exceed a maximum of 100 acre-feet per year for all three solar plants combined, which would primarily be used to provide water for washing heliostats (mirrors) and to replace boiler feed water blow-down.

The quality of groundwater would be improved using a treatment system for meeting the requirements of the boiler make-up and mirror wash water. Water treatment equipment would consist of activated carbon filters, de-ionization media, and a mixed-bed polisher. Each power plant would have a 250,000 gallon raw water storage tank. Approximately 100,000 gallons would be usable for plant process needs and 150,000 gallons would be reserved for fire protection. Demineralized water would be stored in a 25,000-gallon demineralized water storage tank. Boiler feedwater make-up water would be stored in another 25,000-gallon tank.

Fire Protection

The fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water would be the 250,000 gallon raw water storage tank to be located in each power block. Approximately 100,000 gallons would be usable for plant process needs and 150,000 gallons would be reserved for fire protection. All fire protection systems would be focused on the power blocks, administration/warehouse building, and other areas of active operations. The project would not include any specific facilities to address potential wild fires.

Access Roads and Maintenance Paths

Access to the project site would occur from the Yates Well Road exit from I-15 to Colosseum Road. Colosseum Road, currently a dirt road, would be paved to a 30-foot wide, two lane road for a distance of 1.9 miles from the Primm Valley Golf Club to the facility entrance. Because the current route of Colosseum Road would be incorporated into the Ivanpah 2 plant site, the road would be re-routed around the southern end of Ivanpah 2 before re-joining the current road to the west of the proposed facility. Within the heliostat fields, maintenance paths would be established concentrically around the power blocks to provide access for heliostat washing and maintenance. The paths would be established between every other row of heliostats. An additional maintenance path would be established on the inside perimeter of the boundary fence. Within each unit, a diagonal dirt road would be established to provide access to the concentric maintenance paths and the power blocks.

Off-road, recreational vehicle trails currently authorized by BLM which run through the proposed project site would be re-located outside of the project boundary fence. The project boundary would overlap three existing open route designations; route 699226, route 699198, and a segment of Colosseum Road. Approximately 7,200 feet of route 699226 would be cut off by the Ivanpah 3 facility and another 6,500 feet of route 669198 would be cut off by the Ivanpah 2 facility. An estimated 5,000 feet of the Colosseum Road would also be cut off by the Ivanpah 2 facility. The closed portions of the three routes would be removed from the list of open routes on BLM's Off Highway Vehicle designation. The replacement routes would be part of the ROW grant for the project, and would remain open and maintained by the applicant for the life of the facility. The redirected routes and Colosseum Road would be designed and constructed to minimize damage to soil, watershed, vegetation, and air resources. These routes would be monitored by the applicant to avoid disruption to wildlife resources.

Construction Logistics Area, Substation, and Administrative Complex

The applicant proposes using a temporary construction logistics area for staging contractor equipment and trailers, assembly yards, storage of materials, equipment laydown and wash area, construction personnel parking, and assembly areas for heliostats. The construction logistics area would be located between Ivanpah 1 and 2 and would comprise approximately 377.5 acres. Following project construction, the majority of the area would undergo site closure, rehabilitation, and revegetation as described in the Draft Closure, Revegetation, and Rehabilitation Plan (CH2M Hill 2009b).

Fencing

The project area would be surrounded by security fence, which would be constructed of 8-foot tall galvanized steel chain-link, with barbed wire at the top as required. The security fence would surround the outer perimeter of each power plant, the substation, and the administrative complex. Tortoise barrier fence would also be installed in accordance with the Recommended Specifications for Desert Tortoise Exclusion Fencing (USFWS 2005). The tortoise fence would consist of 1-inch horizontal by 2-inch vertical galvanized welded wire. The fence would be installed to a depth of 12 inches, and would extend 22 to 24 inches above the ground surface and integrated with the security fence.

In addition to use of the proposed right-of-way area, the applicant proposes some project-related activities to occur outside of the project fence, on land not included within the proposed right-of-way area. These would include inspection and maintenance of the fence, underground utility repairs, maintenance of drainage systems, and possible installation of new stormwater drainage systems. As discussed with respect to Access Roads above, a roadway would need to be maintained outside of the project fence to allow vehicle and equipment access for these activities.

Transmission System Interconnection and Upgrades

Onsite Transmission Facilities

The ISEGS project would deliver power from Ivanpah 1, 2 and 3 via three separate 115-kilovolt (kV) transmission generation tie lines to a new Ivanpah substation that would be owned and operated by Southern California Edison and located in the common construction logistics area between Ivanpah 1 and 2. The new Ivanpah substation would be about 850 feet by 850 feet and located on a little over 16 acres. Each of the power plants would have a switchyard with a step-up transformer to increase the 13.8 kV generator output voltage to 115 kV. The ISEGS #1 115 kV generator tie line would be approximately 5,800 feet long and supported by single-pole structures. The ISEGS #2 and #3 generator tie lines would share the same poles for the last 1,400 feet of their routes before they interconnect to SCE's Ivanpah Substation. The ISEGS #2 generator would connect to the Ivanpah Substation through a 115kV, 3,900 feet-long single circuit generator tie line built with the last 1,400 feet merged with the ISEGS #3 generator tie line to create a 1,400 feet long, overhead double circuit line prior to entering the Ivanpah Substation. The ISEGS #3 generator tie line would be an approximately 14,100 feet long, single circuit, 115 kV line and would merge into a 115kV double circuit with the ISEGS #2 generator tie line. In accordance with the Interconnection Agreement between the applicant and SCE, the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV line would loop in and out through the newly built Ivanpah Substation to interconnect the project to the SCE transmission grid. This 115-kV line is currently aligned between the Ivanpah 1 and 2 sites along a northeast-southwest right-of-way.

Eldorado – Ivanpah Transmission Line

In order to accommodate the total anticipated 1,400 MW load generation by ISEGS and five other planned renewable energy generation projects in the region, the California Independent System Operator (California ISO) has identified approximately 36 miles of transmission line within California and Nevada that would need to be upgraded from 115 kV to 230 kV. This upgrade of SCE's existing 115-kV line is known as the Eldorado-Ivanpah Transmission Project (EITP). Because the EITP is to be implemented by a different applicant and would occur whether or not the ISEGS proposed project were implemented, it is independent of the proposed ISEGS project, and is currently undergoing a separate environmental review under a joint Environmental Impact Report (EIR) and EIS by the California Public Utilities Commission (CPUC) and BLM. However, since the two projects would be directly linked, additional detailed information regarding the scope of the EITP is provided in the following paragraphs. In the ISEGS FSA/DEIS, the EITP was considered a reasonably foreseeable future project because the proponent had not developed the project in enough detail to begin a joint analysis with ISEGS. That detailed project information on EITP is now available, so EITP is considered to be a cumulative action in this FEIS. The evaluation of cumulative impacts associated with the combination of the proposed ISEGS project with the EITP, presented in Section 5, is supported by additional information that was presented in the Draft EIR/EIS for the EITP, which was published on May 7, 2010. If the reader should desire additional detailed information regarding the EITP project, that information is available in the Draft EIR/EIS.

Telecommunications Facilities

The proposed Ivanpah Substation would also require that new telecommunication infrastructure be installed to provide protective relay circuit and a supervisory control and data acquisition (SCADA) circuit, together with data and telephone services. The telecommunication path from Ivanpah Substation to the local carrier facility interface at Mountain Pass area consists of approximately eight miles of fiber optic cable to be installed overhead on existing poles and through new underground conduits to be constructed in the substation and telecom carrier interface point. The fiber cable would be installed on the existing 12-kV distribution line poles.

Project Design and Management Approach

Stormwater Management Approach

The proposed project site is located on an alluvial fan that acts as an active stormwater conveyance between the Clark Mountain Range to the west and the Ivanpah Dry Lake to the east. The applicant's proposed stormwater design and management system is a Low-Impact Development (LID) design concept which attempts to minimize disruption to natural stormwater flow pathways. The elements of the applicant's design approach include minimizing the areas of direct removal of vegetation, minimizing the areas of grading and leveling, and minimizing the amount of active management of stormwater in engineered channels, ponds, and culverts.

Project Construction

The applicant anticipates ISEGS construction would be performed in the following order: 1) the Construction Logistics Area; 2) Ivanpah 1 (the southernmost site) and other shared facilities; 3) Ivanpah 2 (the middle site); and 4) Ivanpah 3 (the 200-MW plant on the north). However, it is possible that the order of construction may change. The shared facilities will be constructed in connection with the first plant construction, whether it is Ivanpah 1, 2, or 3. Prior to construction, geotechnical testing, heliostat installation tests, and heliostat load tests would be performed in each of the three units. Construction is planned to take place over approximately 48 months, with the applicant's desire that it could begin during the first quarter of 2010 and be completed during the fourth quarter 2013.

Project construction would be performed in accordance with plans and mitigation measures that would assure the project conforms with applicable laws and regulations and would avoid or minimize adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by BLM to support this environmental analysis, are specified in the mitigation measures as appropriate of each technical area of this FEIS. Of the plans already prepared in draft by the applicant, those that have contributed most significantly to define the proposed plan of development, including construction procedures, are as follows:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Administrative Draft ISEGS Construction Stormwater Pollution Prevention Plan (CH2M Hill 2009d)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Draft Desert Tortoise Translocation/Relocation Plan for ISEGS (CH2M Hill 2009f)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Streambed Alteration Agreement Application (CH2M Hill 2009h)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

The proposed facilities and procedures described in these documents have been used by BLM throughout the EIS process to evaluate potential impacts and mitigation measures. The documents have also undergone revision by the applicant throughout the process, in response to comments and questions from BLM and the Energy Commission. The documents are publicly available on the Energy Commission website at http://www.energy.ca.gov/sitingcases/ivanpah/index.html.

Facility Operation and Maintenance

The proposed project would be designed for an operational life of 50 years. During this period, project operations would be supported by a variety of operational, maintenance, and monitoring activities. Within the power blocks, operations would include transmission of water and natural gas into the power block, and operation of the natural gas-fired start-up boiler, the air emission control system for the combustion of natural gas in the start-up boiler, a steam turbine generator, an air-cooled condenser, and auxiliary equipment (feed water heaters, a de-aerator, and an emergency diesel generator, diesel fire pump).

Within the heliostat fields, operations would include routine washing of mirrors on a rotating basis, every two weeks. Washing would utilize water accessed from the groundwater supply wells, following treatment in the water treatment system. Washing would be done using a truck-mounted pressure washer. Maintenance would also include clipping of vegetation that could interfere with mirror movement to a height of 12 – 18 inches, management of weeds as specified in the Applicant's Weed Management

Plan (CH2M Hill 2008c), and use of soil binder and weighting agents to minimize dust accumulation on the mirrors and fugitive dust as could occur by wind or vehicle traffic.

Waste Management

Non-hazardous solid wastes generated during construction would include approximately 280 tons of scrap wood, concrete, steel/metal, paper, glass, scrap metals and plastic waste (CH2M Hill 2007, § 5.14.4.1.1). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a Class III solid waste disposal facility. Hazardous wastes would be recycled to the extent possible and disposed in either a Class I or II waste facility as appropriate. All operational wastes produced at ISEGS would be properly collected, treated (if necessary), and disposed of at either a Class I or II waste facility as appropriate. Wastes include process and sanitary wastewater, nonhazardous waste and hazardous waste, both liquid and solid. A septic system for sanitary wastewater would be located at the administration building/operations and maintenance area, located between Ivanpah 1 and 2. Portable toilets would be placed in the power block areas of each the three solar facilities and pumped by a sanitary service provider. Process wastewater from all equipment, including the boilers and water treatment equipment would be recycled.

Hazardous Waste Management

Hazardous materials used during facility construction and operations would include paints, epoxies, grease, transformer oil, and caustic electrolytes (battery fluid). Several methods would be used to properly manage and dispose of hazardous materials and wastes. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in large storage tanks, while most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed to contain leaks and spills in concrete containment areas.

Project Decommissioning

Following the operational life, estimated at 50 years, the project owner would perform site closure activities to meet federal and state requirements for the rehabilitation and revegetation of the project site after decommissioning. The procedures to be used for project decommissioning and restoration are defined in the Applicant’s Closure, Revegetation, and Rehabilitation Plan – Revision 3 (CH2M Hill 2010). Under this plan, all aboveground structures and facilities would be removed offsite for recycling or disposal. Areas that had been graded would be restored to original contours. Succulent plant species would be salvaged prior to construction, transplanted into windrows, and maintained for later transplanting following decommissioning. Shrubs and other plant species would be revegetated by the collection of seeds and re-seeding following decommissioning. Decommissioning would be subject to many of the same environmental protection plans as are required for construction.

Mitigation Measures

Mitigation measures have been developed that would be implemented during all appropriate phases of the project from initial ground breaking, to operations, and through closure and decommissioning. The mitigation measures include a combination of the following:

- Measures that have been proposed by the applicant, and that effectively comprise a portion of the proposed action;
- Conditions of Certification (COCs) proposed by the California Energy Commission;
- Regulatory requirements of other federal, state, and local agencies;
- USFWS terms and conditions identified in the Biological Opinion; and
- Additional BLM-proposed mitigation measures and standard right-of-way (ROW) grant terms and conditions.

These requirements are generically referred to as “mitigation measures” throughout this FEIS. Table 4.0-1, in Section 4.0, describes the source of each of these measures, including identification of those that would be required by BLM as conditions of approval in the right of way grant.

1.3 Alternatives to the Proposed Project

Alternatives Identification and Screening

In this analysis of the ISEGS project, 25 alternatives to the ISEGS project have been developed and evaluated. These include nine alternative site locations, a range of different solar and renewable technologies, generation technologies using different fuels, and conservation/demand-side management. Of the 25 alternatives, the only alternatives that were determined to be both feasible and have the potential to result in lesser impacts were:

- Mitigated Ivanpah 3 Alternative
- Modified I-15 Alternative
- No Action Alternative

After a comprehensive evaluation of the nine alternative site locations, only the I-15 and Reduced Acreage alternatives, among the site alternatives, were found to have a potential to avoid or minimize adverse effects on the human environment. These two alternatives were retained for more detailed analysis in Section 4, the Environmental Consequences chapter.

Alternative solar thermal technologies (parabolic trough, Stirling dish, utility scale solar photovoltaics, and linear Fresnel) were considered. As with the proposed distributed power tower technology, these technologies would not substantially reduce visual impacts or biological resources impacts, though land requirements vary among the technologies. Rooftop solar photovoltaic (PV) facilities would likewise require extensive acreage, although rooftop PV could minimize the need for undisturbed open space. However, increased deployment of rooftop solar PV faces challenges in manufacturing capacity, cost, and policy implementation. Finally, these alternative solar technologies were not the subject of the application received by the BLM. Although reasonable alternatives to the proposed action may include those that are practicable or feasible from a technical and economic standpoint, rather than simply desirable from the applicant's perspective, it is not within the FLPMA authority granted to BLM to direct a project applicant to the specific type of technology or system of energy development on the public lands. For BLM to dictate a project applicant's business model, and hence its technical or economic feasibility, is highly irregular. However, for NEPA purposes, these alternative technologies were identified but eliminated from full analysis as explained in the body of the text in the FEIS.

Other generation technologies (wind, geothermal, biomass, tidal, wave, natural gas, and nuclear) were also examined as possible alternatives to the proposed solar project. These technologies would either be infeasible at the scale of the ISEGS project, or would not eliminate adverse impacts caused by the ISEGS project without creating their own adverse impacts in other locations. A natural gas plant would contribute to greenhouse gas emissions and would not meet the project's renewable generation objective. Construction of new nuclear power plants is currently prohibited under California law. In addition, these alternatives would not meet the purpose and need for the project, are not reasonable, and many are not within the decision space of the BLM. For instance, tidal and wave energy sources are not within the types of energy sources found on public lands. These alternative energy technologies were eliminated from full discussion in the EIS as noted therein.

Conservation and demand side management programs would likely not meet the state's growing electricity needs that could be served by the ISEGS project. In addition, these programs would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements.

Mitigated Ivanpah 3 Alternative

- In support of the analysis of a reduced acreage alternative, BrightSource (the applicant) submitted a Biological Mitigation Proposal, also referred to as the "Mitigated Ivanpah 3" proposal, on February 11, 2010 (BSE 2010a). The Mitigated Ivanpah 3 proposal was presented for consideration to BLM as an alternative to the proposed project. The Mitigated Ivanpah 3 proposal seeks to address the impacts identified in the DEIS by proposing a facility with the following characteristics:
- Using the same concentrating solar power technology as in the proposed project;
- Reducing the number and modifying the arrangement of heliostats and power towers, thus reducing the overall acreage requested for the ROW authorization;
- Proposing the revised arrangement of heliostats and power towers in a manner that avoids the northern portion of the Ivanpah 3 Unit, and thus reduces the

identified impacts associated with special-status plants, desert tortoises, Visual Resources, and Soil and Water Resources in that area.

A detailed description of the Mitigated Ivanpah 3 proposal is presented in Section 3, and its potential impacts are evaluated in Section 4. The project revision to propose the Mitigated Ivanpah 3 Alternative would reduce the acreage associated with Ivanpah Unit 3 by moving the northern boundary of the ROW grant approximately 1900 feet south of its location in the proposed project, resulting in a reduction of 433 acres of disturbance in that area, as well as a reduction of 433 acres in the total overall ROW grant. The 433-acre area that would be eliminated from the proposed project alternative would be designated as the Northern Rare Plant Mitigation Area (BSE 2010a). The alternative would also eliminate the need to grade approximately 109 acres within the 377-acre Construction Logistics Area (CLA) area. This area would remain within the ROW grant for the Mitigated Ivanpah 3 Alternative, and 67.5 acres of this area would be used as a Rare Plant Transplantation and Succulent Nursery Area. The alignment of the natural gas pipeline ROW, which would follow the northern boundary of Ivanpah Unit 3 in the proposed project alternative, would be extended to and along the revised northern boundary in the Mitigated Ivanpah 3 Alternative. The remainder of the acreage for the requested ROW grant would remain the same as that for the proposed project. However, other facilities and infrastructure within that footprint, including the boundary between Ivanpah 2 and 3, would be adjusted as needed to allow for construction and operation of the revised project design. The total acreage requested for the ROW for the Mitigated Ivanpah 3 Alternative would be 3564.2 acres.

An evaluation of the environmental impacts of the proposal is presented in Section 4. The Mitigated Ivanpah 3 Alternative would accomplish all of the objectives of the purpose and need, including meeting power demand, as well as federal and state objectives for renewable energy development. It would also achieve almost all of the beneficial impacts of the proposed project, including socioeconomic benefits of increases in employment and fiscal resources, and displacement of greenhouse gas and air pollutant emissions associated with fossil-fueled power plants. While meeting these objectives and providing these beneficial impacts, the direct and cumulative adverse impacts of the Mitigated Ivanpah 3 Alternative would be lower than the proposed project, specifically in the areas of Biological Resources (including DT, and special-status plant species), Soil and Water, Visual Resources, Land Use, and Traffic and Transportation. The reduction in impacts would be accomplished by eliminating the northern 433-acre portion of Ivanpah Unit 3 from the project footprint, eliminating grading of approximately 109 acres within the 377-acre CLA area, and using 67.5 acres of the CLA as a Rare Plant Transplantation and Succulent Nursery Area.

Modified I-15 Alternative

To support the analysis of a Modified I-15 Alternative, the applicant submitted a map showing a proposed reconfiguration of Ivanpah Unit 3 to BLM on March 17, 2010 (BSE 2010b). The Modified I-15 Alternative would use the same technology and configuration of components as the Mitigated Ivanpah 3 Alternative, but would seek to further reduce impacts to Biological Resources by placing Ivanpah Unit 3 in an area which is reported to have a lower density of those resources.

A detailed description of the Modified I-15 Alternative, which involves a reconfiguration of Ivanpah Unit 3 in a location closer to Interstate 15, is presented in Section 3. The Modified I-15 Alternative would reduce the acreage associated with Ivanpah Unit 3, and in the overall ROW grant, by 433 acres. The alternative would also eliminate the need to grade approximately 109 acres within the 377-acre CLA area. This area would remain within the ROW grant for the Modified I-15 Alternative, and 67.5 acres of this area would be used as a Rare Plant Transplantation and Succulent Nursery Area. The alignment of the natural gas pipeline ROW, which would follow the northern boundary of Ivanpah Unit 3 in the proposed project alternative, would be extended to and along the northern boundary of Ivanpah Unit 2 in the Modified I-15 Alternative. The remainder of the acreage for the requested ROW grant would remain the same as that for the proposed project. However, other facilities and infrastructure within that footprint would be adjusted as needed to allow for construction and operation of the revised project design. The total acreage requested for the ROW for the Modified I-15 Alternative would be 3,564.2 acres.

An evaluation of the environmental impacts of the alternative is presented in Section 4. The Modified I-15 Alternative would also accomplish all of the objectives of the purpose and need, including meeting power demand, as well as federal and state objectives for renewable energy development. It would also achieve almost all of the beneficial impacts of the proposed projects, including socioeconomic benefits of increases in employment and fiscal resources, and displacement of greenhouse gas and air pollutant emissions associated with fossil-fueled power plants. While meeting these objectives and providing these beneficial impacts, the adverse impacts of the Modified I-15 Alternative would be lower than the proposed project in some areas, but would be increased in other areas. With respect to Biological Resources, the Modified I-15 Alternative would likely have a reduced impact on high quality desert tortoise habitat, as a result of avoiding the northern 433-acre portion of Ivanpah Unit 3, as well as reconfiguring Ivanpah Unit 3 in a location which partially overlaps the lower quality habitat adjacent to Interstate 15. By including this lower quality habitat within the reconfigured Ivanpah Unit 3 boundaries, the overall impact of the Modified I-15 Alternative on the desert tortoise is likely to be lower than that of the Mitigated Ivanpah 3 Alternative, and for purposes of analysis in the EIS, the overall impact to desert tortoise habitat was assumed to be less; however, this assumption cannot be confirmed without formal surveys of the reconfigured Ivanpah Unit 3 area.

Impacts of the Modified I-15 Alternative to Visual Resources and potential glare impacts for viewers on Interstate 15 would increase over those of both the proposed project and the Mitigated Ivanpah 3 Alternative, due to the placement of heliostat fields within 1,000 feet of the highway for a distance of 1.8 miles. The Modified I-15 Alternative could also result in an increase in impacts to recreational access as compared to the proposed project and Mitigated Ivanpah 3 Alternative, due to the greater length of existing OHV trails that would be included within the project footprint.

1.4 Public and Agency Coordination

Both the Energy Commission's Environmental Quality Act (CEQA)-equivalent process and the BLM's NEPA process provide opportunities for the public and other agencies to participate and consult in the scoping of the environmental analysis, and in the evaluation of the technical analyses and conclusions of that analysis. The following subsections describe the status of these outreach efforts.

Agency Coordination

California Energy Commission

The Energy Commission has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). The Energy Commission must review power plant AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Resources Code, § 25519), and compliance with applicable governmental laws or standards (Pub. Resources Code, § 25523 (d)). In the development of their Final Staff Assessment, the Energy Commission staff's analyses were prepared in accordance with Public Resources Code, section 25500 et seq.; Title 20, California Code of Regulations, section 1701 et seq.; and CEQA (Pub. Resources Code, § 21000 et seq.).
As discussed above, the DEIS for this proposed project was developed as a joint environmental review document, the FSA/DEIS, under an MOU between the Energy Commission and BLM California State Office. Throughout the environmental review process, BLM and Energy Commission staff have conducted joint technical analysis, and co-authored the FSA/DEIS. Following the completion of the FSA/DEIS, BLM and the Energy Commission's environmental review process was separated, as BLM prepared a stand-alone SDEIS and this FEIS, and the Energy Commission prepared a stand-alone FSA Addendum to evaluate additional project alternatives. Throughout the process subsequent to the publication of the FSA/DEIS, BLM and Energy Commission staff have continued to coordinate through conference calls and the review of each other's documents.

The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, both the Commission and BLM typically seek comments from and work closely with other regulatory agencies that administer laws and regulations that may be applicable to the proposed project.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE reviews proposed projects to determine whether they may impact such resources, and/or be subject to a Section 404 permit. Throughout the DEIS process, the Energy Commission, BLM, and the applicant have provided information to the

USACE to assist them in making a determination regarding their jurisdiction and need for a Section 404 permit. The USACE rendered a final opinion on May 28, 2009 concluding that the project does not affect waters of the U.S. and thus does not require such a permit.

National Park Service

The National Park Service manages the Mojave National Preserve (MNP), which is located near the proposed project area. Because of the proximity of the MNP, the Park Service has been invited to participate in scoping meetings and public workshops, and has been provided the opportunity review and provide comment on the Preliminary Staff Assessment (PSA) and DEIS.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction to protect threatened and endangered species under the Endangered Species Act (ESA). Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally-listed species. The desert tortoise (*Gopherus agassizii*), which occurs in the proposed project area, is a federally-listed threatened species, and therefore formal consultation with the USFWS is required. This consultation has been initiated through the preparation and submittal of a Biological Assessment (BA) which describes the proposed project to the USFWS. Following review of the BA, the USFWS is expected to issue a Biological Opinion (BO) which will specify mitigation measures that must be implemented for the protection of the desert tortoise.

State Water Resources Control Board/Regional Water Quality Control Board

The Lahontan Regional Water Quality Control Board (RWQCB) has the authority to protect both surface water and groundwater resources at the proposed project location. Throughout the EIS process, the Energy Commission, BLM, and the applicant have invited the RWQCB to participate in public scoping and workshops, and have provided information to assist BLM in evaluating the potential impacts and permitting requirements of the proposed project. The RWQCB has responded by providing comments that have been evaluated and incorporated into the EIS analysis. The RWQCB has also made a determination that the proposed project would impact waters of the state, and has specified conditions to satisfy requirements of a dredge and fill permit/waste discharge requirements. These requirements have been included as mitigation measures in Section 4.10.

California Department of Fish and Game

The California Department of Fish and Game (CDFG) has the authority to protect water resources of the state through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The Energy Commission, BLM, and the applicant have provided information to CDFG to assist in their determination of the impacts to streambeds, and identification of permit and mitigation requirements. The applicant filed a Streambed Alteration Agreement with CDFG on June 2, 2009. The requirements of the Streambed Alteration Agreement will be included as a recommended Mitigation Measure.

CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA). On May 22, 2009, the applicant filed an application for authorization for incidental take of the desert tortoise under Section 2081(b) of the CESA. The requirements of the Incidental Take Permit have been included as a recommended Mitigation Measure.

County of San Bernardino

On March 18, 2008, the BLM California Desert District entered into an MOU with the County of San Bernardino to coordinate environmental reviews for renewable energy projects on public land within the County. Under this MOU, BLM invites the County to become a cooperating agency for EISs, and provides opportunities for County staff to review and participate in technical discussions and analyses. For the proposed project, the County has elected to become a cooperating agency. BLM continues to provide the County with project-related documentation for their review and evaluation, and the County has provided guidance for protection of groundwater resources which has been incorporated into Section 4.10 of this document.

Public Coordination

Both the Energy Commission's CEQA-equivalent process and the BLM's NEPA process provide opportunities for public participation in the scoping of the environmental analysis, and in the evaluation of the technical analyses and conclusions of that analysis. For the Energy Commission, this outreach program is primarily facilitated by the Public Adviser's Office (PAO). As part of the coordination of the environmental review process required under the Energy Commission/BLM California MOU, the agencies have jointly held public meetings and workshops which accomplish the public coordination objectives of both agencies. This is an ongoing process that to date has involved the following efforts.

Libraries

The AFC was sent to the main county libraries in San Bernardino, Barstow, Fresno, and Eureka; the main branches of the San Diego and San Francisco public libraries; the University Research Library at UCLA; the California State Library, and the Energy Commission's library in Sacramento.

Outreach Efforts

BLM solicited interested members of the public and agencies through the NEPA scoping process. BLM published a Notice of Intent to develop the EIS and amend the CDCA Plan in the Federal Register, Vol. 72, No. 214, page 62671, on November 6, 2007. The initial Public Scoping meeting was held on January 4, 2008, and coincided with the Informational Hearing held by the Energy Commission. On January 9, 2009, BLM published notice of an extension of the public scoping period, and an additional joint public scoping meeting was held on January 25, 2008.
Following the scoping period, the Energy Commission and BLM held additional joint Issue Resolution workshops which were announced and made available to the public. These workshops were held on June 23, 2008 in Primm, Nevada, and on July 31 and

December 15, 2009 in Sacramento, California. The Energy Commission continued to accept and consider public comments, and granted petitions to intervene to eight interested groups including Defenders of Wildlife, Sierra Club, Basin and Range Watch, and Center for Biological Diversity (June 2, 2009), California Native Plant Society, Western Watersheds, CURE, and San Bernardino County. Although not officially part of BLM's NEPA process, BLM's NEPA analysis was supported by information received through these activities.

The BLM public participation process included soliciting comments regarding the scope of the analysis from other government agencies, the public, and non-governmental organizations. The persons and organizations which provided scoping comments, and the general issues addressed within their comments, are provided in **Table 2.1**.

Summary of Public Comments on DEIS and Supplemental DEIS

The Notice of Availability of the DEIS was published on November 10, 2009; the 90-day public review and comment period ended on February 11, 2010. During the public comment period, a variety of activities occurred in which BLM received additional information regarding the proposed project and potential alternatives, impacts, and mitigation measures. These activities included:

- Receipt of comments from the public, and other local, state, and federal agencies during the public comment period;
- Public testimony by Energy Commission staff and consultants, BrightSource staff and consultants, and intervenors associated with the Energy Commission certification process for ISEGS;
- Workshops, involving BLM staff and consultants as well as the above groups, to consider and evaluate impact conclusions and mitigation approaches; and
- Submittal of additional technical reports, project design information, impact analyses, and applicant-proposed mitigation measures by BrightSource.

BLM received comments on the DEIS from 37 individuals, groups, and agencies. These comments are summarized in Appendix A-1 of this FEIS. Comments from 20 individuals, groups, and agencies were received on the SDEIS, and these comments are summarized in Appendix A-2 of this FEIS. Both sets of comments included hundreds of comments received both in favor of the project, and in opposition to the project, in the form of mass mailings and e-mails. The summaries in Appendices A-1 and A-2 include a description of how each comment was evaluated and responded to by BLM. Also, where a comment is particularly relevant to the technical discussion in the text of the FEIS (either comments resulting in revision to the FEIS, or comments dissenting from important conclusions of the FEIS), that information has been incorporated into the revisions for the FEIS. Section 9 also provides a discussion of the comments, including both those which resulted in a change to the text in the FEIS, and those which were considered, but did not result in a change. The comments generally addressed the following topics

- The range of alternatives considered and evaluated, and the methodology for evaluating the alternatives;

- The scope of projects considered in the cumulative impacts analysis, and the methodology for conducting that analysis;
- Opposition to the contribution of the project to industrialization of Ivanpah Valley; and
- Specific comments related to impacts to biological resources, the Mojave National Preserve, air traffic, County services, and other resources.

The applicant's Application for Certification to the Energy Commission (CH2M Hill 2007), the Energy Commission's PSA, and the joint BLM/Energy Commission FSA/DEIS are all publicly available on the Energy Commission website at http://www.energy.ca.gov/sitingcases/ivanpah/index.html.

1.5 Environmental Justice

Executive Order 12898, "Federal Actions to address Environmental Justice in Minority Populations and Low-Income Populations," focuses federal attention on the environment and human health conditions of minority communities and calls on federal agencies to achieve environmental justice as part of this mission. The order requires the USEPA and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

The steps recommended to assure compliance with the Executive Order are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. BLM has followed each of the above steps for the following 11 sections in the EIS: Air Quality, Hazardous Materials, Land Use, Noise, Public Health and Safety, Socioeconomics and Environmental Justice, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management.

According to the Census 2000 data there were 36 people within six miles of the proposed project site which resided within California. Ten of these people (27.8 percent) were classified as minority (see **Figure 4.9-1**). No census blocks within a six-mile radius of the proposed ISEGS site contain minority populations greater than 50 percent. The 2000 Census block data did not identify any California residents living below the designated poverty level within a six-mile radius of the project site.

No minority communities or low income communities are located within or adjacent to the proposed project areas. The proposed action would not impact distinct Native American cultural practices or result in disproportionately high or adverse human health or environmental effects on minority communities.

1.6 Organization of the EIS

The FEIS is organized as follows:

Section 1 – Executive Summary summarizes the EIS.

Section 2 – Introduction discusses the purpose and need for the proposed project, as well as BLM's processes for the CDCA Plan Amendment and the EIS.

Section 3 – Alternatives, Including the Proposed Action, provides a detailed description of the proposed project and those alternatives which have been retained for detailed evaluation. The section also describes BLM's methodology for identifying and screening alternatives, and describes the rationale for elimination of other alternatives from detailed evaluation.

Section 4 – Affected Environment and Environmental Consequences. The environmental and public health and safety analyses of the proposed project are contained in Section 4. They include the following: Air Quality, Greenhouse Gases, Biological Resources, Cultural Resources and Native American Values, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health and Safety, Socioeconomics and Environmental Justice, Soil and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Waste Management, , Worker Safety and Fire Protection, Geology, Paleontology and Minerals, Livestock Grazing, Wild Horses and Burros, and Recreation.

Each of these 19 technical area assessments includes a discussion of:

- Detailed project-specific information that is directly relevant to the resource being evaluated;
- Laws and regulations;
- Affected environment;
- Project direct and indirect impacts from construction, operations, and closure and decommissioning impacts;
- Beneficial impacts;
- Impacts of alternatives, including the No Action Alternative;
- Mitigation Measures; and
- Summary

Section 5 – Cumulative Effects, including identification of the past, present, and reasonably foreseeable future projects, and an evaluation of the cumulative impacts resulting from those projects in combination with the proposed project and alternatives.

Section 6 – Other NEPA Considerations provides an evaluation of the irreversible and irretrievable commitment of resources, unavoidable adverse impacts, and growth inducing effects.

Section 7 – General Conditions, which provides the General Conditions of Approval that are proposed for inclusion in the ROW grant.

Section 8 – Summary, which summarizes the results of the environmental analysis, and identifies BLM's preferred alternative.

Section 9 – Public Participation summary

Section 10 – List of Preparers

Section 11 – References

Appendix A provides a summary of public comments received on the DEIS and SDEIS, including BLM's responses to the comments.

Appendix B contains technical resource-specific appendices that provide additional information to support the technical analyses in Section 4.

Appendix C provides additional information developed by the Energy Commission which is not part of BLM's environmental analysis, but describes additional features of the proposed action. This includes the Energy Commission's General Conditions of Certification that are specific to the Energy Commission's certification process. In addition, engineering analyses performed by the Energy Commission are included in Appendix C, and include sections on Facility Design, Power Plant Efficiency, Power Plant Reliability, and Transmission System Engineering.

1.7 Summary of Project Related Impacts

Air Quality

Potential impacts to air quality are summarized as follows:

- The project would not have the potential to exceed Prevention of Significant Deterioration (PSD) emission levels during direct source operation and the facility is not considered a major stationary source with potential to cause adverse air quality impacts. However, without adequate fugitive dust mitigation, the project would have the potential to exceed the General Conformity PM10 applicability threshold during construction and operation, and could cause potential localized exceedances of the PM10 National Ambient Air Quality Standards (NAAQS) during construction and operation. Mitigation measures **AQ-SC1** through **AQ-SC4**, for construction, and **AQ-SC7**, for operation, would reduce the volume of emissions, and thus reduce the potentially adverse, direct impacts and the contribution of the proposed project to indirect and cumulative impacts.
- The project would comply with applicable District Rules and Regulations, including New Source Review requirements, as required by the Mojave Desert Air Quality Management District (MDAQMD) Final Determination of Compliance (FDOC) for the proposed project.
- The project's construction activities would likely contribute to adverse PM10 and ozone impacts. Mitigation measures **AQ-SC1** to **AQ-SC4** would reduce the magnitude of these potential impacts.
- The project's operation would not cause new violations of any NO_2, SO_2, PM2.5 or CO ambient air quality standards, and therefore, the project direct operational NOx, SOx, PM2.5 and CO emission impacts would not be adverse.
- The project's direct and indirect, or secondary emissions contribution to existing violations of the ozone and PM10 ambient air quality standards are likely to be

adverse, unless they are reduced through mitigation. Mitigation measure **AQ-SC7** would mitigate the operating fugitive dust emissions to ensure that the potentially adverse ozone and PM10 impacts are reduced over the life of the project.

Overall, the air quality impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be lower than those associated with the proposed project. Overall project air emissions for both alternatives, as compared to the proposed project, would be reduced due to the reduction in the size of the Ivanpah Unit 3 boiler, and the reduced area of ground disturbance associated with project construction. The re-location of the Ivanpah Unit 3 power block would result in a small increase in one-hour NOx emissions detected at the site boundary. However, these increased emissions would not exceed any of the regulatory thresholds, and would be very limited in duration.

Although the emissions for both alternatives would be lower than those for the proposed project, they would still cause direct, adverse impacts to air quality, and would also contribute, along with other proposed projects in the area, to a cumulative adverse impact on air quality. However, the mitigation measures discussed above would ensure that emissions would not exceed any NEPA or permitting criteria.

Greenhouse Gases

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

GHG emissions from construction activities would not be adverse for several reasons. First, the period of construction would be short-term and not ongoing during the life of the project. Additionally, the best practices control measures included in the mitigation measures, such as limiting idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since the use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. For all these reasons, the short-term emission of greenhouse gases during construction would be sufficiently reduced and would, therefore, not be adverse.

The Ivanpah Solar Electric Generating System project, as a solar project with a nightly shutdown, will operate less than 60% of capacity and is therefore not subject to the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

However, the Ivanpah Solar Electric Generating System project would easily meet the requirements of SB 1368 and the Greenhouse Gas Emission Performance Standard.

Overall, the emission of greenhouse gases associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be lower than those associated with the proposed project, due to the reduction in the size of the Ivanpah Unit 3 boiler, elimination of an emergency generator, and reduced construction duration associated with the alternatives. However, the Mitigated Ivanpah 3 and Modified I-15 Alternatives would also produce less power output, 370 MW versus 400 MW for the proposed project. As a result, the alternatives would not achieve the same level of beneficial impact of the proposed project in displacing emissions associated with fossil fuel-generating plants.

Biological Resources

The proposed project would have direct, adverse impacts to 4,073 acres of desert tortoise habitat, which would require state and federal endangered species “take” authorizations. The tortoises present in the ROW area would be removed and translocated to an area to the west of the project site. In addition to the direct loss of tortoise habitat, the proposed project would also fragment and degrade adjacent habitat, and could promote the spread of invasive plants and desert tortoise predators (ravens). The proposed project would also directly impact breeding and/or foraging habitat for other special-status wildlife species, including burrowing owl, loggerhead shrike, Crissal thrasher, golden eagle, and American badger. The proposed project would also impact vegetation in the 4,073-acre project area, including one species considered sensitive by BLM (the Rusby’s desert-mallow). Finally, the proposed project would adversely impact ephemeral drainages through site grading, compaction, and construction of infrastructure within drainage channels. Although the proposed project construction method, Low Impact Development, would be designed to minimize direct impacts to these drainages, it is assumed that all 2,000 ephemeral drainages (198 acres of waters of the state) would be impacted, and would subject to a streambed alteration agreement with the CDFG. For each of these NEPA impacts identified, mitigation measures that have been proposed by the applicant, Energy Commission staff, other state and federal agencies, and BLM have been developed.

In addition to the evaluation of impacts under NEPA, the analysis of biological impacts of the proposed project in the DEIS included an evaluation of impacts to species considered sensitive under CEQA by the Energy Commission, including plant species listed by the California Native Plant Society (CNPS). For these species, the Energy Commission staff proposed additional Conditions of Certification to reduce the identified impacts. Implementation of these additional Conditions of Certification on public lands would require BLM consent.

The Mitigated Ivanpah 3 alternative would reduce surface disturbance impacts by a total of 433 acres. Of this total, 433 acres located along the northern portion of the proposed Ivanpah 3 site would be removed from the project, preserving an area of diverse, relatively undisturbed native habitat that contains few noxious or invasive weeds. The habitat contains numerous ephemeral drainages, adding to the locations diversity. Many of sensitive species, including desert tortoise utilize this area.

The Mitigated Ivanpah 3 Alternative was developed, in part, to reduce the impacts to wildlife and special status species. By reducing the project footprint by approximately 12.5 percent, the Mitigated Ivanpah 3 Alternative would result in a reduction in impacts to wildlife and special status species. Since the 433-acre area that would remain undisturbed is considered of relatively high quality and diverse native habitat, the benefits would be greater than avoidance of comparable acreage in other, lower quality habitat areas. Further, the location and magnitude of the Mitigated Ivanpah 3 Alternative helps retain large-scale ecological processes and migration corridors that are beneficial to wildlife species.

While the impacts from the Mitigated Ivanpah 3 Alternative would be less and would preserve some of the highest quality habitat, there would be long-term impacts to biological resources in comparison with the No Action Alternative.

The reconfiguration of the proposed Ivanpah Unit 3 to a site adjacent to I-15 would likely result in a reduction in overall impacts to biological resources. For desert tortoise, the Modified I-15 Alternative site would be located within an area already impacted by the proximity of the highway. It is estimated that 315 acres of the reconfigured location of Ivanpah Unit 3, equivalent to 25 percent of the Unit, is adversely impacted by the presence of the highway. Habitat is variable, with areas located below 2,750-feet in elevation consisting of lower quality habitat due to terrain (flat topography with fewer washes), lower forage quality, and proximity to the highway. Fewer tortoises and burrows have been reported at the alternative site (Berry 1984, Cashen 2010), although formal surveys have not been conducted. Consequently, the co-location of the Modified I-15 Alternative with the highway, coupled with fewer acres of high quality tortoise habitat, would likely result in fewer impacts to desert tortoise. Further, some of the highest densities of desert tortoise and highest quality habitat in the project area (the proposed Ivanpah Unit 3 site) would be avoided. Overall, impacts from the Modified I-15 Alternative likely would be less than the proposed project, but would remain greater than the No Action Alternative. Formal consultation with the USFWS will be required for desert tortoise impacts.

Reconfiguration of the Ivanpah Unit 3 site to the Modified I-15 Alternative site co-locates major facilities, while avoiding impacts to the northern portion of the proposed project area. As a consequence, movement corridors between mountainous areas north of the project area remain broad and relatively undisturbed. Human activities associated with the project are less likely to adversely impact big game species, including desert bighorn sheep, as well as other species (e.g., birds, bats) associated with mountainous habitats. Co-location would also reduce habitat fragmentation, leaving large portions of higher quality contiguous habitat intact.

Because the Modified I-15 Alternative would result in direct and indirect affects to wildlife species (e.g., vehicle-wildlife collisions, lower habitat quality within the highway easement, noise, artificial lighting), co-location would reduce adverse impacts to biological resources, while avoiding high quality habitat along the northern portion of the project area.

While some of the habitat within the Modified I-15 Alternative is similar in quality to the Ivanpah Unit 3 site, much of the alternative's habitat located below 2,750-feet in elevation is less diverse and of lower quality than that associated with the proposed project. Although surveys have not been conducted, it is anticipated that there would be fewer acres capable of sustaining rare plant communities, compared to the original Ivanpah Unit 3 site in the proposed project.

The Modified I-15 Alternative was developed, in part, to reduce the impacts to wildlife and special status species by reconfiguring Ivanpah Unit 3 in an area which may have fewer desert tortoises than the location of Ivanpah Unit 3 in the proposed project. The Modified I-15 Alternative likely would reduce impacts to desert tortoise, and also probably to rare plant species, although field surveys would be necessary to confirm this assessment. Big game and other wildlife species would benefit from co-location with the highway, minimizing habitat fragmentation, retaining movement corridors, and avoiding impacts to high quality habitat along the northern portion of the proposed project.

While the impacts from the Modified I-15 Alternative would be less than those associated with the proposed project, there would still be long-term impacts to biological resources in comparison with the No Action Alternative.

Cultural Resources

The proposed project would have no diirect or indirect adverse impacts on known or unknown, National Register of Historic Places (NRHP)-eligible archaeological, ethnographic, or built-environment resources. With the adoption and implementation of mitigation measures **CUL-8** and **CUL-9**, the cumulative effect of the proposed project on the one presently known NRHP-eligible listed resource, the Hoover Dam-to-San Bernardino transmission line (CA-SBR-10315H), would be reduced.

The implementation of mitigation measures **CUL-1** through **CUL-7** and **CUL-10** would require identification and proper management of any resources found during the course of the construction, operation, maintenance, closure, or decommissioning of the project. **CUL-1** through **CUL-7**, and **CUL-10** are intended to facilitate the identification and assessment of previously unknown archaeological resources encountered during construction-related ground disturbance and to mitigate any adverse impacts from the project on any newly found resources assessed as NRHP-eligible. To accomplish this, mitigation measures provide for the hiring of a Cultural Resources Specialist and archaeological monitors, for cultural resources awareness training for construction workers, for the archaeological and Native American monitoring of ground-disturbing activities, in particular situations, for the recovery of data from NRHP-eligible discovered archaeological deposits, for the writing of a technical archaeological report on all archaeological activities and findings, and for the curation of recovered artifacts and other data. When properly implemented and enforced, these mitigation measures would reduce any adverse impacts to previously unknown cultural resources encountered during construction or operation. Additionally, with the adoption and implementation of these mitigation measures, the ISEGS project would be in conformity with all applicable laws and regulations.

Overall, the cultural resource impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be lower than those associated with the proposed project due to the reduced acreage that would be disturbed during construction. For the Modified I-15 Alternative, an area comprising 1,836 acres, which is the reconfigured location of Ivanpah Unit 3, has not had a cultural resources inventory conducted, and could potentially contain resources that would be impacted, and which would not be addressed by the proposed mitigation measures.

Hazardous Materials Management

Hazardous material use, storage, and transportation associated with the proposed project would not pose any direct, indirect, or cumulative adverse impact. The proposed project would be designed, constructed, and operated in compliance with applicable laws and regulations, which would protect the public from risk of exposure to an accidental release of hazardous materials. Mitigation measures would be implemented, as follows. **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in the AFC, unless there is prior approval by the BLM's Authorized Officer. **HAZ-2** ensures that local emergency response services are notified of the amounts and locations of hazardous materials at the facility, **HAZ-3** requires the development of a Safety Management Plan that addresses the delivery of all liquid hazardous materials during the construction, commissioning, and operation of the project would further reduce the risk of any accidental release not specifically addressed by the proposed spill prevention mitigation measures, and further prevent the mixing of incompatible materials that could result in the generation of toxic vapors. Site security during both the construction and operation phases is addressed in **HAZ-4** and **HAZ-5.** **HAZ-6** ensures that the applicant complies with all Federal laws and regulations, regarding use, management, spills, and reporting of hazardous materials on Federal lands.

Because there is no potential for hazardous materials release to extend beyond the facility boundary, there is also no adverse impact to the environment. For any other potential impacts upon the environment, including vegetation, wildlife, air, soils, and water resulting from hazardous materials usage and disposal at the proposed facility, the reader is referred to Sections 4.1, 4.3, 4.10 and 4.14 of this EIS.

Overall, by following regulatory requirements and mitigation measures, there would be no potential impacts for the proposed project, the Mitigated Ivanpah 3 Alternative, or the Modified I-15 Alternative. Any hazards associated with hazardous materials use would be lower for the Mitigated Ivanpah 3 and Modified I-15 Alternatives than for the proposed project, due to the reduced duration of construction and reduced acreage of operations.

DOE has considered the potential environmental consequences of intentional destructive acts at the Ivanpah facility and concludes that it presents an unlikely target for an act of terrorism or sabotage and has an extremely low probability of attack. DOE notes that the environmental impact of any intentional destructive act that could occur is addressed in the impact analysis of containment incidents for hazardous materials, fire, and transportation accidents contained in Chapter 4.

Land Use

The criteria for evaluating Land Use impacts include an assessment of whether a proposed project will conflict with any applicable land use plan. The key land use plan affecting this project is the BLM's CDCA Plan of 1980, as amended (BLM 1980). In the CDCA Plan, the location of the proposed ISEGS facility includes land that is classified as Multiple-Use Class L (Limited Use). The Plan states that solar power facilities may be allowed within Limited Use areas after NEPA requirements are met. This Environmental Impact Statement acts as the mechanism for complying with those NEPA requirements.

Because solar power facilities are an allowable use of the land as it is classified in the CDCA Plan, the proposed action does not conflict with the Plan. However, the Plan also requires that newly proposed power sites that are not already included within the Plan be added to the Plan through the Plan Amendment process. The ISEGS site is not currently included within the Plan, and therefore a Plan Amendment is required to include the site as a recognized element with the Plan. The proposed Plan Amendment, and the corresponding analysis of the proposed Plan Amendment with respect to the analysis requirements contained within Chapter 7 of the Plan, is provided within Section 2 of this EIS. The amendment decision would occur after publication of the FEIS.

Large portions of the land area for Ivanpah 1, 2, and 3 and the administrative complex/logistics area are located within existing Utility Corridors D and BB. The land area for Ivanpah 3 would cover approximately 60% of the 2-mile width of Corridor D. Although the land area for Ivanpah 1 and 2, and the logistics construction area overlap and would limit much of the available area within Corridor BB, future linear facilities could still be routed through the portions of Corridor BB that are within the temporary construction logistics area that will only be used during the construction phase of the project.

The use of land associated with the ISEGS project would combine with impacts of present and reasonably foreseeable projects to result in a cumulative reduction in available land uses within the Ivanpah Valley area, and in the region.

Overall, the land use impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be lower than those associated with the proposed project due to the reduced acreage that would be removed from other potential land uses.

Noise and Vibration

The proposed project, if built and operated in conformance with the proposed mitigation measures, would comply with all applicable noise and vibration laws and regulations for both operation and construction, and would produce no adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

Overall, by following regulatory requirements and proposed mitigation measures, there would be no potential impacts for the proposed project, the Mitigated Ivanpah 3 Alternative, or the Modified I-15 Alternative. Any hazards associated with noise and vibration would be lower for the Mitigated Ivanpah 3 and Modified I-15 Alternatives than for the proposed project, due to the reduced duration of construction and reduced acreage of operations.

Public Health and Safety

The analysis of potential public health risks associated with construction and operation of the ISEGS has not resulted in the identification of any adverse cancer, short-term, or long-term health effects to any members of the public, including low income and minority populations, from project toxic emissions. The analysis of potential health impacts from the proposed ISEGS uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of the health risk assessment, emissions from the ISEGS would not contribute directly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area.

Overall, by following regulatory requirements and proposed mitigation measures, there would be no potential impacts for the proposed project, the Mitigated Ivanpah 3 Alternative, or the Modified I-15 Alternative. Any potential public health threats would be lower for the Mitigated Ivanpah 3 and Modified I-15 Alternatives than for the proposed project, due to the reduced duration and acreage of construction, reduced overall level of emissions, and reduced duration of decommissioning.

Socioeconomics and Environmental Justice

No adverse socioeconomic impacts would occur as result of the construction or operation of the proposed ISEGS. The proposed ISEGS would not cause an adverse direct, indirect, or cumulative impact on population, employment, housing, public finance, local economies, or public services. The proposed ISEGS would benefit the two-county study area (San Bernardino County, California, and Clark County, Nevada) and the local project vicinity in terms of an increase in local expenditures, payrolls, and taxation during construction and operation of the facility. These activities would have a positive effect on the local and regional economy.

The impacts to socioeconomics for the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be beneficial, due to the increase in local employment and tax revenues. However, the increase in employment would not result in an increase in the local population, so would not affect housing or public services. The beneficial impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be slightly lower than those for the proposed project, due to the reduced duration of construction and decommissioning.

Soil and Water Resources

Construction, operation, and decommissioning of the proposed project could potentially impact soil and water resources. Where these potential impacts have been identified, mitigation measures are required to reduce the potential for their occurrence and their magnitude. With these mitigation measures implemented, the project would conform with all applicable laws and regulations. Potential impacts to soil and water resources are summarized as follows:

1. The proposed project would be located on an alluvial fan where flash flooding and mass erosion could impact the project. Project-related changes to the alluvial fan hydrology could result in impacts to adjacent land users and the Ivanpah playa. The applicant completed a hydrologic study and modeling of the alluvial fan. Based on this work and subsequent confirmatory and sensitivity modeling conducted by the BLM, scour analyses have been performed to support development of a project design that can withstand flash flood flows with minimal damage to site structures and heliostats. In addition, a Drainage Erosion and Sediment Control Plan (DESCP) has been developed to mitigate the potential storm water and sediment project-related impacts. However, the calculations and assumptions used to evaluate potential storm water and sedimentation impacts are imprecise and have limitations and uncertainties associated with them. Given the uncertainty associated with the calculations, the magnitude of potential impacts that could occur cannot be determined precisely. As discussed in the Biological Resources and Recreation sections, the potential effects associated with storm water and sedimentation impacts could adversely affect habitat for a threatened species (the desert tortoise), as well as recreational use of Ivanpah Playa. Should these impacts occur, they would likely be highly controversial. Based on these factors, the proposed project could result in direct, adverse impacts. Therefore, mitigation measure **Soil&Water-5** that defines monitoring, inspection, and damage response requirements, as well as standards and procedures for re-considering the proposed storm water management approach if needed in the future.
2. The proposed project would use an air-cooled condenser for heat rejection and would recycle process wastewater from all plant equipment, including boilers and water treatment equipment, to the extent practicable. Recycling the wastewater would maximize reuse of process water and conserve freshwater. Use of this technology would substantially reduce water use and is consistent with water policy and the constitutional requirement that State water resources be put to beneficial use to the fullest extent possible.
3. There would be no adverse impacts to groundwater supply and quality. In the Ivanpah Valley Groundwater Basin, two substantial components of the basin's water balance are groundwater recharge through precipitation and groundwater loss through well pumping. Both precipitation and pumping in the basin will vary over the 50-year life of the proposed project. To ensure that the project's proposed use of groundwater does not adversely impact the beneficial uses and users of the groundwater in the basin, the project would become part of the existing groundwater monitoring and reporting program developed by San Bernardino County for the Primm Valley Golf Club. Substantial changes to groundwater levels caused by the proposed project would be documented by this monitoring and reporting program in accordance with mitigation measure **Soil&Water-6**.

Overall, the potential for soil and water impacts associated with the Mitigated Ivanpah 3 Alternative would be either the same as, or reduced from those associated with the proposed project. Some of these potential impacts, including soil erosion associated with site grading and potential stormwater damage to the facility would be reduced substantially, because of the nature of stormwater drainage on the 433-acre northern portion of Ivanpah Unit 3 that would be eliminated. The Mitigated Ivanpah 3 Alternative would also use a reduced amount of groundwater for washing of heliostats, and would therefore reduce potential groundwater use conflicts.

The potential impacts of the Modified I-15 Alternative on soil erosion due to grading, Waters of the State, and stormwater damage to facility infrastructure cannot be fully evaluated at this time, because complete drainage channel mapping and stormwater modeling of the revised Ivanpah Unit 3 location has not been performed. However, based on a preliminary evaluation of the existing drainage mapping, stormwater modeling, and topographic maps of the area, it is likely that the soil and water impacts associated with the Modified I-15 Alternative would be either similar to or lower than those of the proposed project. The Modified I-15 Alternative would also use a reduced amount of groundwater for washing of heliostats, and would therefore reduce potential groundwater use conflicts.

Traffic and Transportation

The proposed project's potential construction and operational impacts related to the regional and local traffic and transportation system are summarized as follows:

1. During construction, project-related construction traffic would not result in an unacceptable level of service along study area roadway segments or intersections, and therefore no adverse impacts would be created by workforce traffic and truck traffic. The project would exacerbate existing congestion on I-15 on Friday afternoons in the area of Yates Well Road, resulting in an adverse impact at that time. To reduce the proposed project's construction- and operation-related contribution to congestion on northbound I-15 on Friday afternoons, mitigation measure **TRANS-1** would require a Traffic Control Plan.
2. During construction, the project would substantially increase the volume of traffic on roadways and intersections in the vicinity of recreation resources. Therefore, mitigation measure **TRANS-1** requires adequate signage along local roads and intersections to alert travelers to the presence of construction vehicles.
3. Because proposed project construction traffic has the potential to result in unexpected damage to Yates Well Road and I-15 freeway ramps, mitigation measure **TRANS-2** is required to ensure that any damage to local roadways would be repaired to pre-project levels to not present a safety hazard to motorists.
4. Saturday through Thursday during operation, workforce and truck traffic to and from the facility would not result in a substantial increase in congestion, deterioration of the existing level of service, or creation of a traffic hazard during any time in the daily traffic cycle and would therefore not have a direct, adverse impact on routes or roadway intersections that would be used to access the ISEGS site.
5. Solar radiation and light reflected from proposed project heliostats could cause a human health and safety hazard to observers in vehicles on adjacent roadways or

air traffic flying above the site, and could cause a distraction of drivers on I-15 that would lead to road hazards and to pilots of aircraft flying over the site. Mitigation measure **TRANS-3** would ensure that solar radiation and light from the heliostats does not impair the vision of motorists or pilots traveling near the site and that the potential for exposure of observers does not cause a human health and safety hazard.

6. Solar radiation and light reflected from proposed project power tower receivers is not expected to pose a human health and safety hazard to navigation of vehicles on adjacent roadways or air traffic flying above the site, but could potentially cause a distraction of drivers on I-15 that would lead to road hazards. Mitigation measure **TRANS-4** would ensure that glare from power tower receivers does not impair the view of motorists or pilots traveling near the site and that the potential for exposure of observers to light reflected from heliostats is minimized to the extent possible.
7. Because the proposed project would result in construction of structures greater than 200 feet tall in the vicinity of a proposed airport and existing military training flight route, mitigation measure **TRANS-5** is required to ensure that onsite power towers are lighted in accordance with FAA recommendations. The project would not adversely affect aircraft operations associated with any aircraft flight traffic.
8. The construction and operation of the ISEGS as proposed, with the effective implementation of mitigation measures, would ensure that the project's direct adverse traffic and transportation impacts would be avoided or reduced in magnitude.
9. Vehicle trips generated by construction and operation of the ISEGS would combine with vehicle trips generated by past, present and reasonably foreseeable projects to contribute to the existing adverse, cumulative impact of congestion on northbound I-15 on Friday afternoons.
10. With the implementation of the traffic control plan required by mitigation measure **TRANS-1**, construction and operation of the ISEGS would not cause a direct adverse impact on northbound I-15 on Friday afternoons, but would contribute to an existing cumulative adverse impact on northbound I-15 on Friday afternoons.
11. During project operation, heat exhaust from the Ivanpah 3 air cooled condenser would result in thermal plumes that would result in the potential for aircraft to experience turbulence at an altitude of 1,350 feet or less. Therefore, mitigation measure **TRANS-6** is required to ensure that thermal plumes associated with ISEGS operation do not impact aviation activities within the navigable airspace above the site.

Because the employment levels, and therefore commuting trips by workers, would be the same for the proposed project, Mitigated Ivanpah 3 Alternative, and Modified I-15 Alternative, the direct adverse impact, and contribution to cumulative adverse impacts, on Interstate 15 on Friday afternoons would be the same for each alternative. The primary difference in traffic impacts would be that the impacts associated with construction and decommissioning of the Mitigated Ivanpah 3 and Modified I-15 Alternatives would occur for a shorter duration than for the proposed project.

Transmission Line Safety and Nuisance

The proposed transmission lines are not expected to pose an aviation hazard according to current FAA criteria, and therefore it is not necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route.

Since electric or magnetic field health effects have neither been established nor ruled out for the proposed ISEGS and similar transmission lines, the public health impacts of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed lines' design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would not be an issue for the proposed line given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for Southern California Edison (SCE) lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a substantial human health hazard.

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern, and would remain in its present route without nearby residences, the proposed design, maintenance, and construction plan would comply with the applicable laws. With implementation of the mitigation measures proposed above, direct or indirect adverse impacts would not occur.

Because the transmission lines would be the same under the proposed project, the Mitigated Ivanpah 3 Alternative, and the Modified I-15 Alternative, the potential impacts would be the same for all three alternatives. However, in each case, the potential for adverse impacts would be minimized by compliance with regulations and industry standards for operation of transmission lines.

Visual Resources

The proposed project would result in a direct adverse impact to existing scenic resource values as seen from several Key Observation Points in the Ivanpah Valley and Clark Mountains, including:

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

The visual impacts associated with the project would be viewed by visitors to the Mojave National Preserve and two designated wilderness areas, and a land-sailing site of regional or greater importance. The potential effects involve the unique scenic characteristics of the local landscape as indicated by the national park and wilderness designations of portions of the project viewshed; concerns expressed by public commentors to date; and a degree of uncertainty as to the level of discomfort or disability glare from the solar tower receivers.

Some of the adverse visual impacts, such as those associated with the Primm Valley Golf Course (KOPs 1 and 2), could be reduced through implementation of mitigation measures. However, potentially adverse visual impacts at the other locations cited above could not be reduced through mitigation, and would thus result in unavoidable adverse impacts.

Because the project has the potential to result in exposure of aircraft pilots, motorists, and hikers to solar radiation reflected from project heliostats and/or power tower receivers, mitigation measures **TRANS-3** and **TRANS-4** would ensure that potential glare from the project is minimized to the extent possible and does not pose a health and safety risk. The solar receiver units atop the solar power towers would generate conspicuously bright levels of glare for foreground viewers. Even with mitigation measures, glare, while not representing a hazard, could represent a visually dominant feature as seen from the viewpoints named above. Remaining glare could alter the character of views of Clark Mountain from the valley floor, affecting the public's ability to enjoy those views, though not preventing them.

The project, in combination with foreseeable future projects, could also result in adverse and unavoidable cumulative visual impacts of two kinds:

1. Cumulative impacts within the immediate project viewshed, essentially comprising foreseeable future projects in the Ivanpah Valley; and
2. Cumulative impacts of foreseeable future solar and other renewable energy projects within the southern California Mojave Desert.

The analysis establishes that the proposed project would represent a substantial change and impairment of a natural landscape that is largely intact. However, within an urban frame of reference, not all viewers would find the project disagreeable or unattractive; indeed, many viewers could find the project interesting to view due to its novelty. Overall, it would exhibit a moderate level of visual quality and would leave scenic views of Clark Mountain unobstructed physically, though strongly impaired by glare. Within an urban frame of reference, where preservation of natural landscapes is not a primary goal, this level of impact might be considered acceptable.

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

As stated previously, the project would result in unavoidable adverse impacts. However, mitigation measures would minimize impacts to the greatest feasible extent.

Overall, the Mitigated Ivanpah 3 Alternative would have the same adverse impacts that would be associated with the proposed project. However, the magnitude of these impacts would be reduced due to the reduction in the number of power tower receivers, the reduction of the size of the heliostats fields, and the movement of the northern boundary of the facility further from sensitive viewing locations.

The Modified I-15 Alternative would also have the same type of adverse impacts that would be associated with the proposed project. To viewers located in the Mojave National Preserve and Stateline Wilderness to the west and north of the facility, the magnitude of these impacts would be reduced due to the reduction in the number of power tower receivers, the reduction of the size of the heliostats fields, and the reconfiguration of Ivanpah Unit 3. However, the reconfiguration of Ivanpah Unit 3 four miles to the south, to a location directly adjacent to Interstate 15, would increase the magnitude of visual impacts to viewers on Interstate 15.

Waste Management

Project wastes would be managed in compliance with all applicable waste management laws and regulations. Both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and nonrecyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Management of the waste generated during construction and operation of the ISEGS would not result in any direct or cumulative adverse impacts, and would comply with applicable laws and regulations, if the waste management practices and mitigation measures are implemented.

Mitigation measures **WASTE-1** through **WASTE-7** would help ensure and facilitate ongoing project compliance with laws and regulations. These measures would require the project owner to do all of the following:

- Prepare Construction Waste Management and Operation Waste Management Plans detailing the types and volumes of wastes to be generated and how wastes will be managed, recycled, and/or disposed of after generation (**WASTE-3** and **6**).

- Obtain a hazardous waste generator identification number (**WASTE-4**).
- Ensure the project site is investigated and any contamination identified is remediated as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1, 2, and 7**).
- Report any waste management-related laws and regulations enforcement actions and how violations will be corrected (**WASTE-5**).
- Ensure that all spills or releases of hazardous substances are reported and cleaned-up in accordance with all applicable federal, state, and local requirements (**WASTE-7**).

The existing available capacity for the Class III landfills that may be used to manage nonhazardous project wastes exceeds 1 billion cubic yards. The total amount of nonhazardous wastes generated from construction and operation of ISEGS would contribute less than 0.1 percent of the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would not have an adverse impact on Class III landfill capacity.

In addition, the Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of ISEGS have a remaining capacity in excess of 68 million cubic yards (Campbell 2008). The total amount of hazardous wastes generated by the ISEGS would contribute less than 0.02 percent of the remaining permitted capacity. Therefore, impacts from disposal of ISEGS generated hazardous wastes would not have an adverse impact on the remaining capacity at Class I landfills.

Overall, by following regulatory requirements and mitigation measures, there would be no potential adverse impacts for the proposed project, the Mitigated Ivanpah 3 Alternative, or the Modified I-15 Alternative. Any hazards associated with waste generation and management would be lower for the Mitigated Ivanpah 3 and Modified I-15 Alternatives than for the proposed project, due to the reduced duration of construction, and reduced volume of materials requiring demolition.

Worker Safety and Fire Protection

By implementing the described construction safety and health and project operations and maintenance safety and health programs, as required by mitigation measures **WORKER SAFETY -1**, and **-2**; and fulfilling the requirements of mitigation measures **WORKER SAFETY-3** through**-6**, the proposed project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws and regulations. Information initially received from the San Bernardino County Fire Department (SBCFD) indicated that the proposed project would not have adverse impacts on local fire protection and emergency response services. However, the County has provided additional information, in the form of comments on the DEIS, indicating that such an adverse impact may exist. In an attempt to rectify the contradictory information provided by the SBCFD, BLM submitted a letter to the County requesting additional information on the specific impacts, and the County's financial estimate. As of the time of publication of this FEIS, the requested information has not been received. Although such impacts to County services may occur, neither BLM nor the County has a legal mechanism in place to require the applicant to provide funding to the County to address this impact.

Overall, by following regulatory requirements and proposed mitigation measures, there would be no potential impacts for the proposed project, the Mitigated Ivanpah 3 Alternative, or the Modified I-15 Alternative. Any hazards associated with worker safety would be lower for the Mitigated Ivanpah 3 and Modified I-15 Alternatives than for the proposed project, due to the reduced duration of construction, and reduced volume of materials requiring demolition. The risk of wildfire damage to the facility would be the same for the Mitigated Ivanpah 3 Alternative and the proposed project.

Geology, Paleontology, and Minerals

The proposed ISEGS site is located in a moderately active geologic area on the west side of Ivanpah Valley, east of the Clark Mountain Range in the eastern Mojave Desert of Southern California. The main geologic hazards at this site include ground shaking; liquefaction; settlement due to compressible soils, subsidence associated with shrinkage of clay soils, hydrocompaction, or dynamic compaction; and the presence of expansive clay soils. The applicant would comply with state requirements regarding facility design by incorporating recommendations contained in a design-level geotechnical report as required by the California Building Code (2007). In addition, the applicant would comply with Energy Commission Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** (provided in **Appendix C - Facility Design**), which were recommended by Energy Commission staff in their FSA to eliminate or reduce the magnitude of these potential impacts. The design and construction of the project should have no adverse impact with respect to geologic, mineralogical, and paleontological resources.

The proposed project area is currently not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. Sand and gravel resources are present at the site and could potentially be a source of salable resources; however, such materials are present throughout the regional area such that the ISEGS should not have an adverse impact on the availability of such resources.

Paleontological resources have been documented within 45 miles of the project, but no fossils were found during field explorations on the solar plant sites or near the sub-station and ancillary facilities; however, pack rat middens with plant remains were found in the carbonate bedrock outcrop west of Ivanpah 3. If encountered, potential impacts to paleontological resources contained in these materials due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as outlined in mitigation measures **PAL-1** through **PAL-7**.

Overall, the paleontological resource impacts associated with the Mitigated Ivanpah 3 Alternative would be lower than those associated with the proposed project due to the reduced acreage that would be disturbed during construction. Although the acreage would be reduced by approximately 12.5 percent, the potentially impacted area would be reduced by more than 12.5 percent, because the 433-acre area eliminated from the alternative would require extensive grading in the proposed project. Impacts on leasable and locatable mineral resources would be the same or lower for the Mitigated Ivanpah 3 Alternative than the proposed project. No hazards to either the proposed project or Mitigated Ivanpah 3 Alternative from geologic conditions would be expected.

The paleontological resource impacts associated with the Modified I-15 Alternative would also be lower than those associated with the proposed project due to the reduced acreage that would be disturbed during construction. Although the resources within the revised Ivanpah Unit 3 location have not been inventoried, they are likely to be similar to those identified and evaluated for the proposed project. Impacts on leasable and locatable mineral resources would be the same or lower for the Modified I-15 Alternative than the proposed project. No hazards to either the proposed project or Modified I-15 Alternative from geologic conditions would be expected.

Livestock Grazing

The issue of cattle grazing and grazing administration is directly applicable to the proposed project because the public lands associated with the proposed project are within an active grazing allotment. Because the proposed project would involve removal of vegetation and fencing off of the entire property, approval of the proposed project would require modifying the allotment boundaries, resulting in a minor reduction in allotment size of 4 percent. Administratively, this modification can be accomplished through BLM administrative procedures. In addition, increased traffic associated with construction and operation of the proposed project are not expected to cause injury of death to individual cattle through vehicle strikes because the livestock may well avoid the area in its entirety because of the human activities that would occur on the site. The impact would result in modification of the allotment boundaries, resulting in a minor 4 percent reduction in allotment acreage which is not considered a substantial adverse impact to foraging opportunities or to the safety of livestock.

The No Action Alternative would not have any impact on the characteristics or administration of the allotment.

The impact of the Mitigated Ivanpah 3 and Modified I-15 Alternatives on the existing Clark Mountain Grazing Lease would be direct and adverse, but would be lower than that associated with the proposed project. Any hazards associated with vehicle and equipment use in active cattle grazing areas when cattle are present would be the same for both alternatives, and would be mitigated through the use of speed limits and worker notifications.

Wild Horses and Burros

The issue of burros is directly applicable to the proposed project because the public lands associated with the proposed project coincides with a designated HMA, and because burros are known to exist in the vicinity of the proposed project location. Because the proposed project would involve removal of vegetation and fencing of the entire 3,712 acre property that would be permanently disturbed, approval of the proposed project would eliminate a small portion of the land area available for the existing burros. In addition, increased traffic associated with construction and operation of the proposed project could potentially cause injury or death to individual burros through vehicle strikes. Individual burros could also be injured or killed if they were to fall into excavations associated with project construction activities, or be fed and watered by humans in the immediate vicinity of the project footprint.

The Northern and Eastern Mojave (NEMO) Plan Amendments have established the AML in the vicinity of the proposed project area at zero, meaning BLM is actively involved in removing all burros within the area. In addition, the mitigation measures would avoid injury to burros while they may still be present in the project area or vicinity.

The No Action Alternative would not have any impact on the characteristics or administration of the burros.

Neither the proposed project, the Mitigated Ivanpah 3 Alternative, nor the Modified I-15 Alternative would have an adverse impact on wild horses or burros in the project area. Any hazards to individual burros associated with vehicle and equipment use would be the same for all three alternatives, and would be mitigated through the use of speed limits and worker notifications.

Recreation

The proposed project location itself is not specifically permitted, used, or designated for any recreational activity. The proposed location represents a small portion of the overall area available for recreation in the Mojave Desert, and although the proposed project would require re-direction of access roads to recreation areas, the magnitude of this re-direction is expected to be small. However, the issue of recreational resources is still directly applicable to the proposed project because part of the attraction of the area, historically, has been driven by easy vehicular access to an unspoiled desert viewscape. The presence of the proposed facility would likely attract some tourists who are interested in unusual and large-scale industrial operations. While the impact on the quality of outdoor recreational experience would diminish the experience of campers, hikers, hunters, and some other recreational users, it would not likely affect the larger number of local tourists which include golfers, land sailors, and visitors to the Primm casinos.

The impacts related to changes in the viewscape, contributing to the transformation of a mostly natural to a more industrial setting, would be long-term, even though the land could be potentially restored and the associated viewscape as affected by the project could be repaired following facility decommissioning.

The project could potentially impact land sailing on the Ivanpah Dry Lake surface if it were to modify stormwater and sedimentation characteristics or result in hazardous materials, waste or debris being transported to the Dry Lake. Mitigation measures in Sections 4.5, 4.10, and 4.14 would mitigate these impacts by reducing the potential for their occurrence, and by requiring monitoring and response to any identified impacts. Also, the project would not notably modify wind characteristics, or impose a visual glare hazard that would affect the health and safety of land sailors.

The No Action Alternative would not have any impact on the characteristics or administration of recreational resources.

Overall, no direct or indirect impacts on recreational use of the project area, Dry Lake bed, and surrounding areas would be expected from the proposed project, the Mitigated Ivanpah 3 Alternative, or the Modified I-15 Alternative. All three alternatives would likely provide a beneficial impact on tourism by attracting persons interested in the unusual and large-scale character of the facility. However, all three alternatives would also contribute incrementally to an increase in the industrial character of the area, which would likely result in reducing the quality of the recreational experience for many recreational users of the area.

1.8 Summary

Although the proposed project would achieve all project objectives, and generate the maximum amount of beneficial socioeconomic, greenhouse gas, and air pollutant impacts, it would also result in the greatest number and magnitude of adverse impacts. These would include impacts to Biological Resources, Soil and Water Resources, and Visual Resources that could not be completely mitigated.

Selection of the Mitigated Ivanpah 3 Alternative would accomplish all of the objectives of the purpose and need, including meeting power demand, as well as federal and state objectives for renewable energy development. It would also achieve almost all of the beneficial impacts of the proposed project, including socioeconomic benefits of increases in employment and fiscal resources, and displacement of greenhouse gas and air pollutant emissions associated with fossil-fueled power plants. While meeting these objectives and providing these beneficial impacts, the adverse impacts of the Mitigated Ivanpah 3 Alternative would be much lower than the proposed project, especially in the areas of Biological Resources, Soil and Water Resources, and Visual Resources.

Selection of the Modified I-15 Alternative would also accomplish all of the objectives of the purpose and need, including meeting power demand, as well as federal and state objectives for renewable energy development. It would also achieve almost all of the beneficial impacts of the proposed projects, including socioeconomic benefits of increases in employment and fiscal resources, and displacement of greenhouse gas and air pollutant emissions associated with fossil-fueled power plants. While meeting these objectives and providing these beneficial impacts, the adverse impacts of the Modified I-15 Alternative would be lower than the proposed project in some areas, but would be increased in other areas. With respect to Biological Resources, the Modified I-15 Alternative would have a reduced impact on high quality desert tortoise habitat, as a result of moving Ivanpah Unit 3 to a location which partially overlaps the lower quality habitat adjacent to Interstate 15. However, impacts to Visual Resources and potential glare impacts for viewers on Interstate 15 would increase, due to the placement of heliostat fields within 1,000 feet of the highway for a distance of 1.8 miles. The Modified I-15 Alternative could also result in an increase in impacts to recreational access as compared to the proposed project, due to the greater length of existing off-highway vehicle (OHV) trails that would be included within the project footprint.

Most of the impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be very similar to each other, based on the similar size, technology, and configuration of the facility. The only physical difference between the two alternatives would be the location of Ivanpah Unit 3, which would border the northern portion of the facility in the Mitigated Ivanpah 3 Alternative, and the southern portion of the facility in the Modified I-15 Alternative. This difference in location results in potentially different impacts to several resources, as follows:

- Biological Resources

  The difference in location has the potential to impact different habitat, wildlife, and plants in the two different locations. The northern location of Ivanpah Unit 3 in the Mitigated Ivanpah 3 Alternative is likely to have a higher density of tortoises and rare plants, and therefore a higher potential for impacts, than the southern location of Ivanpah Unit 3 in the Modified I-15 Alternative.

- Land Use

  Both the Mitigated Ivanpah 3 and Modified I-15 Alternatives would partially occupy designated utility corridors; however, the corridors involved are different from each other. Under the Mitigated Ivanpah 3 Alternative, Ivanpah Unit 3 would occupy a portion of utility corridor D, while Ivanpah unit 3 in the Modified I-15 Alternative would partially occupy corridor B. In both cases, portions of the corridors would remain available for other uses.

- Soil and Water

  Based on a review of topographic information and stormwater modeling that covers a portion of the Modified I-15 site, it is likely that the position of the Modified I-15 site is similar to, or possibly slightly more favorable than, the Mitigated Ivanpah 3 site with respect to potential stormwater damage.

- Traffic and Transportation

  The potential issue of distraction to drivers on Interstate 15 due to glare from the heliostats and power tower receivers cannot be quantified, and is difficult to predict. If this issue should occur, it would likely be more disruptive at the Modified I-15 location than the Mitigated Ivanpah 3 location, due to the closer proximity of the heliostats and power towers to Interstate 15.

- Visual Resources

  With respect to the position of viewers located on Clark Mountain or the Stateline Wilderness to the north and west of the facility, visual impacts associated with the Modified I-15 Alternative would be lower than those for the Mitigated Ivanpah 3 Alternative. This would be due to the more distal location of Ivanpah Unit 3 in the Modified I-15 Alternative. For the same reason, visual impacts to viewers on Interstate 15 would be higher for the Modified I-15 Alternative, due to the situation of Ivanpah Unit 3 within 1,000 feet of the highway, for a distance of approximately 1.8 miles.

- Recreation

  Both the Mitigated Ivanpah 3 Alternative and the Modified I-15 Alternative would occupy land that currently includes designated OHV trails used for recreation. In both cases, the trails would be re-routed around the outside of the facilities. The length of trails that would be affected would be 8,100 feet (1.5 miles) for the Mitigated Ivanpah 3 Alternative, and 12,270 feet (2.4 miles) for the Modified I-15 Alternative.

Although it would have no adverse impacts, the No Action Alternative would not accomplish project objectives of meeting the demand for power, or contribute to meeting state and federal objectives for renewable energy development. It also would not provide the beneficial impacts associated with the proposed project and Mitigated Ivanpah 3 Alternative, including the socioeconomic benefits. By not contributing to the development of renewable energy, the No Action Alternative would cause the state to continue to rely on fossil-fueled energy sources, with the associated greenhouse gas and air pollutant emissions.

Public comments received on the Supplemental DEIS included additional information and opinions regarding the relative merits of the four alternatives. A detailed discussion of these comments is provided in Appendix A-2. The following summarizes the major points of the comments with respect to the selection of a preferred alternative:

- Many commentors, including the applicant, public officials, labor unions, and individuals favor the proposed project because it would meet the growing electricity needs of the region, would generate that power without releasing greenhouse gases, and would provide jobs. However, numerous other commentors, including environmental organizations and individuals, either oppose the proposed project, or desire that it be modified, due to the adverse impacts that the project would have on biological resources, visual resources, recreation, air quality, and land uses.
- The applicant and individuals provided comments in support of the Mitigated Ivanpah 3 Alternative. These comments supported this alternative for the reasons cited for the proposed project above, as well as the fact that the alternative would result in a reduction of adverse impacts to biological resources. Several of the environmental organizations and individuals who were opposed to the proposed project also opposed the Mitigated Ivanpah 3 Alternative, primarily because they felt that the reduction in adverse impacts associated with this alternative was not as great as could be achieved through the Modified I-15 Alternative.

- The Modified I-15 Alternative was supported by several environmental organizations, including the Sierra Club, primarily because placement of the facility closer to I-15 would minimize adverse impacts to biological resources. The applicant opposed the Modified I-15 Alternative for several technical and impact-related reasons. In their comments on the Supplemental DEIS, the applicant noted that the Modified I-15 Alternative would not be economically feasible for them to implement, due to the length of time that would be needed to re-design and re-configure the engineering design for the project. The applicant also cited increased visual impacts in their opposition to the Modified I-15 Alternative.
- Numerous commentors, including environmental organizations and individuals, supported the No Action Alternative. This was primarily due to concerns with placing the facility in a currently undeveloped location, the likelihood that the facility would incrementally add to industrialization of Ivanpah Valley, and the lack of suitable mitigation and compensation for desert tortoises. Some commentors, such as the Center for Biodiversity, stated a preference for the No Action Alternative, but stated that if a facility must be built, then they preferred the Modified I-15 Alternative.

Based on the comparative analysis of the ability of each alternative to meet the purpose and need, and the environmental impacts that would be associated with each alternative, the Mitigated Ivanpah 3 Alternative is identified as the preferred alternative.

2.0 Introduction

The proposed action evaluated within this Environmental Impact Statement (EIS) is the construction, operation and maintenance, and decommissioning of the Ivanpah Solar Electric Generating System (ISEGS) project, a proposed solar-thermal electricity generation facility located on public lands managed by the Bureau of Land Management (BLM) in San Bernardino County, California. The EIS represents an environmental review document developed by BLM to evaluate potential impacts associated with the proposed action.

Because the proposed project is located on public lands managed by the BLM, BLM is the lead federal agency for evaluating environmental impacts of the proposed right-of-way grant under the National Environmental Policy Act (NEPA). The EIS is the BLM's environmental evaluation of the potential impacts that could result from the authorization of the requested right-of-way and California Desert Conservation Area (CDCA) Plan Amendment. The U. S. Department of Energy (DOE) is a cooperating agency on this EIS pursuant to a Memorandum of Understanding (MOU) between DOE and BLM signed in February 2009.

In August, 2007, the California Energy Commission (Energy Commission) and BLM California State Office entered into a MOU to jointly develop the environmental analysis documentation for solar thermal projects which are under the jurisdiction of both agencies. The purpose of the MOU is to avoid duplication of agency efforts, share agency expertise and information, promote intergovernmental coordination, and facilitate public review. On November 4, 2009, BLM and California Energy Commission (Energy Commission) staff jointly prepared the Final Staff Assessment (FSA)/Draft Environmental Impact Statement (DEIS) and Draft CDCA Plan Amendment for the ISEGS project.

The Notice of Availability (NOA) of the DEIS was published in the Federal Register (74 FR 58043) on November 10, 2009; the 90-day public review and comment period ended on February 11, 2010. During the public comment period, a variety of activities occurred in which BLM received additional information regarding the proposed project and potential alternatives, impacts, and mitigation measures. These activities included:

- Receipt of comments from the public, and other local, state, and federal agencies during the public comment period;
- Public testimony by Energy Commission staff and consultants, BrightSource staff and consultants, and intervenors associated with the Energy Commission certification process for ISEGS;
- Workshops, involving BLM staff and consultants as well as the above groups, to consider and evaluate impact analyses and mitigation approaches; and
- Submittal of additional technical reports, project design information, impact analyses, and applicant-proposed mitigation measures by BrightSource.

In addition to specific technical and process comments, additional information regarding the rationale provided in the DEIS for the elimination of two of the alternatives identified and evaluated by BLM (the Reduced Acreage Alternative and the I-15 Alternative) was obtained through these activities. Based on the receipt of these additional data, BLM concluded that the rationale for eliminating the Reduced Acreage and I-15 Alternatives in the DEIS was insufficient, and that these two alternatives merited more detailed evaluation in a Supplemental Draft EIS (SDEIS). The Notice of the Availability of the SDEIS was published in the Federal Register (75 FR 19992) on April 16, 2010; the 45-day public review and comment period ended on June 1, 2010.

This EIS describes and evaluates the environmental impacts that are expected to result from construction, operation and maintenance, and decommissioning of the ISEGS project. It is not a decision document approving the right-of-way grant by BLM. Specifically, the EIS describes and evaluates the following:

- the proposed project;
- alternatives to the proposed project;
- the affected environment;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws and regulations;
- the environmental consequences of the proposed project and alternatives, including potential public health and safety impacts;
- the potential cumulative impacts of the proposed project in conjunction with other past, present, and reasonably foreseeable actions; and
- mitigation measures proposed by the applicant; BLM; other federal, state, and local agencies; local organizations; and interveners which may lessen or avoid potential impacts;

The analyses contained in this EIS are based upon information from the: 1) applicant's Application for Certification (AFC) submitted for evaluation by the Energy Commission, 2) responses to data requests, 3) supplementary information from local, state, and federal agencies; interested organizations; and individuals, 4) existing documents and publications, including the FSA/DEIS and Supplemental DEIS, 5) independent research, and 6) comments on the FSA/DEIS and Supplemental DEIS and from workshops. The EIS presents the evaluation of potential environmental impacts and conformity with laws and regulations, as well as proposed mitigation measures that have been proposed by the applicant; would be required by other Federal, state, and local agencies (including Conditions of Certification that would be required by the Energy Commission); and have been identified by BLM in this EIS as necessary to reduce identified impacts.

2.1 Background

BrightSource Energy is a U. S. Corporation whose business model includes the development and deployment of concentrating solar power tower technology. It has formed limited liability corporations Solar Partners I, II, IV, and VIII (referred to as applicant or BrightSource Energy hereafter) for the purposes of filing right-of-way (ROW) applications with the BLM for the use of public land and for filing an Application for Certification with the Energy Commission. BrightSource Energy has executed Power Purchase Agreements with Pacific Gas and Electric and interconnection agreements with Southern California Edison to deliver 400 megawatts (MW) of electricity to the California market by the year 2013.

Through the limited liability corporations, the applicant has applied for four ROW grants from the BLM to construct the ISEGS project that will occupy 4073 acres of public land, use approximately 100 acre feet of water per year, produce a nominal 400 MWs of electricity, and operate for a term of 50 years. BrightSource has also filed an Application for Certification with the Energy Commission. Under California law, the Energy Commission has regulatory authority for certifying applications for thermal power generating facilities in excess of 50 megawatts in size.

Additionally, BrightSource has applied to DOE for a loan guarantee pursuant to Title XVII of the Energy Policy Act of 2005 (EPAct). The application for a loan guarantee for Ivanpah 1 was made in November 2008, and the application for Ivanpah 2 and 3 was made in February 2009. The EPAct established a Federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of EPAct authorizes the Secretary of Energy to make loan guarantees for a variety of types of projects, including those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." The two principal goals of the loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits.

The proposed project could help meet the policy goals of the Federal government and State of California of achieving increased production of electricity from renewable sources. Relevant direction and policies include:

- Executive Order 13212, dated May 18, 2001, which mandates that agencies act expediently and in a manner consistent with applicable laws to increase the "production and transmission of energy in a safe and environmentally sound manner."
- The Energy Policy Act (119 Stat. 594, 600), which encourages the Department of the Interior (BLM's parent agency) to approve at least 10,000 MW of renewable energy on public lands by 2015. The proposed project would provide 400 MW of renewable energy production towards this goal.
- U.S. Department of Interior (DOI) Instruction Memorandum (IM) 2007-097, "Solar Energy Development of the Public Lands," dated April 4, 2007. This IM establishes the BLM policy to identify ROW applications for solar power development on the public lands as a "high priority field office workload" and to ensure the timely and efficient processing of ROW applications.
- Secretarial Order 3283, "Enhancing Renewable Energy Development of the Public Lands," dated January 16, 2009. This Secretarial Order facilitates DOI's efforts to achieve the goals established in Section 211 of the EPAct of 2005.
- Secretarial Order 3285, dated March 11, 2009, which "establishes the development of renewable energy as a priority for the Department of the Interior".

- California Senate Bill 1078, updated through Senate Bill 107,which established the California Renewable Portfolio Standard (RPS) requiring utilities to increase their sale of renewable energy to 20 percent by 2020.
- The California Governor's Executive Order S-14-08, establishing an RPS goal of 33 percent by 2020.

2.2 Agency Authorities and Responsibilities

The Bureau of Land Management's authority for the proposed action includes Federal Land Policy and Management Act (FLPMA) of 1976 [43 USC 1701 et seq.) and the BLM's implementing regulations (43 CFR Part 2800), Section 211 of the EPAct, and BLM's Solar Energy Development Policy of April 4, 2007. The FLPMA authorizes BLM to issue right-of-way grants for renewable energy projects. As discussed above, section 211 of the EPAct states that the Secretary of the Interior should seek to have approved a minimum of 10,000 MW of renewable energy generating capacity on public lands by 2015.

Title XVII of EPAct authorizes the Secretary of Energy to make loan guarantees for eligible projects, including those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." BrightSource Energy has applied to DOE for a loan guarantee pursuant to Title XVII of the EPAct. DOE is participating in the review of this NEPA document as a cooperating agency (40 CFR §1508.5) to ensure that analyses needed to support its decision making on whether to provide a loan guarantee to BrightSource Energy are provided in the EIS.

2.2.1 Project Description (Case and Property Description)

The proposed action is designated by BLM as ROW serial numbers CACA 48668, CACA 49504, CACA 49503, and CACA 49502.

The site is located in Townships 16 and 17 North, Range 14 East, Dan Bernardino Meridian, approximately 4.5 miles southwest of Primm, Nevada in San Bernardino County, California. The property proposed for the rights-of-way grants comprises 3,712.7 acres of long-term (life of facility) disturbance, and 359.9 acres of temporary disturbance, for a total of 4,073 acres.

Long-term Acreages:

<u>Legal Description</u>
San Bernardino Principal Meridian

<u>Solar Partners II, LLC CACA-49504</u>

Ivanpah 1 Site
T. 16 N. R.14 E.,
Sec. 2: Lots 2, 3, 4, and SW¼NE¼, S½NW¼, SW¼, W½SE¼
Sec. 3: Lots 1, 2, and S½NE¼, SE¼NW¼, S½SW¼, SE¼
Sec. 10: NE¼, E½NW¼
Sec. 11: W½NE¼, NW¼

Solar Partners I, LLC CACA-48668

Ivanpah 2 Site
T. 17 N., R. 14 E.,
Sec. 27: SW¼SE¼, SW¼
Sec. 28: SE¼SW¼, SE¼
Sec. 33: E½, E½W½
Sec. 34: W½E½, W½

Solar Partners VIII, LLC CACA-49503

Ivanpah 3 Site
T. 17 N., R.14 E.,
Sec. 20: E½, E½W½
Sec. 21: All
Sec. 22: W½W½
Sec. 27:W½NW¼, NW¼SW¼
Sec. 28: N½, SW¼, N½SE¼, SW¼SE¼
Sec. 29: E½, SE¼NW¼, E½SW¼

Solar Partners IV, LLC CACA-49502

Administrative Site and Substation
T. 16 N., R. 14 E.,
Sec. 3: NW¼NE¼, N½NW¼, SW¼NW¼
Sec. 4: E½NE¼

T.17 N., R.14 E.,
Sec. 34: S½SW¼

Temporary Acreages:

Legal Description
San Bernardino Principal Meridian

Temporary Construction Logistics Area
T. 16 N., R. 14 E.,
Sec. 3: W½NE¼, NE¼, N½SW¼
Sec. 4: NE¼, NE¼SE¼

T. 17 N., R. 14 E.,
Sec. 33: SE¼SW¼, S½SE¼
Sec. 34: S½SW¼, SW¼SE¼

2.2.2 Applicant Objectives

The applicant's project objectives are set forth below. The fundamental objective is to build a solar project that generates 400 MW of renewable solar energy that will help the State meet its Renewable Portfolio Standard goals for new renewable electric generation. To assist in meeting the requirement for additional generating capacity, the Applicant (BrightSource) has developed solar technology which requires commercial-scale development to demonstrate its technical and commercial viability, and has entered into power purchase agreements to provide power from renewable sources into the California Independent System Operator (CAISO) system.

1. To safely and economically construct and operate a nominal 400-MW, solar generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities.
2. To demonstrate the technical and economic viability of Bright Source's technology in a commercial-scale project.
3. To locate the facility in areas of high solarity with ground slope of less than 5 percent.
4. To minimize infrastructure needs and reduce environmental impacts by locating the plant near existing and planned infrastructure, including: CAISO transmission lines, a source of natural gas, and an adequate water supply.
5. To avoid siting the plant in areas that are highly pristine or biologically sensitive (e.g., a Desert Wildlife Management Area).
6. To locate the project consistent with existing land use plans. If on public land, to comply with the multiple use objectives of the FLPMA, which includes renewable energy development, and the objectives of the CDCA Resource Management Plan (RMP), which allows for solar energy development in some areas.
7. To assist California in repositioning its generation asset portfolio to use more renewable energy in conformance with State Policy, including the policy objectives set forth in Senate Bill (SB) 1078 (California Renewable Portfolio Standard Program) and Assembly Bill (AB) 32 (California Global Warming Solutions Act of 2006).
8. To comply with provisions of the power sales agreement in negotiation for the first projects, to develop a project that can interconnect to a CAISO transmission line with the potential of achieving a commercial on-line date in 2010, but no later than 2011.

2.2.3 BLM Purpose and Need

NEPA guidance published by the Council on Environmental Quality (CEQ) states that environmental impact statements' Purpose and Need section "shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 CFR §1502.13). The following discussion sets forth the purpose of, and need for, the project as required under NEPA.

BLM's purpose and need for the ISEGS project is to respond to the applicant's application under Title V of the FLPMA (43 USC 1761) for a ROW grant to construct, operate, maintain, and decommission a concentrated solar electric generation plant on public land along with the associated infrastructure in compliance with FLPMA, BLM regulations, and other applicable federal laws. The BLM will approve, approve with modifications, or disapprove ROW applications filed by Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC (applicant), which are subsidiaries of BrightSource Energy, Inc. to develop the ISEGS project. The BLM will determine and disclose the environmental impacts of the ISEGS proposal and decide whether granting the requested ROW is in the public interest. The BLM has determined that the proposed solar project and associated ROW would require an amendment to the CDCA Plan. The BLM will also consider the amendment of the CDCA Plan to identify the ISEGS site.

In conjunction with FLPMA, BLM authorities include the relevant direction and policies noted above.

2.2.4 DOE Purpose and Need

The EPAct established a Federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of the EPAct of 2005 authorizes the Secretary of Energy to make loan guarantees for a variety of types of projects, including those that “avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases, and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued”.

The two principal goals of the loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits. The purpose and need for action by DOE is to comply with its mandate under EPAct by selecting eligible projects that meet the goals of the Act. DOE is using this NEPA process to assist in determining whether to issue a loan guarantee for BrightSource Energy to support the proposed project.

2.2.5 Land Use Plan Conformance and Amendment (BLM)

The principal land use plan affecting this proposed project is BLM’s CDCA Plan of 1980, as amended, and the Northern and Eastern Mojave Desert Management Plan (NEMO), which amends the CDCA Plan for those areas identified as the northern and eastern Mojave Desert. In the CDCA Plan, the location of the proposed ISEGS facility includes land that is classified as Multiple-Use Class L (Limited Use). The Plan states that solar power facilities may be allowed within Limited Use areas after NEPA requirements are met. This EIS is the mechanism for complying with those NEPA requirements.

Because solar power facilities are an allowable use of the land as it is classified in the CDCA Plan, the proposed action does not conflict with the Plan. However, Chapter 3, “Energy Production and Utility Corridors Element” of the Plan also requires that sites associated with power generation and transmission not already identified in the Plan be considered through the Plan Amendment process. The site for the proposed ISEGS facility is not currently identified within the Plan, and therefore a Plan Amendment is required to include that site as a recognized location within the planning boundary. Approval of this power generation site would result in an amendment to the Energy Production and Utility Corridors Element.

Other Agency Plans. In March, 2008, the BLM entered into a MOU (BLM Agreement No. 08-223) with San Bernardino County to establish a cooperative process for conducting environmental reviews of proposed projects located on BLM-managed lands located within the County. Under the terms of the MOU, the BLM acts as the lead agency for NEPA evaluation of each proposed project. The County acts as the California Environmental Quality Act (CEQA) lead agency, except in cases involving thermal energy projects that exceed 50 MW in size, in which case the Energy

Commission is designated as the lead and the County acts as a cooperating agency. For this proposed project, the Energy Commission is the lead agency for CEQA, and an analysis of conformance with applicable San Bernardino County land use plans is included within Section 5.6 of this EIS.

Land within San Bernardino County is classified according to Land Use Zoning Designations under the San Bernardino County General Plan, and Land Use Zoning Districts under the County Development Code. The Development Code implements the General Plan by regulating the use of land within unincorporated portions of the County. The Development Code identifies the land area of the proposed ISEGS facility as Resource Conservation (RC), a designation that allows use for electric power generation. Therefore, the proposed project conforms to the applicable County General Plan.

Planning Criteria (BLM)

The CDCA Plan planning criteria are the constraints and ground rules that guide and direct the development of the Plan Amendment. They ensure that the Plan Amendment is tailored to the identified issues and ensure that unnecessary data collection and analyses are avoided. They focus on the decisions to be made in the Plan Amendment, and will achieve the following:

“Sites associated with power generation or transmission not identified in the Plan will be considered through the Plan Amendment process.”

Because the site for the proposed ISEGS facility is not currently identified within the CDCA Plan, an amendment to identify that site is needed. As specified in Chapter 7, Plan Amendment Process, there are three categories of Plan Amendments, including:

- Category 1, for proposed changes that will not result in significant environmental impact or analysis through an Environmental Impact Statement;
- Category 2, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and
- Category 3, to accommodate a request for a specific use or activity that will require analysis beyond the Plan Amendment Decision.

Based on these criteria, approval of the proposed project would require a Category 3 amendment. This section summarizes the procedures necessary to evaluate the proposed Plan Amendment, as well as the procedures required to perform the environmental review of the ROW application.

Statement of Plan Amendment. The Implementation section of the Energy Production and Utility Corridors Element of the CDCA Plan lists a number of Category 3 amendments that have been approved since adoption of the Plan in 1980. An additional amendment is proposed to be added to this section of the Plan, and would read “Permission granted to construct solar energy facility on a power generation site (proposed Ivanpah Solar Electric Generating System).”

Plan Amendment Process. The Plan Amendment process is outlined in Chapter 7 of the Plan. In analyzing an applicant’s request for amending or changing the Plan, the BLM District Manager, Desert District, will:

1. Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.
2. Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.
3. Determine the environmental effects of granting and/or implementing the applicant's request.
4. Consider the economic and social impacts of granting and/or implementing the applicant's request.
5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from federal, State, and local government agencies.
6. Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

Decision Criteria for Evaluation of Proposed Plan Amendment. The Decision Criteria to be used for approval or disapproval of the proposed amendment require that the following determinations be made by the BLM Desert District Manager:

1. The proposed amendment is in accordance with applicable laws and regulations;
2. The proposed amendment will provide for the immediate and future management, use, development, and protection of the public lands within the CDCA.

The BLM Desert District Manager will base the rationale for these determinations on the principles of multiple use, sustained yield, and maintenance of environmental quality as required in the FLPMA of 1976. Multiple use is defined as management of public lands and their resource values in a combination that best meets the needs of present and future Americans, using some land for less than all of the resources, taking into account balanced and diverse use with long-term needs, and coordinating management of various resources without permanent impairment of productivity and environmental quality considering the relative values of the resources. Sustained yield is defined as achievement and maintenance in perpetuity of a high level annual or regular periodic output of the various renewable resources of the public lands consistent with multiple use. In this context, the authorized officer will determine whether the proposed action comports with these FLPMA principles.

Decision Criteria for Evaluation of Application. In addition to defining the required analyses and Decision Criteria for Plan Amendments, the Plan also defines the Decision Criteria to be used to evaluate future applications in the Energy Production and Utility Corridors Element of Chapter 3. These Decision Criteria include:

1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors;
2. Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables;
3. Provide alternative corridors to be considered during processing of applications;
4. Avoid sensitive resources wherever possible;

5. Conform to local plans whenever possible;
6. Consider wilderness values and be consistent with final wilderness recommendations;
7. Complete the delivery systems network;
8. Consider ongoing projects for which decisions have been made; and
9. Consider corridor networks which take into account power needs and alternative fuel resources.

Factors to be Considered. The Plan also states that, in the evaluation of proposed power plants, BLM will use the same factors affecting the public lands and their resources as those used by the Energy Commission. At the time the CDCA Plan was written, those factors included 1) consistency with the Desert Plan, 2) protection of air quality, 3) impact on adjacent wilderness and sensitive resources, 4) visual quality, 5) fuel sources and delivery systems, 6) cooling-water sources, 7) waste disposal, 8) seismic hazards, and 9) regional equity. These factors are now considered to include the environmental information requirements defined in the California Code of Regulations (CCR) Title 20, Appendix B, which include:

- General (Project Overview)
- Cultural Resources
- Land Use
- Noise
- Traffic and Transportation
- Visual Resources
- Socioeconomics
- Air Quality
- Public Health
- Hazardous Materials Handling
- Worker Safety
- Waste Management
- Biological Resources
- Water Resources
- Soils
- Paleontological Resources
- Geological Hazards and Resources
- Transmission System Safety and Nuisance
- Facility Design
- Transmission System Design
- Reliability
- Efficiency

The specific determinations required for the Plan Amendment evaluation are discussed in detail below. This EIS acts as the mechanism for evaluating both the proposed project application, and the proposed Plan Amendment. The factors specified in CCR Title 20, Appendix B are included within the scope of the analysis presented in the EIS.

Results of CDCA Plan Amendment (BLM)

Required Determinations

1. Determine if the request has been properly submitted and if any law or regulation prohibits granting the requested amendment.

The applicant's request for a right-of-way was properly submitted, and this EIS acts as the mechanism for evaluating and disclosing environmental impacts associated with that applications. No law or regulation prohibits granting the amendment.

2. Determine if alternative locations within the CDCA are available which would meet the applicant's needs without requiring a change in the Plan's classification, or an amendment to any Plan element.

The CDCA Plan does not currently identify any sites as solar generating facilities. Therefore, there is no other location on public land within the CDCA which could serve as an alternative location without requiring a Plan Amendment. The proposed project does not require a change in the Multiple-Use Class classification for any area within the CDCA.

3. Determine the environmental affects of granting and/or implementing the applicant's request.

This EIS acts as the mechanism for evaluating the environmental effects of granting the right-of-way and the Plan Amendment.

4. Consider the economic and social impacts of granting and/or implementing the applicant's request.

This EIS acts as the mechanism for evaluating the economic and social impacts of granting the right-of-way and the Plan Amendment.

5. Provide opportunities for and consideration of public comment on the proposed amendment, including input from the public and from federal, State, and local government agencies.

A Notice of Intent (NOI) to amend the CDCA Plan was published in the Federal Register November 6, 2008, Vol. 72, No. 214 Fed. Reg.62671-62672. Three respondents, all government agencies, provided comments during the 30-day NOI scoping period. Although not part of BLM's required NEPA or Plan Amendment process, public comments were also received on the Preliminary Staff Assessment (PSA) published by the Energy Commission in December, 2008. In response to the PSA, 13 respondents provided comments. These included government agencies, environmental organizations, and individuals with no stated affiliation. In response to the FSA/DEIS, 40 respondents provided comments. In response to the Supplemental DEIS, 20 respondents provided comments.

In accordance with the NOI, issues identified during the scoping period are placed in the comment categories below.

1. Issues to be resolved in the plan amendment

Several commenters who provided comments on the PSA, DEIS, and Supplemental DEIS expressed concern that the proposed project was not in conformance with the

CDCA Plan, and that such conformance should be achieved before the project would be approved. These comments are being resolved through this Plan Amendment.

2. Issues to be resolved through policy or administrative action

All other comments received addressed specific environmental impacts and mitigation measures that each commenter requested be analyzed in the EIS. These comments are being resolved by being considered within this EIS.

3. Issues beyond the scope of this plan amendment

Several commenters requested that the scope of the Plan Amendment be broadened to include issues other than evaluation of the BrightSource ROW application. These comments were outside of the scope of the analysis in this EIS and Plan Amendment.

1. Evaluate the effect of the proposed amendment on BLM management's desert-wide obligation to achieve and maintain a balance between resource use and resource protection.

The balance between resource use and resource protection is evaluated within the EIS. Title VI of the FLPMA, under California Desert Conservation Area, provides for the immediate and future protection and administration of the public lands in the California desert within the framework of a program of multiple use and sustained yield, and maintenance of environmental quality. Multiple use includes the use of renewable energy resources, and through Title V of FLPMA, the BLM is authorized to grant rights-of-way for generation and transmission of electric energy. The acceptability of use of public lands within the CDCA for this purpose is recognized through the Plan's approval of solar generating facilities within Multiple-Use Class L. The purpose of the EIS is to identify resources which may be adversely impacted by approval of the proposed project, evaluate alternative actions which may accomplish the purpose and need with a lesser degree of resource impacts, and identify mitigation measures and Best Management Practices (BMPs) which, when implemented, would reduce the extent and magnitude of the impacts and provide a greater degree of resource protection.

Conformance of ROW Application with Decision Criteria (BLM)

1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors.

The proposed project assists in minimizing the number of separate rights-of-way by being proposed in close proximity to existing Corridors D and BB. Electrical transmission associated with the proposed project will occur within these existing corridors, and placement of the facility adjacent to these corridors minimizes the length of new corridors necessary for transmission of natural gas to the site.

1. Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables.

Placement of the proposed project adjacent to existing Corridor D maximizes the joint-use of this corridor for natural gas and electrical transmission.

2. Provide alternative corridors to be considered during processing of applications.

This decision criterion is not applicable to the proposed project. Placement of the proposed facility adjacent to existing corridors does not require designation of alternative corridors to support the proposed project.

3. Avoid sensitive resources wherever possible;

The extent to which the proposed project has been located and designed to avoid sensitive resources is addressed throughout the EIS. BLM and other Federal regulations that restrict the placement of proposed facilities, such as the presence of designated Wilderness Areas or Desert Wildlife Management Areas were considerations in the original siting process used by the applicant and discussed with BLM during pre-application proceedings (43 CFR 2804.10) to identify potential project locations. The project location and configurations of the boundaries were modified in consideration of mineral resources. The alternatives analysis presented in the DEIS, and supplemented in the SDEIS and FEIS, considered whether the purpose and need of the proposed project could be achieved in another location, but with a lesser effect on sensitive resources.

4. Conform to local plans whenever possible;

The extent to which the proposed project conforms to local plans is addressed within the Land Use section of the EIS. The proposed project is in conformance with the San Bernardino County General Plan.

5. Consider wilderness values and be consistent with final wilderness recommendations;

The proposed project is not located within a designated Wilderness Area or Wilderness Study Area.

6. Complete the delivery systems network;

This decision criterion is not applicable to the proposed project.

7. Consider ongoing projects for which decisions have been made; and

This decision criterion is not applicable to the proposed project. Approval of the proposed project would not affect any other projects for which decisions have been made.

8. Consider corridor networks which take into account power needs and alternative fuel resources.

This decision criterion is not applicable to the proposed project. The proposed project does not involve the consideration of an addition to or modification of the corridor network. However, it does utilize facilities located within Corridors D and BB, which were designed with consideration of both power needs and locations of alternative fuel resources.

2.2.6 Project Evaluation and Decision Process

BLM Process

The Final EIS (FEIS) will be available for public review for a minimum of 30-days before the BLM issues a Record of Decision (ROD). When the ROD is issued, the decision regarding the ROW grant is in full force and effect, however it is appealable to the Interior Board of Land Appeals upon issuance of the ROD. The FEIS will also contain a proposed decision to amend the CDCA Plan. Proposed plan amendment decisions may be protested within 30-days of the proposed decision. BLM cannot make a final decision regarding issuance of a ROW grant or amending the Plan until any Plan protest is resolved.

Under the NEPA process, if an EIS is prepared, the BLM has made a determination of potential significant effect. In the discussion of environmental consequences, the EIS is required to include the environmental impacts of the proposed action and its alternatives, any adverse environmental effects which cannot be avoided if the project is implemented, the relationship between short-term use and long-term productivity, and any irreversible or irretrievable commitments of resources. The FEIS is to include a discussion of direct and indirect effects and their significance, possible conflicts between the proposed action and local land use, a comparison of effects among the alternatives, energy requirements, conservation potential, resource requirements and measures to mitigate adverse effects (40 CFR 1502.16). Impacts in an EIS are to be discussed in proportion to their significance, and are to contain only a brief discussion of other than significant issues (40 CFR 1502.2). The CEQ NEPA regulations provide a definition of “significantly” as used in the NEPA context (40 CFR 1508.27).

As outlined in NEPA regulations Section 1502.16, the analysis also includes a discussion of both direct and indirect effects and their significance, adverse environmental effects which cannot be avoided, whether impacts are short-term or long-term, and any irreversible or irretrievable commitments of resources.

DOE Process

DOE will carry out an independent review of the FEIS to ensure that DOE comments have been addressed and that the proposed action is substantially the same as the action described in the DEIS. If these conditions are met, DOE will adopt the FEIS without recirculating it pursuant to CEQ NEPA regulations at 40 CFR 1506.3(c).

While the FEIS was being developed, DOE also carried out a detailed technical and legal evaluation of the proposed project pursuant to its procedures for loan guarantees set out at 10 CFR Part 609. On February 22, 2010, DOE announced conditional commitments for more than $1.37 billion in loan guarantees under the American Recovery and Reinvestment Act to BrightSource Energy, Inc. to support the construction and start-up of Ivanpah Units 1, 2, and 3. A condition precedent is included in the conditional commitment that requires completion of the NEPA review and the BLM ROW grant process before DOE closes the loan guarantee transaction.

Following conclusion of the NEPA process and the BLM decision on issuance of the ROW grant, DOE will decide whether to issue a ROD and proceed to close the loan guarantee transaction provided that the applicant has satisfied all the detailed terms and conditions contained in the conditional commitment and other related documents, and all other contractual, statutory, and regulatory requirements.

Agency Coordination

California Energy Commission

The Energy Commission has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). The Energy Commission must review power plant AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Resources Code, § 25519), and compliance with applicable governmental laws or standards (Pub. Resources Code, § 25523 (d)). The Energy Commission staff's analyses were prepared in accordance with Public Resources Code, section 25500 et seq.; Title 20, California Code of Regulations, section 1701 et seq.; and CEQA (Pub. Resources Code, § 21000 et seq.).

As discussed above, the DEIS for this proposed project was developed as a joint environmental review document, the FSA/DEIS, under an MOU between the Energy Commission and BLM California State Office. Throughout the environmental review process, BLM and Energy Commission staff have conducted joint technical analysis, and co-authored the FSA/DEIS. Following the completion of the FSA/DEIS, BLM and the Energy Commission's environmental review process was separated, as BLM prepared a stand-alone Supplemental DEIS and this FEIS, and the Energy Commission prepared a stand-alone FSA Addendum to evaluate additional project alternatives. Throughout the process subsequent to the publication of the FSA/DEIS, BLM and Energy Commission staff have continued to review each other's documents in an attempt to maintain consistency between the documents to the extent feasible.

The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, both the Commission and BLM typically seek comments from and work closely with other regulatory agencies that administer laws and regulations that may be applicable to the proposed project. The following paragraphs describe the agency coordination that has occurred through this joint SA/EIS process.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE reviews proposed projects to determine whether they may impact such resources, and/or be subject to a Section 404 permit. Throughout the EIS process, the Energy Commission, BLM, and the applicant have provided information to the USACE to assist them in making a determination regarding their jurisdiction and need for a Section 404 permit. The USACE rendered a final opinion on May 28, 2009 concluding that the project does not affect waters of the U.S. and thus does not require such a permit.

National Park Service

The National Park Service manages the Mojave National Preserve (MNP), which is located near the proposed project area. Because of the proximity of the MNP, the Park Service has been invited to participate in scoping meetings and public workshops, and has been provided the opportunity review and provide comment on the PSA and EIS.

U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction to protect threatened and endangered species under the Endangered Species Act (ESA). Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally-listed species. The desert tortoise (*Gopherus agassizii*), which occurs in the proposed project area, is a federally-listed threatened species, and therefore formal consultation with the USFWS is required. This consultation has been initiated through the preparation and submittal of a Biological Assessment (BA) which describes the proposed project to the USFWS. Following review of the BA, the USFWS is expected to issue a Biological Opinion (BO) which will specify mitigation measures which must be implemented for the protection of the desert tortoise.

State Water Resources Control Board/Regional Water Quality Control Board

The Lahontan Regional Water Quality Control Board (RWQCB) has the authority to protect both surface water and groundwater resources at the proposed project location. Throughout the EIS process, the Energy Commission, BLM, and the applicant have invited the RWQCB to participate in public scoping and workshops, and have provided information to assist the RWQCB in evaluating the potential impacts and permitting requirements of the proposed project. The RWQCB has responded by providing comments that have been evaluated and incorporated into the EIS analysis. The RWQCB has also made a determination that the proposed project would impact waters of the state, and has specified conditions to satisfy requirements of a dredge and fill permit/waste discharge requirements.

California Department of Fish and Game

The California Department of Fish and Game (CDFG) has the authority to protect water resources of the state through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The Energy Commission, BLM, and the applicant have provided information to CDFG to assist in their determination of the impacts to streambeds, and identification of permit and mitigation requirements. The applicant filed a Streambed Alteration Agreement with CDFG on June 2, 2009. The requirements of the Streambed Alteration Agreement will be included as a recommended Mitigation Measure.

CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA). On May 22, 2009, the applicant filed an application for authorization for incidental take of the desert tortoise under Section 2081(b) of the CESA. The requirements of the Incidental Take Permit will be included as a recommended Mitigation Measure.

Tribal Relationships

The BLM has notified affected Indian Tribes regarding the proposed project, has sought their comments and has invited them to consult on the project on a government-to-government basis.

County of San Bernardino

On March 18, 2008, the BLM California Desert District entered into an MOU with the County of San Bernardino to coordinate environmental reviews for renewable energy projects on public land within the County. Under this MOU, BLM will invite the County to become a cooperating agency for EISs, and will provide opportunities for County staff to review and participate in technical discussions and analyses. San Bernardino Count y has requested cooperating agency status pursuant to the MOU. BLM has provided the County with project-related documentation for their review and evaluation.

Wilderness Review Considerations

All Public Lands within the California Desert District (CDD) were analyzed and summarized in 1979 wilderness inventory decisions performed pursuant to the FLPMA. See *"California Desert Conservation Area - Wilderness Inventory –Final Descriptive– March 31, 1979".* Public Land in the ISEGS [CACA 48668, 49502, 49503,49504] project area are contained within CDCA Wilderness Inventory Units [hereafter WIU] #CDCA 226 and 231.

WIU #CDCA 226 is bounded on the west by roads, by utility line corridors on the north and southeast, and the California- Nevada state line on the east. WIU #CDCA 231 is immediately south and is bounded on the northwest by the power line, on the southeast by the Interstate -15 corridor, and on the west by Mountain Pass Road. Both WIUs are dominated by bajadas draining east into Ivanpah Dry Lake, which are lightly vegetated with creosote communities.

The 1979 decision was that the imprints of man were substantially noticeable and that opportunities for solitude and primitive recreation were not outstanding. Each WIU contained signs of mining in the western portions, many roads and routes, and utility lines. The WIUs did not contain outstanding opportunities for solitude due to their size combined with only light vegetative and topographic screening. No one recreational opportunity or combination of recreational opportunities was considered outstanding.

The two inventories were maintained in 2010. The western 1/3 of WIU #CDCA 226 was transferred to the National Park Service in 1994, so it now bounded on the west by the Mojave National Preserve. Virtually all routes within the WIUs were designated as ‘open’ in a CDCA LUP Amendment and continue to be distinct due to vehicle use. Approximately five ROW grants for additional facilities have been approved in this WIU since 1980. Imprints of man remain substantially noticeable and opportunities for solitude and primitive recreation continue to not be outstanding.

Therefore, wilderness characteristics will not be analyzed further.

Public Coordination

Both the BLM's NEPA process and the Energy Commission's CEQA-equivalent process provide opportunities for public participation in the scoping of the environmental analysis. For the Energy Commission, this outreach program is primarily facilitated by the Public Adviser's Office (PAO). As part of the coordination of the environmental review process required under the Energy Commission/BLM California Desert District MOU, the agencies have jointly held public meetings and workshops which accomplish the public coordination objectives of both agencies. This is an ongoing process that to date has involved the following efforts.

Libraries

The AFC was sent to the main county libraries in San Bernardino, Barstow, Fresno, and Eureka; the main branches of the San Diego and San Francisco public libraries; the University Research Library at UCLA; the California State Library, and the Energy Commission's library in Sacramento.

Outreach Efforts

BLM solicited interested members of the public and agencies through the NEPA scoping process. BLM published a Notice of Intent to develop the EIS and amend the CDCA Plan in the Federal Register, Vol. 72, No. 214, page 62671, on November 6, 2007. The initial Public Scoping meeting was held on January 4, 2008, and coincided with the Informational Hearing held by the Energy Commission. On January 9, 2009, BLM published notice of an extension of the public scoping period, and an additional joint public scoping meeting was held on January 25, 2008.

Following the scoping period, the Energy Commission and BLM held additional joint Issue Resolution workshops which were announced and made available to the public. These workshops were held on June 23, 2008 in Primm, Nevada, and on July 31 and December 15, 2009 in Sacramento, California. The Energy Commission continued to accept and consider public comments, and granted petitions to intervene to eight interested groups including Defenders of Wildlife, Sierra Club, Basin and Range Watch, and Center for Biological Diversity (June 2, 2009), California Native Plant Society, Western Watersheds, CURE, and San Bernardino County. Although not officially part of BLM's NEPA process, BLM's NEPA analysis was supported by information received through these activities.

The BLM public participation process included soliciting comments regarding the scope of the analysis from other government agencies, the public, and non-governmental organizations. The persons and organizations which provided scoping comments, and the general issues addressed within their comments, are provided in **Table 2.1**.

The NOA of the DEIS was published on November 10, 2009; the 90-day public review and comment period ended on February 11, 2010. During the public comment period, a variety of activities occurred in which BLM received additional information regarding the proposed project and potential alternatives, impacts, and mitigation measures. These activities included:

- Receipt of comments from the public, and other local, state, and federal agencies during the public comment period;

- Public testimony by Energy Commission staff and consultants, BrightSource staff and consultants, and intervenors associated with the Energy Commission certification process for ISEGS;
- Workshops, involving BLM staff and consultants as well as the above groups, to consider and evaluate impact analyses and mitigation approaches; and
- Submittal of additional technical reports, project design information, impact analyses, and applicant-proposed mitigation measures by BrightSource.

The NOA of the SDEIS was published on April 16, 2010; the 45-day public review and comment period ended on June 1, 2010.

The applicant's Application for Certification to the Energy Commission (CH2M Hill 2007), the Energy Commission's PSA, and the joint BLM/Energy Commission FSA/DEIS are all publicly available on the Energy Commission website at http://www.energy.ca.gov/sitingcases/ivanpah/index.html.

Summary of Public and Agency Scoping Comments

The BLM and Energy Commission processes include soliciting comments regarding the scope of the analysis from other government agencies, the public, and non-governmental organizations. The persons and organizations which provided scoping comments, and the general issues addressed within their comments, are provided in **Table 2.1** below.

Summary of Public Comments on DEIS and Supplemental DEIS

BLM received comments on the DEIS from 37 individuals, groups, and agencies. These comments are summarized in Appendix A-1 of this FEIS. Comments from 20 individuals, groups, and agencies were received on the SDEIS, and these comments are summarized in Appendix A-2 of this FEIS. Both sets of comments included hundreds of comments received both in favor of the project, and in opposition to the project, in the form of mass mailings and e-mails. The summaries in Appendices A-1 and A-2 include a description of how each comment was evaluated and responded to by BLM. Also, where a comment is particularly relevant to the technical discussion in the text of the FEIS (either comments resulting in revision to the FEIS, or comments dissenting from important conclusions of the FEIS), that information has been incorporated into the revisions for the FEIS. Section 9 also provides a discussion of the comments, including both those which resulted in a change to the text in the FEIS, and those which were considered, but did not result in a change. The comments generally addressed the following topics

- The range of alternatives considered and evaluated, and the methodology for evaluating the alternatives;
- The scope of projects considered in the cumulative impacts analysis, and the methodology for conducting that analysis;
- Opposition to the contribution of the project to industrialization of Ivanpah Valley; and
- Specific comments related to impacts to biological resources, the Mojave National Preserve, air traffic, County services, and other resources.

Table 2.1
Scoping Comments Received

Date	Name, Title, Association/ Location	Issue addressed within Comment
Oct. 18,2007	Mack Hakakian, PG, Engineering Geologist, California Regional Water Quality Control Board Lahontan Region	Impacts to surface Water of the State and/or Water of the U.S, pre and post construction stormwater management, Water Quality Certification, Design features (runoff and drainage), Wastewater Discharge
Oct. 25, 2007	Curt Shifrer, Water Resources Control Engineer, California Regional Water Quality Control Board Lahontan Region	Groundwater Quality, Wastewater Discharge, Aboveground Surface Irrigation system, Sub-surface irrigation system
Sept. 26, 2007	Carrie Hyke, AICP, Principal Planner, San Bernardino County Land Use Service Department Advance Planning Division, Environmental & Mining Section, County of San Bernardino Public and Support Services Group, Department of Public Works	Biological Impacts, Cultural Resources, Fire Hazards, Groundwater
January 2, 2008	Mia Ratcliff, Manager, Planning and Programming Branch, U.S. Department of Transportation Federal Aviation Administration, Western Pacific region, Airports Division	Impacts resulting from thermal plumes, glare, and presence of proposed towers.
Jan. 23, 2009	Alice Bond, Regional Program Coordinator, The Wilderness Society, California/Nevade Regional Office Alex Daue, Renewable Energy Coordinator, The Wilderness Society, BLM Action Center Johanna Wald, Senior Attorney, Natural Resources Defense Council	Encourages agency (Energy Commission and BLM) coordination in ROW permitting application. Addresses characteristics conducive to utility-scale development within the project area. Impacts to Natural, Cultural and Visual Resources, Air Quality. Public Benefits (relating to Greenhouse Gas Emissions)
June 22,2009	Sidney Silliman, San Gorgonio Chapter and Desert Committee, Sierra Club	Designation of Areas of Critical Environmental Concern, retire Clark Mountain Grazing Allotment, Alternative Site Analysis (Site Relocation)

2.2.7 Organization of the Document

The FEIS is organized as follows:

Section 1 – Executive Summary summarizes the EIS.

Section 2 – Introduction discusses the purpose and need for the proposed project, as well as BLM's processes for the CDCA Plan Amendment and the EIS.

Section 3 – Alternatives, Including the Proposed Action, provides a detailed description of the proposed project and those alternatives which have been retained for detailed evaluation. The section also describes BLM's methodology for identifying and screening alternatives, and describes the rationale for elimination of other alternatives from detailed evaluation.

Section 4 – Affected Environment and Environmental Consequences. The environmental and public health and safety analyses of the proposed project are contained in Section 4. They include the following: Air Quality, Greenhouse Gases, Biological Resources, Cultural Resources and Native American Values, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health and Safety, Socioeconomics and Environmental Justice, Soil and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Waste Management, , Worker Safety and Fire Protection, Geology, Paleontology and Minerals, Livestock Grazing, Wild Horses and Burros, and Recreation.

Each of these 19 technical area assessments includes a discussion of:

- Detailed project-specific information that is directly relevant to the resource being evaluated;
- Laws and regulations;
- Affected environment;
- Project direct and indirect impacts from construction, operations, and closure and decommissioning impacts;
- Beneficial impacts;
- Impacts of alternatives, including the No Action Alternative;
- Mitigation Measures; and
- Summary

Section 5 – Cumulative Effects, including identification of the past, present, and reasonably foreseeable future projects, and an evaluation of the cumulative impacts resulting from those projects in combination with the proposed project and alternatives.

Section 6 – Other NEPA Considerations provides an evaluation of the irreversible and irretrievable commitment of resources, unavoidable adverse impacts, and growth inducing effects.

Section 7 – General Conditions, which provides the General Conditions of Approval that are proposed for inclusion in the ROW grant.

Section 8 – Summary, which summarizes the results of the environmental analysis, and identifies BLM's preferred alternative.

Section 9 – Public Participation summary

Section 10 – List of Preparers

Section 11 – References

Appendix A provides a summary of public comments received on the DEIS and SDEIS, including BLM's responses to the comments.

Appendix B contains technical resource-specific appendices that provide additional information to support the technical analyses in Section 4.

Appendix C provides additional information developed by the Energy Commission which is not part of BLM's environmental analysis, but describes additional features of the proposed action. This includes the Energy Commission's General Conditions of Certification that are specific to the Energy Commission's certification process. In addition, engineering analyses performed by the Energy Commission are included in Appendix C, and include sections on Facility Design, Power Plant Efficiency, Power Plant Reliability, and Transmission System Engineering.

3.0 Alternatives including the Proposed Action

This section summarizes the alternatives identification and screening process, provides a detailed description of those alternatives which were retained for detailed evaluation, and summarizes the rationale for the elimination of other alternatives that were considered but eliminated from detailed evaluation.

3.1 Overview of Alternatives Development

The alternatives evaluation process in this EIS is a multi-step process which follows the requirements provided in 40 CFR 1502.14. Section 1502.14(a) specifies that the agency "shall rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated". This section of the EIS will:

- Identify potential alternatives;
- Perform a screening analysis to identify those which are reasonable and feasible, to be retained for more detailed analysis; and
- Provide the rationale for elimination of those alternatives which are not reasonable or feasible.

Twenty-five alternatives to the ISEGS project have been identified and evaluated in this section. These include nine alternative site locations, as well as different solar technologies, different renewable technologies, generation technologies using different fuels, and conservation/demand-side management. The range of alternatives identified includes alternatives which are not within the lead agency's (BLM's) jurisdiction, as well as the No Action Alternative. The range of alternatives evaluated in the FEIS encompasses those to be considered by the ultimate decision maker (40 CFR 1502.2(e)). The evaluation in this section includes whether the alternative is reasonable and whether it would accomplish the purpose and need for the proposed action, as well as whether it would avoid or reduce adverse impacts caused by the proposed action. This screening-level analysis is intended to identify the range of reasonable alternatives, and the analysis also includes a resource-by-resource evaluation of environmental impacts of most of the potential alternatives.

The alternatives retained for detailed analysis in this section are evaluated further in Sections 4, 5, and 6 of this EIS. Section 4 provides a succinct description of the environment to be affected (40 CFR 1502.15), and the qualitative and, where applicable, quantitative information necessary to support a comparison among the alternatives (40 CFR 1502.16). Section 4 also identifies appropriate mitigation measures that are not included in the proposed action or the alternatives (40 CFR 1502.14). Section 5 provides an analysis of the cumulative effects associated with each retained alternative, and Section 6 evaluates the alternatives with respect to the irreversible and irretrievable commitment of resources, unavoidable adverse impacts, growth-inducing effects, and relationship between short-term uses and long-term productivity.

Regulatory Requirements

NEPA requires that the decision-makers and the public be fully informed of the impacts associated with the proposed action and alternatives. The intent is to make good decisions based on understanding environmental consequences, and to take actions to protect, restore, and enhance the environment. NEPA requires that an EIS consider all reasonable alternatives, those that are practical or feasible from the technical and economic standpoint and from using common sense, rather than simply desirable from the standpoint of the applicant (NEPA's 40 Questions, 1A).

Regulations promulgated by the Council on Environmental Quality require that an EIS rigorously explore and objectively evaluate all reasonable alternatives to a proposed action. Reasonable alternatives are those for which effects can be reasonably ascertained, whose implementation is not remote or speculative, that are feasible, effective, are not remote from reality, and those that are consistent with the basic policy objectives for management of the area. (40 CFR 1502.14; CEQ Forty Questions, No. 1A; <u>Headwaters , Inc. v. BLM</u>, 914 F.2d. 1174 (9th Cir. 1990).) Reasonable alternatives are dictated by the nature and scope of the proposed action. To determine reasonable alternatives, an agency must define the purpose and need of the proposal. The purpose and need of the proposed action is to be evaluated under a reasonableness standard. CEQ regulations state that an agency should include reasonable alternatives not within the jurisdiction of the lead agency (40 CFR 1502.14(c)). BLM interprets this to apply to exceptional circumstances and limits its application to broad, programmatic EISs that would involve multiple agencies. Because this is a site specific analysis and not a programmatic EIS, and for other reasons, these types of alternatives are identified but are not carried forward for full evaluation for BLM purposes in this FEIS.

For most actions, the purpose and need statement should be constructed to reflect BLM's discretion consistent with its decision space under its statutory and regulatory requirements. Thus, alternatives that are not within BLM jurisdiction would not necessarily be considered reasonable. Further, "[i]n determining the scope of alternatives to be considered, the emphasis is on what is 'reasonable' rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative..." (CEQ Forty Questions, No. 2a.)

Consideration of a No Action Alternative is mandated by NEPA. The No Action Alternative is the scenario that would exist if the proposed project was not constructed and no land use plan amendment was undertaken. Under a No Action Alternative, the land would continue to be managed by BLM under existing management as defined in the California Desert Conservation Area plan. This FEIS evaluates two other NEPA alternatives: in which the project would ultimately not be approved. One of the other alternatives would deny the project application, but the plan would be amended to allow other solar projects on the site, and the other alternative would deny the project application and the plan would be amended to prohibit solar or renewable project development at the site.

Alternatives Screening Methodology

To prepare the alternatives analysis, the BLM first developed an understanding of the project, identified the basic objectives of the project, and described its potentially significant adverse impacts. It then developed a list of potential alternative technologies, locations, and configurations for the proposed action. Once this list was thought to be complete, BLM included a no action alternative, evaluated these potential alternatives to select those qualified for detailed evaluation, and provided the rationale for the elimination of the alternatives that were not retained for full analysis.

Based on this methodology, each potential alternative was evaluated to determine if it should be retained for detailed analysis. Alternatives were eliminated from detailed analysis if:

- It is ineffective (it would not respond to the purpose and need).
- It is technically or economically infeasible.
- It is inconsistent with the basic policy objectives for the management of the area (such as, not in conformance with the land use plan).
- Its implementation is remote or speculative.
- It is substantially similar in design to an alternative that is analyzed.
- It would have substantially similar effects to an alternative that is analyzed.

Data Sources

The information used to support the description of the proposed project and applicant-proposed mitigation measures in this EIS is contained within a variety of documents associated with the applicant's Application for Certification (AFC) to the Energy Commission. Under the Section III of the MOU in which BLM and the Energy Commission established the process for conducting this joint environmental review, the Data Adequacy and Discovery processes were led by the Energy Commission, based on BLM and Energy Commission staff review and evaluation of the AFC. Through this process, BLM's data needs to support the EIS were filled by BLM providing data needs to the Energy Commission, the Energy Commission including these needs in their own data requests to the applicant, and then the applicant providing the information in Data Response documents, which are considered supplements to the AFC. Therefore, although this EIS refers to these AFC and Data Response documents, which are typically Energy Commission-process documents, as the source of information, these documents are considered to comprise BrightSource's application materials, including the Plan of Development, in support of their BLM right of way grant application.

3.1.1 Project Objectives

Eight objectives are set forth by BrightSource in its AFC:

- To safely and economically construct and operate a solar generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities.
- To demonstrate the technical and economic viability of Bright Source's technology in a commercial-scale project.
- To locate the facility in areas of high solarity with ground slope of less than 5 percent.

- To minimize infrastructure needs and reduce environmental impacts by locating the plant near existing and planned infrastructure, including: CAISO transmission lines, a source of natural gas, and an adequate water supply.
- To avoid siting the plant in areas that are highly pristine or biologically sensitive (e.g., a Desert Wildlife Management Area).
- To locate the project consistent with existing land use plans. If on public land, to comply with the multiple use objectives of the FLPMA, which includes renewable energy development, and the objectives of the CDCA Resource Management Plan (RMP), which allows for solar energy development in some areas.
- To assist California in repositioning its generation asset portfolio to use more renewable energy in conformance with State Policy, including the policy objectives set forth in SB 1078 (California Renewable Portfolio Standard Program) and AB 32 (California Global Warming Solutions Act of 2006).
- To comply with provisions of the power sales agreement in negotiation for the first projects, to develop a project that can interconnect to a CAISO transmission line with the potential of achieving a commercial on-line date in 2010, but no later than 2011.

While the objectives of the applicant are of interest to BLM, BLM policy is clear that the BLM purpose and need dictates the range of alternatives and provides the basis for the eventual selection of an alternative.

3.1.2 Summary of Scoping and Screening Results

The development and evaluation of alternatives has included solicitation and consideration of comments from the public and other government agencies. The public scoping comment period allowed the public and regulatory agencies an opportunity to comment on the scope of the environmental document, comment on the alternatives considered, and to identify issues that should be addressed in the environmental review. The discussion below presents the key issues identified from the written and oral comments received on the ISEGS Project. The specific issues raised during the public scoping process are summarized as follows:

- Potential impacts to rare, declining, and listed species and their associated desert habitat and water use;
- Loss of desert tortoise habitat and insufficient land acquisition ratio proposed for mitigation;
- Concerns regarding the proposed relocation of desert tortoise;
- Impacts to bighorn sheep and disruption of wildlife movement;
- Cumulative and regional effects including those of other renewable energy projects in the region, the CDCA and in Nevada;
- Alternatives; reasonable alternatives should include, but are not limited to, alternative sites, capacities, and technologies;

- Potential glare and thermal plume effects on aircraft using airports at or around Jean, Searchlight and Pahrump as well as the proposed Southern Nevada Supplemental Airport;
- Impacts to groundwater quality from additional groundwater withdrawal and emergency wastewater discharges;
- Impacts to the Mojave National Preserve including the scenic viewshed, disruption of natural soundscape, potential for blocking or limiting access to recreation in Clark Mountain, light pollution, and air quality impacts;
- Indirect impacts of solar, wind, and geothermal energy projects resulting from new transmission lines and corridors.

Following publication of the DEIS in November 2009, the public and other agencies provided comments, including identification of other alternatives not considered in the DEIS; specific technical information regarding the feasibility of, or impacts associated with, certain alternatives; and statements of preference for various alternatives. This included the receipt of more detailed information regarding two alternatives which had been eliminated from detailed analysis in the DEIS, the Reduced Acreage Alternative and the I-15 Alternative. This additional information suggested that one or both of these alternatives could be technically and economically feasible, could achieve BLM's purpose and need for the proposed project, and could avoid impacts to sensitive resources in the northern part of the proposed project area. As a result of these comments, the analysis provided in this section was re-evaluated and revised. The revision has resulted in the following actions:

- Revision of the original conclusion in the DEIS to eliminate the Reduced Acreage Alternative and I-15 Alternative from more detailed evaluation. The detailed evaluation of these two alternatives was provided in the Supplemental Draft EIS, published on April 17, 2010, and is provided in **Sections 3.2.2** and **3.2.3** below.
- Revision of the introduction to this section, to provide a more explicit description of how the alternatives evaluation process is linked to requirements under NEPA.
- Modification of BLM's objectives for the project, so that the consideration of alternatives is not constrained by BLM's jurisdiction or the applicant's construction schedule.
- The addition of technical information, where appropriate, in the discussion of specific alternatives.
- The addition and screening evaluation of two alternatives not considered in the DEIS.

3.2 Alternatives Retained for Detailed Evaluation

Based on the screening evaluation, four alternatives have been retained for more detailed analysis and evaluation in Section 4. These alternatives include:

- Proposed Action
- Mitigated Ivanpah 3 Alternative
- Modified I-15 Alternative

- No Action Alternative

To support the detailed environmental analysis of these alternatives, the following subsections provide a detailed description of the facilities, construction procedures, operational procedures, and decommissioning procedures that would be associated with each of these alternatives.

3.2.1 Proposed Action

The applicant for this project consists of Solar Partners I, LLC; Solar Partners II, LLC; Solar Partners IV, LLC; and Solar Partners VIII, LLC (applicant), which are subsidiaries of BrightSource Energy, Inc. On August 31, 2007, the applicant filed an AFC with the California Energy Commission (Energy Commission) seeking permission to develop the ISEGS project. The applicant filed four ROW applications with BLM for the ISEGS project on August 29, 2007. BrightSource Energy, Inc. (BrightSource) is a technology and development company and the parent company of the four limited liability companies. The Applicant would use BrightSource's solar thermal technology to develop ISEGS. The four ROW applications filed by BrightSource are for projects that are designed and intended to operate while sharing certain common areas and facilities. The analysis contained in the EIS applies to the proposed project as a whole. The AFC filed with the Energy Commission and the four applications to BLM include an application for shared facilities including a substation, administration and maintenance buildings within a construction logistics area, and separate applications for the three power plants. The applicant's development plans have been updated several times since filing its original AFC and ROW applications with the most substantial revisions summarized as follows in **Table 3.1**.

Table 3.1
Summary of Applicant's Updates to its ISEGS Development Plans

Date	Reference Document	Project Area	Number of Heliostats	Other Revisions to Proposed Project
AFC and ROW Application				
8-31-07	AFC Section 2.1, page 2-2 (CH2M Hill 2007)	3,400	272,000	The original heliostat proposal consisted of a single 7 square meter (m^2) mirror hung in a landscape orientation;
Revision 1 – Optimized Project Design				
5-9-08	Data Response 1D, page 4 (CH2M Hill 2008d)	3,700	214,000	1. Reduced the total number of heliostats from 272, 000 in the single-hung to 214,000 in the double-hung mirror configuration (reducing from 68,000 to 55,000 heliostats each for Ivanpah 1 and 2, and reducing from 136,000 to 104,000 heliostats for Ivanpah 3); 2. Doubled the heliostat mirror surface area from 7 to 14 m^2; 3. Reduced the number of power towers associated with Ivanpah 1 and 2 from three to one, and increased the height of the power tower from 262 to 459 feet; 4. Moved the project boundaries out an additional 250 feet on the perimeters within the surveyed areas to increase the spacing between the larger heliostats.
Revision 2 – Revision to Site Plans & Stormwater Drainage Design				
6-10-08	Data Response 2A (CH2M Hill 2008e)	4,065	214,000	1. Revised stormwater drainage plans from pass-through to active management including large detention ponds and conveyance features; 2. The addition of stormwater detention ponds resulted in an increased project area from 3,700 to 4,065 acres; 3. Proposed a high level of grading and ground disturbance.
Note: Because the revised plans were not supported with underlying site characterization assumptions and stormwater calculations, BLM and the Energy Commission requested supporting information from the applicant. This led the applicant to reconsider its site plans and to develop Revision 3.				
Revision 3 – Revision to Site Plans & Stormwater Drainage Design				
5-18-09	Data Response 2I (CH2M Hill 2009a)	4,073	214,000	1. Revised stormwater drainage plans again, eliminating large detention basins and conveyance features, and relying on existing ephemeral drainages; 2. Proposed Low Impact Development (LID) approach to minimize ground disturbance and to retain as much vegetation as possible; Vegetation would be cut and maintained to a height of 12 – 18".
Note: The Power Purchase Agreement would allow utilization of up to 270,000 heliostats.				

Proposed Project Location and General Description

The applicant has proposed to locate the ISEGS project in the Mojave Desert, near the Nevada border in San Bernardino County, California, on land administered by the BLM. The proposed project site is located 4.5 miles southwest of Primm, Nevada, and 0.5 mile west of the Primm Valley Golf Club, which is located just west of the Ivanpah Dry Lake. Access to site is from the Yates Well Road Interchange on Interstate 15 (I-15) via Colosseum Road. Please see **Figure 3.1** and **Figure 3.2**.

The proposed ISEGS project would be a development of three solar concentrating thermal power plants, which are comprised of fields of heliostats (elevated mirrors guided by a tracking system) focusing solar energy on boilers located on centralized power towers. Each heliostat tracks the sun throughout the day and reflects the solar energy to the receiver boiler. In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from the solar reheater. The applicant proposes to develop the ISEGS project as three power plants in separate and sequential phases that are designed to generate a total of 400 MW of electricity. Ivanpah 1 and 2 would each have an electrical generation capacity of 100 MW, and Ivanpah 3 a capacity of 200 MW. Shared facilities consisting of the substation, administration and maintenance buildings would be developed during construction of the first power plant in the Construction Logistics area between Ivanpah 1 and 2.

Proposed Right-of-Way Acreage Description

As noted above in **Table 3.1**, since filing the AFC and ROW Application, the applicant's proposed project plans have been updated for design optimization and for two revisions associated with stormwater management approaches. Associated with the Optimized Project Design adjustment of power plant boundaries, the applicant proposed that the western Ivanpah 3 boundary line be moved to exclude the existing mining claim at the limestone outcrop to the west of the project site (CH2M Hill 2008d). The acreages of long term (life of the facility) and temporary disturbances associated with the applicant's final conceptual plans are summarized as follows in **Table 3.2**.

Table 3.2
Long Term and Temporary Disturbance of BLM Land (acres)

Facility	Acres
Long Term Disturbance	
Ivanpah 1	913.5
Ivanpah 2	920.7
Ivanpah 3	1,836.3
Substation	16.1
Administration/warehouse & parking	8.9
Southwest Gas Company's Kern River Gas Line Tap Station (100' X 150')	0.3
Southwest Gas Company's Metering Set for Ivanpah 1 & 2 (20' X 40')	0.02
Groundwater Wells [10' x 10' area for 2 supply wells and 1 monitoring well)	0.01
Transmission Towers (8' x 8' area every 750 feet)	0.01
Linear Facilities (Colosseum Road, Gas, Water & Transmission Lines)	16.9
Subtotal – Long Term Disturbance	**3,712.7**
Temporary Disturbance	
Main Construction Laydown Area	260.0
Equipment Laydown and Wash Area	21.5
Contractor Trailers	20.1
Colosseum Road Improvement (100-ft wide construction corridor from Golf Club to Ivanpah 2, less asphalt road)	12.4
Southwest Gas Company's construction laydown	5.0
Gas line (75' wide construction disturbance from tap to Ivanpah 3 for 2,011 feet)	2.9
Southwest Gas Company's Kern River Gas Line tap construction area (200' x 200')	0.9
Adjustment for Roads	(1.8)
Subtotal – Temporary Disturbance	**321.0**
Existing Transmission Line Corridor (within Construction Logistics Area)	38.9
Total ISEGS Project Land Use	**4,073**
Overview of ISEGS Project Land Use	
Ivanpah 1	**913.5**
Ivanpah 2	**920.7**
Ivanpah 3	**1,836.3**
Construction Logistics Area	**377.5**
External Features to ISEGS Project Boundaries (Roads & Natural Gas Line)	**24.5**
Total ISEGS Project Land Use	**4,073**

Source: CH2M Hill 2009a

The proposed project would cause long term disturbance of about 3,713 acres, temporary disturbance of 321 acres, and including the existing transmission line corridor of about 39 acres within the Construction Logistics area, ISEGS would utilize about 4,073 acres (6.4 square miles) of federal land managed by BLM. Please see **Figure 3.3**.

Solar Power Plant Equipment and Facilities

Heliostats

Each heliostat would be configured with two mirrors hung in the portrait position. Each mirror would be 7.2 feet high by 10.5 feet wide, providing a reflective surface of 75.6 square feet (7.04 m^2) per mirror or 14.08 m^2 per heliostat (See **Figure 3.4**). The overall height of the heliostats would be about 12 feet. The heliostats would be connected with communication cables strung aboveground between each heliostat. The communications cables would transmit signals from a computer-programmed aiming control system that would direct the movement of each heliostat to track the movement of the sun (CH2M Hill 2009a). Heliostats in the northern section of the heliostat array have the highest solar collection efficiency because the sun is predominantly in the southern horizon, and they have the most direct reflection angle to the power towers (most perpendicular to the face of the mirror as it reflects to the power tower). Conversely, heliostats in the southern section of the heliostat array have the lowest solar collection efficiency. The eastern sector of heliostats is more valuable than the western sector because afternoon energy collection during on-peak utility hours, is more valuable than morning energy collection during partial-peak or off-peak hours. In consideration of the relative efficiency of heliostats depending on their orientation to the power tower, the applicant indicated that the number of heliostat rows increased from least to greatest according to this efficiency in order of southern, western, eastern and northern sectors respectively (CH2M Hill 2007, page 2-5).

The heliostats would normally travel by day within the range of the stowed position with the mirrors facing vertically upwards to the track position at some angle higher than facing horizontally. At night, the heliostats would normally be maintained in the stowed position. Approximately every 2 weeks, the mirror would travel from the stowed to the wash position for night-time mirror washing with the mirrors facing horizontally. Daily positioning of the heliostats would occur as follows:

1. At dawn, when likely all heliostats would be moved from stowed to track position to begin reflecting solar energy to the receiver/boiler;
2. During mid-day, when some heliostats would be returned to the stowed position to not exceed solar energy capacity limits of the receiver/boiler;
3. During late-afternoon or evening, when the stowed heliostats would be returned to track position to increase solar energy directed to the receiver/boiler as the sun's position begins to lower in the western horizon and be less optimal for energy production;
4. At nightfall, when all heliostats would be returned to the stowed position or to the wash position for mirror washing at a frequency of about once every two weeks (CH2M Hill 2009a).

The number of heliostats described under the Optimized Project Design (55,000 each for Ivanpah 1 and 2, and 104,000 for Ivanpah 3) represents the maximum number of heliostats that would be constructed; however, all of them may not be constructed. Although the number of heliostats within Ivanpah 1 and 2 have been reduced about 19.1 percent, the permitted surface area of the heliostats would increase about 61.8 percent from about 5,283,600 square feet (~490,960 square meters) to about 8,547,000 square feet (~794,200 square meters). In Ivanpah 3, with a 23.5 percent reduction in the number of heliostats, the reflective surface area permitted would increase about 52.9 percent from about 10,567,200 square feet (~981,920 square meters) to about 16,161,600 square feet (~1,501,760 square meters). This surface area increase would result in additional electricity production (MW-hours) on an annual basis with no change in installed capacity (MW) and with only a small amount of additional land. Under the Optimized Project Design, the applicant has not proposed any changes in the steam turbine-generators and interconnection capacity (CH2M Hill 2008d).

The applicant's proposed increase in heliostat mirror surface area associated with the Optimized Project Design led the applicant to also propose an increase in total ISEGS area of about 300 acres and extension of the project boundaries of the three power plants by 250 feet along each perimeter. The proposed increase in the heliostat mirror area is a result of the following considerations:

1. The double-hung mirror configuration is taller than the single-hung orientation, and the resulting increase in shadowing requires greater distance between the arrays, with the result that the last rows are farther from the towers. Energy collection is less efficient the farther the mirrors are from the tower receivers, so additional heliostat surface area (approximately 5 to 10 percent) is needed to achieve the same annual energy output.

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

3. Finally, a portion of the increased heliostat surface area to be licensed ensures that the project will be able to meet its contractual output requirements even if the solar resource is less than forecasted. The final rows of heliostats may not be necessary. Pending the results of actual performance during plant operation, a decision will be made on whether or not to install the additional heliostats. Thus, the project optimization represents the maximum number of heliostat structures and heliostat surface area (CH2M Hill 2008d).

4. To ensure that installed heliostats are stable with respect to water erosion at their base and pressure applied by wind, the applicant has conducted, and continues to conduct, heliostat installation and stability testing. This has included several phases of field testing in August 2009, February 2010, and June 2010. The testing has included the use of different drilling equipment and methods to identify feasible and efficient means to install the pylons for the heliostats, and stability tests on the installed pylons to determine the necessary type of pylon

configuration and depth of insertion to address the potential effects of wind pressure and water erosion on the heliostats.

Solar Power Towers

Another result of the applicant's Optimized Project Design was to revise the number and height of the solar power towers for Ivanpah 1 and 2. In the original application, Ivanpah 1 and 2 would have required three power tower receivers and one solar reheater; each would have stood 262 feet high. The revised site design incorporated only one power tower for each Ivanpah 1 and 2, with an increased height to 459 feet, consistent with the height of the five power towers for Ivanpah 3. The decrease from three power towers to one each for Ivanpah 1 and 2 also resulted in a change in the orientation of the heliostats as they are generally arranged concentrically around the power tower. Ivanpah 3 would have five power tower receivers situated with one in each quadrant, and one central to the Ivanpah 3 site, each with a height of 459 feet. The central power tower of Ivanpah 3 would include the power block with one steam turbine-generator supplied superheated steam by the five power tower boilers. Steam from the four quadrant solar power tower boilers would be conveyed by above-ground pipeline.

The solar power tower is a metal structure designed specifically to support the boiler and efficiently move high-quality steam through a steam turbine-generator (STG) at its base. The power tower support structure would be about 120 meters high (approximately 393 feet). The receiving boiler (which sits on top of the support structure) would be 20 meters tall (approximately 66 feet) including the added height for upper steam drum and protective ceramic insulation panels (See **Figure 3.5**). Overall, each of the seven power towers would have a height of 140 meters (approximately 459 feet). Additionally, a Federal Aviation Administration (FAA)-required lighting and a lightning pole would extend above the top of the towers approximately 10 feet. The height of the power towers allows heliostats from significant distances to accurately reflect sunlight to the receiving boiler. The receiving boiler is a traditional high-efficiency boiler positioned on top of the power tower. The boiler converts the concentrated energy of the sun reflected from the heliostats into superheated steam. The boiler's tubes are coated with a material that maximizes energy absorbance. The boiler has steam generation, superheating, and reheating sections and is designed to generate superheated steam at a pressure of 160 bars and a temperature of 550 degrees Celsius (°C).

Power Block

Each solar power plant (Ivanpah 1, 2 and 3) would have a power block located in the approximate center of the power plant area. The power block would include a solar power tower, a receiver boiler, a STG set, air-cooled condensers, and other auxiliary systems. Each of the three solar-thermal plants would include the following equipment and facilities in their power block:

- natural gas-fired start-up boiler;
- the air emission control system for the combustion of natural gas in the start-up boiler;
- steam turbine generator;
- air-cooled condenser;

- auxiliary equipment (feed water heaters, a de-aerator, an emergency diesel generator, diesel fire pump, etc.);
- a raw water tank with a 250,000 gallon capacity, to supply water for plant use and fire fighting; and a
- water treatment system.

Each of the three power plants includes a partial-load, natural gas-fired steam boiler, which would be used for thermal input to the turbine during the morning start-up cycle to assist the plant in coming up to operating temperature more quickly. The boiler would also be operated during transient cloudy conditions, in order to maintain the turbine on-line and ready to resume production from solar thermal input, after the clouds pass. After the clouds pass and solar thermal input resumes, the turbine would be returned to full solar production and the boilers would be shut down. The solar field and power generation equipment are started up each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required to keep the turbine on line. The natural gas-fired boilers would not be big enough to allow operation for sustained periods of reduced sunlight (i.e., on cloudy days or at night). Heat input from natural gas would not exceed 5% of the heat input from the sun, on an annual basis. The natural gas-fired boiler use would not exceed four hours on any given day, and average use would be less than one hour per operating day. Solar heat would be used to keep each boiler in hot standby mode, capable of responding to demand on short notice. No fuel would be fired while a boiler is on hot standby. Please see **Figure 3.6** and **Figure 3.7**.

Power Output

The nominal generation values for power plants are general estimates that can represent a class or size of generators without referring to a specific model and design specification. The proposed project would have a nominal generation value of 400 MW. The actual energy output of the facility at any point in time can be influenced by several factors, including the amount of cloud cover, sun angle (as influenced by time of day or time of year), condition of mirrors (clean versus dusty), and plant-related electrical loads.

When a cloud passes over the facility it may or may not impact generation. There are many factors to consider including, time of day, amount of clouds, total cloud cover, ambient temperature, etc. Significant cloud cover in the morning may have a significant impact on generation since there will be a higher percentage of mirrors required to reach design pressure and temperature. A single cloud in the afternoon may not have a significant impact since a large percentage of mirrors will be in standby position. It is possible that retasking mirrors or adding steam heat from the auxiliary boiler could mitigate a decline in generation.

The gross generation is the amount of power at the generator terminals. It does not account for the electrical loads required to actually run the power station. Gross generation is an estimate of the maximum amount of generation that can be generated at the generator terminals without consideration for power requirements to run the plant. Net generation is the amount of power that the power station can send over the transmission system for use by customers. This generation figure takes the gross generation and subtracts all the loads required to run the power station. Loads include the power required to operate pumps, coolers, computer systems, motor operated valves, and heliostat power units. Bechtel Power Corp estimates the house power for each of the units to be approximately 5.5 MW. Therefore, the net generation for ISEGS is as follows:

Table 3.3
Gross and Net Power Generation from Proposed Project

Unit	Gross Generation	House Load Required to run the plant	Net Generation
Ivanpah 1	126	5.5	120.5
Ivanpah 2	133	5.5	127.5
Ivanpah 3	133	5.5	127.5
ISEGS Total	392	16.5	375.5

Related Equipment and Facilities

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

Natural Gas Pipeline

The solar heat used in the boiler (steam) process would be supplemented by burning natural gas to heat a partial load steam boiler when solar conditions are insufficient. Each power plant within the project would include a small package, natural gas-fired start-up boiler to provide additional heat for plant start-up and during temporary cloud cover. Natural gas would be supplied to the site through a new, proposed six-mile long distribution pipeline ranging from 4 to 6 inches in diameter. From the Kern River Gas Transmission pipeline, the pipeline would extend 0.5 miles south to the northern edge of Ivanpah 3. The ROW area required for this section of the pipeline would be 75 feet wide and 0.5 miles long. The line would then run east along the northern edge, and then south along the eastern edge, of Ivanpah 3 to a metering station near the southeast corner of Ivanpah 3. From there, a supply line would extend northwest into the Ivanpah 3 power block. The main pipeline would continue along the eastern edge of Ivanpah 2 to another metering station at its southeastern corner. Again, a branch supply line will extend northwestwards into the center of the Ivanpah 2 power block. From that station, the pipeline would follow the paved access road from Colosseum Road past the administration/warehouse building to the Ivanpah 1 power block. The extensions of the pipeline into the power blocks would be located within the project fenceline. However, the sections of pipeline along the northern boundary of Ivanpah 3, and then the eastern boundaries of Ivanpah 3 and 2, would be located outside of the fenced heliostat area, in order to allow access to the pipeline for maintenance.

A new tap metering station of approximately 100 feet by 150 feet in area would be located at the Kern River Gas Transmission Line. The tap station would measure and record gas volumes. Facilities would be installed at the tap station to regulate the gas pressure, to remove any liquids or solid particles, and facilitate the use of pigs for pipeline inspection and cleaning. Once measured this tap would be a custody transfer point in the sale of natural gas to the applicant. In addition to the tap station, separate metering sets would be installed for each of the power plant sites. The three metering sets would measure and record gas volumes utilized at each individual power plant. As part of the Optimized Project Design, the location of the proposed gas line was re-routed along the west side of Ivanpah 2 and 3 to provide the applicant access to the line for service/repair work (CH2M Hill 2008d). Please see **Figure 3.8**.

Air Pollution Control

Air pollution emissions from the combustion of natural gas in the start-up boiler would be controlled using best available control technology. Each boiler would be equipped with low-Nitrogen Oxide (NOx) burners for NOx control. Carbon Monoxide (CO) would be controlled using good combustion practices such as burner and control adjustment based on oxygen continuous monitoring, operator training and proper maintenance. Particulate and Volatile Organic Compounds (VOC) emissions will be minimized through the use of natural gas as the fuel. To ensure that the systems perform correctly, continuous emission monitoring for NO_x and CO would be performed. Boiler use would not exceed four hours on any given day, and average boiler use would be less than one hour per operating day.

Water Supply and Discharge

The facilities would require a water source to support operations, including process water consisting of make-up water for the steam system and wash water for the heliostats, and potable water for domestic water needs. Groundwater would be supplied from one of two wells that would be constructed at the northwest corner of Ivanpah 1, just outside the perimeter fence but within the construction logistics area. Each of the three power blocks would be connected to the groundwater wells by underground water pipelines. The applicant estimates the amount of groundwater pumped would not exceed a maximum of 100 acre-feet per year (afy) for all three solar plants combined, which would primarily be used to provide water for washing heliostats (mirrors) and to replace boiler feed water blow-down. The applicant has estimated that average annual water demands for all project operating needs would be on the order of 77 afy allocated as shown in **Table 3.4.**

Table 3.4
Annual Average ISEGS Water Demands (acre-feet/year)

Facility	Mirror Wash	Boiler Makeup	Total
Ivanpah 1	11	7	18
Ivanpah 2	11	7	18
Ivanpah 3	21	16.5	37.5
Potable Water			2.9
Total	**43**	**30.5**	**76.4**

The quality of groundwater would be improved using a treatment system for meeting the requirements of the boiler make-up and mirror wash water. Water treatment equipment would consist of activated carbon filters, de-ionization media, and a mixed-bed polisher. Each power plant would have a 250,000 gallon raw water storage tank. Approximately 100,000 gallons would be usable for plant process needs and 150,000 gallons would be reserved for fire protection. Demineralized water would be stored in a 25,000-gallon demineralized water storage tank. Boiler feedwater make-up water will be stored in another 25,000-gallon tank.

Because the BLM expressed concern that the two original proposed well locations would interfere with monitoring and regulation of the Primm Valley Golf Club Colosseum wells, the applicant relocated the proposed wells 4,250 feet south of their original location to the northwest corner of Ivanpah 1. This would eliminate the need for a separate access road and minimize land disturbance. In addition to supply wells, a monitoring well would be installed between the Ivanpah supply wells and the Primm Valley Golf Club wells (CH2M Hill 2008d).

Fire Protection

The fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The primary source of fire protection water would be the 250,000 gallon raw water storage tank to be located in each power block. Approximately 100,000 gallons would be usable for plant process needs and 150,000 gallons would be reserved for fire protection. An electric jockey pump and electric motor-driven main fire pump would be provided to increase the water pressure to the level required to serve all fire fighting systems. In addition, a backup diesel engine-driven fire pump would be provided to pressurize the fire loop if the power supply to the electric motor-driven main fire pump fails. All fire protection systems would be focused on the power blocks, administration/warehouse building, and other areas of active operations. The project would not include any specific facilities to address potential wild fires.

Access Roads and Maintenance Paths

Access to the project site would occur from the Yates Well Road exit from I-15 to Colosseum Road. Colosseum Road, currently a dirt road, would be paved to a 30-foot wide, two lane road for a distance of 1.9 miles from the Primm Valley Golf Club to the facility entrance. A portion of the current route of Colosseum Road would be incorporated into the Ivanpah 2 plant site, so the road would be diverted for a distance of 1.66 miles. A segment of 1.2 miles would be re-routed around the southern end of Ivanpah 2 and paved, and then an additional 0.46 mile, 12-foot wide dirt segment would link the paved road to the existing dirt road to the west of Ivanpah 2. Please see **Figure 3.9**.

Within the heliostat fields, maintenance paths would be established concentrically around the power blocks to provide access for heliostat washing and maintenance. The paths would be established between every other row of heliostats. An additional maintenance path would be established on the inside perimeter of the boundary fence. Within each unit, a diagonal dirt road would be established to provide access to the concentric maintenance paths and the power blocks.

Off-road, recreational vehicle trails currently authorized by BLM which run through the proposed project site would be re-located outside of the project boundary fence. The project boundary would overlap three existing open route designations; route 699226, route 699198, and a segment of Colosseum Road. Approximately 7,200 feet of route 699226 would be cut off by the Ivanpah 3 facility and another 6,500 feet of route 669198 would be cut off by the Ivanpah 2 facility . An estimated 5,000 feet of the Colosseum Road would also be cut off by the Ivanpah 2 facility. The impacts on traffic access to these routes is readily mitigated by the re-direction of roads around the facility and realignment of Colosseum Road through the logistics area between Ivanpah 1 and 2. The re-direction of roads around the perimeter of each facility is addressed in the applicant's proposed action as they require the perimeter access routes to maintain security and desert tortoise fencing. The perimeter routes would be constructed, operated and maintained by the applicant but would remain open to public use and travel. Colosseum Road would also remain open for public travel where it is rerouted through the construction logistics area. The closed portions of the three routes would be removed from the list of open routes on BLM's Off Highway Vehicle designation. The replacement routes would be part of the ROW grant for the project and would remain open and maintained by the applicant for the life of the facility. The redirected routes and Colosseum Road would be designed and constructed to minimize damage to soil, watershed, vegetation and air resources. These routes would be monitored by the applicant to avoid disruption to wildlife resources.

Construction Logistics Area, Substation, and Administrative Complex

The applicant proposes using a temporary construction logistics area for staging contractor equipment and trailers, assembly yards, storage of materials, equipment laydown and wash area, construction personnel parking, and assembly areas for heliostats. The construction logistics area would be located between Ivanpah 1 and 2 and would comprise approximately 377.5 acres. Following project construction, the majority of the area would undergo site closure, rehabilitation, and revegetation as described in the Draft Closure, Revegetation, and Rehabilitation Plan (CH2M Hill 2009b). A 40-acre portion of this area would be used as a botanical succulent storage and stockpiling area.

The administrative complex and substation area would be located within the perimeter of this 377.5 acre logistics area. The administrative complex, comprising 8.9 acres, would be used as a common area to support all three solar facilities. These facilities would include an administration/warehouse building and asphalt-paved parking lot. Please see **Figure 3.10**.

Fencing

The project area would be surrounded by security fence, which would be constructed of 8-foot tall galvanized steel chain-link, with barbed wire at the top as required. The security fence would surround the outer perimeter of each power plant, the substation, and the administrative complex. Tortoise barrier fence would also be installed in accordance with the Recommended Specifications for Desert Tortoise Exclusion Fencing (USFWS 2005). The tortoise fence would consist of 1-inch horizontal by 2-inch vertical galvanized welded wire. The fence would be installed to a depth of 12 inches, and would extend 22 to 24 inches above the ground surface and integrated with the security fence.

In addition to use of the proposed right-of-way area, the applicant proposes some project-related maintenance and monitoring activities to occur outside of the project perimeter fence. As presented in the applicant's Revised Project Description, a variety of project-related activities must be conducted outside of the project security fence, including:

- Inspection and maintenance of security fence and tortoise exclusion fence;
- Underground utility repairs;
- Installation of new underground pipeline;
- Maintenance of drainage systems, including removal of debris and sediment; and
- Installation of new stormwater drainage systems (CH2M Hill 2009a).

In addition to these activities, a roadway would need to be maintained outside of the project fence to allow vehicle and equipment access for these activities. The Revised Project Description does not define specific locations or acreages for these activities. Instead, it states that some activities, such as installation of new stormwater drainage systems, could disturb greater than one acre, with no upward bound placed on the projected disturbance.

Throughout most of the proposed right-of-way area, the applicant proposes that the security and tortoise exclusion fence be inset from the right-of-way boundary to allow access for these activities. These inset distances range from 65 feet where natural gas pipeline is buried to 12 feet in areas without pipeline. In some preliminary drawings submitted by applicant, it is unclear if the fence is inset sufficiently to allow access for proposed maintenance and monitoring activities. Applicant has also stated the potential area of disturbance associated with new stormwater drainage systems is defined as "one acre or more". Since the buffer distance between the security fence and the right-of-way boundary in other areas is as narrow as 12 feet, the development of stormwater drainage systems that exceed one acre in size would likely extend outside of the right-of-way boundary and would require supplemental environmental review and analysis and appropriate land use authorizations and permits (CH2M Hill 2009e, Drainage, Erosion and Sediment Control Plan Figure 15 – Access Roadway Plan). Please see **Figure 3.9**.

Transmission System Interconnection and Upgrades

Onsite Transmission Facilities

The ISEGS project would deliver power from Ivanpah 1, 2 and 3 via three separate 115-kilovolt (kV) transmission generation tie lines to a new Ivanpah substation that would be owned and operated by SCE and located in the common construction logistics area between Ivanpah 1 and 2. The new Ivanpah substation would be about 850 feet by 850 feet and located on a little over 16 acres. Each of the power plants would have a switchyard with a step-up transformer to increase the 13.8 kV generator output voltage to 115 kV. The ISEGS #1 115 kV generator tie line would be approximately 5,800 feet long and supported by single-pole structures. The ISEGS #2 and #3 generator tie lines would share the same poles for the last 1,400 feet of their routes before they interconnect to SCE's Ivanpah Substation. The ISEGS #2 generator would connect to the Ivanpah Substation through a 115kV, 3,900 feet-long single circuit generator tie line built with the last 1,400 feet merged with the ISEGS #3 generator tie line to create a 1,400 feet long, overhead double circuit line prior to entering the Ivanpah Substation. The ISEGS #3 generator tie line would be an approximately 14,100 feet long, single circuit, 115 kV line and would merge into a 115kV double circuit with the ISEGS #2 generator tie line. In accordance with the Interconnection Agreement between the applicant and SCE, the existing Eldorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV line would loop in and out through the newly built Ivanpah Substation to interconnect the project to the SCE transmission grid. This 115-kV line is currently aligned between the Ivanpah 1 and 2 sites along a northeast-southwest right-of-way.

Eldorado – Ivanpah Transmission Line

In order to accommodate the total anticipated 1,400 MW load generation by ISEGS and five other planned renewable energy generation projects in the region, the California Independent System Operator (California ISO) has identified approximately 36 miles of transmission line within California and Nevada that would need to be upgraded from 115 kV to 230 kV. This upgrade of SCE's existing 115-kV line is known as the Eldorado-Ivanpah Transmission Project (EITP). Because the EITP is to be implemented by a different applicant and would occur whether or not the ISEGS proposed project were implemented, it is independent of the proposed ISEGS project, and is currently undergoing a separate environmental review under a joint Environmental Impact Report (EIR) and EIS by the California Public Utilities Commission (CPUC) and BLM. However, since the two projects would be directly linked, additional detailed information regarding the scope of the EITP is provided in the following paragraphs. In the ISEGS FSA/DEIS, the EITP was considered a reasonably foreseeable future project because the proponent had not developed the project in enough detail to begin a joint analysis with ISEGS. That detailed project information on EITP is now available, so EITP is considered to be a cumulative action in this FEIS. The evaluation of cumulative impacts associated with the combination of the proposed ISEGS project with the EITP, presented in Section 5, is supported by additional information that was presented in the Draft EIR/EIS for the EITP, which was published on May 7, 2010. If the reader should desire additional detailed information regarding the EITP project, that information is available in the Draft EIR/EIS.

To accomplish the transmission upgrade, SCE has filed an application for a Certificate of Public Convenience and Necessity from the CPUC. They have also filed an application for a ROW from the BLM. The CPUC is serving as the lead agency for CEQA compliance for the approximately five-mile portion of the transmission line work within California. BLM is serving as the lead agency for National Environmental Policy Act compliance. BLM and CPUC published a NOA of the Draft EIS/EIR on May 7, 2010, six months after the NOA was published for the Ivanpah SEGS proposed project on November 10, 2009. The 45-day public comment period extended through June 21, 2010, and will be followed by publication of the Final EIS/EIR prior to BLM reaching a decision on the right-of-way grant.

The EITP would involve several types of transmission upgrades to connect renewable energy generated in the Ivanpah Valley area to the transmission grid controlled by the

CAISO. A new 230/115- kV Ivanpah Substation, a double-circuit 230-kV transmission line between the existing Eldorado Substation and the Ivanpah Dry Lake area to replace the existing 115-kV line, and a telecommunication system would be constructed. The reliability of the existing 115-kV transmission line would also be improved in compliance with the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) planning criteria, the NERC reliability standards, and the applicant's standards.

The core project would include the transmission upgrades and associated transmission infrastructure and the alternatives included in the application submitted by SCE to the CPUC and the BLM. SCE proposes to construct, operate, and maintain new and upgraded transmission facilities to deliver electricity from several solar energy facilities proposed to be built in the Ivanpah Valley area. The upgraded transmission lines would extend approximately 35 miles from southern Clark County, Nevada, to northeastern San Bernardino County, California. Approximately 28 miles of the project are in Nevada and 7 are in California. The proposed EITP project would include the following components:

- Powerlines
  - Eldorado–Ivanpah Transmission Line – A new double-circuit 230-kV transmission line, approximately 35 miles long, would be constructed between the existing Eldorado Substation in Nevada and the proposed Ivanpah Substation in California. It would replace a portion of the existing 115-kV transmission line that runs from Eldorado through Baker, Cool Water, and Dunn Siding to Mountain Pass. The existing 115-kV transmission line that runs west of the proposed Ivanpah Substation to Mountain Pass Substation would remain unchanged.
  - Subtransmission Line – A proposed 600- to 800-foot-long addition to an existing 115-kV subtransmission line from a connection point on the existing Eldorado–Baker–Cool Water–Dunn Siding–Mountain Pass 115-kV line would connect the proposed Ivanpah Substation to the existing 115-kV subtransmission system.
  - Distribution Lines – A 1-mile extension of the existing Nipton 33-kV distribution line would be constructed with underground circuitry to provide light and auxiliary power to the proposed Ivanpah Substation. In addition, a new 4,300-foot segment from the existing Nipton 12-kV distribution line would be built to provide power to a proposed microwave telecommunications site.
- Substations
  - Ivanpah Substation – The proposed substation would be located in California near Primm, Nevada, and would serve as a connector hub for solar energy generated in the Ivanpah Valley area. The substation would include a mechanical and electrical equipment room and a microwave tower.
  - Eldorado Substation – Changes inside the existing Eldorado Substation would be made to accommodate the new Eldorado–Ivanpah 230-kV transmission line.

- Telecommunication System
  - Existing overhead ground wire would be replaced with optical ground wire on an approximately 25-mile section of the existing Eldorado–Lugo 500-kV transmission line.
  - A 4.8-mile-long underground duct from the Eldorado–Lugo 500-kV transmission line to a proposed communication site in Nipton, California, would be installed.
  - A microwave path (approximately 12 miles) between Nipton and the proposed Ivanpah Substation would be installed that would consist of two 180-foot-tall communication towers.
  - A communications room would be installed in the mechanical and electrical equipment room (MEER) at the new Ivanpah Substation to house communication equipment.
  - Telecommunication equipment would be installed at the Eldorado Substation.

Construction of the EITP components would also involve the temporary use of areas and facilities on public and private lands for equipment and material storage, structure assembly and erection, conductor pulling and tensioning, helicopter landing, and other uses.

Telecommunications Facilities

The proposed Ivanpah Substation would also require that new telecommunication infrastructure be installed to provide protective relay circuit and a supervisory control and data acquisition (SCADA) circuit, together with data and telephone services. The telecommunication path from Ivanpah Substation to the local carrier facility interface at Mountain Pass area consists of approximately eight miles of fiber optic cable to be installed overhead on existing poles and through new underground conduits to be constructed in the substation and telecom carrier interface point. This fiber optic route consists of two segments. The first segment is from Ivanpah Substation to Mountain Pass Substation using the existing Nipton 33-kV distribution line poles built along the transmission line corridor that crosses between Ivanpah 1 and 2. The second segment is from Mountain Pass Substation to the telecommunications facility approximately 1.5 miles away at an interface point to be designated by the local telecommunication carrier. The fiber cable would be installed on the existing 12-kV distribution line poles.

Project Design and Management Approach

Stormwater Management Approach

The proposed project site is located on an alluvial fan that acts as an active stormwater conveyance between the Clark Mountain Range to the west and the Ivanpah Dry Lake to the east. In addition to receiving direct precipitation that results in stormwater runoff, rainfall within the mountains to the west passes through the proposed project site along a complex series of braided channels that are normally dry throughout the year. In response to the original AFC, Energy Commission and BLM provided a series of Data Requests (Numbers 53 through 60, and Number 139) which requested a variety of information and calculations describing the proposed site grading and stormwater management systems, with the intention of understanding both the potential impact of the proposed development on downstream stormwater flow and sedimentation rates, and the potential impact of stormwater on the facilities (heliostats, fences, roads, buildings, and power blocks) installed as part of the proposed project.

In response to the referenced Data Requests, the Applicant developed an iterative series of conceptual design plans, calculations, and other supporting materials which have resulted in the currently proposed stormwater design and management system. This proposed system, defined in Data Response Set 2I (CH2M Hill 2009a), generally relies on a Low-Impact Development (LID) design concept which attempts to minimize disruption to natural stormwater flow pathways. The elements of the applicant's design approach include:

- Minimizing the areas of direct vegetation removal. Where possible, natural vegetation would be left in place and undisturbed during construction activities. This is to be accomplished through the use of equipment selected to maximize slope-climbing capability, minimize width of footprint, minimize weight of equipment and ground pressure, and allow extended reach across multiple heliostat rows. Vegetation would be actively removed only in the power block areas, long term access roads, and areas where topography modification is required for access or construction. In other areas, vegetation may be cut to facilitate access for construction, but existing root systems would remain in place. Additional cutting of vegetation during active operations would be conducted to avoid interference with mirror movement.
- Minimizing the areas of grading and leveling. Grading would be conducted in areas where existing topography must be modified for installation and operations. This primarily includes the northern portion of Ivanpah 3, and may also include limited areas within Ivanpah 1 and 2.
- Providing for active stormwater management in limited areas. Active stormwater management generally includes construction of erosion protection features, diversion channels, detention ponds, and culverts for road crossings. For the proposed project, these systems would be limited to diversion channels around the power block areas, and installation of erosion protection and/or culverts at channel crossings along the long term access roads (CH2M Hill 2009a). Please see **Figure 3.11** and **Figure 3.12**.

Project Construction

The applicant anticipates ISEGS construction would be performed in the following order: 1) the Construction Logistics Area; 2) Ivanpah 1 (the southernmost site) and other shared facilities; 3) Ivanpah 2 (the middle site); and 4) Ivanpah 3 (the 200-MW plant on the north). However, it is possible that the order of construction may change. The shared facilities will be constructed in connection with the first plant construction, whether it is Ivanpah 1, 2, or 3. Prior to construction, geotechnical testing, heliostat installation tests, and heliostat load tests would be performed in each of the three units. This testing was performed in Ivanpah 1 in the summer of 2009, under a Temporary Use Permit granted by BLM. Should the right-of-way be approved, the additional testing in Ivanpah 2 and 3 would occur within the approved right-of-way area under the conditions associated with the right-of-way grant.

Construction is planned to take place over approximately 48 months, with the applicant's desire that it could begin during the first quarter of 2010 and be completed during the fourth quarter 2013. The applicant has estimated the overall durations and aerial extent of grading at the 3 sites and common construction logistics area as follows:

1. Ivanpah 1 and Common Construction Logistics Area - Total of 4 - 5 months for everything comprising the common construction logistics area (laydown, administration and other buildings, main access roads, road to access gas line, and the substation) and Ivanpah 1 comprising the diagonal access roads, perimeter road for fence, channel crossings as needed, and the power block;
2. Ivanpah 2 - Total of 3 - 4 months comprising the diagonal access roads, perimeter road for fence, channel crossings as needed, power block, and grading of approximately 170 acres in the southwest region of the power plant area;.and
3. Ivanpah 3 - Total of 5 months comprising the diagonal access roads, perimeter road for fence, channel crossings as needed, five solar power tower area and one power block, and grading of approximately 360 acres in the northern and western regions of the power plant area.

Project construction would be performed in accordance with plans and mitigation measures that would assure the project conforms with applicable laws and regulations and would avoid adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by the BLM to support this environmental analysis, and the necessary mitigation measures, are specified in the Mitigation Measures as appropriate of each technical area of this EIS. Of the plans already prepared in draft by the applicant, those that have contributed most significantly to define the proposed plan of development including construction procedures are as follows:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Administrative Draft ISEGS Construction Stormwater Pollution Prevention Plan (CH2M Hill 2009d)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Draft Desert Tortoise Translocation/Relocation Plan for ISEGS (CH2M Hill 2009i)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Streambed Alteration Agreement Application (CH2M Hill 2009h)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

Facility Operation and Maintenance

Assuming the construction of Ivanpah 1, 2 and 3 were to begin in a sequential fashion during the first quarter of 2010 and be completed during the fourth quarter of 2013, the applicant would expect to commence commercial operation in the fourth quarter for each of the power plants beginning in 2011 at Ivanpah 1, in 2012 at Ivanpah 2, and in 2013 at Ivanpah 3. The proposed project would be designed for an operational life of 50 years. During this period, project operations would be supported by a variety of operational, maintenance, and monitoring activities. Within the power blocks, operations would include transmission of water and natural gas into the power block, and operation of the natural gas-fired start-up boiler, the air emission control system for the combustion of natural gas in the start-up boiler, a steam turbine generator, an air-cooled condenser, and auxiliary equipment (feed water heaters, a de-aerator, and an emergency diesel generator, diesel fire pump).

Within the heliostat fields, operations would include routine washing of mirrors on a rotating basis, every two weeks. Washing would utilize water accessed from the groundwater supply wells, following treatment in the water treatment system. Water requirements would include approximately 2.5 gallons every 2 weeks, for a total consumption of 42.7 acre-feet per year. Washing would be done using a truck-mounted pressure washer. Maintenance would also include clipping of vegetation that could interfere with mirror movement to a height of 12 – 18 inches, management of weeds as specified in the Applicant’s Weed Management Plan (CH2M Hill 2008c), and use of soil binder and weighting agents to minimize dust accumulation on the mirrors and fugitive dust as could occur by wind or vehicle traffic.

In addition to those activities, discussed above, that would occur within the fenced area, certain routine inspection and maintenance activities would be conducted outside the project security fence. Activities to be conducted outside of the security fence may include inspection and maintenance of the buried natural gas pipeline, the buried water pipelines, and the fence itself, including its desert tortoise exclusion features.

Similar to project construction, facility operations would be performed in accordance with plans and mitigation measures that would assure the project conforms with applicable laws and regulation and would avoid adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by the BLM to support this environmental analysis, and the necessary mitigation measures, are specified in the Mitigation Measures as appropriate of each technical area of this EIS. Of the plans already prepared in draft by the applicant, those that have contributed most significantly to define the proposed plan of development including operating procedures are as follows:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for ISEGS (Ivanpah SEGS) Project (CH2M Hill 2008b)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

Waste Management

Non-hazardous solid wastes generated during construction would include approximately 280 tons of scrap wood, concrete, steel/metal, paper, glass, scrap metals and plastic waste (CH2M Hill 2007, § 5.14.4.1.1). All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a Class III solid waste disposal facility. Generation of hazardous wastes anticipated during construction includes over 100 5-gallon empty hazardous material containers which would include 4,300 pounds of solvents, waste paint, and adhesives; 3,000 pounds of oil absorbents, used oil, oily rags; and varying amounts of batteries, and waste oil filters. Hazardous wastes would be recycled to the extent possible and disposed in either a Class I or II waste facility as appropriate.

All operational wastes produced at ISEGS would be properly collected, treated (if necessary), and disposed of at either a Class I or II waste facility as appropriate. Wastes include process and sanitary wastewater, nonhazardous waste and hazardous waste, both liquid and solid. A septic system for sanitary wastewater would be located at the administration building/operations and maintenance area, located between Ivanpah 1 and 2. Portable toilets would be placed in the power block areas of each the three solar facilities and pumped by a sanitary service provider. Process wastewater from all equipment, including the boilers and water treatment equipment would be recycled. If necessary, a small filter/purification system would be used to treat project groundwater and provide potable water at the administration building. Any reject streams from water treatment would be trucked off site for treatment or disposal at either a Class I or II waste facility as appropriate. Additionally, two concrete-lined holding basins, approximately 40 feet by 60 feet by 6 feet deep in size, would be part of each power block facility, and would serve for boiler commissioning and emergency outfalls from any of the processes.

Hazardous Waste Management

Hazardous materials used during facility construction and operations would include paints, epoxies, grease, transformer oil, and caustic electrolytes (battery fluid). Several methods would be used to properly manage and dispose of hazardous materials and wastes. Waste lubricating oil would be recovered and recycled by a waste oil recycling contractor. Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in large storage tanks, while most other chemicals would be stored in smaller returnable delivery containers. All chemical storage areas would be designed to contain leaks and spills in concrete containment areas.

Project Decommissioning

Following the operational life of 50 years, the project owner would perform site closure activities to meet federal and state requirements for the rehabilitation and revegetation of the project site after decommissioning. The procedures to be used for project decommissioning and restoration are defined in the Applicant’s Draft Closure, Revegetation, and Rehabilitation Plan (CH2M Hill 2009b). Under this plan, all aboveground structures and facilities would be removed to a depth of three feet below grade, and removed offsite for recycling or disposal. Concrete, piping, and other materials existing below three feet in depth would be left in place. Areas that had been graded would be restored to original contours. Succulent plant species would be salvaged prior to construction, transplanted into windrows, and maintained for later transplanting following decommissioning. Shrubs and other plant species would be revegetated by the collection of seeds, and re-seeding following decommissioning.

Similar to project construction and facility operations, decommissioning would be performed in accordance with plans and mitigation measures that would assure the project conforms with applicable laws and regulations and would avoid adverse impacts. These plans that are to be developed by the applicant, for which some have already been prepared in draft and reviewed by BLM to support this environmental analysis, and the necessary mitigation measures, are specified in the Mitigation Measures as appropriate for each technical area of this EIS. Of the plans already prepared in draft by the applicant, those that have contributed most significantly to define the proposed plan of development including decommissioning procedures are as follows:

- Closure, Revegetation, and Rehabilitation Plan - Revision 3 (CH2M Hill 2010)
- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS (Ivanpah SEGS) Project (CH2M Hill 2008b)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c).

3.2.2 Mitigated Ivanpah 3 Alternative

Location

The location of the Mitigated Ivanpah 3 Alternative would be the same as that for the proposed project. The Mitigated Ivanpah 3 Alternative would be located in the Mojave Desert, near the Nevada border in San Bernardino County, California, on land administered by the BLM. The Mitigated Ivanpah 3 Alternative site is located 4.5 miles southwest of Primm, Nevada, and 0.5 mile west of the Primm Valley Golf Club, which is located just west of the Ivanpah Dry Lake.

Project and Acreage Description

The configuration of the Mitigated Ivanpah 3 Alternative is shown in **Figure 3.13**. Similar to the proposed project, the Mitigated Ivanpah 3 Alternative would be a development of three solar concentrating thermal power plants, which are comprised of fields of heliostats (elevated mirrors guided by a tracking system) focusing solar energy on boilers located on centralized power towers. Each heliostat tracks the sun throughout the day and reflects the solar energy to the receiver boiler. In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from the solar reheater. The applicant would develop the Mitigated Ivanpah 3 Alternative as three power plants in separate and sequential phases that are designed to generate a total of 370 MW of electricity. Ivanpah 1 would have an electrical generation capacity of 120 MW, and Ivanpah 2 and 3 would have a capacity of 125 MW each. Shared facilities consisting of the substation, administration and maintenance buildings would be developed during construction of the first power plant in the Construction Logistics Area (CLA) between Ivanpah 1 and 2.

The project revision to propose the Mitigated Ivanpah 3 Alternative would reduce the acreage associated with Ivanpah Unit 3 by moving the northern boundary of the ROW grant approximately 1900 feet south of its location in the proposed project, resulting in a reduction of 433 acres of disturbance in that area, as well as a reduction of 433 acres in the total overall ROW grant. The 433-acre area that would be eliminated from the proposed project alternative would be designated as the Northern Rare Plant Mitigation Area (BSE 2010a). The alternative would also eliminate the need to grade approximately 109 acres within the 377-acre CLA area. This area would remain within the ROW grant for the Mitigated Ivanpah 3 Alternative, and 67.5 acres of this area would be used as a Rare Plant Transplantation and Succulent Nursery Area. The alignment of the natural gas pipeline ROW, which would follow the northern boundary of Ivanpah Unit 3 in the proposed project alternative, would be extended to and along the revised northern boundary in the Mitigated Ivanpah 3 Alternative. The remainder of the acreage for the requested ROW grant would remain the same as that for the proposed project. However, other facilities and infrastructure within that footprint, including the boundary between Ivanpah 2 and 3, would be adjusted as needed to allow for construction and operation of the revised project design. The total acreage requested for the ROW for the Mitigated Ivanpah 3 Alternative would be 3564.2 acres.

The acreages of the ROW for the proposed project and the Mitigated Ivanpah 3 Alternative are summarized as follows in **Table 3-5**.

Table 3-5
Mitigated Ivanpah 3 Alternative, Acreage of BLM Right-of-Way

Overview of ISEGS Project Land Use		
Facility	**Proposed Project (acres)**	**Mitigated Ivanpah 3 Alternative (acres)**
Ivanpah Unit 1	913.5	913.5
Ivanpah Unit 2	920.7	1,097
Ivanpah Unit 3	1836.3	1,227
Construction Logistics Area (excludes all areas of Southern California Edison [SCE] exclusive usage)	377.5	159.2
External Features to ISEGS Project Boundaries (widening of Colosseum Road and natural gas line)	24.5	11.1
SCE use for El Dorado-Ivanpah Transmission Line (EITL) (substation, diversion channel, and transmission line)	n/a	90.4
Succulent Nursery and Rare Plant Transplantation Areas	n/a	66
Total ISEGS Project Land Use (including SCE transmission line usage)	4,073	3,564.2

Source: CH2M Hill 2009j; BSE 2010a

Overall, the Mitigated Ivanpah 3 Alternative would require a BLM ROW grant totaling 3564.2 acres (approximately 5.6 square miles), a reduction of 12.5 percent from the

ROW acreage required for the proposed project. Some of the areas included within this ROW grant, particularly the heliostat fields and power blocks within Ivanpah Units 1, 2 and 3, and the permanent facilities located within the CLA, would be permanently disturbed and occupied by ISEGS-related infrastructure throughout the duration of the ROW grant. This would include, at a minimum, the power blocks and heliostat fields associated with Ivanpah Units 1, 2, and 3, and the substation and administrative complex within the CLA. Together, these areas of permanent disturbance would total a minimum of 3290.8 acres, or 92.4 percent of the ROW grant.

Other areas, including the temporary construction staging areas within the CLA, would be disturbed during construction, but would no longer be needed once construction was complete. These areas could potentially have fencing removed, be restored according to the facility's approved Closure, Revegetation, and Rehabilitation Plan, and be removed from the ROW grant once the project becomes operational. These areas comprise a total of approximately 200 acres, or 5.7 percent of the Mitigated Ivanpah 3 Alternative ROW grant.

A third category of land included within the ROW grant includes areas for which the long-term status is uncertain. In their submittal describing the Mitigated Ivanpah 3 proposal (BSE 2010a), the applicant includes 109 acres of the CLA as being removed from development. This 109-acre area includes 59 acres for the Succulent Nursery Area, 7 acres for the Rare Plant Transplantation Area, and two separate areas (38 acres and 5 acres) designated as "mitigation" areas. Although the Mitigated Ivanpah 3 proposal suggests that these areas would not be disturbed, and should therefore be considered part of the reduction of the footprint of the Mitigated Ivanpah 3 Alternative, they are still part of the requested ROW grant, and would presumably be included within the fenced area. Also, the exact nature of activities that would occur within these areas is not defined. Although not used for construction, it seems likely that some level of vehicle traffic and/or ground disturbance would be required in the Succulent Nursery and Rare Plant areas to accommodate the movement and maintenance of plants. Therefore, for the purposes of this SDEIS analysis, BLM assumes that the 109 acre area is included as a disturbed area within the project footprint.

As the applicant finalizes their detailed plans, they may be able to avoid or minimize disturbance to certain areas, allowing these areas to remain as viable desert tortoise habitat. Therefore, a provision has been added to a mitigation measure, designated as BIO-17 in the DEIS, such that the acreage requiring mitigation for Desert Tortoise can be updated at a later time subject to BLM and Energy Commission approval. Through this process, the temporary disturbance areas and the areas with an unknown long-term status can be removed from the total land area requiring biological mitigation for compensation purposes.

Solar Power Plant Equipment and Facilities

Heliostats

The physical characteristics (size, materials, etc.) of the heliostats in the Mitigated Ivanpah 3 Alternative would be the same as those described in the DEIS for the proposed project. The primary difference would be that the Mitigated Ivanpah 3 Alternative would require approximately 40,000 fewer heliostats than the proposed project, or a total of 173,500. The reduction would be reached by not installing heliostats in the 433 acre northern portion of Ivanpah Unit 3.

The physical arrangement of the heliostats within the project boundaries would also be adjusted from that proposed project. In the proposed project, the heliostats in Ivanpah Unit 3 were arranged concentrically around five individual power towers. In the Mitigated Ivanpah 3 Alternative, the heliostats in Ivanpah Unit 3 would be arranged around a single power tower, thus requiring modification of their arrangement and configuration within the unit.

The Mitigated Ivanpah 3 Alternative would also include modification of the location of the boundary between Ivanpah Units 2 and 3 from that in the proposed project. This is due to the overall higher effectiveness of heliostats in the northern portion of a heliostat field (reflecting the sun in the southern sky) versus those in the southern portion. By eliminating the northern 433 acre portion of Ivanpah Unit 3 without adjusting the boundaries, the impact on the power output of Ivanpah Unit 3 in the Mitigated Ivanpah 3 Alternative would be much greater than the proportion of heliostats eliminated, because it would be the more effective northern heliostats eliminated. Therefore, the revised project design would re-direct a large number of “southern-field” heliostats in Ivanpah Unit 3 to become “northern-field” heliostats directed at the power tower in Ivanpah Unit 2. Combined with a proposed modification to the steam turbines in the Ivanpah Unit 2 and 3 power blocks (discussed below), these revisions result in reduced output from Ivanpah Unit 3 from 200 MW to 125 MW. However, they also result in increased output from Ivanpah Unit 2 from 100 to 125 MW (BSE 2010a).

Power Towers

The overall size, construction, and operation of the power towers in the Mitigated Ivanpah 3 Alternative would be the same as that described in the DEIS for the proposed project. The location and physical characteristics of the power towers in Ivanpah Units 1 and 2 would be the same as that for the proposed project. However, the number and location of power towers in Ivanpah Unit 3 would be modified from that in the proposed project. The proposed project includes five separate power towers within Ivanpah Unit 3. In the Mitigated Ivanpah 3 Alternative, the number of power towers would be reduced to one. The single power tower would be located in the center of the revised Ivanpah Unit 3 acreage, and thus located approximately 272 feet southwest of the location of the power block in the proposed project (BSE 2010a).

Power Block

The size, construction, location, and operation of the power blocks in the Mitigated Ivanpah 3 Alternative would be the same as that described in the DEIS for the proposed project. The location and physical characteristics of the power block in Ivanpah Unit 1 would be the same as that for the proposed project. However, the size of the steam turbines installed in the power blocks in Ivanpah Units 2 and 3 may be adjusted to make up for the reduction in power output caused by the elimination of heliostats (BSE 2010a). The power block in Ivanpah Unit 3 would be located approximately 272 feet southwest of its location in the proposed project.

Related Equipment and Facilities

Natural Gas Pipeline

The Mitigated Ivanpah 3 Alternative would require the use of natural gas in the same manner as that described in the DEIS for the proposed project. The source of the natural gas, the Kern River Gas Transmission Line located to the north of the proposed ISEGS facility, would be the same for the proposed project and the Mitigated Ivanpah 3 Alternative (BSE 2010a). The primary difference would be the length of the pipeline corridor that would exist outside of the project boundaries between the Kern River line and the modified northern border of Ivanpah Unit 3. In the proposed project, the length of this pipeline corridor was estimated to be 2,011 feet. Because the northern boundary of Ivanpah Unit 3 would be moved approximately 1,900 feet to the south, the length of the corridor would be approximately 3,911 feet in the Mitigated Ivanpah 3 Alternative.

The route of the pipeline would also be adjusted. In the proposed project, the pipeline corridor extends directly south from the Kern River line to its intersection with the northern border of Ivanpah Unit 3. At that location, the pipeline corridor would follow the northern border of Ivanpah Unit 3 to the east until it intersects the eastern boundary of Ivanpah Unit 3. The pipeline corridor would then follow the eastern boundary of Ivanpah Unit 3 to the south, ultimately being directed into the power blocks for Units 3, 2, and 1, respectively. In the Mitigated Ivanpah 3 Alternative, the pipeline corridor would still extend east along the northern border of Ivanpah Unit 3, but that eastward extension would be located approximately 1,900 feet south of its location in the proposed project. Once it reaches the eastern boundary of Ivanpah Unit 3, the pipeline corridor for the Mitigated Ivanpah 3 Alternative would then re-join, and be the same as that for the proposed project.

Air Pollution Control

The air pollution control equipment and management practices used on the natural gas-fired start-up boilers for the Mitigated Ivanpah 3 Alternative would be the same as those used for the proposed project. The size of the boiler used for Ivanpah Unit 3 in the alternative would be approximately 50 percent of the size of the boiler in the proposed project (BSE 2010a). However, the associated low-NOx burners, good combustion practices, continuous monitoring for NOx and CO, and operational limitations would be no different than those associated with the proposed project.

Water Supply and Discharge

The general need for a water supply and discharge would be the same for the Mitigated Ivanpah 3 Alternative as for the proposed project. Both the proposed project and Mitigated Ivanpah 3 Alternative would require water as make-up water for the steam system, washwater for the heliostats, and potable water for domestic water needs (BSE 2010a). The volume of water required to support the Mitigated Ivanpah 3 Alternative would be slightly reduced from that required for the proposed project. This reduction would be due to the reduced number of heliostats that require washing in the Mitigated Ivanpah 3 Alternative. Because the reduction in the number of heliostats is approximately 18.7 percent, and heliostat washing is the largest use of water during operations, it is estimated that the volume of water required for operations would be reduced by about 18.7 percent.

The source of water for both alternatives would be groundwater supplied from one of two wells installed in the alluvial fan aquifer, and located within the CLA. To accommodate changes in the use of different areas of the CLA, the location of the wells within the CLA would be different in the Mitigated Ivanpah 3 Alternative. In the proposed project, the wells would be located in the southeast corner of the CLA, on the southeast side of the existing transmission lines, and abutting Ivanpah Unit 1. In the Mitigated Ivanpah 3 Alternative, the wells would be located in the northern portion of the CLA, north of the transmission lines, and close to Ivanpah Unit 2 (BSE 2010a). The wells would be located approximately 2400 feet north of the location in the proposed project.

Similar to the proposed project, the groundwater would be treated in activated carbon filters, de-ionization media, and a mixed-bed polisher to provide water of the required quality, and then directed to storage tanks designated for plant process needs and fire protection. The water in both alternatives would be supplied to the power blocks through underground pipelines (BSE 2010a). Because the locations of the wells would be modified, the precise route of the water pipelines within the CLA would be different in the Mitigated Ivanpah 3 Alternative than the proposed project. However, the routes for both alternatives would be located entirely within the broader outlines of the ROW grant, and the portions of the pipeline routes outside of the CLA would be the same for both alternatives.

Fire Protection

The fire protection system included as part of the Mitigated Ivanpah 3 Alternative would be exactly the same as that for the proposed project (BSE 2010a). For both alternatives, fire protection is provided through a 250,000 gallon water tank located at each power block, with 150,000 gallons reserved for fire protection purposes.

Access Roads and Maintenance Paths

The general approach for relocating existing roads and off-highway vehicle (OHV) trails would be the same for the Mitigated Ivanpah 3 Alternative and the proposed project (BSE 2010a). Both alternatives would require paving and re-routing a portion of Colosseum Road to provide site access, and to divert the road around Ivanpah Unit 2. The configuration and construction details of the access roads to the power blocks, and the concentric heliostat maintenance paths, would be the same for both alternatives.

A primary difference between the proposed project and the Mitigated Ivanpah 3 Alternative would be the locations of the re-routed portions of two OHV trails. In the proposed project, Trail 699226, which currently passes through the northern portion of Ivanpah Unit 3, would be re-located around the outside of the facility, parallel to the northern boundary of Unit 3. Similarly, Trail 699198, currently passing through the proposed Ivanpah Unit 2 location, would be re-routed to a location between Ivanpah Units 2 and 3. In the Mitigated Ivanpah 3 Alternative, Trail 699226 would still be located within the boundaries of Unit 3. As a result, re-location of the trail along the northern boundary of Ivanpah Unit 3 would still be necessary. However, because the location and configuration of the northern boundary of Ivanpah Unit 3 would be approximately 1,900 feet further south in the Mitigated Ivanpah 3 Alternative, the re-routed location would be accordingly revised. Overall, the Mitigated Ivanpah 3 Alternative would result in a shorter, less obtrusive re-routing of this trail than would be associated with the proposed project. Because the location of the Ivanpah Unit 2 and 3 boundary would also be different in the Mitigated Ivanpah 3 Alternative, the location of the re-routed Trail 699198 would also be adjusted accordingly. In this case, the re-routed distance would be approximately the same in both alternatives, but in a slightly different location.

Construction Logistics Area, Substation, and Administrative Complex

Because it involves four fewer power tower receivers and 40,000 fewer heliostats, the Mitigated Ivanpah 3 Alternative would require a smaller amount of acreage (109 fewer acres) within the CLA for construction purposes. However, the alternative would use most of this acreage for a Rare Plant Transplantation Area (approximately 7 acres) and a Succulent Nursery Area (59 acres). Overall, both alternatives would require the same 377 acres designated in the ROW grant for the CLA (BSE 2010a).

In the proposed project, almost all of the CLA acreage would undergo either permanent or temporary disturbance associated with the substation, administrative complex, monitoring wells, and temporary construction laydown and storage areas. In the Mitigated Ivanpah 3 Alternative, the acreage of permanent disturbance required for the permanent facilities would be the same as that for the proposed project. However, the locations of these facilities and associated disturbance would be adjusted within the 377 acre boundaries of the CLA. The location of the substation would be the same for both alternatives, but the administrative complex and monitoring well locations would be re-located from the southeastern portion of the CLA in the proposed project to the northern portion of the CLA in the Mitigated Ivanpah 3 Alternative (BSE 2010a).

Fencing

The type, construction, and maintenance of fencing used for facility security and tortoise barrier would be the same for the proposed project and Mitigated Ivanpah 3 Alternatives (BSE 2010a). The fencing would be comprised of 8-foot tall steel chain-link topped with barbed wire for security purposes, and would also incorporate 1-inch horizontal by 2-inch vertical galvanized, welded wire fence as a tortoise barrier. Because the locations of the outside perimeter of Ivanpah Unit 3 and the boundary between Units 2 and 3 would be modified, the locations of the associated fencing would also be modified in the Mitigated Ivanpah 3 Alternative. The fence location at the northern boundary of Ivanpah Unit 3 would be approximately 1,900 feet south of its location in the proposed project, and the location of the boundary fence between Units 2 and 3 would be slightly north of its location in the proposed project.

As described in the DEIS for the proposed project, the applicant would need to have the fence located inset from the ROW boundary in order to allow for access to the fence from the outside for inspection and maintenance purposes. Also, with respect to the proposed project, the applicant stated a potential need to construct stormwater drainage systems outside of the fence, if needed to address stormwater damage issues. These requirements would still apply to the areas outside of the fence in the Mitigated Ivanpah 3 Alternative. If these inspection or maintenance activities would be required in areas outside of the approved ROW grant, then supplemental environmental review and analysis would need to be implemented, and appropriate land use authorizations and permits would need to be acquired by the applicant.

Transmission System Interconnection and Upgrades

The transmission system requirements of the Mitigated Ivanpah 3 Alternative would be exactly the same as that described for the proposed project (BSE 2010a). Although the total output of the facility would be reduced from 400 MW to 370 MW, the locations and capacities of the required gen-tie lines, Ivanpah substation, and switchyards with step-up transformers would all be the same as those required for the proposed project. The reduced output would also not affect the identified need and plan by SCE to upgrade approximately 36 miles of 115 kV transmission line to 230 kV. The EITP project is proposed to accommodate an anticipated 1400 MW of load generation by ISEGS and five other planned renewable energy projects in the area, and the reduction of the ISEGS output from 400 MW to 370 MW would not be expected to affect the overall need for that project. The environmental impact of the EITP project is currently being evaluated by BLM and the CPUC, and is also considered as part of the analysis of cumulative impacts of the ISEGS project in Section 5 of this FEIS.

Telecommunications Facilities

The telecommunications infrastructure required to support the Mitigated Ivanpah 3 Alternative would be exactly the same as that for the proposed project (BSE 2010a). For both alternatives, the infrastructure is necessary to provide protective relay circuit and a SCADA circuit for the proposed Ivanpah Substation, as well as data and telephone services. These services will be obtained by the construction of approximately eight miles of fiber optic cable from the ISEGS facility to Mountain Pass, along existing distribution line poles.

Project Design and Management Approach

Stormwater Management Approach

The general approach to be used to address stormwater management would be the same for the Mitigated Ivanpah 3 Alternative as for the proposed project. This approach includes the following elements:

- Using a Low Impact Development approach to minimize the amount of grading, vegetation removal, soil compaction, and site disturbance during construction of the heliostat fields;
- Providing active stormwater protection, through the use of diversion channels, around only the power blocks and CLA; and
- Allowing stormwater to follow natural flow paths through the heliostat fields.

Field investigations and stormwater modeling performed by the applicant and BLM during the DEIS process indicated that the deepest and widest stormwater drainage channels, and those expected to receive the highest volume and velocity of flow during major storm events, were those located in the northern portion of Ivanpah Unit 3. Accordingly, in the proposed project description, the primary area designated as requiring grading to allow construction of heliostat fields was the northern portion of Ivanpah Unit 3. Also, because the size of these channels is largest in the northern portion of Ivanpah Unit 3, that area comprised the greatest amount of drainage channel acreage that would be affected by the project.

Reduction of these impacts and associated mitigation requirements was one element in the applicant's decision to propose the Mitigated Ivanpah 3 Alternative. The revised northern boundary of Unit 3 in the alternative was designed, in part, to avoid the installation of heliostat fields in the most active drainages in this area. Accordingly, the Mitigated Ivanpah 3 Alternative would require an amount of grading, site disturbance, vegetation removal, and soil compaction that is substantially reduced from that associated with the proposed project (BSE 2010a).

Project Construction

In general, the sequence, procedures, and equipment used for project construction would be the same for the Mitigated Ivanpah 3 Alternative and the proposed project. The primary difference that would be expected between the construction procedures and schedules would be the duration of construction, especially associated with Ivanpah Unit 3. The duration of construction for Ivanpah Unit 2 would likely be longer than the 3 to 4 months for the proposed project, due to the increased number of heliostats. However, the duration of the construction of Ivanpah Unit 3 would be substantially reduced due to the elimination of four power tower receiver units, and elimination of more than 40,000 heliostats (BSE 2010a).

The construction equipment used for both alternatives would be the same; however, the areas and duration needed for the use of grading equipment would be reduced for the Mitigated Ivanpah 3 Alternative.

The standards and procedures to be used during construction would be the same for both alternatives. The construction of the Mitigated Ivanpah 3 Alternative would be subject to BLM Conditions of Approval as defined in the Record of Decision, Energy Commission Conditions of Certification, and permit and regulatory requirements of other state and federal agencies. These conditions would include provisions defined in the applicant's submittals for the proposed project, including:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Administrative Draft ISEGS Construction Stormwater Pollution Prevention Plan (CH2M Hill 2009d)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Draft Desert Tortoise Translocation/Relocation Plan for ISEGS (CH2M Hill 2009f)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Streambed Alteration Agreement Application (CH2M Hill 2009h)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

Facility Operation and Maintenance

The operation and maintenance of the facility, as developed under the Mitigated Ivanpah 3 Alternative, would be the same as that for the proposed project. The specific operational procedures to be used in daily operations of Ivanpah Units 2 and 3 would differ, due to the different configurations and outputs of these Units in the Mitigated Ivanpah 3 Alternative. The primary differences would include a reduction in the level of effort and water volume needed for heliostat washing, and a reduction in the amount of natural gas burned in the start-up boilers (BSE 2010a). By reducing the number of heliostats from 214,000 to 173,500 (a reduction of 19 percent), the amount of water used for heliostat washing during operations would also be reduced by approximately 19 percent. The start-up boilers would be reduced in size from 924.4 million British thermal units per hour (MMBtu/hr); two boilers at 231.1 and one boiler at 462.2 MMBtu/hr in the proposed project to 693.3 MMBtu/hr in the Mitigated Ivanpah 3 Alternative, a reduction in natural gas usage of 25 percent.

Like construction, the standards and procedures to be used during operation and maintenance would be subject to BLM Conditions of Approval as defined in the Record of Decision, Energy Commission Conditions of Certification, and permit and regulatory requirements of other state and federal agencies. These conditions would include provisions defined in the applicant's submittals for the proposed project, including:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

Waste Management

The types of non-hazardous solid wastes generated during construction, operations, and closure of the facility under the Mitigated Ivanpah 3 Alternative would be the same as those generated as part of the proposed project. All materials would be managed, recycled, and/or disposed of in the same manner for each alternative. The primary difference is that the Mitigated Ivanpah 3 Alternative is expected to generate a reduced volume of non-hazardous wastes, as compared to the proposed project. This is due to the reduced size of the Mitigated Ivanpah 3 Alternative, including construction of three power tower receivers instead of seven, and installation of 40,000 fewer heliostats (BSE 2010a).

Hazardous Waste Management

The types of hazardous materials used during project construction and operations under the Mitigated Ivanpah 3 Alternative would be the same as those generated as part of the proposed project. All materials would be managed, recycled, and/or disposed in the same manner for each alternative. Similar to non-hazardous wastes, the Mitigated Ivanpah 3 Alternative is expected to use a reduced volume of hazardous materials, as compared to the proposed project. This is due to the reduced size of the Mitigated

Ivanpah 3 Alternative, including construction of three power tower receivers instead of seven, and installation of 40,000 fewer heliostats (BSE 2010a).

Project Decommissioning

The closure and decommissioning of the facility, as developed under the Mitigated Ivanpah 3 Alternative, would be the same as that for the proposed project. Similar to construction, the duration of the closure would be reduced under the Mitigated Ivanpah 3 Alternative, due to the reduced number of power tower receivers and heliostats that would require removal (BSE 2010a).

Like construction and operations, the standards and procedures to be used during closure and decommissioning would be subject to BLM Conditions of Approval as defined in the Record of Decision, Energy Commission Conditions of Certification, and permit and regulatory requirements of other state and federal agencies. These conditions would include provisions defined in the applicant's submittals for the proposed project, including:

- Closure, Revegetation, and Rehabilitation Plan - Revision 3 (CH2M Hill 2010)
- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c).

3.2.3 Modified I-15 Alternative

Location

The general location of the Modified I-15 Alternative would be the same as that for the proposed project. The Modified I-15 Alternative would be located in the Mojave Desert, near the Nevada border in San Bernardino County, California, on land administered by the BLM. The Modified I-15 Alternative site is located 4.5 miles southwest of Primm, Nevada, and 0.5 mile west of the Primm Valley Golf Club, which is located just west of the Ivanpah Dry Lake.

Project and Acreage Description

The configuration of the Modified I-15 Alternative is shown in **Figure 3-14** (BSE 2010b). Similar to the proposed project, the Modified I-15 Alternative would be a development of three solar concentrating thermal power plants, which are comprised of fields of heliostats (elevated mirrors guided by a tracking system) focusing solar energy on boilers located on centralized power towers. Each heliostat tracks the sun throughout the day and reflects the solar energy to the receiver boiler. In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from the solar reheater. The applicant would develop the Modified I-15 Alternative as three power plants in separate and sequential phases that are designed to generate a total of 370 MW of electricity. Ivanpah 1 would have an electrical generation capacity of 120 MW, and Ivanpah 2 and 3 would have a capacity of 125 MW each. Shared facilities consisting of the substation, administration and maintenance buildings would be developed during construction of the first power plant in the CLA between Ivanpah 1 and 2.

The Modified I-15 Alternative would reduce the acreage associated with Ivanpah Unit 3, and in the overall ROW grant, by 433 acres. The alternative would also eliminate the need to grade approximately 109 acres within the 377-acre CLA area. This area would remain within the ROW grant for the Modified I-15 Alternative, and 67.5 acres of this area would be used as a Rare Plant Transplantation and Succulent Nursery Area. The alignment of the natural gas pipeline ROW, which would follow the northern boundary of Ivanpah Unit 3 in the proposed project alternative, would be extended to and along the northern boundary of Ivanpah Unit 2 in the Modified I-15 Alternative. The remainder of the acreage for the requested ROW grant would remain the same as that for the proposed project. However, other facilities and infrastructure within that footprint would be adjusted as needed to allow for construction and operation of the revised project design. The total acreage requested for the ROW for the Modified I-15 Alternative would be 3,564.2 acres.

The acreages of the ROW for the proposed project and the Modified I-15 Alternative are summarized as follows in **Table 3-6**.

Table 3-6
Modified I-15 Alternative, Acreage of BLM Right-of-Way

Overview of ISEGS Project Land Use		
Facility	**Proposed Project (acres)**	**Modified I-15 Alternative (acres)**
Ivanpah Unit 1	913.5	913.5
Ivanpah Unit 2	920.7	1,097
Ivanpah Unit 3	1836.3	1,227
Construction Logistics Area (excludes all areas of SCE exclusive usage)	377.5	159.2
External Features to ISEGS Project Boundaries (widening of Colosseum Road and natural gas line)	24.5	11.1
SCE use for EITP (substation, diversion channel, and transmission line)	n/a	90.4
Succulent Nursery and Rare Plant Transplantation Areas	n/a	66
Total ISEGS Project Land Use (including SCE transmission line usage)	4,073	3,564.2

Source: CH2M Hill 2009j; BSE 2010a

Overall, the Modified I-15 Alternative would require a BLM ROW grant totaling 3564.2 acres (approximately 5.6 square miles), a reduction of 12.5 percent from the ROW acreage required for the proposed project. Although no specific proposal for the Modified I-15 Alternative has been submitted by the applicant, for the purpose of this analysis, it is assumed to be the same as the Mitigated Ivanpah 3 Alternative, with the exception of the reconfiguration of Ivanpah Unit 3. Therefore, the information provided by the applicant for the Mitigated Ivanpah 3 Alternative is assumed to be relevant for the Modified I-15 Alternative. Some of the areas included within this 3,564.2–acre ROW grant, particularly the heliostat fields and power blocks within Ivanpah Units 1, 2 and 3, and the permanent facilities located within the CLA, would be permanently disturbed and occupied by ISEGS-related infrastructure throughout the duration of the ROW grant. This would include, at a minimum, the power blocks and heliostat fields associated with Ivanpah Units 1, 2, and 3, and the substation and administrative complex within the CLA. Together, these areas of permanent disturbance would total a minimum of 3,290.8 acres, or 92.4 percent of the ROW grant.

Other areas, including the temporary construction staging areas within the CLA, would be disturbed during construction, but would no longer be needed once construction was complete. These areas could potentially have fencing removed, be restored according to the facility's approved Closure, Revegetation, and Rehabilitation Plan, and be removed from the ROW grant once the project becomes operational. These areas comprise a total of approximately 200 acres, or 5.7 percent of the Modified I-15 Alternative ROW grant.

A third category of land included within the ROW grant includes areas for which the long-term status is uncertain. In their submittal describing the Mitigated Ivanpah 3 proposal (BSE 2010a), the applicant includes 109 acres of the CLA as being removed from development. This 109-acre area includes 59 acres for the Succulent Nursery Area, 7 acres for the Rare Plant Transplantation Area, and two separate areas (38 acres and 5 acres) designated as "mitigation" areas. Although the Mitigated Ivanpah 3 proposal suggests that these areas would not be disturbed, and should therefore be considered part of the reduction of the footprint of the Mitigated Ivanpah 3 Alternative, they are still part of the requested ROW grant, and would presumably be included within the fenced area. Also, the exact nature of activities that would occur within these areas is not defined. Although not used for construction, it seems likely that some level of vehicle traffic and/or ground disturbance would be required in the Succulent Nursery and Rare Plant areas to accommodate the movement and maintenance of plants. Therefore, for the purposes of this SDEIS analysis of the Modified I-15 Alternative, BLM assumes that the 109-acre area is included as a disturbed area within the project footprint.

As the applicant finalizes their detailed plans, they may be able to avoid or minimize disturbance to certain areas, allowing these areas to remain as viable desert tortoise habitat. Therefore, a provision has been added to a mitigation measure, designated as BIO-17 in the DEIS, such that the acreage requiring mitigation for desert tortoise can be updated at a later time subject to BLM and Energy Commission approval. Through this process, the temporary disturbance areas and the areas with an unknown long-term status can be removed from the total land area requiring biological mitigation for compensation purposes.

Solar Power Plant Equipment and Facilities

Heliostats

The physical characteristics (size, materials, etc.) and number of the heliostats in the Modified I-15 Alternative would be the same as those described in Section 3.4 for the Mitigated Ivanpah 3 Alternative. The primary difference from the proposed project would be that the Modified I-15 Alternative would require approximately 40,000 fewer heliostats than the proposed project, or a total of 173,500.

The physical arrangement of the heliostats within the project boundaries would also be adjusted from that proposed project. In the proposed project, the heliostats in Ivanpah Unit 3 were arranged concentrically around five individual power towers. In the Modified I-15 Alternative, the heliostats in Ivanpah Unit 3 would be arranged around a single power tower, thus requiring modification of their arrangement and configuration within the unit.

The Modified I-15 Alternative would also include reconfiguration of the location of the northern boundary of Ivanpah Unit 2 from that in the proposed project. Combined with a proposed modification to the steam turbines in the Ivanpah Unit 2 and 3 power blocks (discussed below), these revisions result in reduced output from Ivanpah Unit 3 from 200 MW to 125 MW. However, they also result in increased output from Ivanpah Unit 2 from 100 to 125 MW (BSE 2010a).

Power Towers

The overall size, construction, and operation of the power towers in the Modified I-15 Alternative would be the same as that described in Section 3.4 for the Mitigated Ivanpah 3 Alternative, but different from that in the proposed project. The location and physical characteristics of the power towers in Ivanpah Units 1 and 2 would be the same as that for the proposed project. However, the number and location of power towers in Ivanpah Unit 3 would be modified from that in the proposed project. The proposed project includes five separate power towers within Ivanpah Unit 3. In the Modified I-15 Alternative, the number of power towers would be reduced to one. The single power tower would be located in the center of the revised Ivanpah Unit 3 acreage, and thus located approximately four miles to the southeast of the Unit 3 power block in the proposed project.

Power Block

The size, construction, and operation of the Unit 1 and 2 power blocks in the Modified I-15 Alternative would be the same as that described in the DEIS for the proposed project. The location and physical characteristics of the power blocks in Ivanpah Units 1 and 2 would be the same as that for the proposed project. However, the power block in Ivanpah Unit 3 would be located to the south of Ivanpah Unit 1. Also, the size of the steam turbines installed in the power blocks in Ivanpah Units 2 and 3 may be adjusted to make up for the reduction in power output caused by the elimination of heliostats (BSE 2010a).

Related Equipment and Facilities

Natural Gas Pipeline

The Modified I-15 Alternative would require the use of natural gas in the same manner as that described in the DEIS for the proposed project. The source of the natural gas, the Kern River Gas Transmission Line located to the north of the proposed ISEGS facility, would be the same for the proposed project and the Modified I-15 Alternative. The primary difference would be the length of the pipeline corridor that would exist outside of the project boundaries between the Kern River line and the ISEGS facility, and the need to extend the pipeline to the south of Ivanpah Unit 1 in order to service the reconfigured location of Ivanpah Unit 3. In the proposed project, the length of the pipeline corridor to the north of the ISEGS facility was estimated to be 2,011 feet. However, Ivanpah 3 would not be constructed in the same location, so the pipeline would need to extend to the northern boundary of Ivanpah Unit 2 instead of Unit 3. Because the original Ivanpah Unit 3 area would be removed from the development, the length of the corridor outside of the facility boundaries would be a minimum of 10,560 feet in the Modified I-15 Alternative, or more than five times the length of the corridor for the proposed project.

In addition to the extended length of the corridor between the Kern River line and the ISEGS facility, the pipeline would also need to extend to the south of Ivanpah Unit 1. In the proposed project, the line entered Ivanpah Unit 1 at its northwestern boundary. To extend to the reconfigured location of Ivanpah Unit 3, the line would need to extend an additional 6,200 feet (approximately) south along the western boundary of Ivanpah Unit 1, and then an additional 5,000 feet (approximately) into the probable power block area of Unit 3. Therefore, the Modified I-15 Alternative would require an estimated increase of more than 11,000 feet to the length of the pipeline ROW.

Air Pollution Control

The air pollution control equipment and management practices used on the natural gas-fired start-up boilers for the Modified I-15 Alternative would be exactly the same as those used for the proposed project. The size of the boiler used for Ivanpah Unit 3 in the alternative would be approximately 50 percent of the size of the boiler in the proposed project (BSE 2010a). However, the associated low-NOx burners, good combustion practices, continuous monitoring for NOx and CO, and operational limitations would be no different than those associated with the proposed project.

Water Supply and Discharge

The use of water and source of water for the Modified I-15 Alternative would be exactly the same as that described in the DEIS for the proposed project.

The general need for a water supply and discharge would be the same for the Modified I-15 Alternative as for the proposed project. Both the proposed project and Modified I-15 Alternative would require water as make-up water for the steam system, washwater for the heliostats, and potable water for domestic water needs (BSE 2010a). The volume of water required to support the Modified I-15 Alternative would be slightly reduced from that required for the proposed project. This reduction would be due to the reduced number of heliostats that require washing in the Modified I-15 Alternative.

Because the reduction in the number of heliostats is approximately 18.7 percent, and heliostat washing is the largest use of water during operations, it is estimated that the volume of water required for operations would be reduced by about 18.7 percent.

The source of water for both alternatives would be groundwater supplied from one of two wells located within the CLA. To accommodate changes in the use of different areas of the CLA, the location of the wells within the CLA would be different in the Modified I-15 Alternative than the proposed project. In the proposed project, the wells would be located in the southeast corner of the CLA, on the southeast side of the existing transmission lines, and abutting Ivanpah Unit 1. In the Modified I-15 Alternative, the wells would be located in the northern portion of the CLA, north of the transmission lines, and close to Ivanpah Unit 2 (BSE 2010a). The wells would be located approximately 2,400 feet north of the location in the proposed project.

Similar to the proposed project, the groundwater would be treated in activated carbon filters, de-ionization media, and a mixed-bed polisher to provide water of the required quality, and then directed to storage tanks designated for plant process needs and fire protection. The water in both alternatives would be supplied to the power blocks through underground pipelines (BSE 2010a). Because the locations of the wells would be modified, the precise route of the water pipelines within the CLA would be different in the Modified I-15 Alternative than the proposed project. However, the routes for both alternatives would be located entirely within the broader outlines of the ROW grant, and the portions of the pipeline routes outside of the CLA would be the same for both alternatives.

Fire Protection

The fire protection system included as part of the Modified I-15 Alternative would be exactly the same as that for the proposed project. For both alternatives, fire protection is provided through a 250,000 gallon water tank located at each power block, with 150,000 gallons reserved for fire protection purposes.

Access Roads and Maintenance Paths

The general approach for relocating existing roads and OHV trails would be the same for the Modified I-15 Alternative and the proposed project. Both alternatives would require paving and re-routing a portion of Colosseum Road to provide site access, and to divert the road around Ivanpah Unit 2. The configuration and construction details of the access roads to the power blocks, and the concentric heliostat maintenance paths, would be the same for both alternatives.

A primary difference between the proposed project and the Modified I-15 Alternative would be that different OHV trails would be affected, and would require re-routing. In the proposed project, Trail 699226, which currently passes through the northern portion of Ivanpah Unit 3, would be re-located around the outside of the facility, parallel to the northern boundary of Unit 3. In the Modified I-15 Alternative, the 8,100 feet of Trail 699226 would not be affected, and would not require re-alignment. However, the new location of Ivanpah Unit 3 in the Modified I-15 Alternative would affect three other trails, as follows; Trail 699238 (for 2,880 feet), Trail 699194 (for 8,880 feet), and Trail 699221 (for 960 feet). The length of these trails within the Modified I-15 Alternative footprint is estimated at a total of 12,720 feet. Overall, the Modified I-15 Alternative would result in a longer and more obtrusive re-routing of existing trails than would be associated with the proposed project.

Construction Logistics Area, Substation, and Administrative Complex

Because it involves four fewer power tower receivers and 40,000 fewer heliostats, the Modified I-15 Alternative would require a smaller amount of acreage (109 fewer acres) within the CLA for construction purposes. However, the alternative would use most of this acreage for a Rare Plant Transplantation Area (approximately 7 acres) and a Succulent Nursery Area (59 acres). Overall, both alternatives would require the same 377 acres designated in the ROW grant for the CLA (BSE 2010a).

In the proposed project, almost all of the CLA acreage would undergo either permanent or temporary disturbance associated with the substation, administrative complex, monitoring wells, and temporary construction laydown and storage areas. In the Modified I-15 Alternative, the acreage of permanent disturbance required for the permanent facilities would be the same as that for the proposed project. However, the locations of these facilities and associated disturbance would be adjusted within the 377-acre boundaries of the CLA. The location of the substation would be the same for both alternatives, but the administrative complex and monitoring well locations would be re-located from the southeastern portion of the CLA in the proposed project to the northern portion of the CLA in the Modified I-15 Alternative (BSE 2010a).

Fencing

The type, construction, and maintenance of fencing used for facility security and tortoise barrier would be the same for the proposed project and Modified I-15 Alternative. The only difference would be the location of the fence, which would surround the Ivanpah Unit 3 in a different location under the Modified I-15 Alternative. As described in the DEIS for the proposed project, the applicant would need to have the fence located inset from the ROW boundary in order to allow for access to the fence from the outside for inspection and maintenance purposes. Also, with respect to the proposed project, the applicant stated a potential need to construct stormwater drainage systems outside of the fence, if needed to address stormwater damage issues. These requirements would still apply to the areas outside of the fence in the Modified I-15 Alternative. If these inspection or maintenance activities would be required in areas outside of the approved ROW grant, then supplemental environmental review and analysis would need to be implemented, and appropriate land use authorizations and permits would need to be acquired by the applicant.

Transmission System Interconnection and Upgrades

The transmission system requirements of the Modified I-15 Alternative would be exactly the same as those described in the DEIS for the proposed project (BSE 2010a). Although the total output of the facility would be reduced from 400 MW to 370 MW, the locations and capacities of the required gen-tie lines, Ivanpah substation, and switchyards with step-up transformers would all be the same as those required for the proposed project. The reduced output would also not affect the identified need and plan by SCE to upgrade approximately 36 miles of 115 kV transmission line to 230 kV. The EITP project is proposed to accommodate an anticipated 1400 MW of load generation by ISEGS and five other planned renewable energy projects in the area, and the reduction of the ISEGS output from 400 MW to 370 MW would not be expected to affect the overall need for that project. The environmental impact of the EITP project is currently being evaluated by BLM and the CPUC, and is also considered as part of the analysis of cumulative impacts of the ISEGS project in Section 5 of this FEIS.

Telecommunications Facilities

The telecommunications infrastructure required to support the Modified I-15 Alternative would be exactly the same as that for the proposed project. For both alternatives, the infrastructure is necessary to provide protective relay circuit and a SCADA circuit for the proposed Ivanpah Substation, as well as data and telephone services. These services will be obtained by the construction of approximately eight miles of fiber optic cable from the ISEGS facility to Mountain Pass, along existing distribution line poles.

Project Design and Management Approach

Stormwater Management Approach

It is likely, but not certain, that the general approach to be used to address stormwater management would be the same for the Modified I-15 Alternative as for the proposed project. The reason for the uncertainty is because detailed stormwater modeling analysis has not been performed for the reconfigured Ivanpah Unit 3 site. As discussed in Section 3.6, reduction of potential stormwater impacts associated with the northern portion of Ivanpah Unit 3 was one element in the applicant's decision to propose the Mitigated Ivanpah 3 Alternative. The Modified I-15 Alternative would be similar in avoiding this area and its potential impacts. However, without detailed stormwater analysis, it is not certain whether the reconfigured location of Ivanpah Unit 3 in the Modified I-15 Alternative would be more or less favorable with respect to potential stormwater impacts. The applicant would likely intend to implement the same Low Impact Development approach to minimize the amount of grading, vegetation removal, soil compaction, and site disturbance during construction of the heliostat fields. However, if later stormwater analysis during the design phase indicated that the Low Impact Development approach was not applicable to the reconfigured Ivanpah Unit 3 area, then the applicant could choose to implement a more active stormwater management approach for this area.

Project Construction

In general, the sequence, procedures, and equipment used for project construction would be the same for the Modified I-15 Alternative and the proposed project. Because the acreage and infrastructure would be exactly the same, the duration of construction, required equipment and materials, and standards and procedures would also be expected to be the same. The reconfigured location of Ivanpah Unit 3 would not cause any substantive difference in site access or other characteristics associated with project construction.

The construction of the Modified I-15 Alternative would be subject to BLM Conditions of Approval as defined in the Record of Decision, Energy Commission Conditions of Certification, and permit and regulatory requirements of other state and federal agencies. These conditions would include provisions defined in the applicant's submittals for the proposed project, including:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Administrative Draft ISEGS Construction Stormwater Pollution Prevention Plan (CH2M Hill 2009d)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Draft Desert Tortoise Translocation/Relocation Plan for ISEGS (CH2M Hill 2009f)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Streambed Alteration Agreement Application (CH2M Hill 2009h)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

Facility Operation and Maintenance

The operation and maintenance of the facility, as developed under the Modified I-15 Alternative, would be the same as that for the proposed project. The specific operational procedures to be used in daily operations of Ivanpah Units 2 and 3 would differ, due to the different configurations and outputs of these Units in the Modified I-15 Alternative. The primary differences would include a reduction in the level of effort and water volume needed for heliostat washing, and a reduction in the amount of natural gas burned in the start-up boilers (BSE 2010a). By reducing the number of heliostats from 214,000 to 173,500 (a reduction of 19 percent), the amount of water used for heliostat washing during operations would also be reduced by approximately 19 percent. The start-up boilers would be reduced in size from 924.4 MMBtu/hr (two boilers at 231.1 and one boiler at 462.2 MMBTU/hr) in the proposed project to 693.3 MMBtu/hr in the Modified i-15 Alternative, a reduction in natural gas usage of 25 percent.

Like construction, the standards and procedures to be used during operation and maintenance would be subject to BLM Conditions of Approval as defined in the Record of Decision, Energy Commission Conditions of Certification, and permit and regulatory requirements of other state and federal agencies. These conditions would include provisions defined in the applicant's submittals for the proposed project, including:

- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c)

Waste Management

The types of non-hazardous solid wastes generated during construction, operations, and closure of the facility under the Modified I-15 Alternative would be the same as those generated as part of the proposed project. All materials would be managed, recycled, and/or disposed of in the same manner for each alternative.

Hazardous Waste Management

The types of hazardous materials used during project construction and operations under the Modified I-15 Alternative would be the same as those generated as part of the proposed project. All materials would be managed, recycled, and/or disposed in the same manner for each alternative.

Project Decommissioning

The closure and decommissioning of the facility, as developed under the Modified I-15 Alternative, would be the same as that for the proposed project. Similar to construction, the duration of the closure would be reduced under the Modified I-15 Alternative, due to the reduced number of power tower receivers and heliostats that would require removal (BSE 2010a).

Like construction and operations, the standards and procedures to be used during closure and decommissioning would be subject to BLM Conditions of Approval as defined in the Record of Decision, Energy Commission Conditions of Certification, and permit and regulatory requirements of other state and federal agencies. These conditions would include provisions defined in the applicant's submittals for the proposed project, including:

- Closure, Revegetation, and Rehabilitation Plan - Revision 3 (CH2M Hill 2010)
- Draft Contractor Health and Safety Standards (CH2M Hill 2009c)
- Preliminary Draft Plan, Revision 2, Drainage, Erosion, and Sediment Control Plan (CH2M Hill 2009e)
- Draft Raven Management Plan, ISEGS (CH2M Hill 2008a)
- Application for Incidental Take Permit Under Section 2081 of the Fish and Game Code (CH2M Hill 2009g)
- Draft Biological Assessment for the ISEGS Project (CH2M Hill 2008b)
- Weed Management Plan for ISEGS, Eastern Mojave Desert (CH2M Hill 2008c).

3.2.4 No Action Alternative

The No Action alternative under NEPA defines the scenario that would exist if the project were not constructed. Under NEPA, the "no action" alternative is used as a benchmark of existing conditions by which the public and decision makers can compare the environmental effects of the proposed action and the alternatives.

If the No Action alternative were selected, the construction and operational impacts of the ISEGS project would not occur. There would be no grading of the site, no loss or disturbance of approximately 4,000 acres of desert habitat, and no installation of extensive power generation and transmission equipment. The No Action alternative would also eliminate the proposed project's contributions to cumulative impacts in the Ivanpah Valley and in the Mojave Desert as a whole. However, the EITP project would still be implemented, so the impacts associated with that action would still occur.

In the absence of the ISEGS project, however, other power plants, both renewable and nonrenewable, would have to be constructed to serve the demand for electricity. If the No Action alternative were chosen, other solar renewable power plants may be built, and the impacts to the environment would likely be similar to those of the proposed project because solar renewable technologies require large amounts of land and similar slope and solarity requirements as the proposed ISEGS project. The No Action alternative may also lead to siting of other non-solar renewable technologies to help achieve the California Renewable Portfolio Standard.

Additionally, if the No Action alternative were chosen, it is likely that additional gas-fired power plants would be built or that existing gas-fired plants could operate longer. If the project were not built, California would not benefit from the reduction in greenhouse gases that this facility would provide. PG&E would not receive the 300-MW contribution to its renewable state-mandated energy portfolio and SCE would not receive the 100-MW renewable energy contribution.

California's Renewable Portfolio Standard has been implemented to reduce greenhouse gas emissions from gas- or coal-fired power plants. While the ISEGS project as proposed would have substantial impacts as a result of the extent of its disturbance, the facility is proposed to be located in an area of the desert that is not protected for specific wildlife species or for its wilderness values. In addition, substantial other development is proposed in the Ivanpah Valley. In the absence of the ISEGS project, other renewable or gas-fired power plants would likely be constructed to serve the electricity demand that could be met with the ISEGS project. Given these factors and the importance of solar technology as a tool in reducing greenhouse gases, the No Action alternative is not superior to the proposed ISEGS project.

3.3 Alternatives Considered but Eliminated from Detailed Analysis

This section summarizes the other alternatives that were considered by BLM, but were not retained for detailed evaluation. For each alternative, this section describes the operation and features of the alternative, as well as the rationale for elimination of the alternative from detailed analysis and comparison of impacts to the proposed project. However, although these alternatives were eliminated from the detailed analysis, this section also provides a summary of their expected environmental impacts, including comparisons to those associated with the proposed project.

Alternative sites for the ISEGS project were suggested in the AFC and in scoping comments and were developed by BLM and Energy Commission staff. The origin of each alternative is explained below. The National Parks Conservation Association and National Park Service suggested consideration of a site west of Clark Mountain, thus offering a buffer between the project site and the Mojave National Preserve. Multiple scoping comments suggested consideration of a private, already disturbed site. The following alternative sites are considered in this analysis and can be seen in **Figure**

3.15. Following are the alternatives considered by BLM, but eliminated from detailed analysis:

Site Alternatives

- Siberia East alternative
- Broadwell Lake alternative
- Private Land alternative
- Ivanpah Site A alternative
- Ivanpah Site C alternative
- West of Clark Mountain alternative
- Ivanpah Playa alternative

Renewable Solar Alternatives

- Parabolic Trough Technology
- Stirling Dish Technology
- Linear Fresnel Technology
- Solar PV Technology
- Distributed Solar Technology

Other Renewable Alternatives

- Wind energy
- Geothermal energy
- Biomass energy
- Tidal energy
- Wave energy

Alternative Methods of Generating or Conserving Energy

- Natural Gas Generation
- Coal Generation
- Nuclear Energy
- Conservation and Demand Side Management

Alternative Project Implementation

- Phased Approval alternative

3.3.1 Site Alternatives

3.3.1.1 Siberia East Alternative

Description

The Siberia site was considered in the AFC as an alternative to the ISEGS site. The site is also the subject of a separate application to BLM for a solar power facility. BrightSource Energy submitted an Application for Transportation and Utility Systems and Facilities on Federal Lands to the BLM on April 30, 2007, to develop up to 1,600 MW of solar power at this site.

For the purposes of this alternatives analysis, an area of approximately 4,000 acres on the eastern half of the BrightSource Siberia site has been identified as an alternative to the ISEGS project. It is called herein the *Siberia East alternative*. The alternative site is located entirely on BLM land, approximately 8.5 miles southeast of the town of Ludlow and immediately west of National Trails Highway (Route 66). Interstate 40 is located approximately 5 miles north of the Siberia East alternative. The site is bordered on the northeast side by the National Trail Highway and a Burlington Northern Santa Fe (BNSF) railroad.

Figure 3.16 shows the regional location of the Siberia East alternative and **Figure 3.17** shows a more detailed map of the location of the Siberia East alternative. Alternatives **Figure 3.16** also shows the federal land parcels that were acquired by BLM from Catellus with funds from The Wildlands Conservancy, other donors and the federal government. The Siberia East alternative would not be located on any Catellus lands.

The Siberia East alternative is located on BLM public lands, managed under the principle of multiple use and sustainable yield, and designated Multiple Use Class M (Moderate) for a controlled balance between more intense land use and protection of public lands. It is located on the eastern edge of the BLM Western Mojave Planning area, just west of the NEMO Planning area.

The land use in the immediate area of the alternative site area is open space, public land. The nearest residences are in Ludlow, California (population 10 in 2000) and approximately 8.5 miles northwest of the Siberia East alternative (U.S. Census 2008). The Bagdad Chase Mine is located approximately six miles west of the site and is owned and controlled by Bagdad Chase, Inc. The mine shares an access road to the western half of the Siberia site as proposed in the BLM application.

Rationale for Elimination

Both the Siberia East and Ivanpah Valley sites are the subject of current applications by BrightSource for solar generating facilities. Because the scale of current solar, wind, and other renewable energy facilities is on the order of 100 to 500 MW, BLM is considering and processing multiple renewable energy applications in order to achieve the objectives of the EPAct, which encourages the Department of the Interior (BLM's parent agency) to approve at least 10,000 MW of renewable energy on public lands by 2015. To be a reasonable alternative to the proposed project, implementation of the Siberia East application in place of the ISEGS application would have to be clearly superior, in terms of environmental impacts, and this is not the case. Because it would likely have substantially similar effects to the proposed project, the Siberia East site is not retained for further analysis as an alternative. The implementation of this alternative would not provide the proponent with the means to satisfy the timing conditions of their contractual obligations in their power purchase agreements, making Siberia East ineffective in meeting the applicant's objectives.

Environmental Impact Summary

Air Quality. The construction and operation emissions resulting from building and operating a 400-MW solar power plant at the Siberia East alternative site would be similar to the emissions for the ISEGS project at Ivanpah Basin and would be subject to permit requirements and require mitigation to avoid or reduce adverse air quality impacts. However, during the construction period, commuting emissions would likely be greater for the Siberia East alternative site than for the proposed ISEGS site.

Biological Resources. Approximately 4,000 acres of Mojave creosote scrub and other native plant communities would be permanently lost by vegetation clearing, grading, and construction of the solar facilities, potentially affecting special status animal species. No surveys were performed at this site, but given the size of the site, it is likely that impacts to listed or sensitive plant species would result from direct or indirect loss of habitat. Indirect loss of individuals may occur in instances such as sediments transported (e.g., from cleared areas during rain events) that cover adjacent plants or changes in a plant's environment that cause its loss (e.g., adjacent shrubs that provided necessary shade are removed). Additional impacts would occur due to the construction and operation of linear facilities associated with a solar facility at the Siberia East alternative site. However, definitive conclusions about the extent of impacts cannot be made in the absence of surveys and project design information.

Cultural Resources. Detailed surveys of the site have not been performed. However, based on site records, one known resource, National Trails Highway, would potentially be affected by construction and operation of a solar facility at the Siberia East alternative site. The presence of a solar facility at the Siberia East site would result in indirect visual impact to the historic architectural resources such as the National Trails Highway (SBR-2910H). This resource has been recommended eligible for the National Register of Historic Places (NRHP). Mitigation Measures such as those required for the ISEGS project in Section 5.4 may reduce this impact; specific site surveys would be required to be certain. It is not known what cultural resources, if any, would be affected by development of a solar facility at the Siberia East alternative site; however, it is reasonable to assume that resources exist and would be uncovered at some places of this site (AIC 2008). Definite conclusions about the potential for adverse impacts cannot be made because of the absence of site-specific survey and project design information.

Land Use. As with the proposed ISEGS site, the Siberia East alternative would not physically divide an established community. The proposed ISEGS site is located in areas that are designated Multiple-Use Class L (Limited Use) while the Siberia East alternative site is located in areas that are designated Multiple-Use Class M (based upon a controlled balance between higher intensity use and protection of public lands). While Multiple-Use Class L is more restrictive than Multiple-Use Class M, both allow for solar energy plants after complying with NEPA requirements.

Recreation. There is a high level of recreational use at the proposed ISEGS site; the Ivanpah Dry Lakebed alone is visited by an estimated 5,000 visitors annually. Recreation and wilderness impacts would be less severe at the Siberia East alternative site because the site is less intensely used for recreation.

Socioeconomics. Most of the socioeconomic impacts of the ISEGS project at the Siberia East alternative site would be similar to building and operating the project at the proposed site. However, because of the limited housing options at the Siberia East alternative site compared with the proposed site, accommodations for the construction workers at the Siberia East alternative would create greater construction impacts than at the proposed ISEGS site.

Traffic and Transportation. Impacts to traffic and transportation at the Siberia East alternative site would be similar to those at the proposed ISEGS site; however, the Siberia East alternative site would not require the use of Interstate 15 east of Barstow during the highly congested Friday afternoon time period. As such, the Siberia East alternative site would not contribute to an adverse cumulative impact on traffic and transportation to northbound Interstate 15 during Friday afternoons as would the ISEGS site.

Visual Resources. The site would be prominently visible from the National Trails Highway (Route 66), particularly for westbound traffic. Travelers would see the site from a distance and there is little elevation or natural contouring to block the solar power towers. The ridges on the northern border of the MCAGCC would border the site to the south and as such would block the Siberia East alternative from sensitive viewers to the south.

The proposed Ivanpah site is preferred over the Siberia East alternative site because while Siberia East would be visible to fewer people than the proposed ISEGS site, it would be located in a much more remote and pristine area. The ISEGS project is located in an area with substantially more development and use because of its location along Interstate 15, adjacent to Primm, Nevada, and adjacent to heavily used recreation areas. As a result, a large solar project in the Siberia East area would create a more dramatic change to the visual environment than would occur at the ISEGS site.

Waste Management. The environmental impacts of waste disposal at the Siberia East alternative site would be similar to those at the proposed ISEGS site at Ivanpah. While the Siberia East alternative is closer to the Barstow Sanitary Landfill, the Ivanpah site has the option of using two additional landfills in Nevada (see Section 5.14).

Geology, Paleontology and Minerals. The peak bedrock ground acceleration is higher for the Siberia East alternative than for the proposed ISEGS site at Ivanpah Basin as the (see the Energy Commission's PSA for details regarding the geologic hazards and peak ground acceleration).With the exception of stronger ground shaking, the Siberia East alternative site is subject to geologic hazards of similar magnitude as the Ivanpah Basin site. Strong ground shaking could be effectively mitigated through facility design. The potential to encounter paleontological resources at the Siberia East alternative site is similar to the Ivanpah Basin site.

Transmission System Engineering. Locating a solar facility at the Siberia East alternative would require re-evaluating the capacity of the SCE transmission lines that would be used for interconnection. This alternative may cause adverse effects to the SCE transmission system and require system upgrades. Moreover, it may not accomplish the project goal to be on line in 2011 because of grid improvement constraints.

Summary of Impacts. Without more site-specific information about biological and cultural resources at the Siberia East alternative, a detailed comparison of sites for those disciplines is not possible. It is assumed that impacts to soils and water at the Siberia East alternative would be similar to those at the proposed Ivanpah Basin site; however, it is uncertain if there is groundwater available at the Siberia East alternative site.

The Siberia East alternative would have impacts similar to the proposed ISEGS site at Ivanpah Basin for Air Quality (operational impacts and most construction impacts), Hazardous Materials, Noise & Vibration, Visual Resources, Public Health & Safety, Transmission Line Safety and Nuisance, Waste Management, Worker Safety and Fire Protection, Facility Design, Power Plant Design, Efficiency and Reliability. While definitive conclusions about the extent of Biological Resource impacts cannot be made in the absence of surveys and project design information, the existing information regarding the Siberia East site suggest that there would likely be similar levels of adverse impacts to desert tortoise at this site as there would be for ISEGS.

The Siberia East alternative would be less preferred than the proposed ISEGS site at Ivanpah Basin for air quality (commuting impacts during construction impacts only), socioeconomics, geology, paleontology and minerals, and transmission system engineering. The Siberia East alternative would be preferred to the proposed ISEGS site at Ivanpah Basin for land use, recreation, and traffic and transportation.

3.3.1.2 Broadwell Lake Alternative

Description

The Broadwell Lake site was considered as an alternative to the ISEGS site and as a site for a potential future solar facility (CH2M Hill 2007). Independently, BrightSource submitted an Application for Transportation and Utility Systems and Facilities on Federal Lands to the BLM on January 25, 2007 to develop up to 500 MW of solar power at this site (BSE 2007a). A September 18, 2009 newspaper article stated that BrightSource has “ceased all activity at the Broadwell site” due to the consideration of the area for a future national monument (San Francisco Chronicle 2009).

The Broadwell Lake alternative would be located on BLM land, approximately 8.5 miles north northwest of Interstate 40 at Ludlow. The Broadwell Lake alternative is located in unincorporated San Bernardino County, approximately 1.5 miles east of the Kelso Dunes Wilderness, approximately 7 miles north-northwest of the Bristol Mountains Wilderness, and approximately 1 mile west of the Broadwell Dry Lake. National Trails Highway (Route 66) and Interstate 40 are located approximately 8.5 miles south of the alternative site, and the historic Tonopah and Tidewater Railroad is located approximately 7 miles south of the site. **Figure 3.16** shows the regional location of the Broadwell Lake alternative and **Figure 3.18** shows the Broadwell Lake in greater detail. **Figure 3.16** also indicates federal lands that had been obtained from Catellus with funds from The Wildlands Conservancy, other donors and the federal government. The Broadwell Lake alternative would be located on some parcels previously owned by Catellus.

The Broadwell Lake alternative as defined in this EIS is located on BLM public lands, which are managed under the principle of multiple use and sustainable yield and are designated Multiple Use Class L (Limited) and M (Moderate) for a controlled balance between higher intensity use and protection of public lands (BLM 2008a). The site is located within the NEMO Planning Area. The elevation of the site is approximately 1,300 feet above mean sea level. The site would be accessed via Crucero Road, a one-lane dirt road with an exit off Interstate 40 (DWR 2004a).

Broadwell Dry Lake is located approximately one mile east of the site. The land use character of the immediate alternative site area is open space and public land. The eastern portion of the dry lake and the mountains to the east are designated as wilderness—BLM’s Kelso Dunes Wilderness Area.

The nearest residences are in Ludlow, CA (population 10 in 2000), approximately 7.5 miles south of the Broadwell Lake alternative (US Census 2008). The nearest schools are in Newberry Springs, approximately 32 miles away.

Rationale for Elimination

BLM is not considering this site further because the site may not be feasible, as it may be included within the proposed Mojave Trails National Monument, should that proposal be adopted. Development of solar projects is likely to be in consistent with the policy objectives for the management of that area, should it be approved. The applicant (BrightSource Energy) has requested that evaluation of this site be placed on hold pending a decision on monument legislation.

Environmental Impact Summary

Air Quality. The construction and operation emissions resulting from building a 400-MW solar power plant at the Broadwell Lake alternative site would be similar to the construction required for the construction of the ISEGS project at Ivanpah Basin and would be subject to permit requirements and require mitigation to avoid or reduce adverse air quality impacts. Emissions from the commute of the construction workers would likely be greater at the Broadwell Lake alternative than at the proposed Ivanpah Basin site.

Biological Resources. Detailed biological surveys of this alternative have not been completed. However, approximately 4,000 acres of Mojave creosote scrub and other native plant communities would be permanently lost to the siting of a solar facility at Broadwell Lake by vegetation clearing, grading, and construction of the solar facilities. Such a siting also would likely result in losses of habitat for special-status plant and animal species as a result from loss of habitat. Indirect loss of individuals may occur in instances such as sediments transported (e.g., from cleared areas during rain events) that cover adjacent plants or changes in a plant's environment that cause its loss (e.g., the removal of shrubs that provided necessary shade). Additional impacts would occur due to the construction and operation of linear facilities associated with a solar facility at the Broadwell Lake alternative site, including a one-mile transmission line and a two-mile gas pipeline. While definite conclusions about the potential for adverse impacts cannot be made because of the absence of site-specific survey and project design information, based on its vegetation and surveys of nearby sites, there would likely be similar adverse impacts to desert tortoise at the Broadwell Lake site as there would be at the proposed ISEGS site.

Cultural Resources. Twenty known archaeological, architectural, or historical sites would potentially be affected by construction and operation a solar facility at the Broadwell Lake alternative site. Mitigation Measures such as those required for the proposed ISEGS project in Section 5.4 of this EIS may reduce this impact; however, specific site surveys would be required to be certain. Unknown, unrecorded cultural resources may be found at the Broadwell Lake alternative site. It is not known what cultural resources, if any, would be affected by development of a solar facility at the Broadwell Lake alternative site; however, it is reasonable to assume that resources exist and would be uncovered at some places in this site (AIC 2008). Definite conclusions about the potential for adverse impacts cannot be made because of the absence of site-specific survey and project design information.

Land Use. As with the proposed Ivanpah Basin site, the Broadwell Lake alternative would not physically divide an established community. The proposed ISEGS site is located in areas that are designated Multiple-Use Class L (Limited Use) while the Broadwell Lake alternative site is located in areas that are designated Multiple-Use Class L and M (based upon a controlled balance between higher intensity use and protection of public lands). While Multiple-Use Class L is more restrictive than Multiple-Use Class M, both allow for solar energy plants after complying with NEPA requirements.

The alternative site would have no impact with respect to farmland conversion; however, the Broadwell Lake alternative site would be located within the Cady Mountain

Grazing Allotment (Cady Mountain, allotment #08006). The Broadwell Lake alternative 4,000-acre property boundary area is part of a larger 97,560-acre (150 square mile) BLM grazing allotment. As stated in Section 5.17, pursuant to Title 43 Code of Federal Regulations, section 4110.4-2(2)(b) Grazing Administration, the process to withdraw a BLM grazing lease to allow development requires a two-year notification be given to the lease holder prior to the start of development.

Recreation. Recreationists at the Bristol Mountains Wilderness and at the Kelso Dunes Wilderness would have an unobstructed view of the ISEGS project were it built at the Broadwell Lake alternative site. Additionally, recreationists at the Cady Mountains and Afton Canyon Natural Area would have a distant view of the power towers. Because of the relatively pristine nature of these recreation areas, the ISEGS project would introduce an industrial nature to the region dissimilar to any existing facilities. While potentially fewer recreationists visit the region surrounding the Broadwell Lake alternative than the proposed Ivanpah Basin site, the recreationists visiting the Broadwell Lake alternative are likely searching for undisturbed desert landscape and wilderness. As such, there may be potential impacts to recreational resources at the Broadwell Lake alternative similar to the proposed project.

Socioeconomics. Most of the socioeconomic impacts of the ISEGS project at the Broadwell Lake alternative site would be similar to building and operating the project at the proposed site. However, because of the limited housing options in the Ludlow area as compared with the proposed site, accommodations for the construction workers at the Broadwell Lake alternative would create greater impacts than at the proposed Ivanpah Basin site.

Traffic and Transportation. Impacts to traffic and transportation at the Broadwell Lake alternative site would be similar to those at the proposed Ivanpah Basin site; however, the Broadwell Lake alternative site would not require the use of Interstate 15 east of Barstow during the highly congested Friday afternoon time period. As such, the Broadwell Lake alternative site would likely have fewer impacts than the Ivanpah Basin site on traffic and transportation.

Visual Resources. The proposed Ivanpah site would be located in an area that is much less remote and more developed, and further from designated wilderness. The Ivanpah Basin site is located in an area with substantially more development and use because of its location along Interstate 15 adjacent to Primm, Nevada, and to heavily used recreation areas. As a result, a large solar project in the Broadwell Lake area would create a more dramatic change to the visual environment than would occur at the Ivanpah Valley site.

Waste Management. The environmental impact of waste disposal at the Broadwell Lake alternative site would be the similar to that at the Ivanpah Basin site. While the Broadwell Lake alternative is closer to the Barstow Sanitary Landfill, the Ivanpah Basin site has the option of using two additional landfills in Nevada (see Section 5.14 of this EIS).

Transmission System Engineering. Locating a solar facility at the Broadwell Lake alternative site would require re-evaluating the capacity of the SCE transmission lines that would be used for interconnection. This alternative may cause adverse effects to the transmission system and require system upgrades. Moreover, it may not accomplish the project goal to be on line in 2011 because of grid improvement constraints.

Summary of Impacts. Surveys for biological and cultural resources have not been conducted at the Broadwell Lake alternative, so a detailed comparison is not possible. Details on surface water flow are also not available, but given the topography and soils, it is assumed that most impacts to soils and water at the Broadwell Lake alternative would be similar to those at the proposed Ivanpah Basin site. However, it is unknown if there is groundwater available at the Broadwell Lake alternative site.

The Broadwell Lake alternative would have similar impacts as the proposed Ivanpah Basin site for air quality (operation and most construction impacts), hazardous materials management, visual resources, land use, recreation, noise, public health, transmission line safety and nuisance, waste management, worker safety and fire protection, facility design, power plant efficiency and power plant reliability. While definitive conclusions about the extent of Biological Resource impacts cannot be made in the absence of surveys and project design information, there would likely be similar levels of adverse impacts to desert tortoise at the Broadwell Lake sites as there would be for ISEGS.

The Broadwell Lake alternative would be less preferred than the proposed Ivanpah Basin site for Air Quality (for construction commuting only), Socioeconomics & Environmental Justice, Geology, Paleontology and Minerals, and Transmission System Engineering. The Broadwell Lake alternative would be preferred to the proposed Ivanpah Basin site for Traffic and Transportation.

3.3.1.3 Private Land Alternative

Description

Multiple scoping comments requested that an alternative site be considered on disturbed private land in order to minimize the loss of more pristine public lands. The applicant evaluated three private land alternatives in its AFC (Harper Lake, Lucerne Valley, and Rabbit Lake alternatives; see **Figure 3.15**). All of these sites were eliminated from further consideration by the applicant because they would have required completing option-to-purchase agreements with multiple private owners. BrightSource felt that obtaining site control with numerous owners would have been time-consuming and risky (CH2M Hill 2007). Only one of the private sites, Harper Lake, had sufficient land for a 400 MW facility with the configuration of the proposed project; however, one of the major land owners at the site requested too much money to make the site economically feasible.

A Private Land Alternative was evaluated in the Energy Commission's PSA, but eliminated from consideration based on the number of private parcels that would be required to assemble enough land for a large project. Comments on the PSA requested that the Private Land alternative be analyzed in more detail; this section responds to those comments. Because this alternative was not discussed in detail in the PSA, the analysis of this alternative in this EIS presents more detail than for other alternatives.

There are limited areas where undeveloped contiguous private land parcels exist within the California desert with the appropriate slope and solarity requirements. One of these areas is the triangular land area east of Barstow, bounded by I-15 on the north, I-40 on the south, and BLM land on the east. The western portion of this area was identified as a disturbed area by the RETI Phase 2 maps and includes the towns of Daggett and Yermo (both about 12 miles east of Barstow), the Barstow-Daggett Airport, and the Marine Corps Logistics Base (MCLB). The Mojave River passes through the northern portion of the triangle, and its floodplain ranges from about 2,000 feet to one mile wide. The river parallels I-15 on a northeasterly trend.

Figure 3.19A shows this area of private land. The western portion of this land area is the location of the first two solar power tower facilities of the Solar Electric Generating System (SEGS), built in Daggett by LUZ Industries. The location adjacent to these original SEGS facilities was considered for a possible Private Land Alternative, incorporating approximately 2,000 acres of agriculture land. However, sufficient disturbed land is not available to build a 400 MW solar power facility without interfering with a number of existing residential areas. Additionally, the area surrounding the original SEGS facilities is located within 2,000 feet of the Barstow-Daggett Airport and would potentially conflict with the Federal Aviation Regulation Part 77 – Objects Affecting Navigable Airspace, specifically the surface structure height would potentially obstruct or impede air navigation. The Barstow-Daggett area also includes undisturbed private land, rural residences, and a few private water ski lakes. Based on these restrictions in the western portion of the area, an area in the northeastern portion was selected for evaluation as the Private Land alternative. **Figure 3.19B** is a more detailed map of this potential site.

A Private Land alternative would require approximately 900 acres for each of the two 100 MW Phases and approximately 1,800 acres for the 200 MW phase. An additional approximately 100 acres would be required for a shared administrative building, operations and maintenance building, substation, and detention ponds. Approximately 300 acres is required for construction staging activities. The total footprint of the ISEGS project on private lands would be approximately 4,000 acres (approximately 6.25 square miles).

While all parcels at the location shown in **Figure 3.19A** are not for sale, there are large parcels of land (500 acres or more) in the general vicinity that are listed on a number of real estate websites.[1] Approximately 0.5 miles west of the Private Land alternative, at the intersection of Interstate 15 and Manix Rd, there is one square mile lot for sale specifically targeting solar and wind energy. While large lots of land are available in the vicinity of Daggett or Newberry Springs, a number of criteria would need to be met to make it most likely that the available land would be suitable for solar development.

To meet the alternative site criteria allowing development of a project the same size as the proposed ISEGS project, approximately 4,000 acres of land would be required. To minimize land use impacts, the land should avoid conflicting with existing rural residences and existing airports. While disturbed agricultural land is located in the Newberry Springs and Daggett communities, much of this land is located near the Barstow-Daggett Airport. Other already disturbed land is located in Newberry Springs

[1] See Trulia Real Estate Search at http://www.trulia.com/property/1045905451-Lot-Land-Yermo-CA-92398 and Land Watch at http://www.landwatch.com/San-Bernardino-County-California-Land-for-sale/pid/1343937 (Accessed May 9, 2009) and http://www.loopnet.com/property/16038677/I-15-and-Manix-Rd/ (Accessed May 28, 2009) for the one square mile parcel targeting solar and wind energy providers.

south of the Mojave River. This area has a much greater density of rural residences, including water ski lakes with residences adjacent. In order to minimize land use conflicts, a site north of the Mojave River and south of Interstate 15 was selected as the Private Land alternative. The site is made up of disturbed agricultural land and private and public open space.

The Private Land alternative would be located on private land with a few BLM parcels included, south of and adjacent to Interstate 15 in the community of Harvard, north of Newberry Springs. Interstate 40 is located approximately 7 miles south of the alternative site. The Private Land alternative has appropriate insolation and minimal slope. The elevation of the site is approximately 1,800 feet above mean sea level. The site would be accessed via Harvard Road, off Interstate 15 at the Harvard Road exit. Additionally, there are several existing structures and residences on some of this private land, and removal of houses or other structures may be required.

The Private Land site would require acquisition of approximately 70 parcels, although the number of separate landowners may be fewer. Due to the number of parcels that would have to be acquired, this alternative would be substantially more challenging for an applicant to obtain site control (in comparison to BLM land). The applicant would have to negotiate separately with multiple landowners. The Draft Phase 2a Report published by the Renewable Energy Transmission Initiative (RETI) in early June 2009 identified private land areas for solar development only if there were no more than 20 owners in a two square mile (1,280 acre) area.

The Mojave River is located approximately 0.25 miles south of the site. The river is dry most of the year and flows only during the largest rain events. The land use character of the immediate alternative site area is open space and rural residential. Some public lands (BLM) occur within the site boundaries. There are lands owned by the CDFG just south of the site boundary. A Desert Wildlife Management Area (DWMA) for protection of desert tortoise is located north of the site on the north side of Interstate 15.

Approximately five residences are located within the site. The site would also be located adjacent to a low density residential area on east of Newberry Springs.

Like the proposed ISEGS project, the Private Land alternative would include a natural gas-fired start-up boiler to provide additional heat for plant start-up and during periods of cloud cover. The Private Land alternative would obtain natural gas by installing a pipeline to the Kern River Gas Transmission Pipeline approximately 3.3 miles north of the Private Land Alternative.

The SCE Cool Water-Dunn Siding 115 kV transmission line runs through the Private Land alternative site. The Private Land alternative would require either an interconnection and upgrade of the SCE Cool Water-Dunn Siding 115 kV transmission line or the construction of a new 10-mile 230 kV transmission line that would follow the existing corridor southwest to the Cool Water Substation. Additional transmission lines (between 287 kV and 500 kV) are located approximately two miles north of the Private Land alternative site on the northern side of Interstate 15.

Rationale for Elimination

The Private Land Alternative is not considered further in this EIS because its implementation is remote and speculative. Development of this site would depend upon the ability of a developer to acquire multiple, contiguous private land holdings covering a large area, which is not likely to be feasible.

Environmental Impact Summary

Air Quality

Environmental Setting. Like the proposed ISEGS project, the Private Land alternative would be located within the Mojave Desert Air Basin, regulated by the Mojave Desert Air Quality Management District (MDAQMD). The Private Land alternative would be located in the Western Mojave Desert where ozone and particulate matter violate ambient standards, despite the low population density east of Barstow (EPA 2008a).

Environmental Impacts. Exhaust emissions from heavy-duty diesel and gasoline-powered construction equipment and fugitive particulate matter (dust) would be essentially the same at any site. Exhaust emissions would also be caused by workers commuting to and from the work sites, from trucks hauling equipment and supplies to the sites, and crew trucks (e.g., derrick trucks, bucket trucks, pickups). Workers and trucks hauling equipment and supplies would have to commute 20 miles (to Barstow) or 60 miles (to Victorville) to reach the Private Land alternative. The proposed project is located about 50 miles from Las Vegas, NV. Appropriate mitigation at the Private Land alternative site would likely involve similar, locally oriented recommendations such as the mitigation measures presented in Section 5.1 of this EIS.

Comparison to Proposed Project. The construction and operational emissions at the Private Land alternative site would be similar to those of the ISEGS project at Ivanpah Basin.

Biological Resources

Environmental Setting. The Private Land alternative is located in the desert region of unincorporated San Bernardino County within the BLM West Mojave Planning Area. The western Mojave Desert comprises a distinct area of the Mojave Desert biome, and flora and fauna have adapted to local conditions and formed distinct natural communities. Freezing temperatures occur on a limited basis in the winter, and summer temperatures regularly exceed 100 degrees. The desert habitat of San Bernardino County includes soils that are predominantly sandy gravel, as well as major dune formations, desert pavement, and dry alkaline lake beds (San Bernardino County 2007). The Mojave Desert region is characterized by arid conditions with low precipitation, and the eastern portion of the West Mojave Planning Area is crossed by expansive alluvial washes.

The West Mojave Planning Area supports a diverse array of plant and wildlife species because of the varied topography and landforms within the planning area (BLM 2005). The predominant aspect of the West Mojave is a flat, sparsely vegetated region interspersed with mountain ranges and dry lakes. The characteristic creosote bush and saltbush plant communities bloom during years of above-normal winter rainfall, and up to 90 percent of the flora is comprised of annual plants (BLM 2005).

The Private Land alternative would be located immediately north of the Mojave River. The Mojave River is in many ways the most prominent landscape feature of the West Mojave desert (BLM 2004). The now-dry river and playas of the historic Mojave River supported species of invertebrates, fish, amphibians, and pond turtles, and attracted migratory birds dependent on water. Remnant populations of these animals are still present today, and comprise many of the rare species in the vicinity of the river. The ancient river and lakes formed sandy beaches and prevailing winds carried the finer particles to the east, forming hummocks and dunes. These blowsand areas now support unique species of insects, plants, and reptiles, including the Mojave fringe-toed lizard, whose entire distribution can be traced to the former path of the ancient Mojave River and Amargosa River (BLM 2004).

The Private Land alternative would be located immediately north of the CDFG Camp Cady Wildlife Area (BLM 2004). This site supports mesquite thickets and riparian forest, and protects western pond turtle, summer tanager, yellow-breasted chat, and a variety of birds of prey, especially in winter. Camp Cady includes habitat for Mojave tui chub, hawks, songbirds and shorebirds. Adjacent public and private lands on the west including the Private Land alternative contain blowsand deposits with the Mojave fringe-toed lizard (BLM 2004).

The Private Land alternative would be located on habitat that is considered suitable for the Mohave Ground Squirrel (CDFG 2005). The Mohave Ground Squirrel is restricted to the Mojave Desert in San Bernardino, Los Angeles, Kern and Inyo Counties and populations have been reduced by urban development, off-road vehicle use, and agriculture. Populations in the southwestern San Bernardino County appear to be extirpated (CDFG 2005).The Mohave Ground Squirrel was not identified in the California Department of Fish and Game Natural Diversity Database (CNDDB) data for this site.

A reconnaissance survey of the biological resources of the Private Land alternative was conducted on August 16, 2009 from public access roads which allowed visitation throughout the site. Mojave creosote bush scrub and atriplex scrub are the two dominate habitat types at the Private Land alternative site. The Private Land alternative also included some lands dominated by fallow and ruderal fields and developed areas. During this survey, a number of habitat characteristics were used to rate the quality of the habitat and the capacity to support desert tortoises. These include topography, soil texture, dominant shrubs, herb layer, plant diversity, likelihood of desert tortoise occurrence, likelihood of other special status species occurrence, quality of surrounding habitat, overall habitat quality for wildlife, and overall habitat quality for desert tortoise. Results of the survey show that the Private Land alternative site has varying habitat quality for desert tortoise and wildlife and is generally made up of unsuitable to medium quality habitat for desert tortoise.

The Private Land alternative had poor quality habitat for rare plants, except on Harvard Hill (where no impacts would be expected due to unbuildable slopes). Much of the Mojave River lacks any notable riparian vegetation. Even where riparian vegetation is good, impacts to wildlife using the river vegetation during breeding season from a solar facility up on the ridge of private lands was expected to be low. There is a buffer of perhaps 300-500 feet from river vegetation/active channel to buildable flats to north where the Private Land alternative could be expected to be built.

The following sensitive species occur in the vicinity of the alternative site (CNDDB 2009). Several species are noted because of the proximity to the Mojave River, which flows rarely.

- Southwestern pond turtle
- Vermilion flycatcher
- Mohave tui chub
- Desert tortoise
- Mojave fringe-toed lizard
- Parish's popcorn-flower
- Pallin bat
- Townsend's big-eared bats'

Environmental Impacts. Approximately 650 acres of the Private Land alternative are disturbed agricultural land. Approximately 3,350 acres of Mojave creosote scrub and other native plant communities would be permanently lost by vegetation clearing, grading, and construction of the solar facilities, potentially affecting special status animal species. Impacts to listed or sensitive plant species would result from direct or indirect loss of known locations of individuals or direct loss of habitat. Indirect loss of individuals may occur in instances such as sediments transported (e.g., from cleared areas during rain events) that cover adjacent plants or changes in a plant's environment that cause its loss (e.g., adjacent shrubs that provided necessary shade are removed). Additional impacts would occur due to the construction and operation of linear facilities associated with a solar facility at the Private Land alternative site, including a possible transmission line approximately 10 miles long and a 3.3-mile gas pipeline. In addition, this alternative is located near the Mojave River, so mitigation measures to protect river corridor species and habitat would be important.

Impacts/Mitigation to Wildlife—Overview

Building a solar facility at the Private Land alternative site would potentially have an adverse effect on listed and sensitive wildlife species and their habitats either directly or through habitat modifications. Any wildlife residing within the proposed project area would potentially be displaced, injured, or killed during project activities. Animal species in the project area could fall into construction trenches, be crushed by construction vehicles or equipment, or be harmed by project personnel. In addition, construction activities may attract predators or crush animal burrows or nests.

Migratory/Special Status Bird Species. Mojave creosote bush scrub at the power plant site provides foraging, cover, and/or breeding habitat for migratory birds, including special-status bird species that may be present at the site. Project construction and operation could impact nesting birds in violation of the Migratory Bird Treaty Act. Preconstruction surveys and avoidance of nesting birds could reduce such impacts.

Desert Tortoise. The Private Lands Alternative site is located in habitat of varying quality for desert tortoises. Although the habitat/plant community varies somewhat with elevation, slope, and soils, many areas have been heavily disturbed and some are actively farmed. Portions of the site are unsuitable for desert tortoises and other portions range between low and medium quality habitat for desert tortoise. It is anticipated that the private lands alternative also provides unsuitable to medium quality habitat for other special status species that are known to occur in the area.

The Mojave River is located approximately one-half mile from the site. There are patches of well developed riparian habitat and areas of no and poorly developed riparian habitat. The proximity of the river to the project site would most likely result in increased bird activity in the area but this increase is not expected to result in adverse impacts. This site is of much less value to desert tortoise than the ISEGS and I-15 sites.

This notwithstanding construction and operation activities may result in direct or indirect impacts to the desert tortoise or its occupied habitat and mitigation measures similar to those required for the proposed ISEGS site would be required should the project be build at the Private Land alternative.

Mohave Ground Squirrel. Construction and operation activities may result in direct or indirect impacts to the Mohave ground squirrel or its occupied habitat. The project would result in potential take of individuals and permanent loss of up to 4,000 acres of habitat on the solar facility site. The project could also result in disturbance to nearby populations should there be any and increased road kill hazard from construction and operation traffic.

Human activities in the Private Land alternative project area potentially provide food or other attractants in the form of trash, litter, or water, which draw unnaturally high numbers of tortoise predators such as the common raven, kit fox, and coyote. Predation could be reduced through the preparation of a Raven Management Plan and other avoidance and minimization measures such as the mitigation measures presented in Section 5.3 of the EIS.

Spread of Noxious Weeds. Construction of a solar facility at the Private Land alternative site could result in the introduction and dispersal of invasive or exotic weeds. The permanent and temporary earth disturbance adjacent to native habitats increases the potential for exotic, invasive plant species to establish and disperse into native plant communities, which leads to community and habitat degradation. A weed reduction program could potentially reduce and mitigate impacts.

Noise. Noise from construction activities could temporarily discourage wildlife from foraging and nesting immediately adjacent to the project area. Many bird species rely on vocalization during the breeding season to attract a mate within their territory. Noise levels from certain construction, operations, and demolition activities could reduce the reproductive success of nesting birds.

Lighting and Collisions. Like the proposed project, the heliostat array at the Private Land alternative site would be arranged around centralized solar power towers 459 feet high, which would potentially include FAA-required lighting and a lightening pole that would extend above the top of the towers approximately 5 to 10 feet. Lighting may increase the collision risk because lights can attract nocturnal migrant songbirds. Bright night lighting close to the ground at the ISEGS project site could also disturb wildlife that occurs adjacent to the project site (e.g., nesting birds, foraging mammals, and flying insects).

Operation of a 10-mile transmission line could result in increased avian mortality due to collision with new transmission lines. Mitigation could include installing the transmission line in accordance with the Avian Powerline Interaction Committee (APLIC) Guidelines designed to minimize avian-power line interactions.

Definite conclusions about the potential for adverse impacts to biological resources cannot be made in the absence of site-specific survey and project design information.

Comparison to Proposed Project – Biological Resources

Overall, development of a solar project at the Private Land alternative site would likely impact slightly fewer biological resource compared to those of the proposed ISEGS project because approximately 650 acres of the alternative would occur on disturbed, agricultural land. The Private Land alternative site has varying habitat quality for desert tortoise and wildlife and is generally made up of unsuitable to medium quality habitat compared with the proposed ISEGS site which has a high quality desert tortoise and wildlife habitat. The Private Land alternative is preferred over the ISEGS for impacts to biological resources.

Cultural Resources

Environmental Setting. The Private Land alternative is located on a combination of agricultural land, undeveloped BLM land, and open space private land in San Bernardino County, California. The alternative site is located in the Mojave Desert and is located just north of the CDFG Camp Cady Wildlife Area. The California desert has been inhabited for at least 8,000 to 12,000 years and perhaps longer (BLM 2005). Prehistoric settlement was often centered on lakes, now the dry playas characteristic of the Mojave Desert and Great Basin. The lakes and marsh environments along the edges had abundant plant and animal species providing food, fibers, medicines, tools, clothing, and ritual objects required for daily life (BLM 2005). Closer to the Private Land alternative, the Mojave River was a significant focus of prehistoric settlement and the principal corridor for prehistoric travel and trade, particularly during the Protohistoric Period (A.D. 1200 to ca. A.D. 1850) (Moratto 1984, pp. 426–430).

From 8,000 to 6,000 years before present, climatic change caused the lakes to dry, and food gathering and land use patterns began that continued into the historic period, including a use of a greater variety of habitats, plants, and animals (BLM 2005). The bow and arrow may have appeared around 2,000 years ago as evidenced by a shift in projectile point types, and the expansion of bow-and-arrow technology is evidenced by the late prehistoric introduction of the Desert Side-Notched and Cottonwood Triangular points found through the California desert (BLM 2005). A pattern of exploitation of seasonally available resources resulted in the use of large areas by relatively small populations and left archaeological sites widely scattered (BLM 2005).

The first documented exploration of the Mojave Desert by nonindigenous people occurred in the mid-1700s by Francisco Garces, a Spanish Franciscan priest looking for a route from Arizona to Northern California (BLM 2005). Much of the history of this region is because of its use as a corridor, one used by fur trappers and caravans. California was annexed in 1848, the same year that gold was discovered, leading to an influx of prospectors (BLM 2005). Roads were established to transport goods, people, livestock, food, and ore between the Mojave Desert and Los Angeles, and the western Mojave Desert began to have a large mining industry.

Railroad surveys began in 1853; the San Pedro, Los Angeles, and Salt Lake Line, predecessor to the Union Pacific through the Mojave Desert, was completed in 1905, and the Tonopah and Tidewater finished its line from Ludlow to Beatty, Nevada, in 1907 (BLM 2005). In 1914, a road was completed to parallel the tracks of the Atlantic & Pacific Railroad, which was the precursor to U.S. 66 (National Trails Highway).

Military bases were established in the desert prior to World War II, and large tracts were set aside for military use, including the MCAGCC (BLM 2005). Further information regarding this region can be found in Section 5.4 of the EIS.

One California State Historical Landmark is located immediately south of the Private Land alternative. Camp Cady (No. 963-1) was located on the Mojave Road which connected Los Angeles to Albuquerque. Non-Indian travel on this and the nearby Salt Lake Road was beset by Paiutes, Mohaves, and Chemehuevis defending their homeland. To protect both roads, Camp Cady was established by U.S. Dragoons in 1860. The main building was a stout mud redoubt. Improved camp structures were built 1/2 mile west in 1868. After peace was achieved, the military withdrew in 1871. This protection provided by Camp Cady enabled travelers, merchandise, and mail using both roads to boost California's economy and growth (OHP 2009). Much of the camp has been destroyed, and unrelated wooden structures exist onsite. The Camp Cady site today is bare of apparent evidences of early use, because a flood in 1938 washed away all traces of the original adobe structures.

A records search for the Private Land alternative at the San Bernardino Archeological Information Center of the California Historical Resources Information System reveals that the alternative, which is in and adjacent to the Mojave River floodplain, is in a landscape context that has a moderately high frequency of prehistoric archaeological sites. The Energy Commission conducted the records search on August 5, 2009, focusing on the Private Land alternative and areas four miles to the east and west along the Mojave River. The records search documents the presence of diverse archeological site types on the alluvial terraces that flank the river. The site types include habitation areas, village sites, and campsites, each of which may have food processing, lithic reduction, burial, and cremation components. Other site types typical on and beyond the terraces include lithic quarry sites, rock art sites, ceramic scatters, and trails.

The known prehistoric archaeological site distribution across the area of the Private Land alternative reflects both the frequency and the diversity of the site types in adjacent areas. Roughly 27 percent of the Private Land alternative appears to have been subject to reliable pedestrian surveys. The surveys document three prehistoric archaeological sites in or immediately adjacent to the area of the alternative, a moderately complex habitation area on the alternative that includes three food processing areas, one campsite, and one ceramic scatter (P1801-14), a village site found adjacent to the alternative in 1966 and destroyed by agriculture prior to 1980 (CA-SBR-2689), and a lithic quarry site related to the exploitation of toolstone available on Harvard Hill on the western portion of the alternative (CA-SBR-1933). The extrapolation of the archaeological site frequency for the known, roughly 27 percent sample of the alternative would appear to indicate the potential presence of three to four times the number of known archaeological sites on the alternative.

Environmental Impacts. The construction and operation of a solar facility on the site of the Private Land alternative would appear likely to destroy one whole known prehistoric archaeological site and part of a second, and may destroy components of a third, and has the further potential to wholly or partially destroy a number of other prehistoric archaeological sites on portions of the alternative that have not yet been subject to pedestrian survey. One would need to establish the historical significance of the three known resources above and any additional ones that would be found as a result of the complete pedestrian survey of the alternative to comment more definitively on whether any of these resources would qualify for treatment under Federal and State regulatory programs. Given the historic significance of the Mojave River corridor during most of prehistory and the character of the diverse archaeological site types known for the Private Land alternative and adjacent areas, it is, however, reasonable to assume that the alternative would most likely have the potential to destroy significant prehistoric archaeological deposits. Federal and State regulatory programs would require treatment for all such deposits.

One historical archaeological site, Camp Cady (California State Historical Landmark No. 963-1), is known in the vicinity of the Private Land alternative. As the resource is roughly one half of a mile to the south of the alternative, it is relatively unlikely that the presence of a solar facility would result in an adverse impact to the particular values for which the resource may be significant. The primary value of the resource probably relates to the information that the careful excavation of the historical archaeological deposits that make up the camp would produce. The construction and operation of a solar facility on the Private Land alternative would not disturb or destroy any of these deposits. The historical archaeological deposits of Camp Cady could also potentially be found to have historical value for the association of the deposits with significant events or patterns in history. Were the deposits found to have such value, the potential for a nearby solar facility to degrade the visual integrity of the resource would have to be taken into account. The resolution of this issue would require further study.

There are a number of known built environment resources (buildings, structure, and linear infrastructure elements) in and near the Private Land alternative. The former San Pedro, Los Angeles, and Salt Lake Railroad, now the Union Pacific Railroad, and segments of the Old Spanish Trail, the Mormon Trail, and the Mojave Road are thought to run through the area of the alternative. Camp Cady Ranch is roughly one half of a mile south of the alternative. The presence of the trail and road segments on the alternative is presently unconfirmed, and the integrity of the railroad, trail and road segments, or Camp Cady Ranch is similarly unconfirmed. Further study of the resources could reveal that a solar facility on the Private Land alternative would have adverse physical and visual impacts on historically significant railroad, road, and trail segments that contribute respectively to the historic significance of each overall transportation route, and have a visual impact to Camp Cady Ranch.

Comparison to Proposed Project. The development of a solar facility on the site of the Private Land alternative would most likely have cultural resource impacts that far exceed those of the ISEGS project at the Ivanpah Basin. Whereas the ISEGS project would have an adverse impact to a portion of one historical resource, the Hoover Dam-to-San Bernardino transmission line (CA-SBR-10315H), the construction and operation of a solar facility on the Private Land alternative has the real potential to wholly or partially destroy a number of significant prehistoric archaeological sites. The partial destruction or visual degradation of historical archaeological resources and built environment resources are other potentially adverse impacts of such a facility. More site-specific information about the cultural resources on the Private Land alternative would serve to better qualify this comparison.

Hazardous Materials

Environmental Setting. The topography of the Private Land alternative site is essentially flat, as are the immediately surrounding areas. Sensitive receptors are present within the Private Land alternative site, and a residential community is located adjacent to the southeast corner of the alternative site. Additional rural residences are located 0.5 miles north of the site north of Interstate 15, 2.5 miles west of the site, and 1 mile south of the site.

Access to the Private Land alternative would likely be via Interstate 15 from Barstow to the Harvard Road exit. At Harvard Road, transport would likely turn south onto Harvard Road and would continue southeast for approximately 1 mile through primarily open space and agriculture land.

Environmental Impacts. Hazardous materials use at the Private Land alternative, including the quantities handled during transportation and disposal, would be the same as those of the proposed project. As stated in Section 5.5 for the proposed project, hazardous materials used during the construction phase of the project would include gasoline, diesel fuel, motor oil, lubricants, and small amounts of solvents and paint. No acutely toxic hazardous materials would be used on site during construction, and none of these materials pose a potential for adverse off-site impacts as a result of the quantities on site, their relative toxicity, their physical states, and/or their environmental mobility.

Natural gas would be transmitted to the site via a new pipeline from an existing gas line approximately 3.3 miles north of the Private Land alternative and would likely require another 0.5 to 1.5 miles of pipeline to reach the power block depending on the site layout.

Transportation of hazardous materials to the Private Land alternative site would require passing near residences located in the town of Barstow, approximately 20 miles from the Private Land alternative. However, the transportation would be primarily on Interstate 15 and not on smaller road with residences. The transportation route from Interstate 15 on Harvard Road would be primarily through open space.

Comparison to Proposed Project. The hazardous materials that would be used at the Private Land alternative site would be the same as those used at the proposed ISEGS site; however, the Private Land alternative site has sensitive subgroups within a five-mile radius. As such, the potential impacts at the Private Land alternative would likely be somewhat greater. Compared to the proposed project, selecting the Private Land site would result in slightly greater impacts from transportation of hazardous materials. With adoption of the proposed mitigation measures, the Private Land alternative would comply with all applicable laws and regulations, and result in no adverse impacts to the public.

Land Use

Environmental Setting. The Private Land alternative would be located on private open space land containing a few rural residences and agricultural lands, and would also include approximately 900 acres of unclassified BLM land. The San Bernardino General Plan Land Use designation for the area is Rural Living. The intended use of Rural Living is to provide sites for rural residential uses, incidental agriculture uses, and similar and compatible uses. The primary purpose of the Rural Living Land Use District is to identify areas and encourage appropriate rural development, and prevent inappropriate demands for urban services. Electrical power generation is an allowed use on Rural Living land with a Conditional Use Permit (San Bernardino 2009).

The Private Land alternative would be located on approximately 320 acres of Prime Farmland and approximately 150 acres of Farmland of Statewide Importance (DOC 2006). The Private Land alternative would impact no lands under Williamson Act contracts (San Bernardino County 2008). Approximately 650 acres of the Private Land alternative are or were used for agricultural purposes.

Approximately 900 acres of the Private Land alternative are BLM land, and approximately 2,450 acres are private open space lands. The BLM land is within the BLM Western Mojave Planning Area, the purpose of which is to develop management strategies for the desert tortoise, Mohave ground squirrel and over 100 other sensitive plants and animals throughout the western Mojave Desert.

Approximately five rural residences exist on the Private Land alternative; however, during a site visit it appeared that some of the residences may not be occupied. There is a large private religious camp (Ironwood) located near the alternative site.

Environmental Impacts. Like the ISEGS proposed site, a key land use plan affecting this project is the U.S. Bureau of Land Management's CDCA Plan of 1980, as amended. The Private Land alternative, as stated above, is located within areas of the CDCA West Mojave Plan on land that has not been classified by the BLM, and that would not be subject to the Plan.

Additionally, the Private Land alternative would be located within San Bernardino County Land Use designation Rural Living. As stated above, electrical power generation is an allowed use in a Rural Living area with a Conditional Use Permit which would require a General Plan Amendment to apply the Energy Facilities Overlay (San Bernardino 2009).

Based on the site review, there are approximately 650 acres of productive agricultural uses on the Private Land alternative project site or which approximately 320 acres are considered Prime Farmland. The construction and/or operation of the proposed project would result in a removal of approximately 650 acres of actively-used agriculture land. The construction and operation of the solar power plant would eliminate existing agricultural operations and foreseeable future agricultural use. This loss of agricultural lands is a potentially adverse impact, and would require a mitigation measure potentially requiring purchase of an equivalent number of acres of farmland.

The Private Land alternative would be build on land that currently has approximately five houses and related agricultural facilities located on the site. It is not certain if the houses are currently occupied, and some of the housing structures appeared abandoned during the site visit. The Newberry Springs area has a total of 1,522 housing units (US Census 2009). The five houses within the Private Land alternative represent less than one percent of the housing units in the Newberry Springs area. If this area were purchased for the purpose of constructing a solar project, the residences would likely be demolished. The landowners cannot be compelled to sell, since BrightSource does not have eminent domain powers, and the current owners would be compensated based on the negotiated sale price of the property. Therefore, while the removal of the five homes by the project would result in a loss of residential dwelling units and associated agricultural facilities, this impact is not considered to be adverse.

One group of residences is located within 1,000 feet of the Private Land alternative, east of the intersection of Troy Road and Cherokee Street. Construction activities for the alternative would create temporary disturbance to these residential areas (i.e., heavy construction equipment on temporary and permanent access roads and moving building materials to and from construction staging areas). Mitigation Measures to reduce noise and air quality impacts are presented in Sections 5.1 and 5.7 for the proposed ISEGS site. However, these measures would not eliminate the disturbance to nearby residences. While this disturbance would be temporary at any one location, impacts would be adverse if construction was not carefully managed and residents not kept informed.

Comparison to Proposed Project. Selecting the Private Land alternative site would result in greater impacts to land use than would the ISEGS Ivanpah Basin site because approximately five residences would potentially require demolition. Additionally, approximately 650 acres of agricultural land would be removed from production, and there would be construction and operational impacts to the nearby religious camp. Additional mitigation measures to offset loss of agricultural lands would be required.

Recreation and Wilderness

Environmental Setting. The Private Land alternative site would be located immediately adjacent to the California Department of Fish and Game Cady Camp Wildlife Area. The Cady Camp Wildlife Area is approximately 1,870 acres of desert riparian habitat with opportunities for hiking and bird watching along with dove, quail, and rabbit hunting (DFG 2009). Camping is allowed at the Cady Camp headquarters and at the Harvard Road “dove” field. Cady Camp Wildlife Area hosts a variety of Game Bird Heritage Program Special Hunts such as a Junior Pheasant Hunt and a Family Pheasant Hunt in the 2007-2008 season (DFG 2009).

A number of man-made water ski lakes are located in the vicinity of the Private Land alternative. The nearest lake is located southeast of the eastern border of the Private Land alternative adjacent to the Cady Camp Wildlife Area.

The BLM Manix ACEC is located approximately two miles east of the Private Land alternative. The Manix ACEC was established in 1990 by the BLM to protect paleontological and cultural resources. The site also contains terminus of the Mojave Road, which is used by off-highway vehicles.

Environmental Impacts. The Private Land alternative would be located adjacent to the northern border of the CDFG Cady Camp Wildlife Area, and one to three miles north of ski lakes in the Newberry Springs area. Because of the flat topography and the close proximity of the Private Land alternative to the Cady Camp Wildlife Area, the solar power plant would be visible from the Wildlife Area.

Project construction activities would create a number of temporary conditions that may dissuade recreationists from visiting the Cady Camp Wildlife Area. Noise, dust and heavy equipment traffic generated during construction activities would negatively affect a visitor's enjoyment of the recreation area. The location of construction equipment may temporarily preclude access to recreation areas, especially in the vicinity of Harvard Road and in the Harvard Road "dove" field. Disturbances to recreational activities would potentially cause a temporary reduction of access and visitation during construction activities.

Construction of the 4,000 acres of heliostats and solar power towers would change the character of the Cady Camp Wildlife Area. While the wildlife area is located in an area that is zoned Rural Living, few residences are located immediately adjacent to the wildlife area except on the eastern border. Presence of the heliostats and power towers would contrast with the existing open space and agriculture areas north of the Cady Camp Wildlife Area. The heliostats and power towers would also result in a long-term visual impact to travelers and recreationists in this region. The noise and activity of the solar power plant may potentially scare hunting prey and preclude hunting at the Cady Camp Wildlife Area.

Comparison to Proposed Project. Both the proposed site and the Private Land alternative are located adjacent to Interstate 15, and both are located in areas with existing recreational use. There is a golf course adjacent to the proposed site, and the Ivanpah Dry Lakebed is visited by an estimated 5,000 visitors annually for land sailing. There is a less intense, but still high level of recreational use near the Private Land alternative. Recreation and wilderness impacts would be similar at the Private Land alternative than at the ISEGS site because of the close proximity between the Private Land alternative and the Cady Camp Wildlife Area and the recreational water ski lakes in the communities of Newberry Springs and Harvard. No natural or man-made feature would block the alternative site from view at the wildlife area. Use of the wildlife area as a hunting ground may no longer be possible should the Private Lands alternative be chosen. Overall, recreation impacts at the two sites would be similar.

Noise and Vibration

Environmental Setting. Generally low levels of ambient noise exist along the southern portion of the Private Land alternative area, as this portion of the site is primarily undeveloped open space and not adjacent to the freeway. Low noise levels under 50 dBA generally are expected to occur on these lands, which are used for agriculture with scattered rural residences. Noise levels would be elevated along the northern boundary of the project due to the presence of heavily traveled Interstate 15. For the majority of the Interstate 15 freeway corridor, a 65 dBA contour extends approximately 100 to 150 feet in either direction from the centerline (FRA 2009).

Intermittent noise is expected to occur at the eastern side of the Private Land alternative where the alternative site is to be located near a small residential community.

Nearby sensitive receptors include the residential community adjacent to the Private Land alternative southeast corner and the Cady Camp Headquarters which is also used for camping. The nearest residential area would be about 500 feet from the alternative site boundary, immediately adjacent to the southeast corner of the Private Land alternatives between the alternative and the Mojave River.

Environmental Impacts. As stated in Section 5.7 of this EIS, the construction of the ISEGS plant would create noise, or unwanted sound. The character and loudness of this noise, the times of day or night at which it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause adverse environmental impacts.

The noise experienced at any specific receptor during operation of a solar facility on this site would depend on which facility components were closest to the receptor. The heliostat arrays would not create operational noise, but the power block would create more noticeable noise.

If built in accordance to mitigation measures similar to those proposed for the ISEGS site, adverse noise impacts to sensitive receptors from construction and operation would be reduced or eliminated.

Comparison to Proposed Project. Given the proximity of both sites to the I-15 freeway, the baseline noise levels are elevated. However, the Private Land alternative would be in a location with more nearby sensitive receptors than the proposed site, so impacts at that site would be more severe at the alternative site.

Public Health and Safety

Environmental Setting. The Private Land alternative site is located in an isolated desert area. The nearest small community is located immediately adjacent to the southeast corner of the Private Land alternative site.

Environmental Impacts. While the meteorological conditions and topography at the site are not exactly the same as at the applicant's proposed site, they are similar enough that the results of air dispersion modeling and a human health risk assessment for the Private Land alternative site would be similar to that found for the proposed site. The cancer risk and hazard indices are much below the level of significance at the point of maximum impact, so the project would be unlikely to pose an adverse impact to public health at this location.

Comparison to Proposed Project. There is no substantial difference between this location and the proposed site for public health and safety.

Socioeconomics and Environmental Justice

Environmental Setting. Like the proposed ISEGS site, the Private Land alternative is located in San Bernardino County. The demographic characteristics of San Bernardino County are described in Section 5.9 of the EIS.

Environmental Impacts. Because of the limited population in Harvard and Newberry Springs, construction workers would most likely be from larger nearby cities such as Victorville and Barstow. The construction workers would most likely have to commute

20 to 50 miles or more daily to reach the construction site due to the limited housing availability in the Harvard and Newberry Springs region. There are no hotels in Newberry Springs, although RV camp sites are available. An additional option would be to erect temporary housing in the immediate area of the Private Land alternative site; however, this would increase the construction impacts and require provision of additional services such as electricity, water, and food. Because it is unlikely that the construction workers would relocate to the Newberry Springs or Harvard region, the Private Land alternative would not cause an adverse socioeconomic impact on the area's housing, schools, police, emergency services, hospitals, and utilities.

There would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional labor market area, and construction activities are short-term. Benefits from the ISEGS project, should it be built at the Private Land alternative, are likely to be similar to the benefits from ISEGS in the Ivanpah Valley. Benefits include increases in sales taxes, employment, and income for San Bernardino County.

Comparison to Proposed Project. The socioeconomic impacts of the ISEGS project at the Private Land alternative site would be similar to building and operating the project at the proposed site.

Soil and Water Resources

Environmental Setting. Soils in the San Bernardino County Desert Region are primarily sandy gravel with low runoff coefficients and fast percolation (San Bernardino County 2006). The desert habitat of San Bernardino County includes soils that are predominantly sandy gravel and include major dune formations, desert pavement, and dry alkaline lake beds (San Bernardino County 2007).

The entire region is crossed by alluvial wash deposits. Desert soils are susceptible to erosion where disturbed due to the limited vegetation and low moisture content, as well as common high winds and infrequent high-intensity rainfall events that may occur (San Bernardino County 2006).

The Private Land alternative lies within the Lower Mojave River Valley Groundwater Basin (DWR 2004b). The Lower Mojave River Valley Groundwater Basin underlies an elongate east-west valley with the Mojave River flowing occasionally through the valley from the west across the Waterman fault and the existing valley to the east through Afton Canyon. Precipitation is between 4 to 6 inches with the average for the basin near 4 inches. Water-bearing deposits in this basin are predominantly unconfined (DWR 2004b). Wells yield range from 100 to 4,000 gpm and the average yield is about 480 gpm. The basin is bounded by the Camp Rock-Harper Lake, Calico-Newberry and Pisgah fault zones which form barriers or partial barriers to groundwater flow. Historically springs were located on the west side of many of these faults but most are no longer flowing because of a decline in the water table (DWR 2004b). In the northeastern portion of the basin relatively shallow clay layers result in shallow water levels near Camp Cady.

The published total storage capacity of the Lower Mojave River Valley Groundwater Basin varies. DWR calculated the total storage capacity for the Troy and Daggett storage units as 7,950,000 acre feet (DWR, 2004b). The Mojave Water Agency calculated a total storage capacity of approximately 9,010,000 acre feet for the Lower Mojave River Valley Groundwater Basin (DWR 2004b).

Environmental Impacts - Soil Erosion Potential by Wind and Water. As stated in Section 5.10 of this EIS, construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation and water-dependent habitats. Activities that expose and disturb the soil leave soil particles vulnerable to detachment by wind and water. Soil erosion results in the loss of topsoil and increased sediment loading to nearby receiving waters. Access to the Private Land alternative site would be via the Harvard Road and would not require any additional access road to reach the site. While the volume of earth movement is unknown at this time, the topography and slopes of the Private Land alternative and the Ivanpah Basin site are similar. Therefore, it is expected that the large footprint and extensive grading required for the facilities would be similar at both the Ivanpah and Private Land alternative sites, and similar erosion and sedimentation control methods would be used at both sites. Because of the high erosion potential of the desert soil, impacts to the soils at the Private Land alternative site would likely be adverse and require mitigation similar to the mitigation required at the Ivanpah Basin site. Low Impact Development principles would likely be used at this site, as at the ISEGS site, and grading plans, a Storm Water Pollution Prevention Plan (SWPPP), and a Drainage Erosion and Sediment Control Plan (DESCP) would be required. While grading plans, a SWPPP, and a DESCP would potentially reduce or avoid adverse impacts, near final grading plans, the SWPPP, and the DESCP would need to be prepared and reviewed to be certain this would be feasible.

Environmental Impacts - Storm Water. As stated in Section 5.10, potentially adverse water quality impacts could occur during construction, excavation, and grading activities if contaminated or hazardous soil or other materials used during construction were to drain off site. The Private Land alternative site is in primarily undeveloped area with some farmland. Brush would be cleared prior to grading. The storm water runoff percolates either into the soil or into flows overland off site. Impacts from storm water runoff would likely be similar to those at the Ivanpah Basin site because of the high volume of earth displacement and the long duration for construction. Similar mitigation measures would be required.

Environmental Impacts - Project Water Supply. It is unlikely that groundwater would be encountered during grading activities as the recorded depth to groundwater in the Lower Mojave River Valley Groundwater Basin is between 50 and 800 feet. However, as stated above relatively shallow clay layers result in shallow water levels near the Private Land alternative site. The volume of groundwater required for construction would be similar to that required for constructing the projects at the Ivanpah Basin location; however, there is a general trend in this basin for declining groundwater levels. While it is unknown at this time if there is sufficient groundwater available in the Lower Mojave River Valley Groundwater Basin to meet the construction and operation requirements of the Private Land Alternative, BLM expects that water use associated with current agriculture practices would be higher than the annual volume of water required of the project. With the makeup of the Private Land site including 320 acres of Prime Farmland and approximately 150 acres of Farmland of Statewide Importance, the existing water use for agriculture is expected to likely be greater than the average project operational water demand of 100 acre-feet/year.

Environmental Impacts - Wastewater. Groundwater would be needed during construction of the ISEGS project at the Private Land alternative. Once used, this water would be reused to the extent possible and then discharged as wastewater. Improper handling or containment of construction wastewater could cause a broader dispersion of contaminants to soil or groundwater. The discharge of any nonhazardous wastewater during construction would be required to be in compliance with regulations for discharge. Water that could not be reused would be transported to an appropriate treatment facility. With implementation of required regulations, adverse impacts would be avoided or reduced.

Comparison to Proposed Project. Due to the large footprint and extensive grading required for the solar facility at both the ISEGS and Private Land alternative sites, similar erosion and sedimentation control methods would be used at both sites. Impacts to soil and water erosion would be similar at the two sites. Based on the current water use for agriculture, it is expected that sufficient water is available at the Private Land alternative site.

Traffic and Transportation

Environmental Setting. The Private Land alternative would be located adjacent to Interstate 15. Access to this site would be via Interstate 15 to the Harvard Road exit in Harvard, then approximately 1 mile south on Harvard Road. The Private Land alternative site entrance would most likely be from Harvard Road. A Union Pacific railroad track is located adjacent to Interstate 15. Workers employed to construct the project at this alternative site would most likely commute from Barstow (20 miles) or Victorville (60 miles). Given the freeway access, there would not likely be added traffic on the Interstate 15 east of the site (towards Las Vegas).

Environmental Impacts. Similar to the ISEGS project at Ivanpah Basin, before construction could occur for the Private Land alternative, a construction traffic control and transportation demand implementation program would need to be developed in coordination with Caltrans. This analysis may result in the need to limit construction-period truck and commute traffic to off-peak periods to avoid or reduce traffic and transportation impacts. These impacts would likely be less severe than those of the proposed project because construction at the Private Land alternative would not require travel on Interstate 15 east of Barstow, and the Interstate15 areas with most severe congestion would not be affected.

The project would potentially impact the Union Pacific right-of-way because it would be located less than one mile south of an active railroad right of way. Impacts to rail operations would be avoided or reduced through proper coordination with local agencies. Additionally, this rail line could potentially be used as a means of bringing in the materials required for the project.

Additionally, the Private Land alternative would be approximately 0.5 miles from a landing strip located on BLM land. This may require additional marking and lighting along the power towers in order to ensure safety of aircraft.

Comparison to Proposed Project. Impacts to traffic and transportation at the Private Land alternative site would be similar to those at the proposed ISEGS site; including the use of Interstate 15 east of Barstow. However, the Private Land alternative site would not require the use of Interstate 15 east of Barstow for the highly congested Friday afternoon time period. Because of its location closer to sources of workers in the Victor Valley and Barstow, the Private Land alternative site would likely have fewer impacts on traffic and transportation than those the Ivanpah Basin site.

Transmission Line Safety and Nuisance

Environmental Setting. The Private Land alternative would connect with the SCE transmission system by two possible options. The first would be through an interconnection with the existing SCE 115 kV transmission line that crosses the site; this would require a transmission line upgrade to 230 kV. The second option would be to construct a 230 kV transmission line for approximately 10 miles southwest to the existing SCE Cool Water Substation in Daggett. The new transmission line would follow the existing 115 kV corridor. The Private Land alternative site is in uninhabited open space, agriculture land, and some rural residences crossed by a BLM utility corridor. BLM utility corridors are typically between two and five miles wide to provide flexibility in selecting alternative routes for rights-of-way (BLM 1999). As with the ISEGS Ivanpah Valley site, the Private Land alternative would be able to tap into the Kern River Gas Transmission Company pipeline approximately 3.3 miles north of the Private land site.

Environmental Impacts. Similar to the proposed project, this alternative would not be likely to cause transmission line safety hazards or nuisances. As stated in Section 5.12, the potential for nuisance shocks would be minimized through grounding and other field-reducing measures that would be implemented in keeping with current standard industry practices, and the potential for hazardous shocks would be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, section 1250, would minimize fire hazards, while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would minimize the potential for corona noise and its related interference with radio-frequency communication in the area around the route. As with the proposed ISEGS transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. However, the proposed lines' design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information.

Comparison to Proposed Project. The Private Land alternative site would potentially require a longer transmission line interconnection with the SCE transmission system should a new transmission line be built. The increased length and proximity to sensitive receptors would likely increase the impact of the transmission interconnection at the Private Land alternative site.

Visual Resources

Environmental Setting. The alternative site parallels Interstate 15, and a 115kV transmission line crosses the alternative site from southwest to northeast. There are few buildings in the area; they include scattered rural residences and the Cady Camp

Headquarters are located near the alternative site. The transmission line and the freeway introduce a more developed and industrial feature to the otherwise rural setting.

Nearby views from the Private Land alternative site to the south, west and east are of undisturbed desert landscape crossed by a few unpaved roads, some agriculture lands, and some rural residential areas. A berm crosses the Private Land alternative along the northern boundary, along which are located railroad tracks, approximately one mile south of I-15. Further views become more residential once the community of Newberry Springs comes into view. Elevation rises to the east of the site, eventually becoming the foothills of the Cady Mountains. More rural communities are located north of Interstate 15 within viewing distance of the site in addition to a number of other major transmission lines paralleling the freeway.

Environmental Impacts. As stated in Section 5.13, the Energy Commission, in coordination with BLM, applied the BLM Visual Resource Management (VRM) system of visual assessment to the proposed ISEGS site at Ivanpah Basin. The existing visual setting baseline under the VRM methodology is characterized in terms of Visual Resource (VR) Classes. Under the VRM system, areas of the project viewshed are delineated and mapped based on broadly uniform characteristics of visual quality, viewers' sensitivity, and distance from project to viewers. These delineated areas are then assigned a VR Class (from I through IV). VR Classes are analogous to Overall Sensitivity ratings under the Energy Commission method and are used to determine an area's visual objective, that is, the level of project-caused contrast that is acceptable, above which contrast could constitute a potentially adverse impact. The BLM land areas considered for the Private Land alternative have not been assigned a VR Class so a formal impact determination under BLM's system cannot be made.

For the non-BLM land (the bulk of the Private Land alternative), visual impact analysis would be based on a comparison of the area's visual sensitivity with the added industrial features added by the solar project at this location. With the addition of the project, views of the desert and rural communities would change from a relatively undisturbed desert landscape to a substantially more industrial, highly altered one, dominated by roughly four square miles of mirror-arrays and 459-foot-tall solar collector towers, graded areas, and retention ponds, as well as light rays reflected off ambient atmospheric dust and the bright glow of the receiving portions of the solar collectors. There would be no natural features to block the view of the solar facilities on any side.

The site would be prominently visible from Interstate 15, for both westbound and eastbound traffic. Travelers would see the site from a distance although the berm that is located along the northern boundary of the project would potentially block some of the heliostats from view. The berm is not tall enough to block the solar power towers. . Additionally, because of the shape of the site (see Figure 5B), Interstate 15 would run the entire length of the solar power plant making the visible components more visually intrusive to westbound and eastbound traffic.

The linear facilities associated with the Private Land alternative site include a gas pipeline approximately three miles long and a potential 230-kV transmission line approximately 10 miles long. Construction of the gas pipeline would create a visible scar across the desert landscape that would remain for many years, even with restoration efforts. The transmission line would follow the existing utility corridor and would roughly parallel an existing 115 kV transmission line for 10 miles until reaching the SCE Coolwater Substation and would be prominently visible from Interstate 15. The Private Land alternative interconnection would introduce additional industrial character to the Interstate 15 corridor.

Comparison to Proposed Project. The Private Land site is preferred over the proposed ISEGS site. While the solar power towers at the Private Land alternative site might be slightly more visible to riders along Interstate 15, it would be located in a more urban setting near existing communities and some of the project components would be potentially blocked by an existing berm. The proposed ISEGS site would be visible to heavily used recreation areas including wilderness areas within the Mojave National Preserve. While the Private Land site would be prominently visible to the Cady Camp Wildlife Area, views from this camp to the south and east are already relatively built up due to the communities of Harvard and Newberry Springs which surround the site. As a result, a large solar project in the ISEGS area would create a more dramatic change to the visual environment than would occur at the Private Land site.

The Private Land alternative transmission line would create a visual impact similar to that of the Ivanpah Basin transmission interconnection. The interconnection transmission line at the Private Land alternative would potentially be longer than the Ivanpah Basin transmission interconnection, but would be located adjacent to an existing line in an existing corridor.

Waste Management

Environmental Setting. As stated in Section 5.14, hazardous and nonhazardous solid and liquid waste, including wastewater, would be generated at the ISEGS project during construction and operation of the solar power plant. Waste would be recycled where practical and non-recyclable waste would be deposited in a Class III landfill. The nearest waste disposal facility that could potentially accept the nonhazardous construction and operation wastes generated by the project is the Barstow Sanitary Landfill in Barstow, California. The remaining capacity for the disposal facility is 924,401 cubic yards, and the Barstow Sanitary Landfill Expansion plan is currently undergoing environmental review (CIWMB 2008).

The hazardous waste generated during this phase of the project would consist of electrical equipment, used oils, universal wastes, solvents, and empty hazardous waste materials (CH2M Hill 2007, section 5.14.1.2). Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper, and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices. Section 5.14.4.2.2 of the ISEGS AFC discusses the two Class I landfills that accept hazardous wastes and are open in California: the Clean Harbor Landfill (Buttonwillow) in Kern County and the Chemical Waste Management Landfill (Kettleman Hills) in Kings County. The Kettleman Hills facility also accepts Class II and Class III wastes. In total, there is in excess of 11 million cubic yards of remaining hazardous waste disposal capacity at these landfills, with approximately 30 years of remaining operating lifetimes.

Environmental Impacts. Construction at the Private Land alternative site would require excavation of fill material that underlies the site similar to that of the proposed project. Both nonhazardous and hazardous wastes would be created by the construction of the

ISEGS project at the Private Land alternative in similar quantities as at the proposed ISEGS site and would be disposed of at appropriate facilities. As with the proposed ISEGS site, the applicant would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction and would be required to comply with similar mitigation measures. The project would produce minimal maintenance and plant wastes.

All nonhazardous wastes would be recycled to the extent possible, and nonrecyclable wastes would be regularly transported off site to a local solid waste disposal facility. Generation plant wastes include: oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers. As with the proposed project, all construction and operation activities would need to be conducted in compliance with regulations pertaining to the appropriate management of wastes. The total amount of nonhazardous waste generated from the project is estimated to be less than 300 cubic yards of solid waste from construction, and approximately 250 cubic yards per year from operation. This would contribute less than 4 percent of the available landfill capacity. The disposal of the solid wastes generated by the ISEGS can occur without adversely impacting the capacity or remaining life of any of these disposal facilities.

Like nonhazardous wastes, hazardous wastes would be recycled to the extent possible. The four tons of hazardous waste from the ISEGS requiring off-site disposal would not adversely impact the capacity or remaining life of the Class I waste facilities. Similar to the proposed project, the project would need to implement a comprehensive program to manage hazardous wastes and obtain a hazardous waste generator identification number (required by law for any generator of hazardous wastes).

Comparison to Proposed Project. The environmental impacts of waste disposal at the Private Land alternative site would be similar to those at the proposed ISEGS site at the Ivanpah Basin. While the Private Land alternative would be closer to the Barstow Sanitary Landfill, it would also be closer to sensitive receptors, specifically the rural residences that would border the southeast corner of the site.

Worker Safety and Fire Protection

Environmental Setting. The Private Land alternative site would be located within an area that is open space. The area is currently served by the San Bernardino County Fire Department. See Section 5.15 for more information regarding the San Bernardino County Fire Department. The fire risks of this alternative would be similar to those of the proposed Ivanpah Basin site as both have similar habitat and desert conditions and both sites are adjacent to a heavily used transportation corridor.

Environmental Impacts. Similar to the proposed Ivanpah Basin project, it would be appropriate for a solar plant at Private Land alternative to provide a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety. The applicant would also be required to provide safety and health programs for project construction, operation, and maintenance, similar to the requirements for the proposed Ivanpah Basin project site. Also similar to the proposed project, the San Bernardino County fire department would be contacted to assure that the level of staffing, equipment, and response time for fire services and emergency medical services are adequate.

Comparison to Proposed Project. The environmental impact of worker safety and fire protection at the Private Land alternative site would be similar to that at the proposed Ivanpah Basin site.

Geology, Paleontology and Minerals

Environmental Setting. The Private Land alternative site is located in an area mapped as Pleistocene nonmarine, dune sand, and alluvium along with limited undivided Miocene nonmarine areas (USGS 2008). No known geologic resources or active mineral resources exist at the Private Land alternative site.

The Manix fault, a left-lateral, strike slip located on the southeast side of and sub-parallel to Interstate 15 in the community of Manix between Barstow and Baker, crosses the site (USGS 2008). The Manix fault is active; in April 1947 a M6.5 earthquake occurred on the Manix fault. The length of the surface rupture was approximately 3 miles and the maximum slip was approximately 5 centimeters.

The Bedrock Peak Ground Acceleration (10% in 50 years) at the Private Land alternative site is 0.27g (CGS 2009). This includes faults within 100 miles of the solar plant site and estimates of potential seismic ground motion. The peak bedrock ground acceleration is higher for both the Private Land alternative than for the proposed ISEGS site at Ivanpah Basin. An active fault runs through the Private Land alternative site which has experienced a M6.5 earthquake and the fault is considered capable of producing a M7.0 earthquake.

Environmental Impacts. Seismic ground shaking is probable at the alternative site because the Manix fault crosses the site. The severity and frequency of ground shaking associated with earthquake activity at the Private Land alternative is higher than at the proposed Ivanpah Basin site. As such, more stringent design criteria may be required for the Private Land alternative in accordance with a design-level geotechnical report and California Building Code (2007) standards. Adequate design parameters for the facility would need to be determined through a site-specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer. Impacts due to seismic hazards and soil conditions would be addressed by compliance with the requirements and design standards of the California Building Code. The potential for liquefaction exists in San Bernardino County in areas where relatively loose, sandy soils exist with high groundwater level during long duration, high seismic ground shaking. While few areas within the desert region of the county have potential for liquefaction, there is potential for liquefaction along the Mojave River and along the Private Land alternative (San Bernardino 2009).

The paleontological sensitivity and potential to encounter significant paleontological resources in Quaternary alluvium at the alternative site and the Ivanpah Basin site is similar. As stated in Section 5.16, construction of the proposed project will include grading, foundation excavation, utility trenching, and possibly drilled shafts. There exists the probability of encountering paleontological resources. As with the Ivanpah Basin site, the proposed mitigation measures are designed to mitigate any paleontological resource impacts.

Comparison to Proposed Project. With the exception of stronger ground shaking and potential for liquefaction, the Private Land alternative site is subject to geologic hazards of similar magnitude as the Ivanpah Basin site. Strong ground shaking could be effectively mitigated through facility design. The potential to encounter geologic resources and significant paleontological resources at both alternative sites is similar to the Ivanpah Basin site. The mitigation measures provided in Section 5.16 would be applicable to the Private Land alternative.

Transmission System Engineering

Locating a solar facility at the Private Land alternative would require re-evaluating the capacity of the SCE transmission lines that would be used for interconnection. This alternative may cause adverse effects to the SCE transmission system and require system upgrades. Moreover, it may not accomplish the project goal to be on line in 2011 because of grid improvement constraints.

Summary of Impacts. The Private Land alternative would have impacts similar to the proposed ISEGS site at Ivanpah Basin for air quality, hazardous materials management, recreation, public health, socioeconomics, transmission line safety and nuisance, waste management, worker safety and fire protection, facility design, power plant efficiency, geology and paleontology, and power plant reliability.

The Private Land alternative would be preferred to the proposed ISEGS site at Ivanpah Basin for biological resources, visual resources, and traffic and transportation. The Private Land alternative would be less preferred than the proposed ISEGS site at Ivanpah Basin for cultural resources, land use (including agriculture), noise, and transmission system engineering.

It is assumed that impacts to soils and water at the Private Land alternative would be similar to those at the proposed Ivanpah Basin site; however, it is uncertain if there is groundwater available at the Private Land alternative site.

3.3.1.4 Ivanpah Site A Alternative

Description

Ivanpah Site A was identified by BrightSource in the AFC as a potential alternative site. It was not pursued as the proposed site because it is located partly on state land, further complicating the land leasing and permitting process; had a longer interconnection with the Kern River gas transmission line; would require more grading; and was found to be slightly less environmentally preferred by the applicant (CH2M Hill 2007). It is located adjacent to and southwest of the proposed ISEGS site in the Ivanpah Valley, in the southern portion of the NEMO Planning Area; see **Figure 3.15**. Ivanpah Site A overlaps the ISEGS site in a portion of BLM sections totaling approximately one square mile, and it also includes one section (Section 16) of state land under the jurisdiction of the California State Lands Commission.

The setting of Ivanpah Site A is very similar to that of the ISEGS site, as illustrated by the close proximity and overlapping of the two sites. They are both adjacent to the Ivanpah Dry Lake and the Primm Valley Golf Club, northeast of the Mojave National Preserve and approximately five miles from the California/Nevada border. The elevation of Ivanpah Site A is between 3,600 feet and 3,100 feet, as compared with between

3,150 to 2,850 feet for the proposed site. The sites share similar habitats and similar biological and cultural concerns (CH2M Hill 2007). Both Ivanpah Site A and the proposed site would be visible from the Mojave National Preserve, Interstate 15, and the Clark Mountains.

Rationale for Elimination

This alternative is not considered further by BLM because it would have substantially similar effects to those of the proposed project.

Environmental Impact Summary

Ivanpah Site A would require a large amount of land and would result in the permanent loss of approximately 3,800 acres of desert habitat in the same region as the proposed ISEGS site. Given the proximity of Ivanpah Site A to the proposed ISEGS, it is reasonable to assume that the impacts to desert tortoise and barrel cacti would occur and be similar at both sites in the approximately one square mile of overlapping region between the two sites.

Impacts to land use and recreation at the Ivanpah Site A would be similar to impacts of the proposed ISEGS site because they are both equally distant from the Ivanpah Dry Lake and other recreational activities in the Ivanpah Valley. Like the proposed ISEGS site, Ivanpah Site A is located within the CDCA and NEMO Planning Areas and may conflict with these plans. Ivanpah Site A would also be located on some state lands, which may cause permitting difficulties (CH2M Hill 2007).

Both the proposed ISEGS site and Ivanpah Site A would have a large footprint and require extensive grading, potentially resulting in erosion and runoff. However, the Ivanpah Site A has a somewhat greater slope, being located nearer to the Clark Mountains, and would therefore require somewhat greater grading and would potentially have a greater impact to soils and water. Ivanpah Site A is the same distance as the proposed ISEGS site from Ivanpah Dry Lake and would be visible from the dry lake, a resource frequently used for recreation (CH2M Hill 2007). Additionally, because Ivanpah Site A is closer to the Mojave National Preserve than the proposed ISEGS site (less than one mile away) it would also result in visual impacts to the preserve and to recreationists within the preserve (including from the Clark Mountains) that are similar to those at the proposed site. Given the size of the power plants and the height of the receiver power towers, approximately 459 feet tall for the three power plants, visual impacts would be considerable and similar to those at the proposed ISEGS site. In addition, Ivanpah Site A is closer to I-15 than the ISEGS facility, so visual impacts would be greater for passing motorists.

Due to the proximity between the ISEGS site and the Ivanpah Site A, impacts of the Ivanpah Site A would be similar to the proposed project. However, Ivanpah Site A would be closer to Interstate 15 and to the Mojave National Preserve. This results in increased visibility from these sensitive areas. Also, a longer interconnection with the Kern River gas transmission line would be required, thereby increasing any impacts associated with the linear connection, including ground disturbance.

3.3.1.5 Ivanpah Site C Alternative

Description

Ivanpah Site C was identified in the AFC as a site considered by BrightSource. It was not pursued as the proposed site because the interconnections to both the Kern River gas transmission line and SCE transmission line would be longer, the site offered little flexibility for layout revisions, and the site was considered to have greater environmental concerns than the proposed ISEGS site (CH2M Hill 2007).

Site C alternative is located southeast of the proposed ISEGS site, bordering Interstate 15 on the north and west and Nipton Road (Highway 164) to the south; see **Figure 3.15**. It would be bordered by the Ivanpah Dry Lake to the east. It has similar characteristics to the ISEGS site, with an average elevation of between 2,950 and 2,600 feet and a similar slope. Given the proximity of the sites, it is reasonable to assume that they have similar habitat characteristics. The transmission interconnection would also be similar to that at the ISEGS site. Ivanpah Site C would border the Mojave National Preserve to the south.

The site would be located in a DWMA, established to protect denser populations of desert tortoise (CH2M Hill 2007). Longer interconnections with the Kern River gas transmission line and the SCE transmission line would be required due to the site's greater distance from these utilities.

Rationale for Elimination

This alternative is not considered further in this EIS because it would be located within a DWMA. It is likely that this type of project would be inconsistent with the basic policy objectives for the management of a DWMA, which include protection of the biological resources.

Environmental Impact Summary

Ivanpah Site C would result in the permanent loss of approximately 4,000 acres of desert habitat. Given the proximity of Ivanpah Site C and the proposed ISEGS site at Ivanpah Basin, the impacts on biological resources and sensitive species habitat would be about the same. Given that the Ivanpah Site C would be located in a Desert Wildlife Management Area, impacts to desert tortoise may be greater than at the proposed ISEGS site. Impacts to land use and recreation at the Ivanpah Site C would also be similar to impacts of the proposed ISEGS site due to its proximity to Ivanpah Dry Lake and recreational off-highway vehicle use. Ivanpah Site C would be located entirely on BLM land and would be within the CDCA and NEMO Planning Areas and may conflict with these agencies' plans.

Ivanpah Site C is immediately adjacent to the Ivanpah Dry Lake on the east side, which is used more frequently than the west side for large recreational events (Downing 2008). Ivanpah Site C borders the Mojave National Preserve, a National Park Service unit with high value for recreation and preservation of views. In addition, Ivanpah Site C borders both the I-15 and Nipton Road and would cause greater visual impacts to passing motorists than the proposed site.

Due to the proximity of the proposed ISEGS site and the Ivanpah Site C, many impacts of the Ivanpah Site C would be similar to those of the proposed site. However, Ivanpah Site C would be more visible from I-15 and Nipton Road. Also, because Ivanpah Site C is located in a Desert Wildlife Management Area, the potential for impacts to desert tortoise may be greater. Longer interconnections with the Kern River gas transmission line and the SCE transmission line would be required, with associated increased ground disturbance and visual impacts. The greater proximity to the Ivanpah Dry Lake could increase cultural resource impacts as more cultural artifacts may be present.

3.3.1.6 West of Clark Mountain Alternative

Description

At the request of the National Parks Conservation Association and National Park Service, a site west of Clark Mountain was considered as a means of reducing visual impacts to the Mojave National Preserve. Two broad valleys west of Clark Mountain offer slopes consistent with solar requirements: the Silurian Valley (north of Baker, which is used by the Army for desert warfare training based in the National Training Center at Fort Irwin) and the Shadow Valley immediately west of the Clark Mountain Range. The Silurian Valley is bisected by State Highway 127, which is a major access road for Death Valley National Park.

Although there is land west of Clark Mountain that fits the site selection criteria for a solar energy project, much of the land immediately west of the Clark Mountain Range in Shadow Valley is located in the Eastern Mojave Desert Tortoise Recovery Unit and within a Desert Wildlife Management Area and therefore, while it may meet the site selection criteria, it would not be feasible as an alternative to the ISEGS site. Further east of Shadow Valley, among the Shadow Mountains, the topography is such that a contiguous 400-MW solar thermal power plant would not have the suitable ground slope requirement and is therefore not feasible for solar energy projects. Suitable land for a solar project exists in the Silurian Valley; however, existing solar and wind applications have already requested use of this land. The solar and wind project applications in the area west of Clark Mountain pending before BLM are the following (BLM 2008b and BLM 2008c):

- Solar Investments VI LLC, solar trough technology (6,400 acres);
- FPL Energy LLC, parabolic trough technology (7,680 acres);
- Solar Investments Inc., parabolic trough technology (9,600 acres);
- Solar Investments XI LLC, parabolic trough technology (10,000 acres);
- Pacific Wind Development LLC (Iberdrola), wind turbines (6,623 acres).

West of the Silurian Valley is the Fort Irwin National Training Center, which is not considered to be available for a large solar project.

Rationale for Elimination

This alternative is not considered further in this EIS because it would be located within a DWMA. It is likely that this type of project would be inconsistent with the basic policy objectives for the management of a DWMA, which include protection of the biological resources.

3.3.1.7 Ivanpah Playa Alternative

Description

Although not initially identified as a potential alternative by BLM, public comments on the DEIS recommended consideration of an alternative in which the proposed project would be located on Ivanpah Dry Lake. The objective of this alternative was to implement the development in a location which would avoid disturbance of biological resources such as plants and desert tortoises associated with the proposed project location.

Although placement of the facility on the Dry Lake bed would eliminate impacts to vegetation and tortoises, it would likely not be technically or economically feasible, and would also create other impacts. The Dry Lake bed does flood, sometimes more than once per year, and when it does, vehicles cannot drive on the Dry Lake bed surface. When it floods, it usually remains flooded for a period of weeks or months. The project location could potentially be diked to protect the facility against flooding, but this would likely be economically prohibitive, and would also not protect the facility against direct rainfall.

Placement of the facility on the Dry Lake bed would also eliminate the use of the Dry Lake bed for its current recreational uses. The Dry Lake bed is specifically designated, within the CDCA Plan, for nonmotorized open-space recreational activities. The Dry Lake bed is also specifically designated as closed to vehicle access in the CDCA Plan.

Rationale for Elimination

The Ivanpah Playa alternative would not be economically feasible, and would be inconsistent with current management objectives for non-motorized recreation on the Dry Lake bed, so it is not considered further in this EIS.

3.3.1.8 Other Site Alternatives Eliminated

The following alternatives were considered by the applicant, but were not retained for full analysis in their AFC; they are also not analyzed by BLM in this EIS as explained in **Table 3.7**.

Table 3.7
Alternatives Not Carried Forward for Further Analysis

Site	Reasons Eliminated
Carrizo Plain	Carrizo Plain was eliminated from consideration due to poor solarity and poor gas and water infrastructure. In addition, potential site control difficulties meant the site was not considered economically viable.
Harper Lake	Harper Lake was eliminated from consideration because gaining site control was considered to be time consuming and speculative.
Lucerne Lake	Lucerne Lake was eliminated from consideration because the site was too small and did not provide adequate site control; therefore, the site was not economically viable.
Rabbit Lake	Rabbit Lake was eliminated from consideration because the site was too small and did not provide adequate site control; therefore, the site was not economically viable.
Jean Lake	Jean Lake was eliminated from consideration because the site contained a pending application by a different applicant.
Ivanpah Site B	Ivanpah Site B was eliminated from consideration because the site contained a pending application with BLM by a different applicant.

Source: CH2M Hill 2007

3.3.2 Alternative Solar Generation Technologies

Alternative solar technologies were not the subject of the application received by the BLM. Although reasonable alternatives to the proposed action may include those that are practicable or feasible from a technical and economic standpoint, rather than simply desirable from the applicant's perspective, it is not within the FLPMA authority granted to BLM to direct a project applicant to the specific type of technology or system of energy development on the public lands. For BLM to dictate a project applicant's business model, and hence its technical or economic feasibility, is highly irregular. However, for NEPA purposes, these alternative technologies were considered but eliminated from full analysis as explained below.

Although alternative solar generation technologies would achieve most of the project objectives, each would have different environmental or feasibility concerns. The following solar generation technologies are considered in this analysis:

- parabolic trough technology
- Stirling dish technology
- linear Fresnel technology
- photovoltaic technology

Among the solar thermal technology alternatives, the linear Fresnel alternative has the potential for least impacts due to its more compact configuration (reducing ground disturbance); however, the technology is proprietary and is not available to other developers such as BrightSource. The distributed solar alternative would have fewer impacts than the proposed project because it would be located on already existing buildings or on already disturbed land. However, achieving 400 MW of distributed solar PV or solar thermal would depend on additional policy support, manufacturing capacity, and lower cost than currently exists to provide the renewable energy required to meet the California Renewable Portfolio Standard requirements so additional technologies, like utility-scale solar thermal generation, are also necessary.

For each of these technologies, as well as BrightSource's power tower technology, there are current efforts to improve efficiency, reduce land use requirements, and otherwise reduce environmental impacts. The environmental evaluation is based on current information for each technology. While improvements to a single technology in the future may result in a reduction of impacts relative to the other technologies, those improvements cannot be predicted, or incorporated into the environmental analysis at this time.

3.3.2.1 Parabolic Trough Technology

Description

A parabolic trough system converts solar radiation to electricity by using sunlight to heat a fluid, such as oil, which is then used to generate steam. The plant consists of a large field of trough-shaped solar collectors arranged in parallel rows, normally aligned on a north-south horizontal axis. As illustrated in the photo below. Each parabolic trough collector has a linear parabolic-shaped reflector that focuses the sun's direct beam radiation on a linear receiver, also referred to as a heat collection element located at the focus of the parabola. Heat transfer fluid within the collector is heated to approximately 740°F as it circulates through the receiver and returns to a series of heat exchangers where the fluid is used to generate high-pressure steam. The superheated steam is then fed to a conventional reheat steam turbine/generator to produce electricity.

A solar trough power plant generally requires land with a grade of less than 1 percent. On average, 5 to 8 acres of land are required per MW of power generated. A parabolic trough power plant would include the following major elements.

- **Parabolic Trough Collectors**. The parabolic trough collectors rotate around the horizontal north/south axis to track the sun as it moves through the sky during the day. Reflectors, or mirrors, focus the sun's radiation on a linear receiver/heat collection element, which is located along the length of the collector.
- **Solar Boiler.** Solar boilers are designed differently than conventional gas-fired boilers in that they are fueled with hot oil instead of hot gases. This design is similar to any shell and tube heat exchanger in that the hot heat transfer fluid is circulated through tubes and the steam is produced on the shell side.
- **Heat Transfer Fluid Oil Heater**. Due to the high freezing temperature of the solar field's heat transfer fluid (54°F), to eliminate the problem of oil freezing, an oil heater would be installed and used to protect the system during the night hours and colder months.

Parabolic trough power plants are the most established type of large solar generator. They exist in several places, including the following examples:

- **Nevada SolarOne** (illustrated in **Figure 3.20**) near Boulder City, Nevada, has been in operation since June 2007. It cost of more than $260 million dollars and generates 64 MW. It is the largest concentrating solar power plant to be built in the last 17 years and is the third largest plant of its kind in the world (Nevada SolarOne 2008).
- **Sunray Energy, Inc. Solar Energy Generating System** is located in Daggett, adjacent to an abandoned power tower facility. It generates 44 MW.
- **Kramer Junction Solar Energy Generating System** is located about 30 miles west of Barstow. The solar energy generating system projects are a series of utility-scale solar thermal electric power plants, which were designed and developed in the mid-1980s by LUZ Industries. The facility can produce 165 MW at full capacity (Solel 2008).

Rationale for Elimination

While solar trough technology is a viable renewable technology and would likely reduce the footprint of the project, it would have substantially similar effects to those of the proposed project. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore, this alternative technology is eliminated from further consideration.

Environmental Impact Summary

Approximately 2,000 to 3,200 acres of land would be required for a 400-MW solar trough power plant, resulting in a permanent loss of natural desert habitat similar to the habitat loss created by the proposed solar tower technology.

If the solar trough technology were used at Ivanpah, somewhat more than 3,200 acres may be required because the proposed site is crossed by several desert washes. Parabolic troughs require a more level ground surface than power tower technology, because the troughs are connected by piping and must be level to allow flow of heated fluid. Therefore, the entire solar trough power plant would be graded to eliminate small-scale drainage features, removing all vegetation from the area. This results in a somewhat more severe effect on biological resources than the ISEGS project, which would not require grading over the entire site.

The size and height of the solar trough mirrors (each approximately 28 feet high) would cause visual impacts from Interstate 15 and Ivanpah Dry Lake. The plant would also be visible from the Primm Golf Course, immediately east of the ISEGS site and slightly elevated. While the solar trough technology would not have the approximately 459-foot-tall solar power towers, the number of solar troughs and the large acreage required would still introduce prominent and reflective structures.

Solar trough plants require water to generate the steam that powers the turbines. The technology uses a closed-loop circulation that requires some boiler make-up water to replace water lost in the system. Water is also required to wash the mirrors for both types of technologies. If wet cooling were used, the cooling towers would require approximately 600 AFY per 100 MW of capacity. Dry cooling would use substantially less water, approximately 18 AFY per 100 MW (NRDC 2008a).

Because of the extensive grading required for a solar trough plant, soil erosion could be more severe than that of the ISEGS project. The parabolic trough solar plant uses a heat transfer fluid to collect the heat from each parabolic trough collector and convey it to the solar boiler. The project would still require use of I-15 for commuting workers during both construction and operation.

The large land area needed for a solar trough power plant would likely be less than ISEGS, but more intensive in terms of ground disturbance. Because of the more intensive use of the land and the grading required to achieve a 1 percent grade, there could be more severe impacts to biological resources including vegetation, than would occur with the ISEGS facility. In addition, due to the large size of the power plant and the use of taller parabolic trough mirrors (approximately 28 feet high when at their maximum tilt) compared to the approximately 12 foot high heliostats for ISEGS, the visual impact could be greater, although the visual impact for ISEGS would be adverse and cannot be mitigated from some locations. Use of a heat transfer fluid as would be conveyed in miles of pipelines from the parabolic trough collectors to the solar boiler would create a potential for spill of a hazardous material into soil or water, which would not be present with ISEGS. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would continue to contribute to an adverse cumulative impact during project construction and operation.

3.3.2.2 Stirling Dish Technology

Description

The Stirling dish technology converts thermal energy to electricity by using a mirror array to concentrate and focus sunlight on the receiver end of a Stirling engine. The curved dishes that focus the sun's energy are approximately 45 feet tall and occupy a maximum horizontal space of approximately 1,135 square feet (0.026 acres), with an anchored footprint of 12.5 square feet (assumed 4-foot diameter caisson). See **Figure 3.20** for an illustration. The internal side of the receiver heats hydrogen gas, which expands. The pressure created by the expanding gas drives a piston, crankshaft, and drive shaft. The drive shaft turns a small electricity generator. The entire energy conversion process takes place within a canister the size of an oil barrel. The generation process requires no water, and the engine does not produce emissions as no combustion takes place. Each concentrator consists of one Stirling engine mounted above one mirror array. Once installed, each concentrator requires very little maintenance aside from periodic washing of the mirrored surfaces of the dish.

In general, the Stirling system requires 7 to 9 acres of land per MW of power generated. Based on literature search, a 400-MW Stirling engine field would require from 2,800 acres to 3,600 acres of land. However, for two proposed solar thermal power plants using Stirling engine technology currently being considered by BLM and the Energy Commission, SES Solar 1 and 2, the land use per MW of installed capacity is about the same as ISEGS, and thus would require about the same footprint as ISEGS (See Efficiency Table 1 in **Appendix C - Power Plant Efficiency**).

Site preparation involves sinking a cement base with an embedded pedestal to support the dish (SES 2008a). Each Stirling dish generates 25 kW of power, so 16,000 dishes would be required to generate 400 MW. Each dish includes two major elements:

- **Solar Concentrator.** Large parabolic concentrators include 89 mirror facets attached to a frame by three point adjusting mounts (SES 2008a). They are designed in five subassembly units for ease of transport and installation on site. Two small motors are attached to the pedestal and programmed to swivel the dish on two axes, following the sun's progress across the sky during the day.
- **Power Conversion Unit.** The Stirling engine's cylinder block incorporates four sealed cylinder assemblies along with coolers, regenerators, and heater heads (SES 2008a). Concentrated solar energy heats up self-contained gas (hydrogen) in the power conversion unit, causing the gas to expand into the cylinders, moving the cylinders, and generating electricity. This cycle is repeated over and over as the engine runs at a steady rate of 1,800 rpm (SES 2008a). Power is generated by heat transfer from the concentrated solar rays to the working gas in the engine's heater head, which converts the heat energy into mechanical motion.

The generator of each unit in a utility-scale project is connected by underground transmission line to a small substation where the power can be transformed into a higher voltage for more efficient transmission across the grid.

Rationale for Elimination

Stirling dish technology has been eliminated from further consideration as an alternative technology because it would have substantially similar effects to those of the proposed project. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore, this alternative technology is eliminated from further consideration.

Environmental Impact Summary

The land area required for a 400-MW Stirling engine power plant is similar to that required for the proposed ISEGS project. However, it is not necessary to grade the entire parcel as only the 18-inch diameter pedestal of the Stirling engine requires level ground. It would still be necessary to grade permanent access roads between every two rows of Stirling engines due to the need for regular washing of the mirrors. This grading would cause removal of vegetation. Additionally, because the proposed Ivanpah site is crossed by several desert washes, the installation of 16,000 Stirling engines could require a larger total acreage of land, resulting in a greater loss of habitat.

Due to the size and height of the Stirling mirrors, impacts to visual resources would be similar or greater to those of ISEGS. While the Stirling engine technology would not require the approximately 459-foot-tall solar power towers, the 16,000 Stirling engines would introduce an industrial character and transformation of the site with the 45 foot tall engines. There would be less grading for the Stirling engine structures, but the numerous access roads required for cleaning the energy systems would create a high contrast between the disturbed area and its surroundings. The project would still require use of I-15 for commuting workers during both construction and operation.

The large area needed for a Stirling engine power plant would be comparable to the land requirement for the ISEGS power plant. Although grading requirements for the Stirling engines and solar concentrators are relatively small, like ISEGS, grading for access roads would be extensive because access roads are required for every other row of Stirling engines (SES 2008b). For these reasons, recreation and land use, and biological resources impacts would be similar to those of the ISEGS facility. In addition, due to the extent of the facility and the height of each concentrator, adverse visual impacts would not be avoided or reduced by this alternative and may be greater considering that the 45-foot high solar concentrators would be more pronounced than the approximately 12-foot high heliostats. However, the Stirling technology does not require power towers or a turbine. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would continue to contribute to adverse cumulative impacts during project construction and operation.

3.3.2.3 Linear Fresnel Technology

Description

A solar linear Fresnel power plant converts solar radiation to electricity by using flat moving mirrors to follow the path of the sun and reflect its heat on the fixed pipe receivers located about the mirrors. During daylight hours, the solar concentrators focus heat on the receivers to produce steam, which is collecting in a piping system and delivered to steam drums located in a solar filed and then transferred to steam drums in a power block (Carrizo 2007). The steam drums transferred to the power block will be used to turn steam turbine generators and produce electricity. The steam is then cooled, condensed into water, and recirculated back into the process.

In general, the linear Fresnel technology requires 4 – 5 acres of land per MW of power generated, which is about half the land required by the other solar technologies. A 400-MW solar linear Fresnel field would require approximately 1,600 – 2,000 acres of land.

Each row-segment is supported by large hoops that rotate independently on metal castors. Rotation of the reflectors would be driven by a small electrical pulse motor. Reflectors are stowed with the mirror aimed down at the ground during the night. The major components are:

- **CLFR Solar Concentrator.** A solar Fresnel power plant would use Ausra's CLFR technology which consists of slightly curved linear solar reflectors that concentrate solar energy on an elevated receiver structure. Reflectors measure 52.5 by 7.5 feet (Carrizo 2007). There are 24 reflectors in each row. A line is made up of 10 adjacent rows and operates as a unit, focusing on a single receiver (Carrizo 2007).
- **Receiver Structure.** The receiver structure is approximately 56 feet tall (Carrizo 2007). It would carry a row of specially coated steel pipes in an insulated cavity. The receiver would produce saturated steam at approximately 518°F from cool water pumped through the receiver pipes and heated (Carrizo 2007). The steam would drive turbines and produce electricity.

Rationale for Elimination

Linear Fresnel solar technology would have substantially similar effects to those of the proposed project. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore, this alternative technology is eliminated from further consideration.

Environmental Impact Summary

Though the Fresnel solar technology would require less acreage per MW of electricity produced than the ISEGS power tower plant, the Fresnel technology would still require the removal of approximately 1,600 – 2,000 acres of desert habitat. The mirrors are placed close together, so grading of the entire 1,600 acres would likely be required. Also, because the proposed Ivanpah site location is crossed by several desert washes, the engineering of the Fresnel siting may require a larger acreage than would otherwise be expected.

The Fresnel receiver structure is approximately 56 feet high and is required for every 10 rows of mirrors. Additionally, steam drums about 58 feet tall would be required to collect the steam from the receiver structure. The steam turbine generators would be roughly 60 feet tall and the air-cooled condensers, 115 feet tall. Due to the height of the many project facilities, impacts to visual resources would be similar to those of the proposed ISEGS facility.

Linear Fresnel plants would require water to generate the steam that powers the turbines. The technology uses a closed-loop circulation that requires some make-up water to replace water lost in the system. Water would also be required to wash the mirrors. If wet cooling were used, the cooling towers would require approximately 600 acre feet per year per 100 MW. Dry cooling would use significantly less water, approximately 12.3 acre feet per year per 100 MW (NRDC 2008b). The project would still require use of I-15 for commuting workers during both construction and operation.

Although the linear Fresnel technology would require grading of the entire project site, the plant would require only 1,600 – 2,000 acres, about half the acreage required by the ISEGS project to generate the same amount of power. While visual and ground disturbance impacts would be reduced due to the smaller footprint, the ground disturbance would be more intense within the project boundaries and the visual impacts of the solar field could be more pronounced when comparing the 56-foot high receivers to the approximately 12-foot high heliostats for ISEGS. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would continue to contribute to adverse cumulative impacts during project construction and operation.

3.3.2.4 Solar Photovoltaic Technology – Utility Scale

Description

A solar photovoltaic (PV) power generation facility would consist of PV panels that would absorb solar radiation and convert it directly to electricity. Major PV facilities have been suggested using two general technologies:

- Thin film installed on fixed metal racks, as proposed by First Solar (see **Figure 3.21**)
- Concentrating photovoltaics installed in elevated groups of panels that track the sun. These technologies are available from companies such as SunPower and

Amonix. SunPower's PowerTracker technology consists of a single-axis mechanism that rotates the PV panels to follow the sunlight. The Amonix technology allows tracking on two axes. See **Figure 3.21**.

Photovoltaics are used frequently in smaller scale, but have been used infrequently for larger scale power generation. Examples of existing larger PV facilities are:

- Nellis Air Force Base (Nevada): Over 72,000 solar panels, generating 14 MW of energy, were constructed between April and December 2007, by Sunpower Corp. on 140 acres of Nellis land (Whitney 2007).
- GreenVolts (Tracy, CA): GreenVolts is building a 2MW facility near the intersection of Interstates 580 and 205 to demonstrate the commercial viability of its concentrating photovoltaic technology. The facility is comprised of CarouSol devices which magnify the sun rays 625 times onto a composite solar cell (Nauman 2008).

Because PV technologies vary, the acreage required per MW of electricity produced from a large solar PV power plant is wide ranging and likely to change as technology continues to develop. The land requirement varies from approximately 3 acres per MW of capacity for crystalline silicon to more than 10 acres per MW produced for thin film and tracking technologies (NRDC 2008c). Therefore, a nominal 400-MW solar PV power plant would require between 1,600 and 4,000 acres.

Utility-scale solar PV installations require land with less than 3 percent slope. Solar photovoltaics do not require water for electricity generation. Some water may be required to wash the solar panels to maintain efficiency, approximately 2-10 acre feet per year of water may be required for a 100 MW utility solar PV installation or 8 to 40 acre feet for a 400 MW installation (NRDC 2008c). The SunPower-CA Valley Solar Ranch states that the facility would use approximately 11.6 AFY for a 250 MW PV facility, which would equal less than 20 AFY for a 400 MW PV facility (SLO 2009).

Solar PV arrays and inverters would be approximately 15 to 20 feet high; however, some components of the solar PV facility, such as collector power lines or a transmission interconnection may be significantly taller (SLO 2009).

As with any large solar facility, additional operational components may be required. The SunPower-California Valley Solar Ranch would require such operational components as electrical equipment, collector power lines, access roads, a substation, an operation and maintenance building, and water tanks, among others (SLO 2009).

Rationale for Elimination

While utility scale solar PV technology is a viable renewable technology it would have substantially similar effects to those of the proposed project. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore, this alternative technology is eliminated from further consideration.

Environmental Impact Summary

A utility scale solar PV facility would create a number of adverse impacts similar to those created by the ISEGS facility.

If utility scale solar PV technology were built at the Ivanpah Valley, approximately 1,600 to over 4,000 acres may be required, depending on the technology. Because the proposed site is crossed by several desert washes, it is likely that the acreage required for a solar PV facility would exceed that of ISEGS, in order to site the solar PV arrays away from substantial washes. Additionally, solar PV technology requires ground surface with less than 3 percent slope. Although the regional-scale slope within the proposed project area (from the mountains to the Dry Lake bed) is lower than 3 percent, the presence of numerous incised drainages channels, on a small-scale, frequently exceeds 3 percent. Therefore, it is likely that areas with a slope greater than 3 percent would be entirely graded, removing all vegetation from these locations. This results in a somewhat more severe effect on biological resources than the ISEGS project, which would not require grading over the entire site.

The size and height of the solar PV arrays would likely be visible from nearby regions, such as Interstate 15 and the Ivanpah Dry Lake due to the large size of the solar PV facility. The facility would also be visible from the Primm Golf Course, immediately east of the ISEGS site and slightly elevated. The large number of solar PV arrays, access roads, and interconnection power lines required for a 400 MW solar facility would introduce prominent industrial features; however, the solar PV technology would not introduce components as tall as the approximately 459-foot-tall solar power towers or the cooling towers as with the solar power tower technology. Additionally, because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would not be created as with the mirrors required for the power tower, Fresnel, and trough technologies. Although the visual impacts would not be as noticeable as those of the proposed project, they would still be substantial.

Because the solar PV technology does not require any water for cooling or steam generation, the technology uses less water than solar concentrating technologies. Water would be required for washing the solar PV arrays. Approximately 20 AFY would be required instead of the approximately 78 AFY for the solar power tower technology (SLO 2009).

More extensive grading would be required for a solar PV facility than a solar power tower facility. Because solar PV facilities require land with only 3 percent slope and the solar panels are grouped more densely together, it is likely that more grading would be required for a solar PV facility than for a solar power tower facility to establish man-made stormwater conveyance channels. This would not achieve the low-impact development approach as is proposed with ISEGS that would minimize grading and would largely avoid disturbance to the ephemeral drainages. Additionally, many miles of permanent access roads would be required for washing and maintenance of the solar panels. The extensive grading would likely create greater erosion concerns than those of the ISEGS project. The project would still require use of I-15 for commuting workers during both construction and operation.

The large land area required for PV development would result in similar impacts to recreation, land use, biological resources, and likely greater impacts to soil and water resources as those of the ISEGS facility. In addition, the large facility would be highly visible and would still have unavoidable adverse visual impacts. Impacts to northbound I-15 traffic congestion on Friday afternoons and evenings would also not change, and would continue to contribute to adverse cumulative impacts during project construction and operation.

3.3.2.5 Distributed Solar Technology

Description

Distributed solar generation is generally considered to use PV technology, but at slightly larger scales, distributed solar can also be implemented using solar thermal technologies.

Rooftop Solar Systems

A distributed solar PV alternative would consist of PV panels that would absorb solar radiation and convert it directly to electricity. The PV panels could be installed on residential, commercial, or industrial building rooftops or in other disturbed areas.

California currently has 441 MW of distributed solar PV systems which cover over 40 million square feet (CPUC 2008a). During 2008, 158 MW of distributed solar PV was installed in California, doubling the amount installed in 2007 (78 MW) (CPUC 2009). While small distributed solar PV systems are relatively common in California, large distributed solar PV installations are less so. Examples of proposed rooftop PV systems to attain large amounts of energy are the following:

- Southern California Edison (Fontana, CA): Over 33,000 solar panels were attached to a 600,000-square-foot commercial roof, generating 2 MW of energy, using thin film PV technology provided by First Solar; this is the first installment of a planned installation of 3.5 million PV panels that would generate 250 MW of capacity (SCE 2008).
- San Diego Gas & Electric (San Diego, CA): Solar Energy Project is designed to install up to 80 MW of solar PV which would include parking structures and tracking systems on open land (SDG&E 2008).
- Pacific Gas & Electric (San Francisco, CA): PG&E launched a five-year program to develop 500 MW of solar PV power. The program would consist of 250 MW of utility-owned PV generation and an additional 250 MW to be built and operated by independent developers under a streamlined regulatory process. PG&E's program targets mid-sized projects, between 1 to 20 MWs, mounted on the ground or rooftop within its service area (PG&E 2009).
- City of San Jose (San Jose, CA): The City of San Jose is considering the development and implementation of 50 MW of renewable solar energy on city facilities and/or land (San Jose 2009). San Jose's Green Vision lays out a goal of achieving 100% of the city's electricity from renewable energy by 2020; as part of this project, the City issued a solicitation for the installation of 50 MW of energy on City facilities and/or land in June of 2009 (San Jose 2009). The City anticipates that City facilities with appropriate solar access including parking lots, garages, lands and landfills would be eligible for solar installation.
- Like utility-scale PV systems, the acreage of rooftops or other infrastructure required per MW of electricity produced is wide ranging. As stated above, California has approximately 40 million square feet (approximately 920 acres) of

distributed solar PV accounting for 441 MW installed (CPUC 2008a). However, based on SCE's use of 600,000-square-feet for 2 MW of energy, 120 million square feet (approximately 2,750 acres) would be required for 400 MW.

- Most rooftop PV systems in California are crystalline systems, and result in approximately 15 percent of sunlight converted to energy (SB 2009). The newer technology is thin film, which converts approximately 5 to 10 percent of sunlight to energy.
- San Bernardino County is estimated to have the technical potential for over 2,000 MW of distributed solar PV (CEC 2007a). However, the location of the distributed solar PV would impact the capacity factor of the distributed solar PV.[2] Capacity factor depends on a number of factors including the insolation[3] of the site. Because a distributed solar PV alternative would be located throughout the state of California, the insolation at some of these locations may be less than in the Mojave Desert. The RETI assumed a capacity factor of approximately 30 percent for solar thermal technologies and tracking solar photovoltaic and approximately 20 percent capacity factor for rooftop solar PV which is assumed to be non-tracking (B&V 2008; CEC 2009a).

Distributed Solar Thermal Systems

Solar thermal technology, specifically Concentrated Solar Power (CSP) technology, has also been adapted for use at distributed locations. In August 2009, eSolar began operations of a new distributed solar power tower technology. This technology uses small, flat mirrors which track the sun and reflect the heat to tower-mounted receivers that boil water to create superheated steam (eSolar 2009). An example of the eSolar system is the Sierra SunTower, located in Lancaster, CA, which will produce 5 MW of energy on 20 acres of land for SCE (eSolar 2009). Each eSolar module locates one tower, one thermal receiver, and 12,000 mirrors on ten acres of land and produces 2.5 MW of power. Additionally, eSolar has developed a larger module, a 46 MW CSP plant that would include sixteen towers, a turbine generator set, and a steam condenser which would be located on approximately 160 acres (eSolar 2009).

An additional example of a distributed solar trough power plant technology is the Andasol 1 power plant in Spain. Andasol 1, generating 50 MW of power, went online in November 2008 (Solar Millennium 2008). The Andasol plant includes thermal storage systems which absorb a portion of the heat produced in the solar field during the day and can run the turbines for approximately 7.5 hours at full load, regardless of the solar conditions at the time (Solar Millennium 2008). The Andasol 1 solar field is approximately 510,000 square meters or 127 acres (Solar Millennium 2008). This does not include the ancillary facilities.

Both these technologies have been implemented recently and are described here as an example of the evolving distributed solar technologies.

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[2] The capacity factor of a power plant is a percentage that tells how much of a power plant's capacity is used over time (CEC 2008a)
[3] Insolation is the total amount of solar radiation striking a surface exposed to the sky (CEC 2008a).

Rationale for Elimination

The rate of PV manufacturing and installation is expected to continue to grow very quickly. However, given that there is currently a total of about 500 MW of distributed solar PV in California, the addition of another 400 MW to eliminate the need for the ISEGS project cannot be guaranteed. This would require an even more aggressive deployment of PV at more than double the historic rate of solar PV implementation than the California Solar Initiative program currently employs. Challenges to an accelerated implementation of distributed solar PV are discussed below.

- **RETI Consideration of Subsidies, Tariffs, Cost, and Manufacturing.** The RETI Discussion Draft Paper *California's Renewable Energy Goals – Assessing the Need for Additional Transmission Facilities* published with the RETI Final Phase 2A Report (September 2009)*,* addresses the likelihood of a scenario of sufficient distributed solar PV to remove the need for utility scale renewable development. This discussion paper identified the factors likely to influence the pace of large scale deployment of distributed solar PV: subsidies, feed-in tariffs, manufacturing and installation cost, and manufacturing scale-up.
- **Cost.** The 2009 Integrated Energy Policy Report (IEPR) states that solar PV technology has shown dramatic cost reductions since 2007, and is expected to show the most improvement of all the technologies evaluated in the 2009 IEPR model, bringing its capital cost within range of that of natu*ra*l gas-fired combined cycle units. However, the CPUC *33% Renewables Portfolio Standard Implementation Analysis Preliminary Results* considered a number of cases to achieve a 33 percent RPS standard. The results of this study state that the cost of a high distributed generation case is significantly higher than the other 33 percent RPS alternative cases. The study explains that this is due to the heavy reliance on solar PV resources which are more expensive than wind and central station solar.
- **Tariffs**. The IEPR discusses the need to adjust feed-in tariffs to keep downward pressure on costs. Feed-in tariffs should be developed based on the size and type of renewable resources, given that the cost of generating energy from a 100-MW wind farm is less than the cost of generating to ensure a good mix of new renewable energy projects. According to the report, differentiating feed-in tariffs by type and size can ensure a good mix of new renewable energy projects and avoid paying too much for some technologies and too little for others.
- **Limited Installations**. There are few existing large scale distributed solar projects. In the spring of 2008, SCE proposed 250 to 500 MW of rooftop solar PV to be installed in five years. As of January 2010, SCE had installed only 3 MW. As the 2009 IEPR points out, the potential for distributed resources remains largely untapped and integrating large amounts of distributed renewable generation on distribution systems throughout the State presents challenges.
- **Electric Distribution System**. The State's electric distribution systems are not designed to easily accommodate large quantities of randomly installed distributed generation resources at customer sites. Accomplishing this objective efficiently and cost-effectively will require the development of a new transparent distribution planning framework.

The 2009 IEPR makes a number of recommendations to support the integration of distributed generation into the California grid, expand feed-in tariffs, and support the efforts to achieve the RPS goals as a whole. It also recommends supporting new renewable facilities and the necessary transmission corridors and lines to access the facilities.

In testimony filed by the Center for Biological Diversity in the ISEGS proceeding [Docket No. 07-AFC-5], Bill Powers stated that the technology and manufacturing capacity is available to develop 400 MW of distributed PV, and that he believed that the distribution system would be able to accommodate the additional distributed generation. He presented numerous examples of California utility programs that have committed to development of hundreds of megawatts of additional distributed solar PV.

These considerations indicate that implementation of distributed solar technology at the scale needed is remote and speculative, and would likely be technically and economically infeasible. As a result, this technology is eliminated from detailed analysis.

Environmental Impact Summary

Installations of 400 MW distributed solar PV would require between 40 to 120 million square feet of solar panels to be installed on urban rooftops, parking lots, or other developed areas, as compared to approximately 177 million square feet for the proposed project. Distributed solar PV is assumed to be located on already existing structures or disturbed areas so little to no new ground disturbance would be required and there would be few associated biological impacts.

Minimal grading or new access roads would be required and relatively minimal maintenance and washing of the solar panels would be required. As such, it is unlikely that the rooftop solar PV alternative would create erosion impacts. Relatively large amounts of water would be required to wash the solar panels, especially with larger commercial rooftop solar installations; however, the commercial facilities would likely already be equipped with drainage systems. Therefore, the wash water would not contribute to runoff or to erosion.

Because most PV panels are black to absorb sun, rather than mirrored to reflect it, glare would not create visual impacts as with the power tower, Fresnel, and trough technologies. Additionally, the distributed solar PV alternative would not require the additional operational components, such as dry-cooling towers, substations, transmission interconnection, maintenance and operation facilities with corresponding visual impacts. Solar PV panels would be visible to passing residents and may be viewed by a larger number of people.

3.3.3 Other Alternative Renewable Technologies

Non-solar renewable generation technologies were considered as potential alternatives to the proposed project. The following renewable generation technologies were considered in this analysis:

- wind energy
- geothermal energy
- biomass energy

- tidal energy
- wave energy

The non-solar renewable technologies alternatives (wind, geothermal, biomass, tidal, wave) would likely be infeasible at the scale of the ISEGS project, are generally restricted to specific locations, and might not avoid or minimize adverse effects of the proposed action. In addition, many of these forms of alternative renewable energy are not within the jurisdiction of the BLM. Tidal and wave energy are not found on public land managed by the BLM, are remote and speculation forms of renewables, are ineffective in responding to the purpose and need, and are inconsistent with the basic policy objectives for management of the desert. Geothermal energy is an alternative energy source that can be approved on the public lands under BLM management, but these types of projects require a specific and particularized resource. The project must be located where the resource is found. The Ivanpah Valley has no geothermal resources. In addition, the project applicant has not applied for tidal, wave, geothermal, biomass, or wind energy grant. Specifically, wind energy that would be viable at some locations in the Mojave Desert could create significant impacts to biological, visual, cultural, and water and soils resources.

3.3.3.1 Wind Energy

Description

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feed alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind's kinetic energy into electricity. A single 1.5-MW turbine operating at a 40 percent capacity factor generates 2,100 MWh annually. Modern wind turbines represent viable renewable alternatives to large solar energy projects within the region as exemplified by the number of wind projects applications pending to BLM within both California and Nevada. The BLM has received approximately 96 applications for wind projects within the California Desert District as of November 2008, for use of over 750,000 acres of land (BLM 2008b).

Wind turbines currently being manufactured have power ratings ranging from 250 watts to 5 MW, and units larger than 7 MW in capacity are now under development. The average capacity of wind turbines installed in the United States in 2007 was 1.65 MW (EERE 2008).

The perception of wind as an emerging energy source reached a peak in the early 1980s, when wind turbine generators to convert wind power into electricity were being installed in California at a rate of nearly 2,000 per year. Progress slowed a few years later, however, as start-up tax subsidies disappeared and experience demonstrated some deficiencies in design. At the present time, technological progress again has caught up, contributing lower cost, greater reliability, and reason for genuine optimism for the future.

The technology is now well developed and can be used to generate significant amounts of power. There are now approximately 2,490 MW of wind being generated in California.

Rationale for Elimination

Because the scale of current solar, wind, and other renewable energy facilities is on the order of 100 to 500 MW, BLM is considering and processing multiple renewable energy applications, including wind applications, in order to achieve the objectives of the EPAct, which encourages the Department of the Interior (BLM's parent agency) to approve at least 10,000 MW of renewable energy on public lands by 2015. Although wind energy is clearly a reasonable and feasible renewable technology, approval of wind energy projects alone is not expected to be sufficient to achieve the EPAct objectives. Also, although the impacts of wind energy are different from those of solar, they can still be adverse, and implementation of wind power facilities is limited by both technical and environmental factors. Therefore, wind energy is not retained for further analysis as an alternative to the proposed project.

Environmental Impact Summary

Wind turbines can create environmental impacts, as summarized below:

- Wind energy requires between 5 and 17 acres per MW of energy created. As such a nominal 400-MW power plant would require between 2,000 and 6,800 acres. However, wind turbine "footprints" typically use only 5 percent of the total area, or approximately 100 to 340 acres for a 400-MW power plant.
- Erosion can be a concern in certain habitats such as the desert or mountain ridgelines. Standard engineering practices can be used to reduce erosion potential.
- Birds collide with wind turbines. Avian deaths, particularly raptors, are a significant concern depending on raptor use of the area.
- Wind energy can negatively impact birds and other wildlife by fragmenting habitat, both through installation and operation of wind turbines themselves and through the roads and power lines that are required.
- Bats collide with wind turbines. The extent of bat mortality depends on turbine placement and bat flight patterns.
- Visual impacts of wind turbines can be adverse, and installation in scenic and high traffic areas can result in strong local opposition. Other impressions of wind turbines are that they are attractive and represent clean energy.

Approximately 2,000 to 6,800 acres of land would be required for a 400-MW wind electricity power plant. While wind plants would not necessarily impact the same types of wildlife and vegetation as the ISEGS solar power tower plant, the acreage necessary for a 400-MW wind plant would still cause significant habitat loss in addition to potentially adverse impacts from habitat fragmentation and bird and bat mortality.

Wind turbines are often over 400 feet high for 2-MW turbines. As such, any wind energy project would be highly visible, which is of special concern in scenic areas.

3.3.3.2 Geothermal Energy

Description

Geothermal technologies use steam or high-temperature water obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are utilized to extract energy from the high-temperature water.

Geothermal plants account for approximately 5 percent of California's power and range in size from under 1 MW to 110 MW. Geothermal plants typically operate as baseload facilities and require 0.2 to 0.5 acre per MW, so a 400-MW facility would require up to 200 acres. California is the largest geothermal power producer in the United States, with about 1,800 installed capacity in 2007, 13,000 gigawatt hours of electricity were produced in California (CEC 2008b). Geothermal plants provide highly reliable baseload power, with capacity factors from 90 to 98 percent.

Geothermal plants must be built near geothermal reservoir sites because steam and hot water cannot be transported long distances without significant thermal energy loss. Geothermal power plants are operating in the following California counties: Lake, Sonoma, Imperial, Inyo, Mono, and Lassen.

Rationale for Elimination

Geothermal generation is a commercially available technology and is important for California's renewable energy future because it provides baseload power. However, it is limited to areas with geologic conditions resulting in high subsurface temperatures. Even in areas where such conditions are present, there have been concerns about the reliability and corrosiveness of the steam supply. Additionally, while the technology is available, there are not enough geothermal resources to meet BLM's renewable energy approval goals, so additional technologies, like solar thermal generation, would also be required. Therefore, geothermal energy is not retained for further analysis as an alternative to the proposed project.

Environmental Impact Summary

Concerns regarding geothermal power plants include land use, water use, visibility, and hazardous materials, specifically gaseous emission. Geothermal power projects use less land than almost any other energy source, typically from about 0.2 to 0.5 acres per MW; however, geothermal plants must be built where the resource is since the steam cannot be piped long distances without significant heat loss. This results in a highly secure and predictable fuel supply and some inflexibility in siting. It may also result in a long interconnection requirement to reach a transmission system.

Drilling and operation of geothermal wells may also potentially degrade local groundwater aquifers. Geothermal wells are typically cased and cemented in a manner that precludes contamination of aquifers. Hot water and steam can only flow into the bottom of a geothermal well, significantly below cold water aquifers, and are confined within one to three layers of casing cemented almost all the way down the well. If there were a natural connection (or one created by drilling) between the reservoir and a cold water aquifer, it could destroy the commercial viability of the geothermal reservoir.

Operators avoid inflow of cold waters into a geothermal reservoir, or vice versa, both to comply with regulatory protections of groundwater aquifers and to protect the geothermal reservoir.

Geothermal plants can cause visual impacts; however, this can be reduced by careful siting of the power plant, using the natural screening of topography and trees, by painting facilities to blend with the surroundings and by locating them away from sensitive viewsheds. Very efficient water-cooled cooling towers can be designed so that vapor plumes from cooling towers are barely visible except on very cold, clear days.

Geothermal plant can also produce waste and byproducts that can have adverse impacts. The most significant and potentially harmful gas generally encountered in geothermal systems is hydrogen sulfide (H_2S), which, at concentrations higher than 30 parts per million (ppm), is a toxic substance (CEC 2003). It can cause a variety of problems including dizziness, vomiting, and eventually death if one is exposed for long periods of time. In stronger concentrations above 100 ppm, H_2S can be fatal. H_2S is heavier than air and can accumulate in low-lying areas (equipment pits, ravines, and other depressions) and become concentrated over time.

H_2S releases could potentially be of concern during drilling, well testing, and plant start-up and shut-down operations, although recent technology improvements in atmospheric separators can significantly decrease emissions and noise during these operations. H_2S is now often abated at geothermal power plants, resulting in a conversion of close to 100 percent of the H_2S into elemental sulfur (GEA 2007). Since 1976, H_2S emissions have decreased from 1,900 pounds per hour to 200 pounds per hour despite an increase in geothermal power production from 500 MW to 2,000 MW (GEA 2007).

3.3.3.3 Biomass Energy

Description

Electricity can be generated by burning organic fuels in a boiler to produce steam, which then turns a turbine; this is biomass generation. Biomass can also be converted into a fuel gas such as methane and burned to generate power. Wood is the most commonly used biomass for power generation. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Several techniques are used to convert these fuels to electricity, including direct combustion, gasification, and anaerobic fermentation. Biomass facilities do not require the extensive amount of land required by the other renewable energy sources discussed, but they generate much smaller amounts of electricity.

Currently, nearly 19 percent of the state's renewable electricity derives from biomass and waste-to-energy sources (CEC 2007c). Most biomass plant capacities are in the 3- to 10-MW range and typically operate as baseload capacity. The average size of a sales generation biomass plant is 21 MW. Unlike other renewables, the locational flexibility of biomass facilities would reduce the need for significant transmission investments. Solid fuel biomass (555 MW) makes up about 1.75 percent of the state’s electricity, and landfill gas generation (260 MW) makes up about 0.75 percent. Existing landfills not now producing electricity from gas could add a maximum of about 170 MW of new generation capacity.

Rationale for Elimination

Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and so could not meet the applicant's objectives, nor could they contribute substantially to BLM's renewable energy objectives under EPAct. In addition, implementation of biomass facilities in southern California may be limited by the available of fuel (which requires water), and by air quality considerations. Therefore, this technology is not considered as an alternative to the proposed project.

Environmental Impact Summary

Generally, small amounts of land are required for biomass power facilities; however, a biomass facility should be sited near a relatively large source of biomass in order to minimize the cost of bringing the biomass waste to the facility.

Operational noise impacts may be a concern, originating from truck engines as a result hauling operations coming from and going to the facility repeatedly on a daily basis. Other operations of the biomass facilities, while internal to the main structure, can result in increased noise due to the material grinding equipment.

The emissions due to biomass fuel-fired power plant operation are generally unavoidable. Direct impacts of criteria pollutants could cause or contribute to a violation of the ambient air quality standards. Adverse impacts can potentially occur for PM10 and ozone because emissions of particulate matter and precursors and ozone precursors would contribute to existing violations of the PM10 and ozone standards. Biomass/biogas facility emissions could also adversely affect visibility and vegetation in federal Class I areas or state wilderness areas, which would deteriorate air quality related values in the wilderness areas. Toxic air contaminants from routine operation would also cause health risks that could locally adversely affect sensitive receptors.

3.3.3.4 Tidal Energy

Description

The oldest technology to harness tidal power for the generation of electricity involves building a dam, known as a *barrage*, across a bay or estuary that has large differences in elevation between high and low tides. Water retained behind a dam at high tide generates a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines.

Certain coastal regions experience higher tides than others. This is a result of the amplification of tides caused by local geographical features such as bays and inlets. In order to produce practical amounts of power for tidal barrages, a difference between high and low tides of at least 5 meters is required. There are about 40 sites around the world with this magnitude of tidal range. The higher the tides, the more electricity can be generated from a given site and the lower the cost of electricity produced. Worldwide, existing power plants include a 240-MW plant in France, a 20-MW plant in Nova Scotia, and a 0.5-MW plant in Russia (EPRI 2006a).

Tidal Fences

Tidal fences are effectively barrages that completely block a channel. If deployed across the mouth of an estuary, they can be very environmentally destructive. However, in the 1990s, their deployment in channels between small islands or in straights between the mainland and islands has increasingly been considered a viable option for generation of large amounts of electricity.

The advantage of a tidal fence is that all the electrical equipment (generators and transformers) can be kept high above the water. Also, by decreasing the cross-section of the channel, current velocity through the turbines is significantly increased.

The first large-scale commercial fences are likely to be built in Southeast Asia. The most advanced plan is a scheme for a fence across the Dalupiri Passage between the islands of Dalupiri and Samar in the Philippines, agreed upon by the Philippine government and Energy Engineering Company of Vancouver, Canada in late 1997. The site, on the south side of the San Bernardino Strait, is approximately 41 meters deep (with a relatively flat bottom) and has a peak tidal current of about 8 knots. As a result, the fence is expected to generate up to 2,200 MW of peak power (with a base daily average of 1,100 MW) (Osborne 2000).

Tidal Turbines

Tidal turbines are the chief competition to the tidal fence. Looking like an underwater wind turbine, they offer a number of advantages over the tidal fence. They are less disruptive to wildlife, allow small boats to continue to use the area, and have much lower material requirements than the fence.

Tidal turbines function well where coastal currents run at 2 to 2.5 meters per second (slower currents tend to be uneconomic while larger ones stress the equipment). Such currents provide an energy density four times greater than air, meaning that a 15-meter-diameter turbine will generate as much energy as a 60-meter-diameter windmill. In addition, tidal currents are both predictable and reliable, a feature which gives them an advantage over both wind and solar systems. The tidal turbine also offers significant environmental advantages over wind and solar systems; the majority of the assembly is hidden below the waterline, and all cabling is along the sea bed.

There are many sites around the world where tidal turbines could be effectively installed. The ideal site is close to shore (within 1 kilometer) in water depths of about 20 to 30 meters. In April 2007, the first major tidal-power project was installed in the United States off New York City's Roosevelt Island (Fairley 2007). Turbines such as those used in New York City use in-flow turbines, thereby lessening the environmental impacts. A study conducted in 2006, *System Level Design, Performance, Cost and Economic Assessment – San Francisco Tidal In-Stream Power Plant*, concluded that a tidal plant located under the Golden Gate Bridge could create approximately 35 MW of power with no significant impacts to the environment and recommended further research and development into both ocean energy technology and a pilot project in San Francisco (EPRI 2006b).

Rationale for Elimination

Tidal fence technology is a commercially available technology, but it is limited to areas that are adjacent to a body of water with a large difference between high and low tides. In-flow tidal turbines are a relatively new technology that is unproven at the scale that would be required to replace the proposed project, making implementation speculative. Therefore, it is not further considered as an alternative to the proposed project.

Environmental Impact Summary

Tidal technologies, especially tidal fences, have the potential to cause adverse biological impacts, especially to marine species and habitats. Fish could be caught in the unit's fins by the sudden drop in pressure near the unit. The passageways, more than 15 feet high and probably sitting on the bay floor, could squeeze out marine life that lives there or alter the tidal flow, sediment build-up, and the ecosystem in general. Even the in-flow turbines can have environmental impacts on marine systems. The in-flow turbines off New York City must undergo environmental monitoring for 18 months to ensure the turbines will not create environmental impacts to the river's marine wildlife. Also, depending on the location of the tidal technology, commercial shipping could be disrupted during construction.

The reduced tidal range (difference between high and low water levels) resulting from tidal energy generation can destroy inter-tidal habitat used by wading birds. Sediment trapped behind the barrage could also reduce the volume of the estuary over time.

3.3.3.5 Wave Energy

Description

Wave power technologies have been around for nearly 30 years. Setbacks and a general lack of confidence have contributed to slow progress towards proven devices that would have a good probability of becoming commercial sources of electrical power.

The highest energy waves are concentrated off the western coasts in the 40^{o} to 60^{o} latitude range north and south. The power in the wave fronts varies in these areas between 30 and 70 kilowatts per meter (kW/m) with peaks to 100 kW/m in the Atlantic southwest of Ireland, the Southern Ocean and off Cape Horn. Many wave energy devices are still in the research and development stage and would require large amounts of capital to get started. Additional costs from permitting and environmental assessments also make wave energy problematic (WEC 2007). Nonetheless, wave energy is likely to increase in use within the next 5 to 10 years.

The total power of waves breaking on the world's coastlines is estimated at 2 to 3 million megawatts. In favorable locations, wave energy density can average 65 MW per mile of coastline. Three approaches to capturing wave energy are:

- **Floats or Pitching Devices.** These devices generate electricity from the bobbing or pitching action of a floating object. The object can be mounted to a floating raft or to a device fixed on the ocean floor.
- **Oscillating Water Columns.** These devices generate electricity from the wave-driven rise and fall of water in a cylindrical shaft. The rising and falling water

column drives air into and out of the top of the shaft, powering an air-driven turbine.

- **Wave Surge or Focusing Devices.** These shoreline devices, also called "tapered channel" or "tapchan" systems, rely on a shore-mounted structure to channel and concentrate the waves, driving them into an elevated reservoir. Water flow out of this reservoir is used to generate electricity, using standard hydropower technologies.

In December 2007, PG&E signed a power purchase agreement with Finavera Renewables, which had planned to operate a wave farm approximately 2.5 miles off the coast of Eureka, California. The agreement was for 2 MW of power beginning in 2012. On October 16, 2008, the California Public Utilities Commission rejected PG&E’s request for approval of a renewable resource procurement contract with Finavery Renewables because, among other reasons, the CPUC concluded the project had not been shown to be viable. As stated in the decision, there is significant uncertainty surrounding wave technology and the wave energy industry is at a beginning stage (CPUC 2008b). The CPUC did authorize up to $4.8 million for PG&E to undertake its WaveConnect project in D.09-01-036. WaveConnect is designed to document the feasibility of a facility that converts wave energy into electricity by using wave energy conversion (WEC) devices in the open ocean adjacent to PG&E's service territory.

Rationale for Elimination

Wave energy is new and may not be technologically feasible. Additionally, wave power must be located where waves are consistently strong; even then, the production of power depends on the size of waves, which result in large differences in the amount of energy produced. Wave technology is not considered an alternative to the ISEGS project because is an unproven technology at the scale that would be required to replace the proposed project.

Environmental Impact Summary

The environmental impacts of wave power have yet to be fully analyzed. A recent study published by the U.S. Department of Commerce and National Oceanic and Atmospheric Administration listed a number of potentially adverse environmental impacts created by wave power (Boehlert 2008). These include (Boehlert 2008):

- Significant reduction to waves with possible effects to beaches (e.g. changes to sediment transport processes).
- The use of buoys may have positive effects on forage fish species, which in turn could attract larger predators. Structures need to reduce potential entanglement of larger predators, especially marine turtle species.
- Modifications to water circulation and currents may result in changes to larval distribution and sediment transport.
- Wave energy development may affect community structures for fish and fisheries.
- Lighting and above-water structures may result in marine bird attraction and collisions and may alter food webs and beach processes.

- A diversity of concerns would arise regarding marine mammals including entanglement issues.
- Energy-absorbing structures may affect numerous receptors and should avoid sensitive habitats.
- Chemicals used in the process must be addressed both for spills and for a continuous release such as in fouling paints.
- New hard structures and lighting may break loose and increase debris accumulation.
- Impacts on fish and marine mammals caused by noise coming from the buoys should be understood and mitigated.
- Electromagnetic effects may affect feeding or orientation and should be better understood.
- Impact thresholds need to be established. As projects scale up in location or implementation, new risks may become evident.

3.3.4 Alternative Methods of Generating or Conserving Electricity

Nonrenewable generation technologies that require use of natural gas, coal, or nuclear energy would not achieve the key project objective for ISEGS: to safely and economically construct and operate a nominal 400-megawatt, renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities.

While these generation technologies would not achieve this key objective, they are presented here in brief for the benefit of the public and decision makers. Conservation and demand-side management is also briefly addressed in this section.

The following topics are considered in this analysis:

- natural gas
- coal
- nuclear energy
- conservation and demand-side management

Of the nonrenewable generation alternatives (natural gas, coal, and nuclear), only the natural gas-fired power plants would be viable alternatives within California. However, gas-fired plants would fail to meet a major project objective: to construct and operate a renewable power generating facility in California capable of selling competitively priced renewable energy consistent with the needs of California utilities and would therefore not achieve the purpose and need of the project. Because these alternatives would not support renewable power generation within California, and could have adverse environmental impacts of their own, they were eliminated from further consideration.

3.3.4.1 Natural Gas Generation

Description

Natural gas power generation accounts for approximately 22 percent of all the energy used in the United States and comprises 40 percent of the power generated in California (CEC 2007c). Natural gas power plants typically consist of combustion turbine generators, heat recovery steam generators, a steam turbine generator, wet or dry cooling towers, and associated support equipment. An interconnection with a natural gas pipeline, a water supply, and electric transmission are also required.

A gas-fired power plant generating 400 MW would generally require less than 40 acres of land.

Rationale for Elimination

Although natural gas generation is clearly a viable technology, it is not a renewable technology, so it would not attain BLM's objective of approving renewable energy applications. Therefore, this alternative is not considered in detail as an alternative to the ISEGS project.

Environmental Impact Summary

Natural gas power plants may result in numerous environmental impacts such as the following.

- Overall air quality impacts would increase because natural gas-fired power plants contribute to local violations of PM10 and ozone ambient air quality standards, and operational emissions could result in toxic air contaminants that could adversely affect sensitive receptors. Net increases in greenhouse gas emissions due to natural gas-firing in the conventional power plants would also be adverse.
- Environmental justice may be a concern. Gas-fired power plants tend to be located in developed urban areas that are zoned for heavy industry. In some instances, low-income and minority populations are also located in such areas.
- In order to avoid land use impacts, natural gas-fired power plants must be consistent with local jurisdictions' zoning.
- Several hazardous materials, including regulated substances (aqueous ammonia, hydrogen, and sulfuric acid), would be stored at a natural gas power plant during operation. Aqueous ammonia would be stored in amounts above the threshold quantity during the final stages of construction, initial start-up, and operations phase. Transport of hazardous materials during power plant operation includes delivery of aqueous ammonia and removal of wastes. During operation, the aqueous ammonia transporter would be required to obtain a Hazardous Material Transportation License in accordance with California Vehicle Code section 32105 and would be required to follow appropriate safety procedures and routes.
- Cultural impacts can be severe depending on the power plant siting; however, because natural gas power plants require significantly fewer acres per megawatt

of power generated, impacts to cultural resources would be expected to be fewer than with solar facilities.

- Power plant siting may result in the withdrawal of agriculture lands. However, because natural gas power plants require significantly fewer acres per megawatt of power generated, impacts to agriculture would be expected to be less than with solar facilities should they be sited on agriculture lands.
- Visual impacts may occur with natural gas power plants because they introduce large structures with industrial character. The most prominent structures are frequently the cooling towers, which may reach 100 feet tall, and the power plant stacks, which may reach over 100 feet tall. Visible plumes from the cooling tower would also potentially occur.

3.3.4.2 Coal Generation

Description

Coal-fired electric generating plants are the cornerstone of America's central power system. Traditional coal-fired plants generate large amounts of greenhouse gases. New “clean coal technology” includes a variety of energy processes that reduce air emission and other pollutants from coal-burning power plants. The Clean Coal Power Initiative is providing government co-financing for new coal technologies that help utilities meet the Clear Skies Initiative to cut sulfur, nitrogen, and mercury pollutants by nearly 70 percent by 2018. The Clean Coal Power Initiative is now focusing on developing projects that utilize carbon sequestration technologies and/or beneficial reuse of carbon dioxide (DOE 2008). However, these technologies are not yet in use.

In 2006, approximately 15.7 percent of the energy used in California came from coal fired sources; 38 percent of this was generated in state, and 62 percent was imported (CEC 2007c). The in-state coal-fired generation includes electricity generated from out-of-state, coal-fired power plants owned by and reported by California utilities (CEC 2007c). In 2006, California enacted SB 1368 (Perata, Chapter 598, Statutes of 2006), which prohibits utilities from making long-term commitments for electricity generated from plants that create more carbon dioxide (CO_2) than clean-burning natural gas plants (CEC 2007c).

Rationale for Elimination

Although coal generation is a viable technology, it is not a renewable technology, so it would not attain BLM’s objective of approving renewable energy applications. Therefore, coal generation was eliminated from detailed analysis.

Environmental Impact Summary

Coal-fired power plants may also result in numerous environmental impacts such as the following.

- Overall, air quality impacts would increase because coal-fired power plants contribute carbon dioxide, sulfur dioxide, nitrogen oxides, mercury, and fly ash (EPA 2008b). Mining, cleaning, and transporting coal to the power plants generates additional emissions. Average emissions of a coal-fired power plant are 2,249 pounds per megawatt hour of carbon dioxide, 13 pounds per megawatt hour of sulfur dioxide and 6 pounds per megawatt hour of nitrogen oxides (EPA 2008b). Net increases in greenhouse gas emissions due to coal-firing in the conventional power plants would be substantial.

- Health risks associated with power plants have also been documented, including problems associated with exposure to fine particle pollution or soot, an increase in asthma, and an increase in non-fatal heart attacks.
- Large quantities of water are generally required to produce steam and for cooling. When coal-fired power plants use water from a lake or river, fish or other aquatic life can be impacted (EPA 2008a).

3.3.4.3 Nuclear Energy

Description

Due to environmental and safety concerns, California law currently prohibits the construction of any new nuclear power plants in California until the California Energy Commission finds that the federal government has approved and there exists a demonstrated technology for the permanent disposal of spent fuel from these facilities (CEC 2006). In June 1976, California enacted legislation directing the Energy Commission to perform an independent investigation of the nuclear fuel cycle. This investigation was to assess whether the technology to reprocess nuclear fuel rods or to dispose of permanently high-level nuclear waste had been demonstrated and approved and was operational (Public Resources Code 25524.1 (a) (1), 25524.1 (b), and 25524.2 (a)). After extensive public hearings, the Energy Commission determined that it could not make the requisite affirmative findings concerning either reprocessing of nuclear fuel or disposal of high-level waste. This information was published in a report: *Status of Nuclear Fuel Reprocessing, Spent Fuel Storage and High-level Waste Disposal*, Energy Commission publication P102-78-001, January 1978.) As a result, the development of new nuclear energy facilities in California was prohibited by law.

It has been more than 25 years since the last comprehensive Energy Commission assessment of nuclear power issues. The *Nuclear Power in California: 2007 Status Report* was published in October of 2007, and gives a detailed description of the current nuclear waste issues and their implications for California. This was prepared as part of the development of the Energy Commission's *2007 Integrated Energy Policy Report* (CEC 2007d).

Rationale for Elimination

The permitting of new nuclear facilities in California is currently illegal, so this technology is infeasible as an alternative to the proposed project.

3.3.4.4 Conservation and Demand-Side Management

Description

Conservation and demand-side management consist of a variety of approaches to reduction of electricity use, including energy efficiency and conservation, building and appliance standards, and load management and fuel substitution. In 2005 the Energy

Commission and CPUC's Energy Action Plan II declared cost effective energy efficiency as the resource of first choice for meeting California's energy needs. The Energy Commission noted that energy efficiency helped flatten the state's per capita electricity use and saved consumers more than $56 billion since 1978 (CPUC 2008b). The investor-owned utilities' 2006-2008 efficiency portfolio marks the single-largest energy efficiency campaign in U.S. history, with a $2 billion investment by California's energy ratepayers (CPUC 2008b). However, with population growth, increasing demand for energy, and the need to reduce greenhouse gases, there is a greater need for energy efficiency.

The CPUC, with support from the Governor's Office, the Energy Commission, and the California Air Resources Board, among others, adopted the California Long-Term Energy Efficiency Strategy Plan for 2009 to 2020 in September 2008 (CPUC 2008b). The plan is a framework for all sectors in California including industry, agriculture, large and small businesses, and households. Major goals of the plan include:

- All new residential construction will be zero net energy by 2020;
- All new commercial construction will be zero net energy by 2030;
- Heating, ventilation, and air conditioning industries will be re-shaped to deliver maximum performance systems;
- Eligible low-income customers will be able to participate in the Low Income Energy Efficiency program and will be provided with cost-effective energy efficiency measures in their residences by 2020.

Rationale for Elimination

Conservation and demand-side management is important for California's energy future and cost effective energy efficiency is considered as the resource of first choice for meeting California's energy needs. However, with population growth and increasing demand for energy, conservation and demand-management alone is not sufficient to address all of California's energy needs. Additionally, it will not attain BLM's objective of approving renewable energy applications and it is not within the framework of BLM authority to require energy conservation.

3.3.5 Phased Approval Alternative

Description

Although not initially identified as a potential alternative by BLM, public comments on the DEIS recommended consideration of an alternative in which only the ROW for Ivanpah Unit 1 was approved, with approval of the ROWs for Units 2 and 3 being withheld until additional construction and operational information was obtained. In the DEIS, it was acknowledged that the proposed project was the first of this scale and technology proposed on federal lands, and that uncertainties regarding potential impacts existed. To address these uncertainties, BLM proposed mitigation measures for some resource areas, including Soil and Water and Traffic, that would require monitoring of impacts, and response actions should impacts be identified. However, the comment recommending phased approval provides another potential method for addressing these uncertainties.

Under the Phased Approval alternative, BLM would approve the ROW for Ivanpah Unit 1, and would monitor impacts associated with construction and operation of the unit. The Phased Approval Alternative could ultimately incorporate portions of other reasonable alternatives, including an alternative site, reduced acreage alternative, or alternative solar, other renewable, or other generation technology, depending on the results of the impact monitoring and the identification of potential options. At an undefined time during, or following, the completion of Ivanpah Unit 1, BLM would consider the impacts that had resulted during Ivanpah Unit 1 construction and/or operation, and either approve Units 2 and 3 as proposed, recommend approval with modifications, or recommend no approval. Modifications to be considered could include, if reasonable, alternative sites, alternative technologies, alternative construction or operation procedures, and modified mitigation measures.

Rationale for Elimination

Although it could potentially result in fewer impacts, the Phased Approval alternative is likely to be economically infeasible for the applicant because they would not qualify for the DOE federal loan guarantee program under the EPAct of 2005. In response to the public comment on this issue, BLM has reviewed the monitoring requirements that were included within the mitigation measures proposed in the DEIS to address potentially uncertain impacts to verify that they would be effective. Based on this review, the mitigation measures provide the flexibility necessary to respond to newly identified impacts and conditions, and phased approval would not likely reduce those impacts further. Also, BLM’s ROW regulations allow for adjustments to grant conditions after ROW grant approval, and this mechanism would effectively perform the same function as Phased Approval.

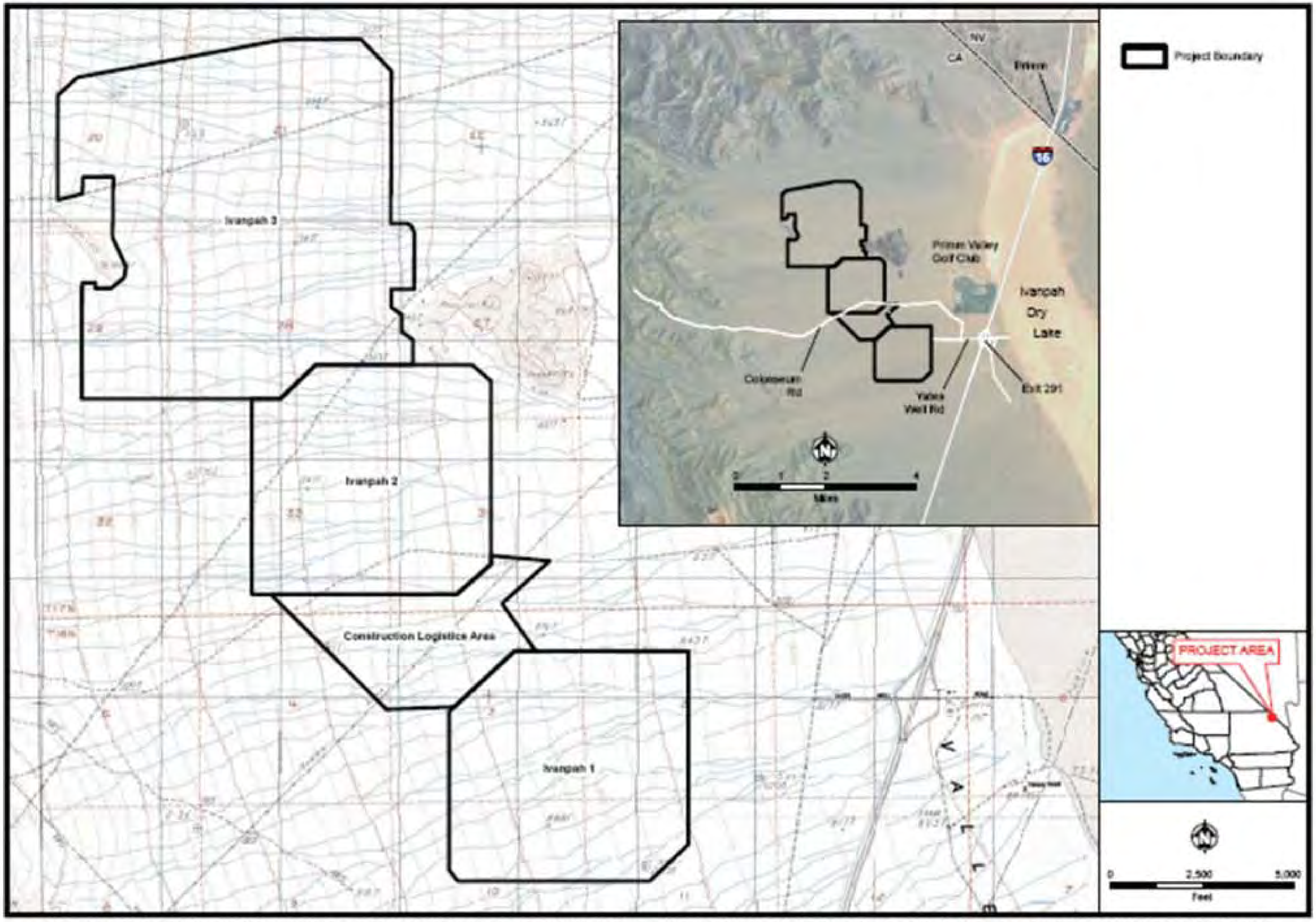
Environmental Impact Summary

The Phased Approval Alternative would likely have a reduced level of impacts from the proposed project because it would include project modifications to address impacts that were actually observed during construction and operation of Ivanpah Unit 1. By being based upon actually operational data, it is possible that project modifications for Units 2 and 3 could be more effective in reducing impacts. However, the Phased Approval Alternative would likely not be economically feasible for the developer. Because ultimate approval of the ROWs for Units 2 and 3 would be uncertain, it is unlikely that the developer would receive the necessary financing, including Federal and State incentives for renewable energy development, to proceed with the project.

Figure 3.1
Ivanpah Solar Electric Generating System - Regional Setting

U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 1

Figure 3.2
Ivanpah Solar Electric Generating System - Local Setting

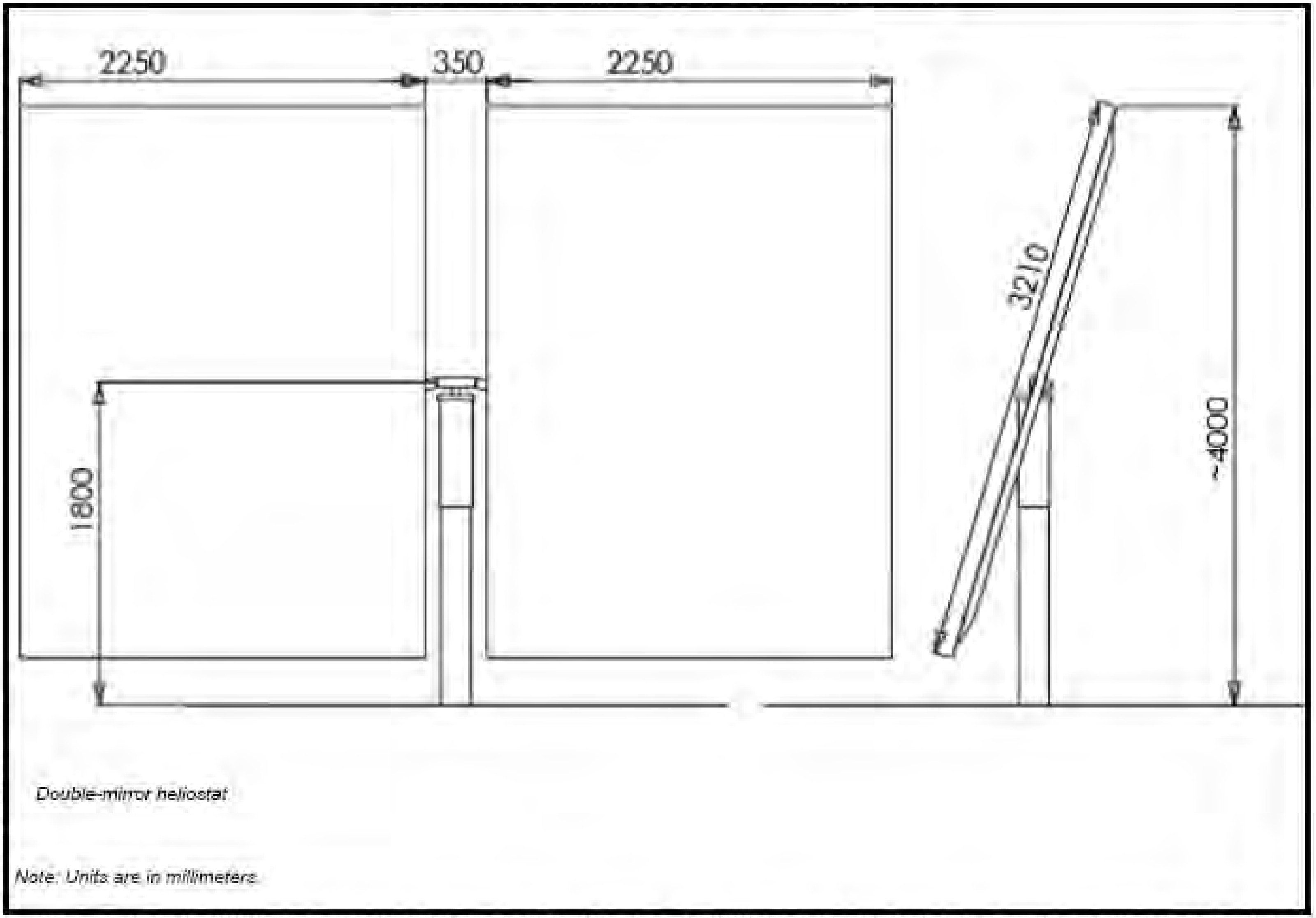


U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Attachment DR130-2B Figure 1

Figure 3.3
Ivanpah Solar Electric Generating System - Visual Simulation view from Benson Mine / Mojave Preserve

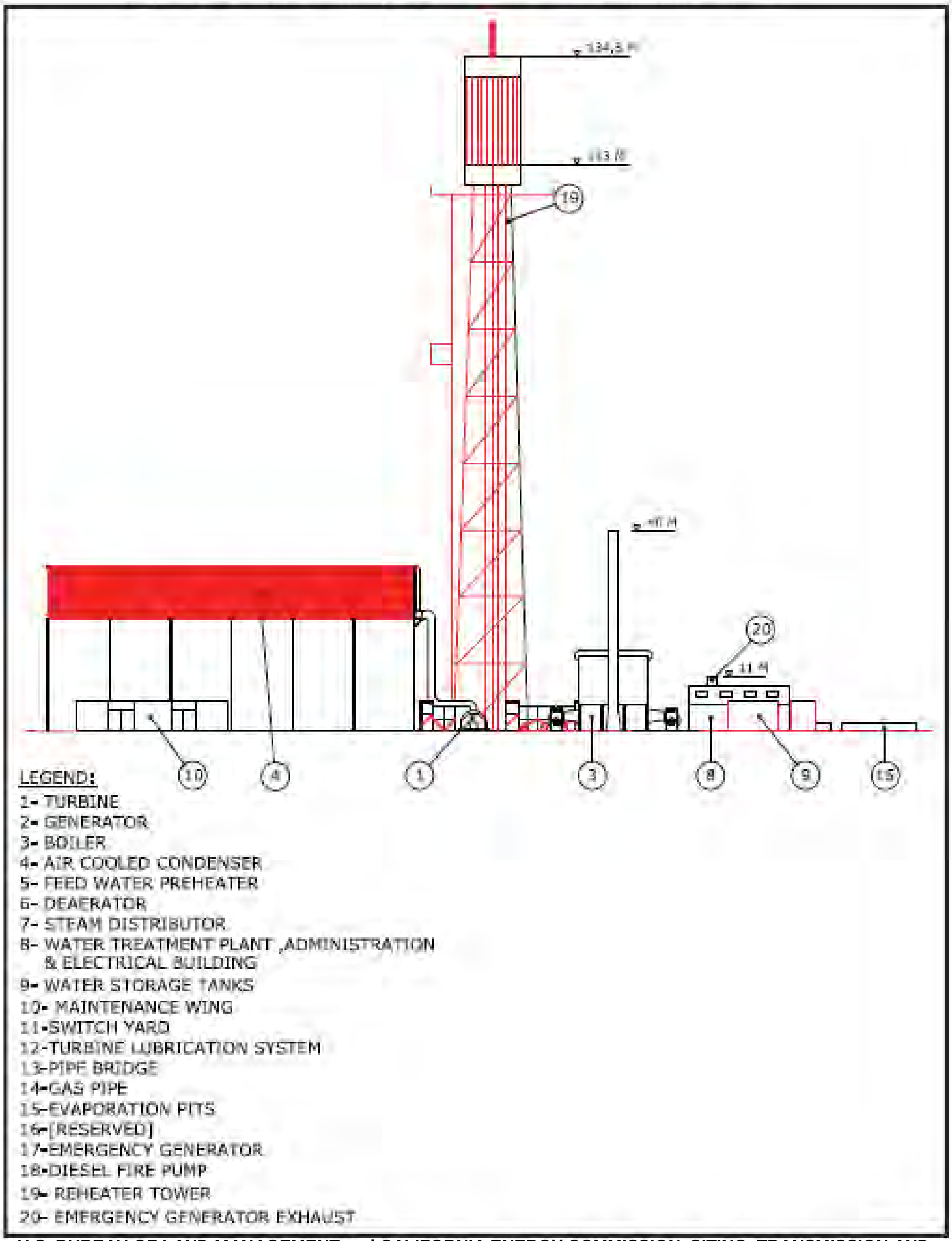
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Data Response Set 2C #148 Figure DR 147-3

Figure 3.4
Ivanpah Solar Electric Generating System - Double Mirror Heliostat



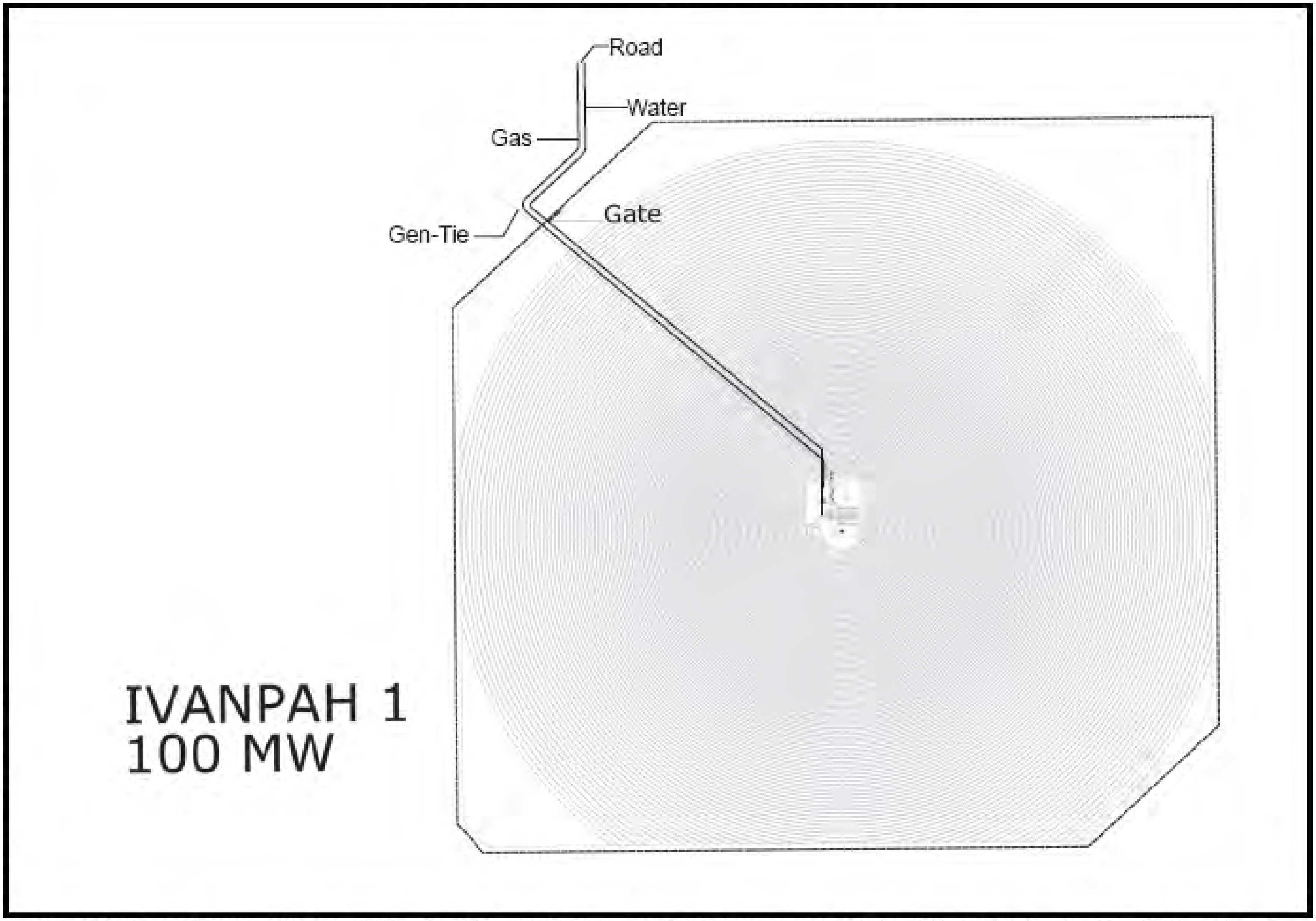
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: DR SET 1D # 102-1R

Figure 3.5
Ivanpah Solar Electric Generating System - Power Block Power Tower Elevations



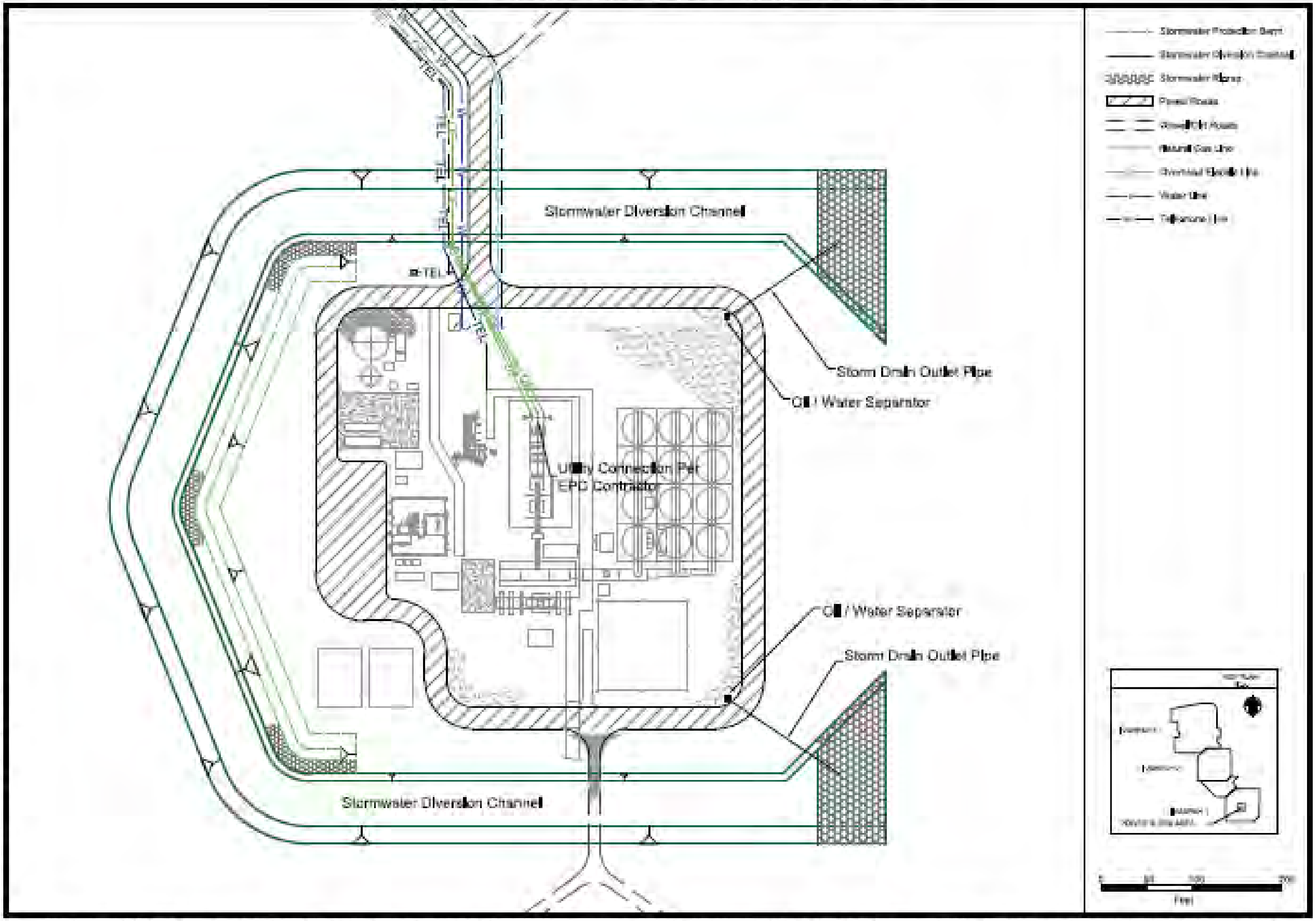
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: AFC Figure 2.2-C

Figure 3.6
Ivanpah Solar Electric Generating System - Ivanpah 1 Solar Field



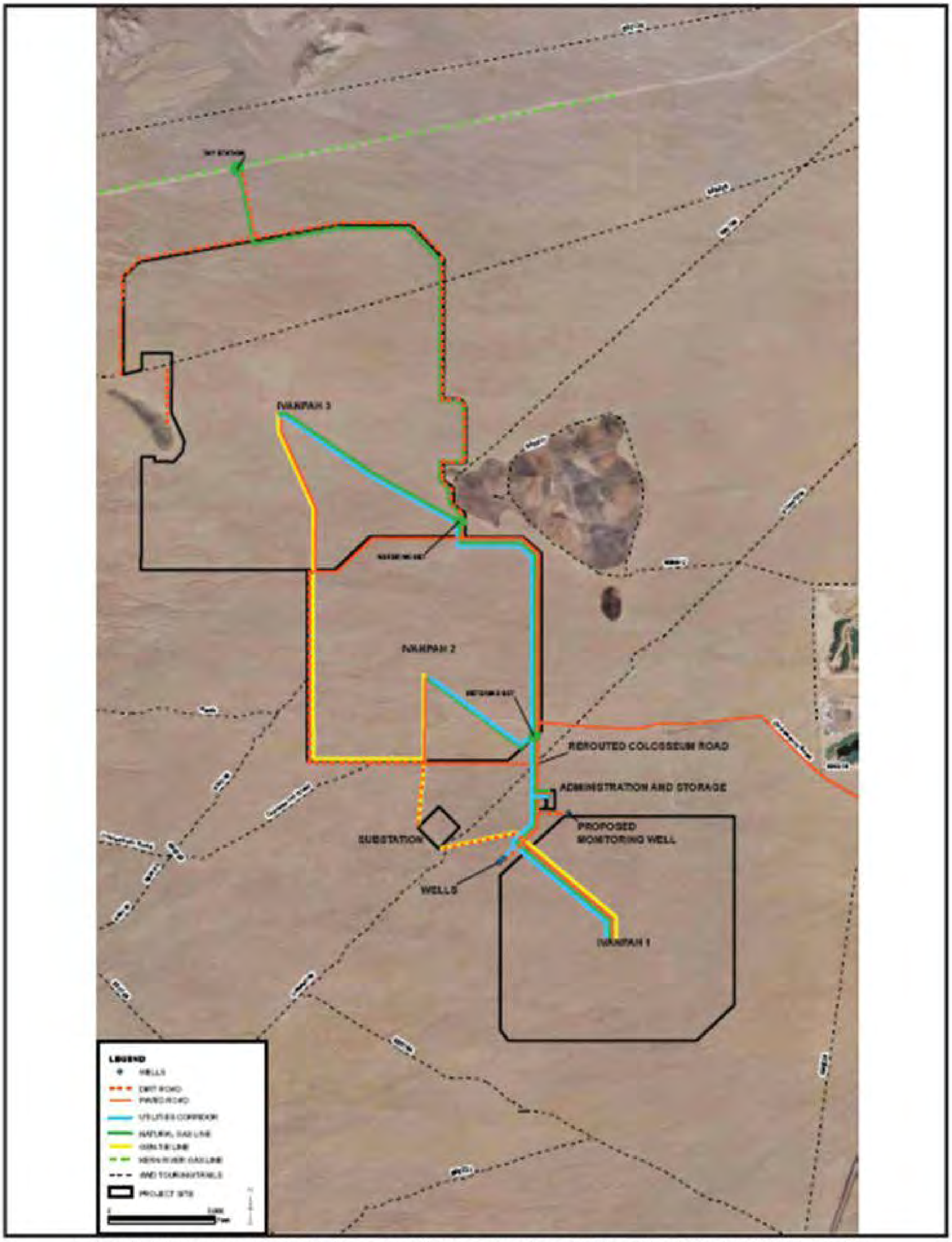
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Data Response Set 1D- Figure DR4-1

Figure 3.7
Ivanpah Solar Electric Generating System - Ivanpah 1 Power Block



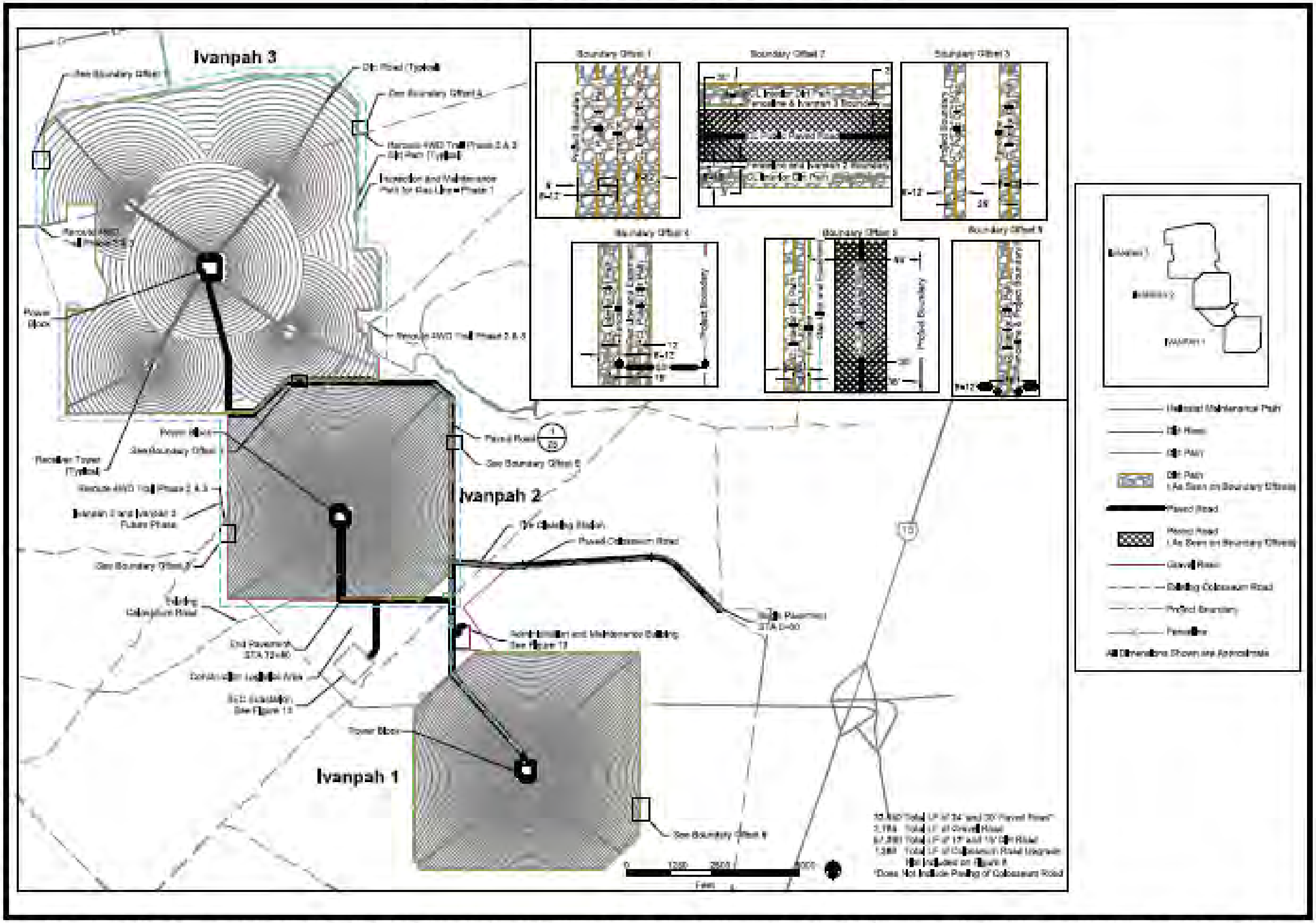
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Attachment DR130-2B Figure 7

Figure 3.8
Ivanpah Solar Electric Generating System - Site Plan and Linear Facilities



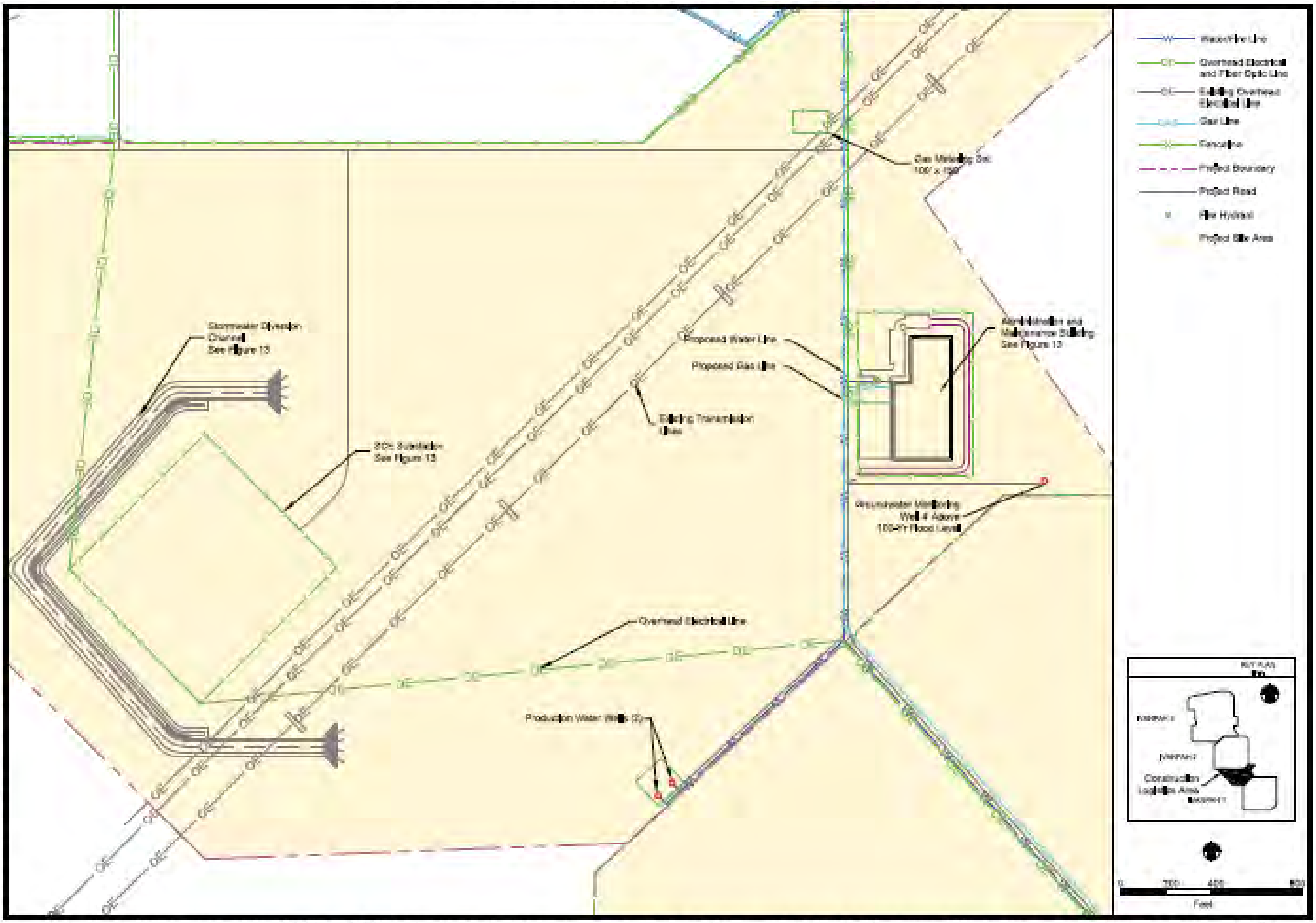
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Data Response 21 - Fig.1 - Trails

Figure 3.9
Ivanpah Solar Electric Generating System - Access Roads



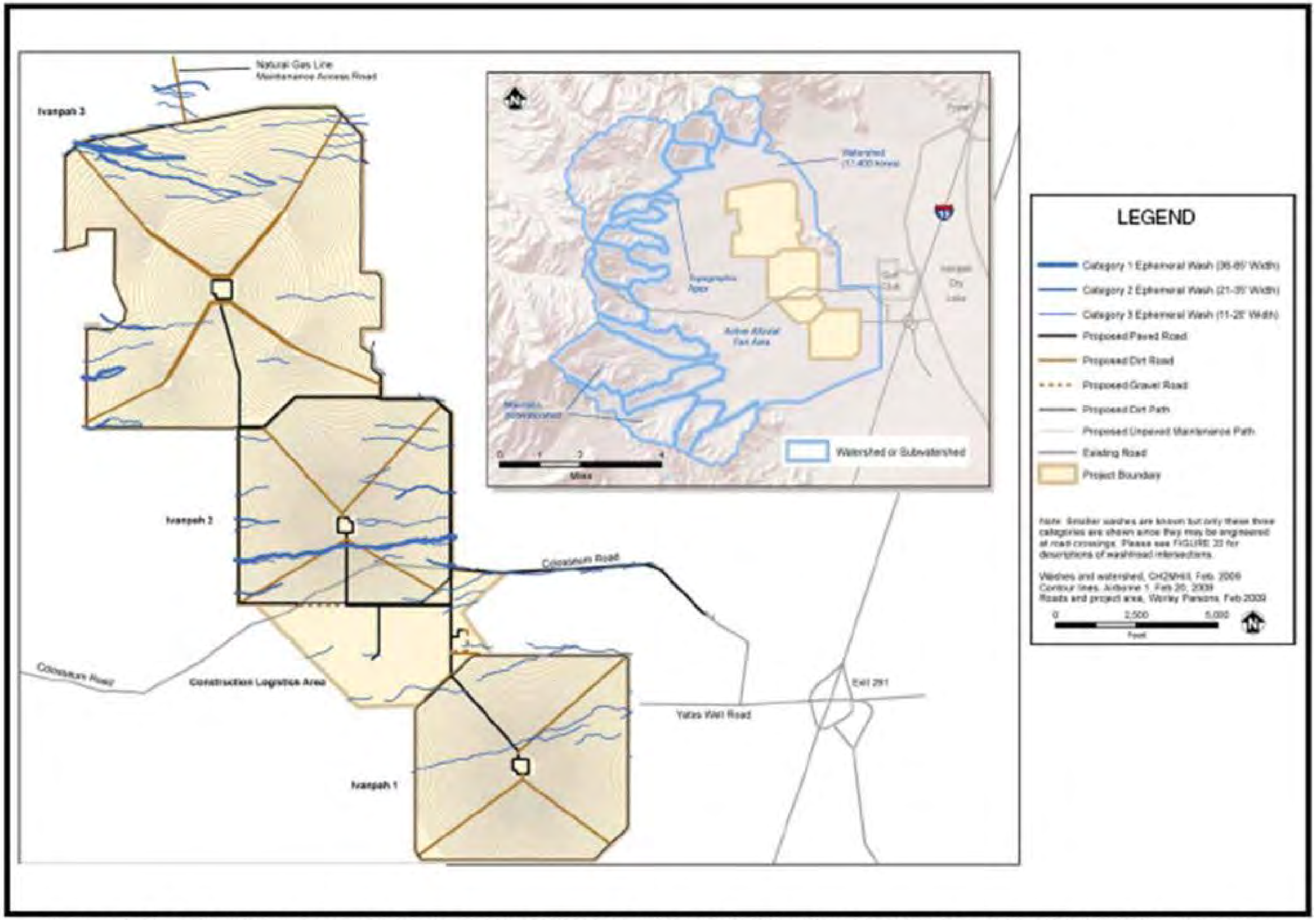
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Attachment DR130-2B Figure 15

Figure 3.10
Ivanpah Solar Electric Generating System - Construction Logistics Area



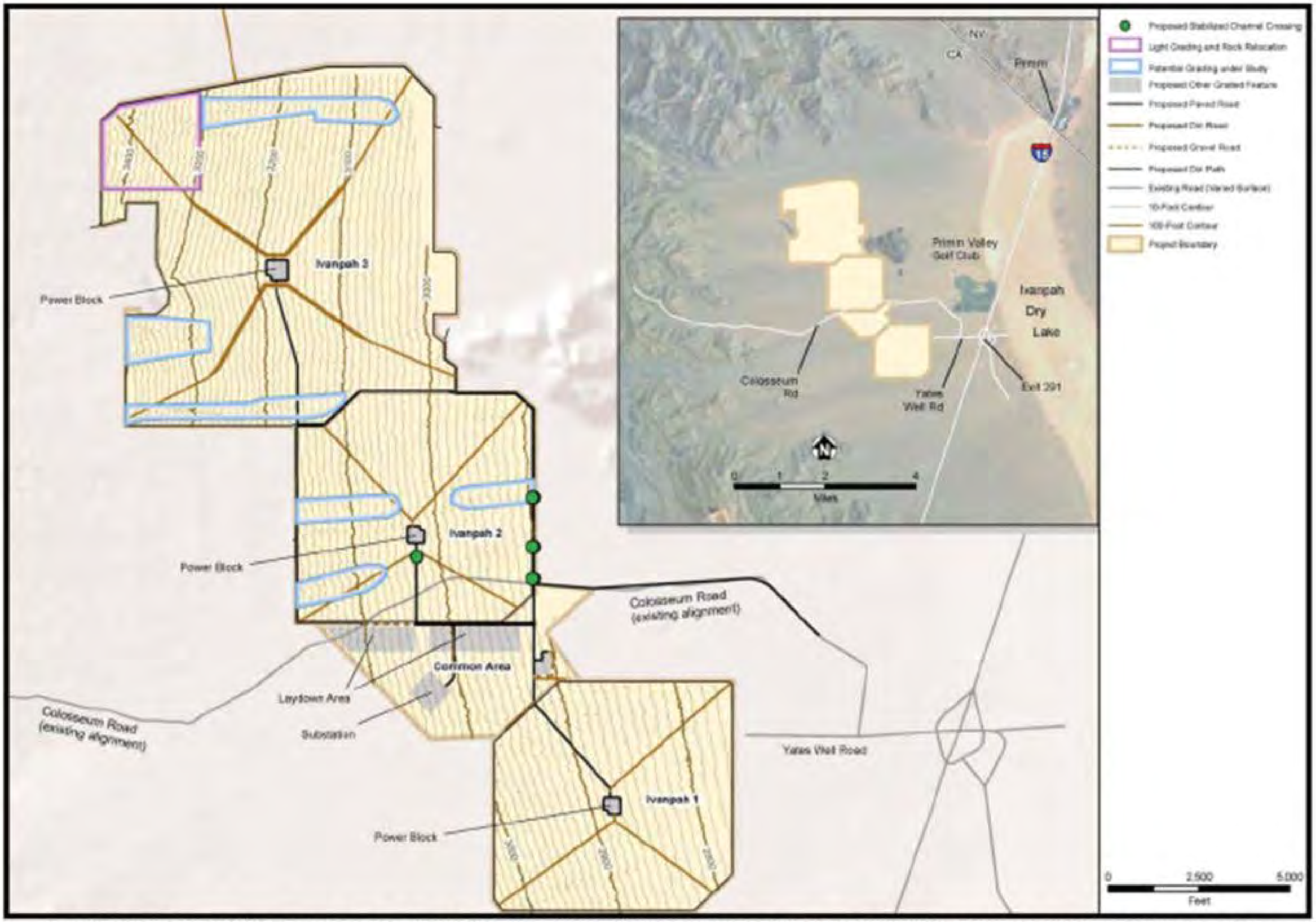
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Attachment DR130-2B Figure 4

Figure 3.11
Ivanpah Solar Electric Generating System - Existing Watershed and Primary Washes



U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Attachment DR130-2B Figure 8

Figure 3.12
Ivanpah Solar Electric Generating System - Overall Grading Plan



U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Attachment DR130-2B Figure 11

Figure 3.13
Site Plan for Mitigated Ivanpah 3 Alternative (Source: BSE 2010a)

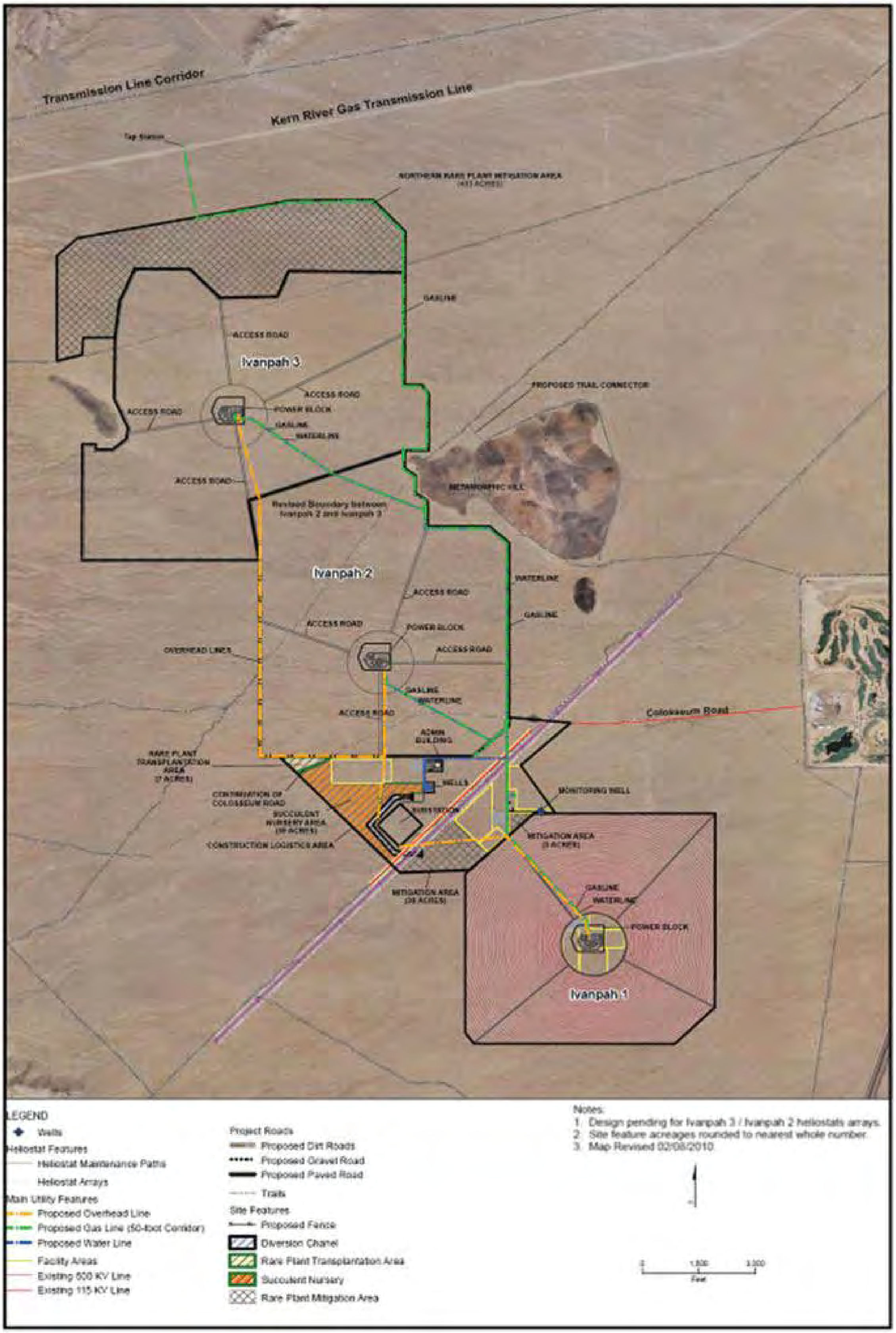
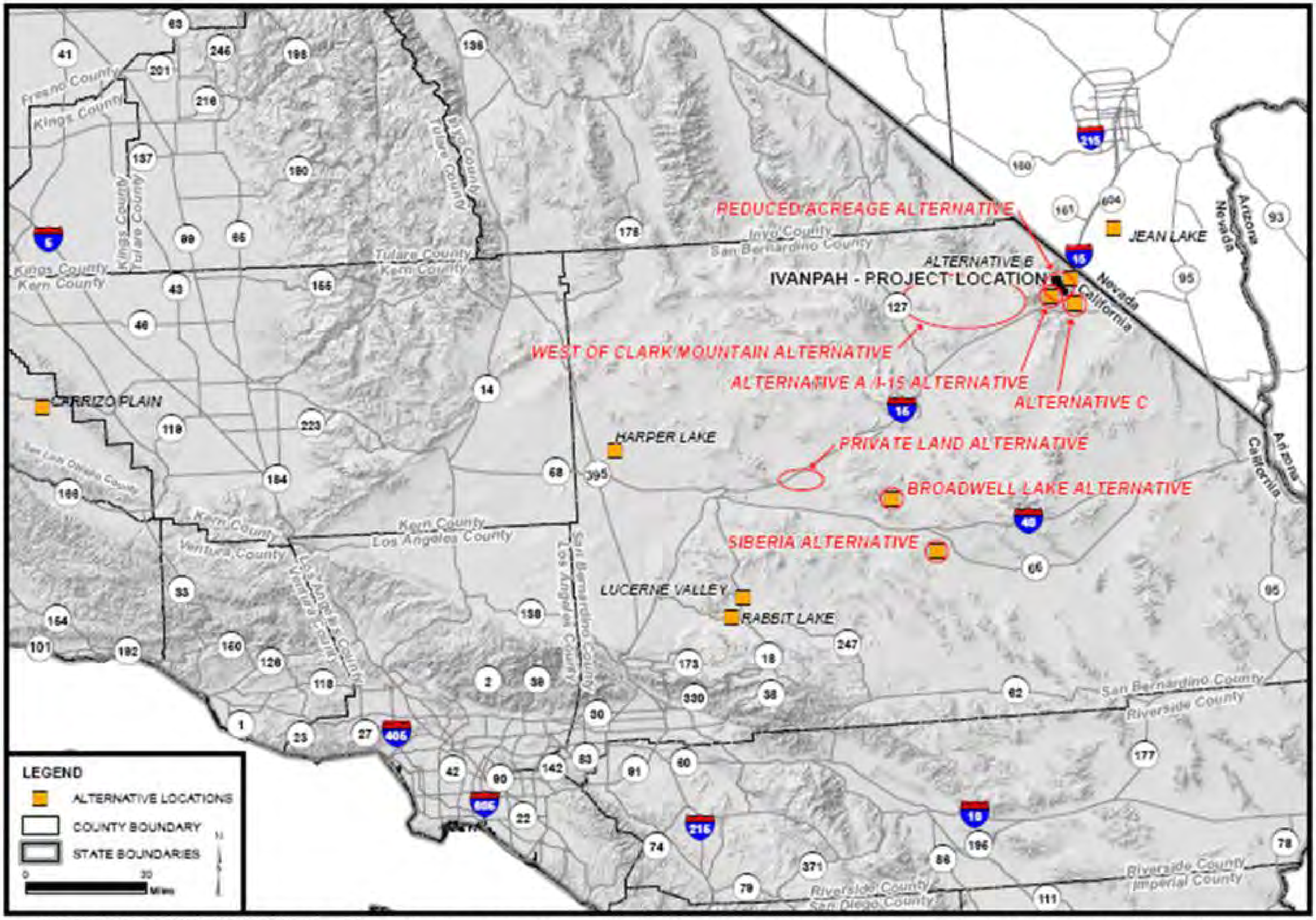


Figure 3-14
Reconfigured Unit 3 in Modified I-15 Alternative (Source: From BSE 2010b)

Figure 3-15
ISEGS - Locations of Alternatives Eliminated (in red)



U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: BSE, 2007a

Figure 3-16
ISEGS – Alternative Regional Locations

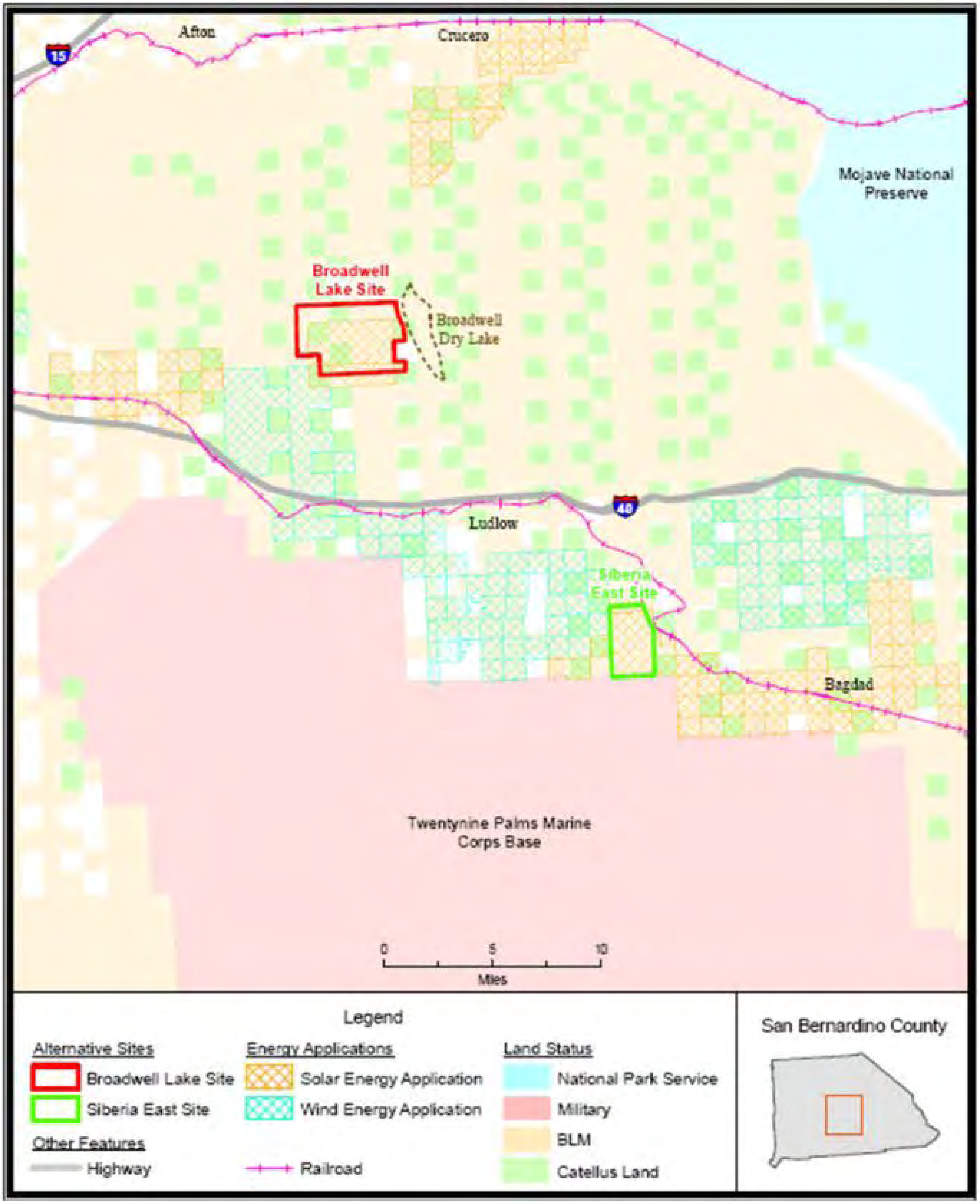
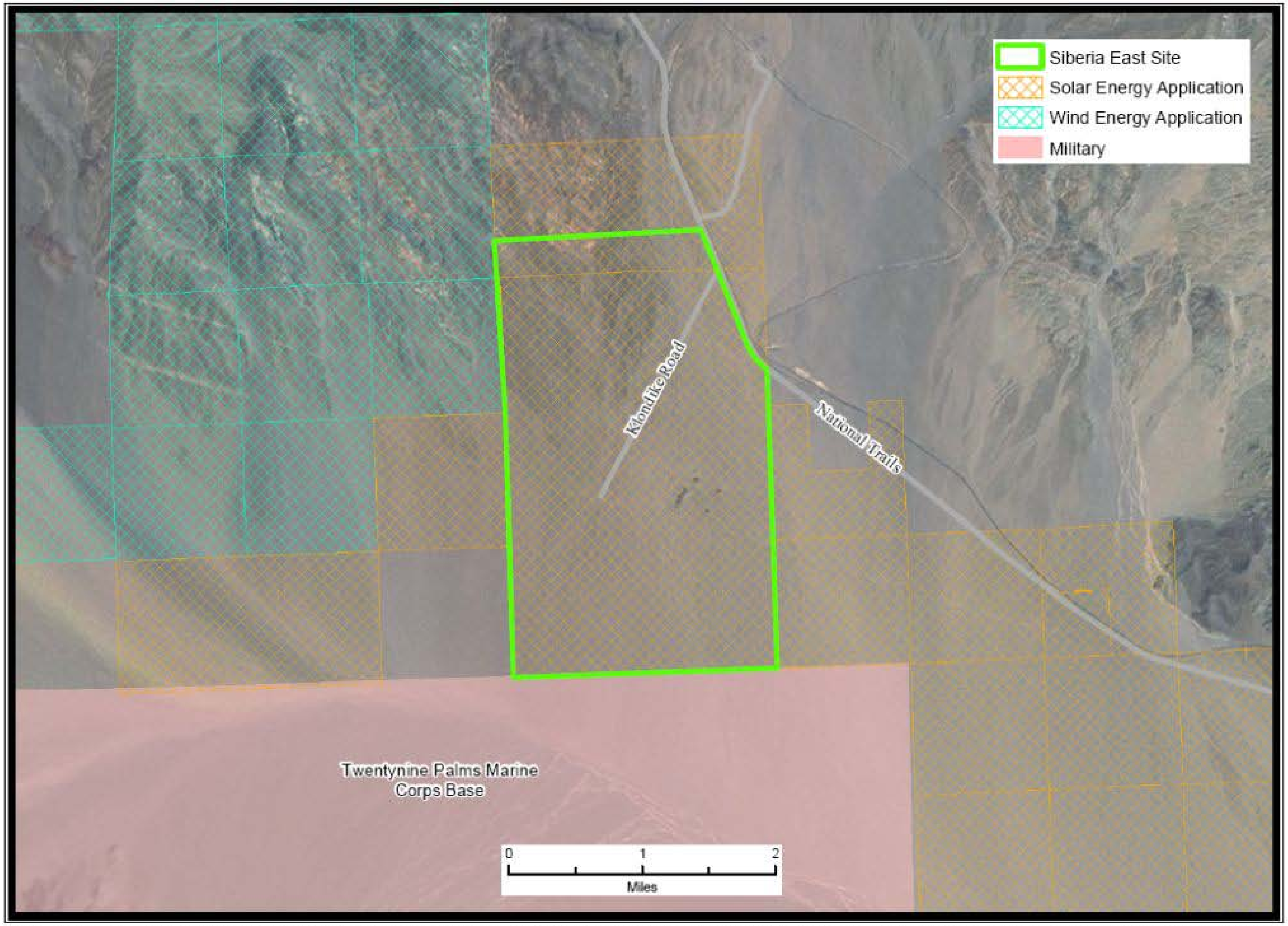
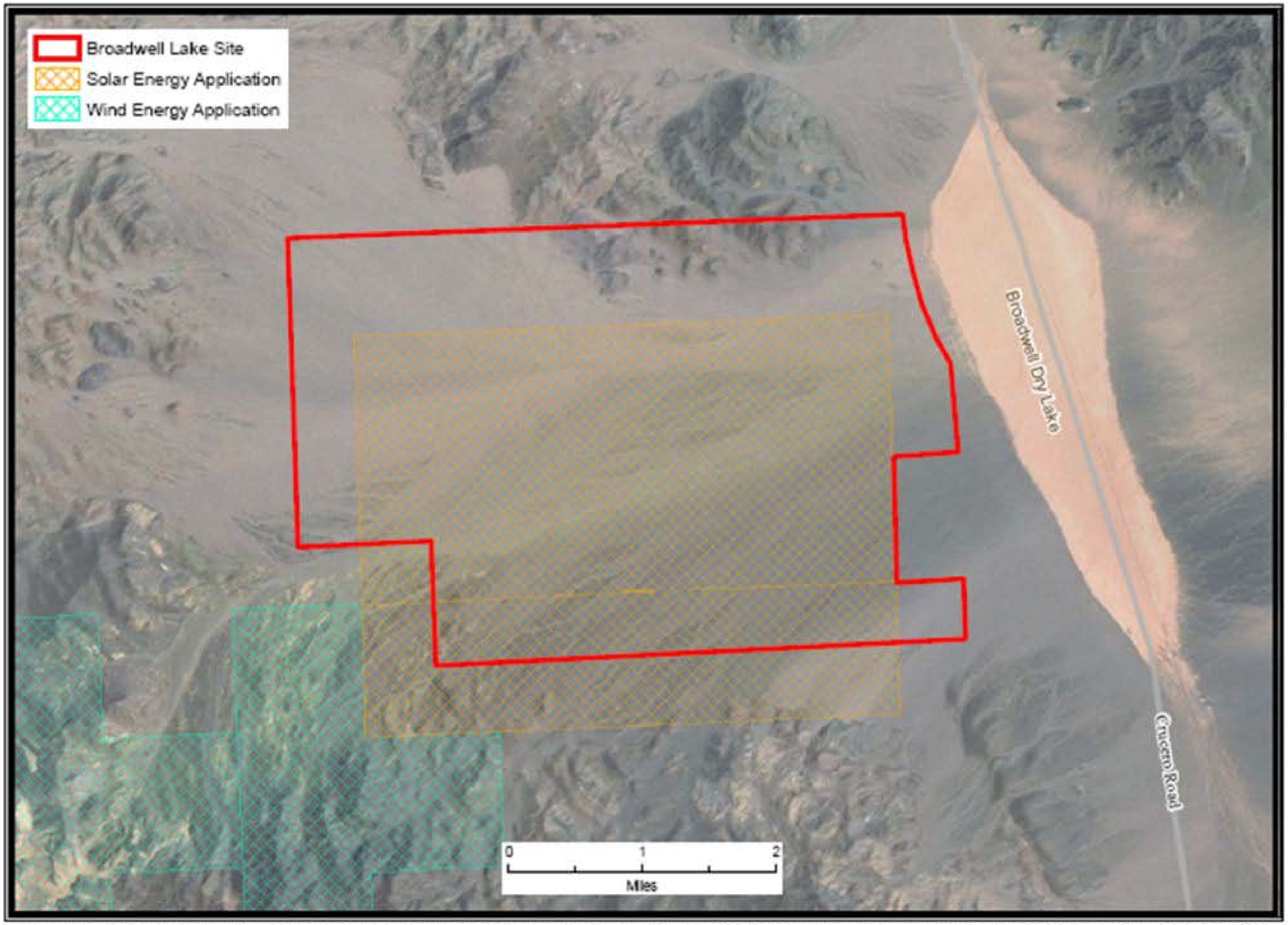


Figure 3-17
ISEGS – Siberia East Alternative



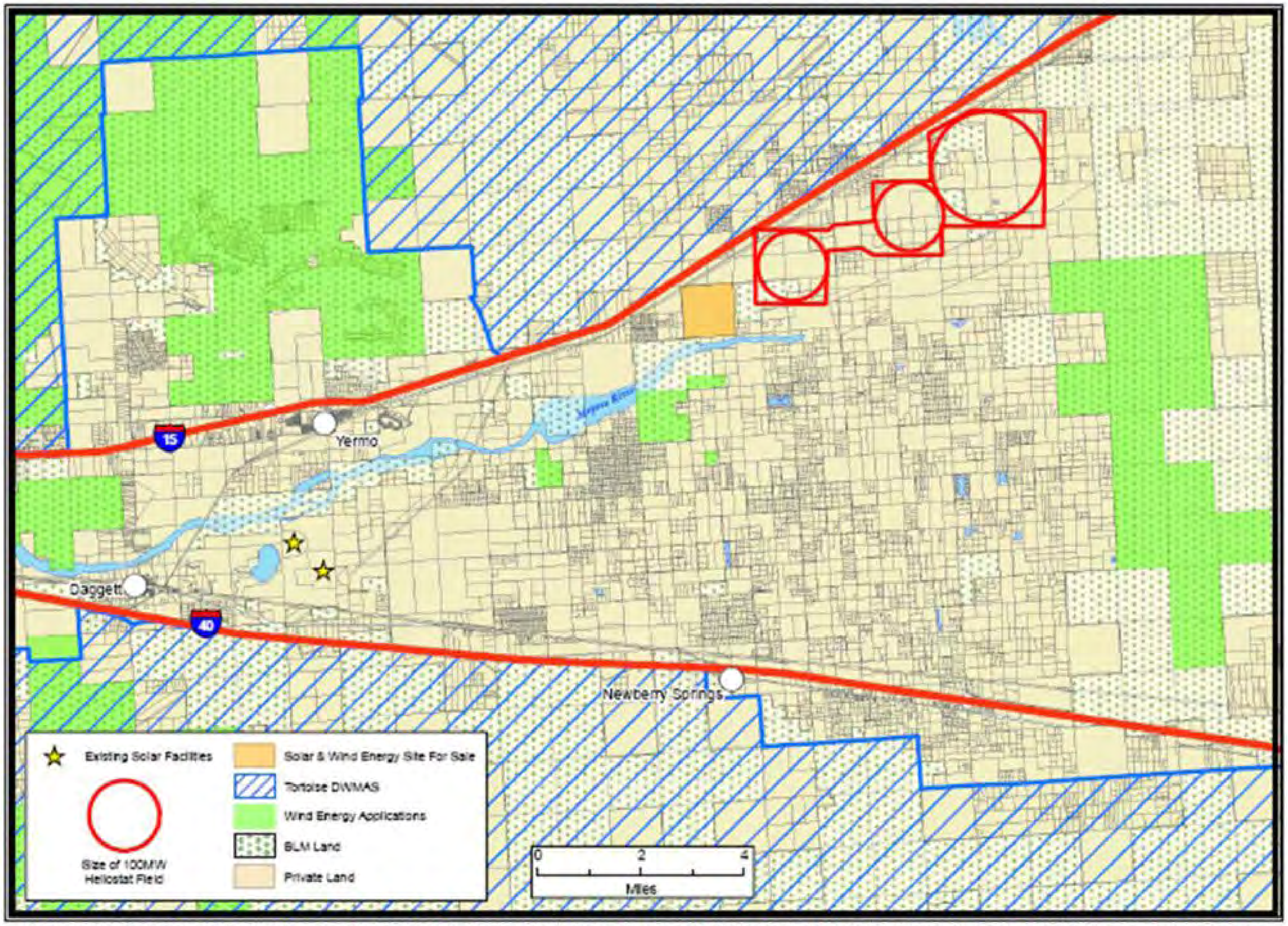
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: BLM, 2008

Figure 3-18
ISEGS – Broadwell Lake Alternative



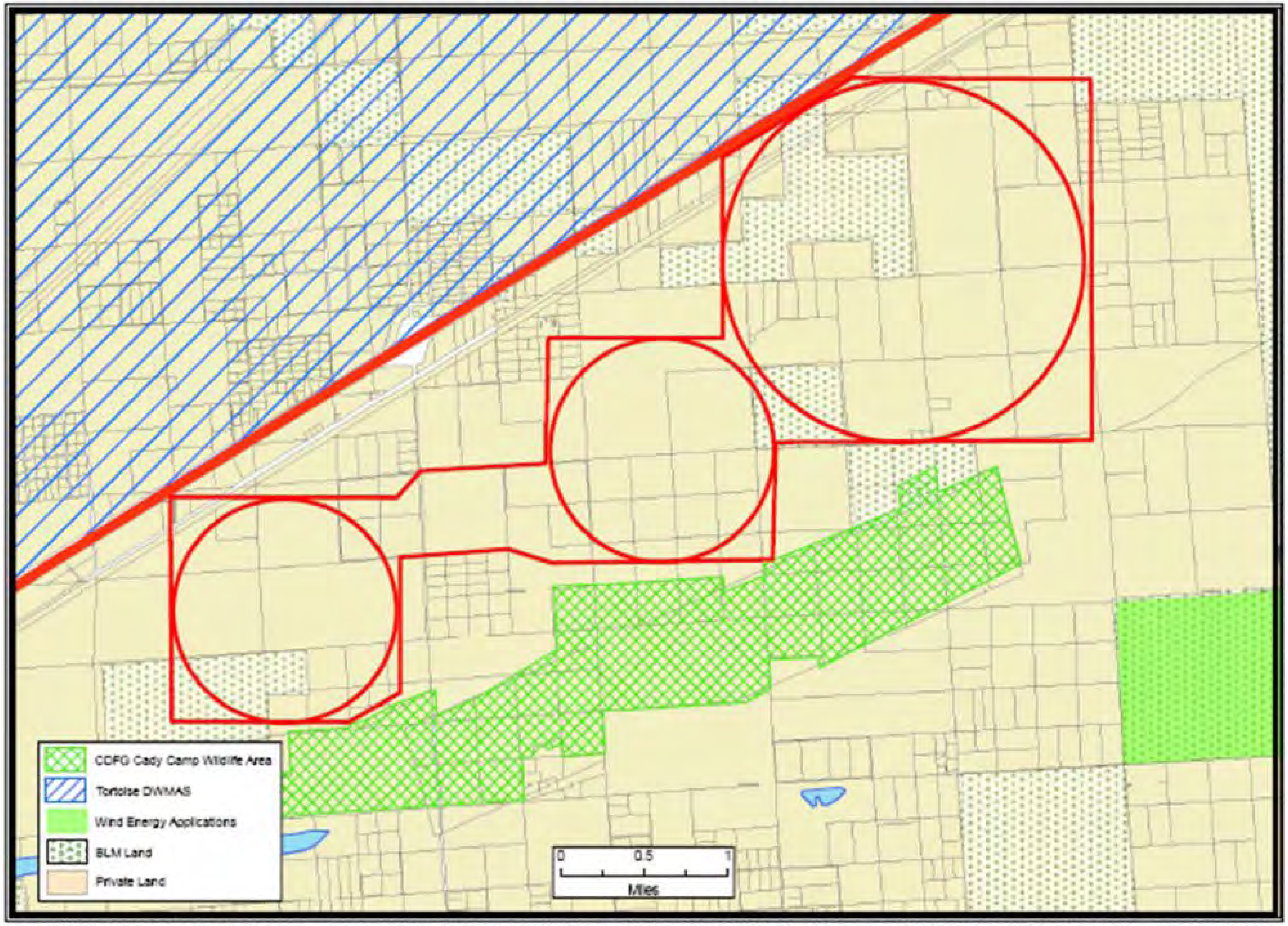
U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: BLM, 2008

Figure 3-19A
ISEGS – Private Land Alternative



U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

Figure 3-19B
ISEGS – Private Land Alternative Detail

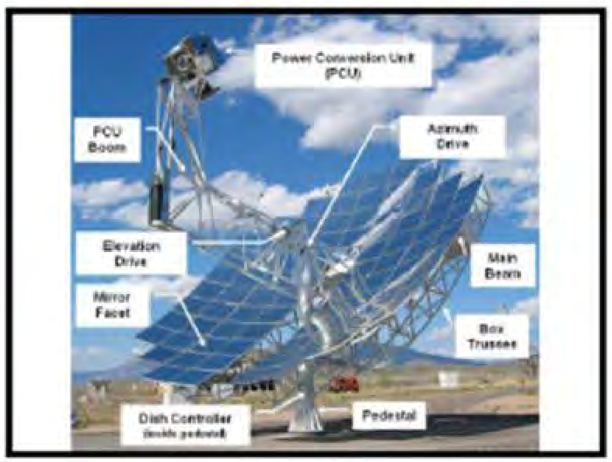


U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: California Energy Commission - Tele Atlas Data - San Bernardino County

Figure 3-20
ISEGS – Solar Generation Technologies

Parabolic through technology as used in Daggett, CA

Parabolic through technology in a 64 MW field
(Nevada SolarOne in Boulder City, NV)



Stirling Dish

U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE:Sunray Energy, Inc., SolarOne website, Stirling Energy Systems website

Figure 3-21
ISEGS – Linear Fresnel and Photovoltaic Technologies

Linear Fresnel Technology

First Solar's thin film solar photovoltaic field

Canon Solar Partners proposes to use the 35 kW Amonix System

SunPower's PowerTracker Solar in Gwangju City Power Plant, South Korea - 1 MW

U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION, OCTOBER 2009
SOURCE: Wikipedia.org, Fresnel_reflectors_ausra.jpg, www.optisolar.com/topaz.htm, Canon 2008, www.sunpowercorp.com/For-Power-Plants.aspx

5.0 Cumulative Effects

Introduction

Preparation of a cumulative impact analysis is required under NEPA. “Cumulative impact” is the impact on the environment that results from the incremental impact of the proposed project when considered with other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such other actions (40 CFR §1508.7). Cumulative impacts analysis is intended to highlight past actions that are closely related either in time or location to the project being considered, catalogue past projects and discuss how they have harmed the environment, and discuss past actions even if they were undertaken by another agency or another person. Most of the projects discussed in this section have, are, or will be required to undergo their own independent environmental review under either CEQA or NEPA.

Under NEPA, an EIS must provide a sufficiently detailed catalogue of reasonably foreseeable future projects, and provide an adequate analysis of how these projects, in conjunction with past and present projects and the proposed action, are thought to have impacted or are expected to impact the environment. NEPA is designed to inform decision making and through disclosure of relevant environmental considerations, permit informed public comment.

Methodology

The first step in the analysis of cumulative effects associated with the proposed project and alternatives is the identification of the full range of past, present, and reasonably foreseeable projects that may require consideration within each resource-specific analysis. This is done in Section 5.1 below. Then, this section evaluates the cumulative impacts for each resource area, following these steps:

- Define the geographic and temporal scope of cumulative impact analysis, based on the potential area within which impacts of the ISEGS project and its alternatives could combine with those of other projects, and the known or expected timing of the other projects.
- Evaluate the effects of the ISEGS project and its alternatives, in combination with past and present (existing) projects within the geographic and temporal scope.
- Evaluate the effects of the ISEGS project and its alternatives with foreseeable future projects that occur within the area of geographic effect and temporal scope.

Geographic and Temporal Scope of Cumulative Analysis

The area of cumulative effect varies by resource. For example, air quality impacts tend to disperse over a large area, while traffic impacts are typically more localized. For this reason, the geographic scope for the analysis of cumulative impacts must be identified for each resource area. The analysis of cumulative effects considers a number of variables including geographic (spatial) limits, time (temporal) limits, and the characteristics of the resource being evaluated. The geographic scope of each analysis is based on the topography surrounding the ISEGS project and its alternatives, and the characteristics of each resource.

In addition, each project in a region will have its own implementation schedule, which may or may not coincide or overlap with the ISEGS project's schedule. This is a consideration for short-term impacts from the ISEGS project. The cumulative analysis includes an evaluation of the likely timeframe of implementation of future projects.

Evaluation of Past and Present Conditions

For each resource area, the affected environment, as discussed in Section 4, is assumed to represent the cumulative effect of past projects in the region. For example, the establishment of baseline toxic air pollutant concentrations in Section 4.1 represents the cumulative impact of past and current air emissions sources in the region, and is the baseline from which impacts of the proposed project, and other reasonably foreseeable future projects, could add.

Project Effects in Combination with Foreseeable Future Projects

The discussion of impacts within each resource area evaluates the impacts of the proposed project and its alternatives on top of the current baseline—the past, present (existing), and reasonably foreseeable or probable future projects within the geographic scope. Reasonably foreseeable projects that could contribute to the cumulative effects scenario depend on the extent of resource effects, but could include projects in the immediate Ivanpah area, as well as other projects in the region.

Analysis of Cumulative Impacts

The analysis presented for each resource area describes the geographic area of effect for that discipline and the potential cumulative effects of the ISEGS project and its alternatives with the other existing and reasonably foreseeable or probable future projects defined on the tables and maps presented in this section. Where impacts are identified, BLM identifies a measure to avoid or minimize environmental harm.

5.1 Past, Present, and Reasonably Foreseeable Actions

Table 5-1 lists the existing projects in the Ivanpah Valley area which have historically contributed to cumulative impacts to environmental resources at issue in the proposed ISEGS project and alternatives, and **Table 5-2** summarizes the reasonably foreseeable future projects in the area. The locations of these projects, with respect to the proposed ISEGS facility, are shown in **Figure 5-1**. In general, it is assumed that the projects and developments in close proximity to the proposed project and its alternatives are those most likely to contribute to adverse cumulative impacts, and those further away are less likely to contribute to those impacts. Therefore, this section also provides a detailed description of those projects located in Ivanpah Valley

Table 5-1
Existing Projects in the Ivanpah Valley

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
1	Bighorn Electric Generating Station	Primm, Nevada (approximately 4 miles northeast of the proposed project)	Reliant Energy Wholesale Generation, LLC	Existing, producing energy since 2004	Operating 570 MW natural gas power plant, uses dry cooling system	Land Use, Air Quality, Greenhouse Gases, Hazardous Materials, Waste Management, Public Health, Visual Resources, Transmission Line Safety and Nuisance
2	Primm Casinos: Buffalo Bill's, Primm Valley, Whiskey Pete's	I-15 at state line, NV 31900 Las Vegas Blvd. South. Primm (approximately 4 miles northeast of the proposed project)	Terrible's Primm Valley Casino Resorts (MGM Mirage)	Existing, undergoing renovation	Two existing Resort and Casinos and one existing Hotel and Casino	Land Use, Traffic and Transportation, Socioeconomics, Recreation, Visual Resources
3	Primm Valley Golf Course	3 miles south of state line in California, (less than one mile from project site)	Terrible's Primm Valley Casino Resorts (MGM Mirage)	Existing	Existing golf course located south of the California/Nevada border along I-15, opened in 1997, approximately 22-acres	Land Use, Recreation, Socioeconomics, Soil and Water
4	Primm Outlet Mall	Primm, Nevada 32100 Las Vegas Blvd. S. Primm, NV (approximately 4 miles northeast of the proposed project)	Fashion Outlets (MGM Mirage)	Existing since 1998	Existing shopping outlet with over 100 stores. Connected to the Primm Casinos by monorail, approximately 359,000 square feet of leasable area and 1,600 parking spaces. More than one million vehicles pass the Fashion Outlets per month.	Land Use, Traffic and Transportation, Socioeconomics, Recreation, Visual Resources

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
5	Recreation Activities	Ivanpah Dry Lake (approximately 1 mile from proposed project)	BLM	Ongoing	Approximately 200 casual use permits are issued annually (these cover between 1 individual to 6 individuals) and approximately 5000 annual visitors. Approximately 12 Permitted and Organized events occur on the Dry Lake annually on both east and west sides. (Approximately 50% of these permitted and organized events occur on the west side and 50% on the east side, although the largest of the events tend to occur on the east side of the Dry Lake.) Permits are also given out that include use of both sides. Examples of such events include: • Archery events • Kite buggying • Land Sailing	Recreation, Land Use, Socioeconomics, Traffic and Transportation
6	Molycorp	Mountain Pass, Sulphide Queen Property	Molycorp Minerals	Ongoing, expected to continue until mid-2020.	Existing mining operation on Mountain pass, property was acquired by Molycorp in 1950 and has been mined since, Molycorp was acquired by Unocal in 1977, which was acquired by Chevron-Texaco in 2005. In 2009, the facility was acquired and became Molycorp Minerals, LLC.	Land Use, Geology, Paleontology, and Minerals, Socioeconomics, Traffic and Transportation, Soil and Water, Biological Resources, Visual Resources, Hazardous Materials, Waste Management, Worker Safety, Air Quality, Public Health

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
7	Colosseum Mine	12 miles west of Primm, Nevada (approximately 6 to 7 miles from Ivanpah site)	Lac Minerals	Inactive – as of early 1990s. Remedial action undergone.	Mining facilities occupied approximately 1,000, now located in the Mojave National Preserve.	Soil and Water, Waste Management, Air Quality
8	Clark Mountain and Crescent Peak Allotment 10 Year Lease CA-690-EA06-25	Northern Clark Mountain Range (surrounds the proposed project)	Allotment #09003	Ongoing	Grazing Lease. Project would remove 4,065 acres of Clark Mountain Grazing Allotment.	Livestock Grazing, Land Use, Biological Resources, Socioeconomics
9	Molycorp (Now Chevron Environmental Management Company) Evaporation pond	Southeast of the Ivanpah Dry Lake (Approximately 3.25 miles from project)	Chevron	Closed, pending final closure	Pond was used for the disposal of mining-related wastewater from 1988 to 1998. Site is currently undergoing environmental investigation (soil and groundwater), and the owner is awaiting regulatory approval of their plan to cap the pond in place.	Land Use, Soil and Water, Hazardous Materials, Waste Management, Visual Resources, Recreation
10	AT&T Fiber-optic replacement of cables	Along the west side of the Ivanpah Dry Lake and of I-15	AT&T	Environmental Assessment of project was released in July 2008.Project was completed in 2009.	Existing direct buried fiber-optic cable was replaced from Nevada border to the Halloran Summit, including a segment adjacent to the ISEGS project to the west of the Ivanpah Dry Lake. Used existing 10 foot ROW with some temporary larger ROW for where existing cable must be replaced.	Land Use
11	Existing 115-kV transmission line from El Dorado substation (Hoover-to-San Bernardino)	Through Ivanpah SEGS site	SCE	Active	SCE 115 kV ROW is located at ISEGS proposed site. This 115 kV is located in the BLM transmission corridor. An additional BLM corridor is located north of the ISEGS proposed site.	Transmission Line Safety and Nuisance, Visual Resources

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
12	Molycorp (Now Chevron Environmental Management Company) pipeline	Runs from Molycorp south of I-15, through the Mojave National Preserve to the Evaporation pond	Chevron Environmental Management Company	Closed, currently being removed	13-mile long pipeline that runs between the Molycorp mine and the evaporation pond. During summer of 1996, 11 releases were experienced in the 13.mile long pipeline that carries waste discharge to the evaporation pond. With the exception of two minor and localized areas of contamination spill-related material was removed by the fall of 2000. Pipeline and contaminated soils are currently being removed by Chevron.	Land Use, Hazardous Materials, Soil and Water, Waste Management, Biological Resources
13	Jean/Roach Dry Lake SRMA	Large portion (224,931 acres) of the Nevada side of Ivanpah Valley, from north of Jean to California state line.	BLM	Existing	Jean/Roach Dry Lake Special Recreation Management Area provides opportunities for casual use and other types of recreation, including motorcycling, all-terrain vehicle and 4 x 4 driving, horseback riding, mountain biking, small-game hunting, and organized racing events.	Recreation, Biological Resources, Air Quality, Traffic and Transportation
14	Kern River Pipelines	North of Ivanpah SEGS	Kern River	Existing	Natural gas transmission lines	Land Use, Hazardous Materials

Sources: BLM 2006; BLM 2008d; BLM 2008e; BLM 2008f; BLM 2008c; Chevron 2008; Downing 2008; EPA 1992; EPA 1993; Fashion Outlets; Kerns 2008; Lahontan Regional Water Quality Control Board 2001; Terrible's Primm Valley Casino Resorts.

Table 5-2
Future Foreseeable Projects in the Ivanpah Valley Area

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
A	Stateline Solar CACA 48669	Ivanpah, south of Calif./Nevada line T17N/R14E	FirstSolar	Application on file with BLM Needles Field Office	300 MW Photovoltaic 4,160 acres land requested	Land Use, Biological Resources, Visual Resources, Soil and Water, Cultural Resources, Traffic and Transportation, Air Quality, Socioeconomics, Recreation, Air Quality
B	Southern Nevada Supplemental Airport	30 miles South of the McCarran International Airport - Note outline of purple around the project depicts the airport noise compatibility area	Clark County Department of Aviation	Draft EIS was in progress, but suspended June 2010. New reports in June 2010 suggest project on hold.	International Airport to supplement the McCarran International Airport in Las Vegas • 5,934 acre site • 17,000 acre sphere of influence • Adjacent to desert tortoise relocation site	Air Quality, Greenhouse Gases, Biological Resources, Cultural Resources, Hazardous Materials, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water, Traffic and Transportation, Visual Resources, Waste Management, Recreation

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
C	Victorville-Las Vegas High Speed Train	Train along the I-15 between Victorville and Las Vegas	DesertXpress Enterprises	Draft EIS was published in March 2009 and the public comment period ended on May 22, 2009.	DesertXpress would run from Victorville to Las Vegas. It hopes to operational by 2012.On August, 2006, DesertXpress submitted a ROW application to the BLM for portions of the corridor between Victorville and Las Vegas that would be located on BLM land. Two alternative alignments in the vicinity of the east approach to Mountain Pass on Interstate 15 were identified. In November, 2006 BrightSource submitted an application to the BLM for a ROW grant to construct and operate the ISEGS facility. The BLM notified DesertXpress that one of its proposed route segments – Segment 4B – travelled through two proposed solar projects, ISEGS and a proposed solar power plant by OptiSolar, Inc. In January, 2009 BLM sent a letter to DesertXpress, BrightSource, and OptiSolar alerting the parties of the conflict and urging them to consult together to determine if there is a mutually agreeable solution so that the projects could co-exist. As a result of the coordination meetings, DesertXpress developed several potential alternatives to avoid the ISEGS project area.	Land Use, Traffic and Transportation, Biological Resources, Livestock Grazing, Recreation, Visual Resources, Socioeconomics

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
E	Joint Port of Entry CA-690-EA06-01	Between Yates Well Road and Nipton Road, San Bernardino County	CALTRANS, California Dept of Food and Ag (CDFA)	Caltrans submitted a Recreation and Public Purposes Act Lease application to the BLM for the JPOE facility	Joint Port of Entry would include an Agricultural Inspection Facility and a Commercial Vehicle Enforcement Facility located on the north side of Interstate 15 between Nipton Road and Yates Well Road. Total 133 acres.	Traffic and Transportation, Visual Resources, Biological Resources
G	Mixed-use Development	166 acres near Jean, Nevada	MGM Mirage and Jeanco Realty Development, LLC	Demolition of the Nevada Landing Casino as the first phase of the proposed new development to begin in April. Note: On hold due to International Airport plans, will not be replaced at least until building of new airport is begun if not complete.	MGM Mirage announced a joint-venture partnership with two Las Vegas-based developers to turn undeveloped land on both sides of Interstate 15 into a community that features affordable housing, commercial businesses, shops and a new hotel-casino. This would include the demolition of two casinos MGM Mirage currently owns in Jean.	Land Use, Traffic and Transportation, Socioeconomics, Recreation, Visual Resources
H	Clark Mountain and Crescent Peak Allotment 10 Year Lease CA-690-EA06-25	Northern Clark Mountain Range	Allotment #09003	In Progress	Grazing Lease	Livestock Grazing, Land Use, Biological Resources, Socioeconomics

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
I	Ivanpah Energy Center	Primm, Nevada	Diamond Generating Corporation	Construction was to begin in the first quarter of 2006. No construction currently taking place	500 Mw gas-turbine combined-cycle power plant	Land Use, Air Quality, Greenhouse Gases, Hazardous Materials, Waste Management, Public Health, Visual Resources, Transmission Line Safety and Nuisance
J	PPM Wind energy power plant CACA 44988	Mountain Pass T15N/R14E R151/2N/R14E	PPM Energy	Application received 10/15/02 & 08/04/06 Testing & monitoring – 2nd Term	75 Mw wind energy project 2,330 acres Military: Red	Land Use, Biological Resources, Transmission Line Safety and Nuisance, Visual Resources
M	Power Partners SW Solar Application NVN 86156	West of Jean, NV.	Power Partners Southwest LLC	Application received 9/19/09, additional information requested by BLM.	Solar Power Plant to generate 250 MW, located on approximately 10,814 acres near Jean, NV.	Land Use, Biological Resources, Visual Resources, Soil and Water, Cultural Resources, Traffic and Transportation, Air Quality, Socioeconomics, Recreation, Air Quality
N	Eldorado-Ivanpah Transmission Project	Along northern transmission lines of Southern California Edison (SCE)	SCE	Project filed June 2009, Draft EIS published April, 2010	Construct a new Ivanpah Substation sized to accommodate 220 / 115 kV facilities. Remove approximately 36 miles of a portion of the Eldorado-Ivanpah leg of the existing Eldorado-Baker-Cool Water - Dunn Siding - Mountain Pass 115 kV line and construct a double circuit 220 kV line.	Transmission Line Safety and Nuisance, Cultural Resources, Visual Resources, Air Quality

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
O	Mixed Use - Recreation	Ivanpah Dry Lake	BLM	Numbers are approximate for annual use. The use is expected to continue into the foreseeable future.	Approximately 200 Casual Use permits are issued annually (these cover between 1 individual to 6 individuals). Approximately 12 Permitted and Organized events occur on the Dry Lake annually on both east and west sides. (Approximately 50% of these permitted and organized events occur on the west side and 50% on the east side, although the largest of the events tend to occur on the east side of the Dry Lake.) Permits are also given out that include use of both sides. Annual dry-sailing and buggy events include: • Ivanpah Playa Commercial Landsailing Tours • Land sailing and wind buggy regatas	Recreation
P	New fast food restaurant	Primm, NV	Unknown	In permitting process, application received by the Clark County permitting office 2/7/08	Fast food restaurant to be built adjacent to the Primm Outlet Mall (32100 S. Las Vegas Blvd.)	Traffic and Transportation

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
Q	Silver State Solar	Just south of Primm, Nevada, on the California/ Nevada border	NextLight Renewable Power, LLC	Application in to the Las Vegas BLM Field Office	Two solar power plants are proposed by NextLight Renewable Power, LLC at the Nevada/California border. One is a 250 MW solar trough project on approximately 2,500 acres (Serial number NVN 085801). Construction expected to take 32 months.	Land Use, Biological Resources, Visual Resources, Soil and Water, Cultural Resources, Traffic and Transportation, Air Quality, Socioeconomics, Recreation, Air Quality
Q	Silver State Solar	Just south of Primm, Nevada, on the California/ Nevada border	NextLight Renewable Power, LLC	Application in to the Las Vegas BLM Field Office	Two solar power plants are proposed by NextLight Renewable Power, LLC at the Nevada/California border. One is a 500 MW solar trough project on approximately 4,700 acres (Serial number NVN 085077).	Land Use, Biological Resources, Visual Resources, Soil and Water, Cultural Resources, Traffic and Transportation, Air Quality, Socioeconomics, Recreation, Air Quality
R	Cogentrix NVN 083083 and 083129	East, southeast of Jean, NV.	Cogentrix Solar Services LLC	Application received 1/18/07, additional information requested and received	Solar thermal energy facility for approximately 9.760 acres and 19,840 acres respectively. Mining claims identified in the same area.	Land Use, Biological Resources, Visual Resources, Soil and Water, Cultural Resources, Traffic and Transportation, Air Quality, Socioeconomics, Recreation, Air Quality

ID #	Project Name	Location	Ownership	Status	Project Description	Potentially Affected Resources
S	Southern Nevada Regional Heliport	North of Jean	Clark County Department of Aviation	BLM issued Finding of No Significant Impact in March 2008.	Permanent disturbance of 236 acres	Air Quality, Greenhouse Gases, Biological Resources, Cultural Resources, Hazardous Materials, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soil and Water, Traffic and Transportation, Visual Resources, Waste Management, Recreation
	CalNev Pipeline upgrades and additional line in same ROW	On east side of I-15	Kinder Morgan	In environmental review	Petroleum fuel transportation pipeline	Land Use, Hazardous Materials

Sources: BLM 2008d; BLM 2008e; BLM 2008f; CALTRANS 2008; CPUC 2008d; Chevron 2008; DOE 2003; DesertXpress high Speed Train 2008; Downing 2008; Federal Railroad Administration 206; Kerns 2008; NextLight Renewable Power LLC 2008; OptiSolar 2008; Southern Nevada Supplemental Airport 2008; Non-Interference Agreement by and between BridghtSource Energy, Inc. and DesertXpress Enterprises, LLC.

5.1.1 Future Foreseeable Project Descriptions

Projects that are expected to be most significant in terms of cumulative impacts are those which have the following characteristics:

- Those in closer proximity are expected to contribute to cumulative impacts to a greater degree than those farther away.
- Those of larger scale are expected to contribute to a greater degree than smaller-scale projects.

In general, projects in Ivanpah Valley, California, and Ivanpah Valley, Nevada, are more likely to contribute to cumulative impacts than those located outside of the valley. Therefore, this section provides a more detailed discussion of the features and impacts of those reasonably foreseeable future projects that could contribute cumulative impacts to those of the ISEGS, including:

- Eldorado – Ivanpah Transmission Project;
- Stateline Solar (FirstSolar);
- DesertXpress Rail Facility;
- NextLight Solar -- Silver State Solar North and Silver State Solar South;
- Southern Nevada Supplemental Airport -- Ivanpah Valley Site; and
- Southern Nevada Regional Heliport.

Eldorado – Ivanpah Transmission Project

SCE intends to upgrade the Eldorado – Ivanpah segment of its existing 415-amp, 115-kV Eldorado – Mountain Pass Transmission Line to 220-kV service. The existing transmission line originates at Eldorado Substation near the City of Boulder City, crosses the McCullough Range, and crosses Ivanpah Valley near the ISEGS Project site. The line originally was constructed in 1931 within a 100-foot-wide ROW on steel H-frame lattice structures with a nominal height of 55-feet (Lorenzo 2006). Reconstruction of the line would be within the existing ROW. Therefore, additional lands necessary for the project would be minimal.

The BLM and CPUC published a Notice of Availability of the Draft EIS/EIR on May 7, 2010. In the Draft EIS/EIR, BLM and CPUC identified major, adverse, and unavoidable impacts to aesthetics and visual resources. For all other resource areas, impacts were determined to either be less than significant, or, for CEQA purposes, reduced to a less than significant level with mitigation measures. However, impacts to these other resources could potentially contribute to cumulative impacts in combination with the Ivanpah SEGS and other projects.

The Draft EIS/EIR identified the following cumulative impacts:

- The degradation of existing visual character or quality would be adverse during construction, and moderate during operations due to a moderate change in color of the landform and moderate contrast with existing structures.

- Temporary ambient air quality impacts caused by construction would contribute substantially to an air quality violation, and would be adverse.
- Temporary emission increases of NOx, VOCs, and PM10 during construction would contribute to a net increase of a criteria pollutant in a non-attainment area.
- The project, in conjunction with other projects, would result in cumulative impacts on native vegetation communities, including cacti and yucca species, and would adversely affect special management areas due to temporary and permanent habitat loss.
- The direct or indirect loss of listed or sensitive wildlife and associated habitat, including desert tortoise, would be adverse. This includes the contribution of the project to cumulative impacts to movement corridors and migratory paths.
- The lowering of a water table or interference with aquifer recharge, when combined with groundwater use by Primm and the Primm golf course, would be adverse. This includes both short-term use of water for construction, as well as the project's contribution to increased long-term water consumption.
- Construction-related traffic would contribute incrementally to an adverse cumulative impact on traffic load and capacity, including Level of Service of I-15 on Friday afternoons and evenings.

In the ISEGS DEIS, BLM presented a section titled "Cumulative Analysis of SCE Transmission Upgrades", beginning on Page 5-19. That analysis was based on the only information available at the time, which was SCE's Proponent's Environmental Assessment (PEA). Since that time, BLM and CPUC have published the Draft EIS/EIR for the EITP project. The Draft EIS/EIR is based on updated project description information, and includes a revised analysis of the project's direct, indirect, and cumulative impacts. Therefore, the Draft EIS/EIR supersedes the "Cumulative Analysis of SCE Transmission Upgrades", as presented in the ISEGS DEIS, and that section has not been included within this FEIS. Instead, the information in the EITP Draft EIS/EIR has been incorporated into the cumulative analysis in this section of the ISEGS FEIS.

Stateline Solar (FirstSolar)

The Stateline Solar facility would be constructed using thin film PV technology at a location that was originally to be developed by Gen 3 Solar and more recently by Optisolar. Stateline Solar is located west of I-15, south of the Nevada/California state line, and adjacent to the proposed ISEGS facility. The project would be constructed as a series of movable photovoltaic panels within the 4,168 acres and would be rated at 300 MW. Construction of Stateline would be completed during 2015 and construction would not be expected to coincide with that of the ISEGS.

Impacts to air quality would be limited to increased airborne PM10 during and following construction as a result of soil disturbance and lack of vegetation. Construction impacts to biological resources are expected to be similar to those associated with ISEGS as both projects would occupy and fragment comparable acreages on the bajada that provide habitat for desert tortoise and avian and terrestrial species. Impacts to cultural resources would be avoided or mitigated. The loss of 4,168 acres of public lands would adversely affect recreational opportunities within the project site. Recreation use losses would be largely limited to casual uses rather than organized activities. Installation of solar PV panels within 4,168 acres would decrease the availability of permeable soils within the area and increase stormwater runoff. Runoff and related sediment transport also would increase as a result of reduced vegetation. Increased runoff likely would affect Ivanpah Dry Lake during stormwater runoff events. Development of the project site would result in visual impacts within an area that presently consists of undeveloped desert. Project construction would likely require grading, which could impact previously unknown cultural resources within the project area. The project would also result in impacts to traffic on I-15 from increased trips associated with construction workers and deliveries. These impacts would be much less during operations due to the much lower number of workers.

DesertXpress Rail Facility

DesertXpress Enterprise is proposing to construct and operate a high speed rail system between Victorville, California, and Las Vegas, Nevada, a distance of approximately 180 miles. The facility would operate at speeds up to 150 miles per hour on either diesel electric power or electric power supplied through overhead centenary lines.

Feasibility of the project is based on proven steel-wheel technology, relatively flat terrain, relatively straight ROW, and availability of public lands. Tentative plans call for construction of the rail line parallel and adjacent to the I-15 corridor; the rail line would extend through Ivanpah Valley, California, and Ivanpah Valley, Nevada, with possible stops in Primm and the proposed Southern Nevada Supplemental Airport Ivanpah Valley site. A 40-mile-long, 500-foot-wide corridor has been assumed for analysis purposes. Project benefits would:

- reduce the use of fossil fuels;
- reduce car, bus, and airplane exhaust emissions;
- relieve overcrowded McCarran Airport;
- reduce traffic demand on I-15;
- reduce highway travel time and stress;
- reduce highway accidents;
- avoid the need to widen 150 miles of I-15;
- enhance rail facilities in southern California; and
- provide construction jobs.

DesertXpress is in the planning phase of development, and the route and construction dates have not been established. Currently, two routes are under consideration. The preferred alternative would be aligned with I-15 and pass east of ISEGS, but would thus go through the Mojave National Preserve. The alternative route would pass along the base of the mountains west of ISEGS, and would then require a tunnel to exit on the west side of the Clark Mountain Range.

It is likely that ISEGS would be in full operation prior to construction of DesertXpress and cumulative impacts associated with construction of the two projects are not anticipated. The cumulative impact of the operation of the two facilities would vary depending on the route selected for DesertXpress.

DesertXpress is expected to result in a beneficial reduction of traffic on I-15. The project also is expected to result in beneficial impacts to air quality and traffic safety as a result of reduced motor vehicle use along the interstate. Reduced air pollution from vehicles on I-15 would result in partially off-setting air quality impacts from the ISEGS, Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport.

Development and operation of DesertXpress would adversely impact visual resources in Ivanpah Valley and contribute the cumulative degradation of visual resources in the area. Motorists travelling north along I-15 would be visually impacted by the presence of the rail system and ISEGS in the same viewshed. Similar visual impacts would result from construction in Ivanpah Valley, Nevada, where views already have been degraded by casinos and retail facilities in Primm and Jean, and the Bighorn Generating Facility. Additional visual impacts would result from the Silver State North and South facility, the Southern Nevada Supplemental Airport, and the Southern Nevada Heliport. As a whole, impacts from existing facilities, ISEGS, and other reasonably foreseeable future projects would result in adverse cumulative visual impacts. Similar adverse cumulative impacts would result from views from the recreational use areas in the Clark Mountains and Mojave National Preserve.

DesertXpress would have little or no impact on night sky views. Therefore, there would be no cumulative impacts to night sky resources.

DesertXpress would require use of public lands in Ivanpah Valley. An undetermined amount of relatively undisturbed desert habitat would be eliminated due to rail construction which would result in direct and indirect impacts to desert tortoise and other terrestrial species. ROW across the playa floor would result in minimal impacts to habitat due to a lack of vegetation. However, impacts likely would contribute to adverse cumulative impacts associated with the ISEGS Project and other foreseeable future projects.

DesertXpress would contribute to cumulative impacts to recreational resources. Installation of the rail line would block public access to public lands along some areas, and some land that would otherwise be available for public use would be lost.

DesertXpress would not affect cultural resources, but would minimally affect geology and soils, surface waters, and groundwater in the area.

NextLight Solar – Silver State Solar North and Silver State Solar South

NextLight Renewable Power LLC proposes to construct two adjoining solar photovoltaic facilities in Ivanpah Valley, Nevada. Silver State Solar North and Silver State Silver South would be east of Primm, north of the Nevada/California state line, and east of the proposed Southern Nevada Supplemental Airport Ivanpah Valley project site and the existing Bighorn Generating Facility. Silver State North and Silver State South would produce a total combined output of 400 MW and would occupy a total of more than 8,300 acres that are located on the bajada originating from the Lucy Gray Mountains.

A construction date has not been established; however, it is likely that construction of the Silver State projects would coincide with that of the ISEGS project. Therefore, construction impacts of both projects could be cumulative.

BLM published a Draft EIS for the Silver State projects in April, 2010. The Draft EIS identified the following cumulative impacts:

- Air Quality could be impacted as a result of particulate emissions from the overlap of construction of the Silver State projects with the EITP project and the CalNev pipeline project.
- Groundwater use could be impacted, from the combination of water use from the Silver State projects with those of the Primm casinos, Primm Golf Course, Molycorp mine, and Ivanpah SEGS.
- Unavoidable adverse impacts to vegetation and habitat loss would occur, in combination with the Southern Nevada Supplemental Airport, EITP, and Ivanpah SEGS.
- The proposed action would provide 8,373 acres of loss of habitat for desert tortoise to a total of 52,950 acres of habitat that would be lost due to the combination of the proposed action, Southern Nevada Supplemental Airport, DesertXpress, Ivanpah SEGS, and other projects in Ivanpah Valley in California and Nevada.
- Unavoidable visual resource impacts would occur.
- Changes in access to recreational resources would create unavoidable, unmitigable impacts.
- The impact of the Silver State projects and other projects on traffic on Interstate 15 would be adverse.

Adverse visual impacts would likely occur as large expanses of relatively undisturbed desert would become industrialized through the installation of photovoltaic panels, access roads, and support facilities. Those facilities cumulatively would contribute to visual impacts from the proposed ISEGS project, largely because Silver State Solar South and Silver State Solar North would be within 4 to 8 miles from the ISEGS site. Existing visual impacts within the area would be compounded by the Bighorn Generating Facility and casinos and retail facilities at Primm. Impacts would be further compounded with foreseeable future projects such as DesertXpress and the Southern Nevada Supplemental Airport.

The project would eliminate 8,373 acres of habitat for the desert tortoise and nearly all other terrestrial and avian species. Vegetation would be mechanically removed and controlled in a manner that would be similar to that of the ISEGS Project. The project also would result in habitat fragmentation. Effects of habitat loss and habitat fragmentation from the Silver State projects would be adverse.

Windblown and waterborne erosion likely would take place throughout most of the alluvial fan (7,840 acres). If left unchecked, surface water flows would result in sediment transport and potentially increased volumes of water and sediment to Roach Lake (Nevada). Ivanpah Dry Lake (California) (the site of the ISEGS Project). Ivanpah

Valley, Nevada and Ivanpah Valley, California are not linked by surface hydrology; however, runoff patterns on the alluvial fan indicate that approximately 30 percent of the project area (2,350 acres) flows to Ivanpah Dry Lake in California; 70 percent (5,488 acres) flows to Roach Lake. Therefore, cumulative effects to surface water flows from the Silver State projects would contribute to increased cumulative totals of sediment from Silver State South and ISEGS to Ivanpah Dry Lake (California). Increased sediment flows to Roach Lake (Nevada) also would be increased, but would not be considered as a cumulative impact associated with the ISEGS Project.

Earth moving equipment that would be needed for construction would increase the potential for non-native and noxious weeds in the area. Although they would be monitored and controlled to the extent practicable, it is likely that they would add cumulatively to weed infestation related to other reasonably foreseeable future projects.

The proposed Silver State project sites traditionally have been used for recreational purposes. Portions of the 7,840 acres frequently have been used for off-road races. The cumulative effects of lost recreational acreage in Ivanpah Valley, Nevada, and the lost recreational opportunities due to the ISEGS project could represent an adverse impact to recreational opportunities in the area (NextLight Solar 2010).

The project would not affect cultural resources because potentially affected resources either would be avoided or mitigated. The project would contribute cumulatively to the degradation of Native American Traditional Use Areas. The project would not affect geology or groundwaters in the area; however, mining would be excluded from the area.

The project would also result in impacts to traffic on I-15 from increased trips associated with construction workers and deliveries. These impacts would be much less during operations due to the much lower number of workers.

Southern Nevada Supplemental Airport – Ivanpah Valley Site

Clark County Department of Aviation is proposing the development of a new international airport in Ivanpah Valley. In the *Clark County Conservation of Public Land and Natural Resources Act of 2002* (Public Law [PL] 107-282), "… Congress directed the Secretary of Interior, who acted through the BLM, to establish a corridor between the Las Vegas Valley and the proposed Ivanpah Valley Airport for the placement of transportation facilities and utilities[1] and to transfer an additional approximately 17,000 acres, surrounding the proposed airport site to Clark County, identified as a Noise Compatibility Area (NCA) for the proposed airport[2] after the County has satisfied the conditions for transfer that are described in PL 107-282, Section 501(c)(2). Neither the establishment of the corridor nor the transfer of the NCA shall take effect until after construction of the Airport is approved.[3] The approval referred to is associated with NEPA[4] at PL 106-362, Section 5." Although the EIS is in progress and conceptual plans are not completed, major project elements are well-defined and baseline studies have been largely completed. In June, 2010, new reports were issued stating that the

[1] PL 107-282 at Section 501(b).
[2] PL 107-282 at Section 501(c)(1).
[3] PL 107-282 at Section 501(d).
[4] PL 91-190 (codified as amended at 42 United States Code Sections 4321-4347).

CCDOA had suspended development of this project indefinitely. Therefore, the probability of this project occurring is uncertain. However, because this is very recent information which has not been verified by BLM, the cumulative analysis assumes that the project could continue.

The airport (airport footprint) would occupy approximately 6,000 acres east of I-15, in Roach Lake Playa, between Primm and Jean, Nevada. ``Seventeen thousand acres that are largely on the bajada east, north, and south of the airport footprint have been identified as a NCA. Although such lands could undergo development for facilities that would be compatible with airport operations (air shipping companies, storage companies, etc), Clark County has indicated that the NCA would remain undeveloped. Furthermore, a portion of the 17,000-acre tract provides habitat and supports several populations of white-margined penstemon (*Penstemon albomargenatus*), a species that is being considered for listing as threatened and it is likely that such populations will require protection.

A 0.5-mile-wide Transportation Utility Corridor (TUC) would parallel the east side of I-15 and extend from the northern end of the airport footprint to the southern city limits of Las Vegas, a distance of approximately 20 miles. Facilities in the 6,400-acre TUC presently include the CalNev (Kinder Morgan) Pipeline that brings refined products from southern California to Las Vegas, segments of the Union Pacific Railroad, and two fiber optics communications lines. Tentative plans call for the addition of a Las Vegas Valley Water District water supply line, a dedicated airport access service road, and the DesertXpress rail line.

Three off-site surface water retention basins have been proposed as part of the project to control stormwater flows. The Goodsprings Retention Basin would cover a surface area of approximately 200 acres adjacent to the Desert Tortoise Translocation Area, west of I-15. The Lucy Gray Retention Basin would occupy 185 acres on the bajada northeast of the Lucy Gray Mountains. The North Retention Basin would be located near the northeastern end of the airport footprint and would total approximately 900 acres.

The loss of approximately 1,300 acres for retention basins; 6,000 acres for the airport footprint; and the use of miscellaneous lands would ultimately result in the loss of 6,787 acres of desert tortoise habitat (based on current development projections). Losses would be considerably greater if the NCA (17,000 acres) were to undergo development.

New radar/navigation aid facilities are tentatively planned near Goodsprings and near Nipton. Existing facilities on Table Mountain, at CAG/FAA, and at Nelson Cutoff (Eldorado Valley) may be modified as part of the project. Construction materials for the airport would be excavated from the retention basin sites and from a site near Jean. Approximately 10 acres have been assumed (for evaluation purposes) to be needed for each radar/navigation aid site, including access road(s). An additional 50 acres has been estimated for excavation of construction materials.

When fully constructed, the airport would occupy most of the 6,000-acre footprint and include two runways, a terminal, associated tarmac, parking, access roads, storage tanks, a control tower, and support facilities. I-15 would be modified from the airport to south Las Vegas to accommodate site access, and at least one existing high voltage transmission line (Intermountain 500-kV DC line) would be relocated.

Development of a new international airport in Ivanpah Valley, Nevada, would result in adverse visual impacts within the 6,000-acre airport footprint and access roads along I-15 as views of native desert are transformed to an industrial setting. Visual impacts would result from construction of stormwater retention basins near Goodsprings, Lucy Gray Mountains, and at the north end of the airport footprint, as well as installation of navigational aid (navaid) and radar equipment near Goodsprings. Industrialization of the valley would contribute to adverse cumulative impacts within the area.

An EIS is being prepared with an expected completion date of late 2012. If authorized, construction of the airport would begin in early 2013 and would be completed during 2017. Construction of the airport and ISEGS is not expected to be simultaneous.

Airport construction would require disturbance of more than 7,000 acres, which would increase the potential for the introduction and spread of non-native and noxious weeds. The extent of soil disturbance would be greater than that of the ISEGS and likely would contribute cumulatively to increases in non-native and noxious weeds in the area.

Development of the proposed Ivanpah Valley Airport site would contribute to night sky pollution of ambient light. Although mitigation measures (e.g., reduced light intensity and shielding) would be implemented to the extent practicable, cumulative impacts associated with the ISEGS Project would, as a whole, have far reaching consequences. It is likely that the project would contribute cumulatively with the ISEGS Project, ongoing light pollution from the Las Vegas metropolitan area, and other reasonably foreseeable future projects to affect night sky viewing at Mojave National Preserve and other public places. The project would likely contribute to an adverse cumulative impact resulting from theo degradation of night sky viewing.

Construction of the new airport in Ivanpah Valley would result in direct loss and secondary impacts to relatively undisturbed desert habitat totaling 6,787 acres. More than 7,000 acres would be permanently taken as part of airport construction, creation of surface water retention basins, radar/navaid facilities, access road improvements, and materials excavation sites. Additional lands would be impacted as a result of periodic discharge from the three retention basins. Additional analyses are needed to determine the severity of impacts that would be associated with water releases.

The airport would result in habitat fragmentation and loss of desert tortoise habitat that would contribute cumulatively to impact a species that currently is considered to be threatened as (in part) a result of habitat destruction. Avian and terrestrial species that would be jeopardized by the ISEGS project and other reasonably foreseeable future projects would be further jeopardized by the proposed airport project. Access to water that temporarily would be held at the retention basins and other areas would attract avian wildlife.

Loss of recreational lands within Ivanpah Valley, Nevada, as well lands affected by the ISEGS Project would represent a cumulatively substantial impact to recreational opportunities in the area.

Southern Nevada Regional Heliport

CCDOA plans to construct a new heliport north of Jean. The heliport and ancillary facilities (pumping station, water supply line, power line, and communications line) temporarily would disturb 331 acres; 236 acres would be permanently affected (required) for the project. The project would eliminate desert tortoise habitat and would affect other terrestrial and avian species.

New facilities would be constructed on lands adjacent to Las Vegas Boulevard that are currently unoccupied. The loss of existing desert lands would result in visual impacts to viewers from Las Vegas Boulevard and I-15. Helicopter operations likely would result in adverse noise and night sky impacts due to equipment operations and ambient glare. The magnitude of glare likely would be offset by that present from Las Vegas, Henderson, Sloan, and other sources. Some cumulative impacts from the ISEGS project and the Heliport are expected.

The project would not contribute cumulative impacts to surface or groundwater resources, soils, or geological resources.

BLM issued a Finding of No Significant Impact (FONSI) in March 2008, authorizing construction of the heliport. Although construction has been delayed and a date has not been announced, it is possible that construction would coincide with that of the ISEGS project, and that construction-related cumulative impacts could occur.

5.2 Cumulative Impact Analysis

5.2.1 Air Quality

Much of the discussion of air quality impacts in Section 4.1 is concerned with cumulative impacts. The “Existing Ambient Air Quality” subsection describes the air quality background in northeastern San Bernardino County portion of the Mojave Desert Air Basin, including a discussion of historical ambient levels for each of the assessed criteria pollutants. That section constitutes an evaluation of the cumulative impact of past and present projects on air quality. The “Construction Impacts and Mitigation” subsection in Section 4.1 discusses the project’s contribution to the local existing background caused by project construction. The “Operation Impacts and Mitigation” subsection discusses the project’s contribution to the local existing background caused by project operation. The following subsection includes two additional analyses:

- a summary of projections for criteria pollutants by the air district and the air district’s programmatic efforts to abate such pollution;
- an analysis of the project’s direct operating emissions combined with other local major emission sources;

<u>Summary of Projections</u>

The northeastern San Bernardino County portion of the MDAB is designated as non-attainment for both the federal and State PM10 standards, and for the State ozone standard. PM2.5, CO, NO_2, and SO_2 are all considered to be attainment or unclassified for the federal and State standards.

Ozone

Since a portion of San Bernardino County in the Mojave Desert is currently classified as non-attainment, south and west of the project site, for the federal 8-hour ozone standard, the District is required to prepare and adopt an ozone attainment plan for submittal to the EPA describing how it will achieve attainment with the federal 8hour standard. The project is not specifically subject to the provisions in the federal attainment plan and the site is outside of the non-attainment area.

Particulate Matter

The District is currently classified as nonattainment for the state and the federal 24-hour PM10 air quality standard. The District first adopted a Federal Particulate Matter Attainment Plan (PMAP) in July 31, 1995. However, some experts are critical of the federal standards as not being sufficiently health protective. California has adopted standards that are far more stringent for PM10. Currently, virtually all air districts in the state (the lone exception being Lake County) are designated nonattainment of the state PM_{10} standard. There is no legal requirement for air districts to provide plans to attain the state PM_{10} standard, so air districts have not developed such plans.

In 1997, the federal government adopted PM2.5 standards, as did the state in 2003. The EPA has determined that the area is unclassified, or attainment for both the annual and the 24-hour federal PM2.5 standard. However, the ARB classified the area as nonattainment of the annual state PM2.5 air quality standard.

The PMAP states that "(t)he air quality of the MDAQMD is impacted by both fugitive dust from local sources and occasionally by region-wide wind blown dust during moderate to high wind episodes. This region-wide or “regional” event includes contributions from both local and distant dust sources which frequently result in violations of the National Ambient Air Quality Standards (NAAQS) that are multi-district and interstate in scope." It also states that "(i)t is not feasible to implement control measures to reduce dust from regional wind events." Therefore, the District would have put considerable effort to reduce the emissions from "…unpaved road travel, construction, and local disturbed areas in the populated areas, and certain stationary sources operating in the rural Lucerne Valley."

As a solar power generation facility, the direct air pollutant emissions from power generation are negligible and the emission sources are limited to auxiliary equipment and maintenance activities. With the mitigation required by the recommended mitigation measures and District conditions, it is unlikely that the project would have an adverse impact on particulate matter emissions.

Summary of Conformance with Applicable Air Quality Plans

The applicable air quality plans do not outline any new control measures applicable to the proposed project’s operating emission sources. Therefore, compliance with existing District rules and regulations would ensure compliance with those air quality plans.

Localized Cumulative Impacts

The applicant, in consultation with the District, has conducted a survey of stationary sources that are either under construction, or have received permits to be built or operate in the near future and that have the potential for emissions of criteria air contaminants within six miles of the project site. The survey results indicate that no such sources exist within the 6-miles radius[7] of the proposed project site (CH2M Hill 2008g).

There are several proposed projects near the project site, as presented in **Table 5-2**, including the EITP project, several other renewable energy facilities (solar and wind), the Southern Nevada Supplemental Airport, a high speed train, a new commercial/residential development in Jean, and other long-term projects with minimal air quality impacts, and temporary projects with no long term air quality impacts. In general, most of these projects would create minimal long-term emissions, but construction emissions of the other renewable energy facilities, EITP, the airport, and the large development in Jean will likely have high temporary emissions from construction vehicles and fugitive dust. In the long-term, several of the developments should cause beneficial air quality impacts such as the high-speed train reducing traffic emissions on I-15, and the renewable energy projects reducing emissions associated with fossil fuel-burning power plants.

The expected daily emissions associated with overlapping construction of Ivanpah Units 1 and 2 with construction of EITP are presented in **Table 5-3**. Should construction of other solar projects in the area overlap, their emissions would likely be similar to those of ISEGS.

Table 5-3
Estimated Daily Construction Emissions of Criteria Pollutants for ISEGS and EITP

ISEGS Solar Facility Construction	Daily Emissions (lbs/day) [a]					
	NOx	**SOx**	**CO**	**VOC**	**PM10**	**PM2.5**
Maximum Daily Emissions (assumes overlap of units)	588	7.6	643	81	383	95.7
EITP Maximum Daily Emissions	532	2.1	277	62	619	NA
Total Daily Emissions	1120	9.7	920	143	1002	NA

Source: AFC (CH2M Hill 2007), Data Responses (CH2M Hill 2008f), and EITP DEIS
Notes:
a. Emissions include fugitive dust.

Although construction of each of the reasonably foreseeable future projects would have associated emissions, the required mitigation measures to minimize these emissions would likely be similar for each project, and would ensure that no air quality NAAQS are exceeded. Mitigation Measures **AQ-SC1** and **AQ-SC-7** describe best practices for the construction and operation of the ISEGS desert solar project.

For operations, the EITP and other solar projects in the local area (which are all photovoltaic) would have minimal emissions. Therefore, these projects would not cumulatively add to the direct impacts for ISEGS, which would be mitigated by the Energy Commission staff's proposed Conditions of Certification and the District's permit conditions.

No adverse cumulative air quality impacts are expected after implementation of the Mitigation Measures. Mitigation Measures **AQ-SC1** and **AQ-SC-7** as best practices for the construction and operation of the ISEGS desert solar project.

Alternatives

Similar to the proposed project, both the Mitigated Ivanpah 3 and Modified I-15 Alternatives would generate fugitive dust and vehicle emissions during construction and emissions from the burning of natural gas and operation of maintenance vehicles during operations. The magnitude of these emissions both alternatives would be approximately the same as that for the proposed project, and in approximately the same location. Therefore, the emissions from the alternatives, combined with construction and operations emissions from the past, present, and reasonably foreseeable future projects, would likely contribute to an adverse cumulative impact on air quality. Mitigation measures described for the proposed project would also be applied to the alternatives, and would also likely be applied to future foreseeable projects. These measures would thus reduce the contribution of the project to potential cumulative impacts.

The No Action Alternative would not contribute any emissions to the existing or future conditions.

Summary

The existing condition of air quality that exists today is that the northeastern San Bernardino County portion of the MDAB is designated as non-attainment for both the federal and State PM10 standards, and for the State ozone standard. PM2.5, CO, NO_2, and SO_2 are all considered to be attainment or unclassified for the federal and State standards.

The impact to this baseline from the reasonably foreseeable future projects would be the contribution of additional emissions to the already impacted baseline condition. By generating fugitive dust, vehicle emissions, and natural gas emissions, the ISEGS project would contribute incrementally to that expected future increase in emissions. Because their emissions would be similar, the contribution of the Mitigated Ivanpah 3 and Modified I-15 Alternatives to this cumulative impact would be similar to each other, and to those of the proposed project. However, the No Action Alternative would not contribute to any potential adverse cumulative impact.

5.2.2 Greenhouse Gases

The entire assessment of greenhouse gas emissions in Section 4.2 constitutes a cumulative impact assessment. The proposed project, Mitigated Ivanpah 3 Alternative, and modified I-15 Alternative would emit greenhouse gases, and would also potentially displace greenhouse gas emissions from electricity generation from fossil fuel-based sources. However, neither these emissions, nor the displacement of other emissions, would alone be sufficient to adversely or beneficially impact global climate. Therefore, the evaluation presented in Section 4.2 has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

5.2.3 Biological Resources

Past and current actions have reduced and degraded the plant communities and wildlife habitat within the Ivanpah Valley, and the proposed project would substantially contribute to the loss of biological resources and genetic diversity of special-status species within the valley. Given the project's location on a large portion of the Ivanpah Valley, and in particular, the bajada and alluvial fans that support special-status plant species, it is reasonable to assume that a substantial portion of the suitable habitat for these plants would be affected by construction of the ISEGS project, increasing the threat of local extirpation of the Ivanpah Valley proportion of these species' ranges. The project, combined with future proposed projects, would also adversely affect the population of desert tortoise within the Northeastern Mojave Recovery Unit that occurs in the Ivanpah Valley (Murphy et al. 2007, USFWS 2008a).

Geographic Scope

Cumulative construction impacts to biological resources from ISEGS would be temporary and would require coincidental construction of other large-scale projects within the geographic range of specific species. Long-term cumulative impacts from Project operations would affect biological resources due to habitat loss at various disassociated locations. The geographic range of cumulative impacts associated with ISEGS is largely limited to Ivanpah Valley, California, and Ivanpah Valley, Nevada, due to surrounding mountains.

Past and Present Conditions

Ivanpah Valley California and Nevada has undergone development since the early 1800s, which has resulted in habitat loss and fragmentation. Linear features, such as the San Pedro Los Angeles and Salt Lake Railroad (currently the Union Pacific Railroad [UPRR]) was completed in 1905 and the Arrowhead Trail Highway (currently I-15) effectively have fragmented habitat and eliminated the movement of terrestrial wildlife from major sections of the valley. Development within the area includes population centers of Nipton, Primm, Goodsprings, Jean, and Sloan. Commercial and industrial development includes casinos and retail facilities in Primm and Jean and the Bighorn Generating Facility west of Primm, and the Southern Nevada Correctional Center and the Jean Regional Airport in Jean. Approximately 3,500 acres within Ivanpah Valley, California, and Ivanpah Valley, Nevada, have been developed.

Reasonably Foreseeable Future Conditions

Cumulative impacts associated with construction of the ISEGS would include those related to the Eldorado – Ivanpah Transmission Line, as well as concurrent construction of ISEGS with other solar projects in the area. The ISEGS would eliminate terrestrial habitat for most species within a 3,564- to 4,073-acre area (depending upon alternative). Similar, but temporary, habitat losses would result from construction of the transmission line. Both projects would result in habitat fragmentation, which is exacerbated by the presence of the UPRR and I-15 that effectively block the migration of terrestrial species from east to west. Fragmentation could be exacerbated in a similar manner by the DsertXpress line. ISEGS would result in permanent habitat fragmentation and loss; effects from transmission line construction would result in temporary habitat fragmentation and loss.

As shown in **Table 5-4**, construction and operation of the ISEGS, Stateline Solar, DesertXpress, NextLight Solar, the Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport, would result in an increase of developed land in the local area from the current 3,500 acres to approximately 30,000 acres. Of this additional 26,500 acres, most (approximately 26,000 acres) would comprise habitat for desert tortoise and other wildlife and vegetation species. A small portion of this new development (approximately 613 acres) comprises a portion of the Southern Nevada Supplemental Airport that would be located on portions of Jean/Roach Dry Lake that are not considered to be habitat. Additional existing and proposed land uses potentially impact habitat for desert tortoise and other species, but not to the extent of the impact presented by the solar and airport facilities. For instance, the 224,931-acre Jean/Roach Dry Lake SRMA likely has an impact on wildlife and vegetation species due to off-road vehicle use. However, this impact is not expected to be as severe as the removal, grading, and fencing of areas required for the solar and airport developments.

These developments would create long-term adverse impacts to biological resources in the area. ISEGS would eliminate the vegetation and wildlife habitat covering an area of 3,564 to 4,073 acres, depending upon alternative; Stateline Solar, DesertXpress, NextLight, the Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport would result in the elimination of an additional 22,068 acres of vegetation and wildlife habitat. Therefore, construction of the ISEGS would represent approximately 16 percent of the habitat impacts associated with reasonably foreseeable future projects within the area.

Table 5.4
Habitat Disturbance for ISEGS and Reasonably Foreseeable Future Projects

Project	Total Acres of Habitat	Percent of Current Development	Percent of Total Foreseeable Development
ISEGS	3,564 – 4,073	100 – 120	13
Eldorado – Ivanpah Transmission Line Upgrade	373	10	1
Stateline Solar	4,168	120	14
DesertXpress	2,424	70	8
NextLight Solar	7,840	224	27
Southern Nevada Supplemental Airport	7,400	211	25
Southern Nevada Regional Heliport	236	7	1
Current Development	3,500	---	12
Total	29,505 – 30,014	---	---

Construction and operation of ISEGS, Stateline Solar, NextLight Solar, and the Southern Nevada Supplemental Airport would reduce foraging habitat for the Pallid bat, Townsend's big-eared bat, and golden eagle. Foraging and nesting habitat also would be reduced for Bendire's Thrasher. Cumulative impacts to Nelson's bighorn sheep would result from ISEGS, the Stateline Solar, NextLight Solar, portions of the Southern Nevada Supplemental Airport project, and (possibly) the Southern Nevada Regional Heliport. The proposed project and other action alternatives would affect 3,196 to 4,073 acres; cumulative impacts would total 22,227 to 23,104 acres. Long-legged myotis, western burrowing owl, and gray vireo are not known to be present at the ISEGS Project site and would not contribute to cumulative impacts to the species.

Construction of the ISEGS would eliminate 3,196 to 4,073 acres (depending upon alternative) of habitat that would be used by migratory bird species (see Section 4.3 for list of species) and the desert tortoise. When combined with habitat losses associated with the other reasonably foreseeable future projects (solar projects and the Southern Nevada Supplemental Airport), cumulative habitat losses would total 22,227 to 23,104 acres.

Potential impacts to the gila monster that would result from construction or operation of ISEGS or reasonably foreseeable future projects would be minimal. Those projects that would have the greatest possibility of attributing cumulatively to impacting the species are largely limited to project areas within rocky terrain of the proposed ISEGS project, Stateline Solar, and NextLight Solar. Because these projects are located primarily on the bajadas, each is expected to impact little, if any, terrain that would provide habitat for gila monsters. The DesertXpress, the Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport would be largely located within lower alluvial fans and playa floors, which do not provide habitat for the species.

Alternatives

Construction of the proposed ISEGS Alternative would result in greater impacts to biological resources than would occur as a result of construction of the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative because most of the 4,073-acre project site would be made up of high quality habitat. Reduced project size that is proposed for the Mitigated Ivanpah 3 Alternative would eliminate 433 acres of good quality habitat, thus approximately 3,564 acres would be affected. The Modified I-15 Alternative would include construction within proximity to I-15 and on the playa lake lakebed. Approximately 30 percent (368 acres) of the 1,227-acre Unit 3 Modified I-15 Alternative previously has been impacted by I-15 or is within the playa floor and does not support suitable biological habitat. Therefore, cumulative impacts associated with the proposed project would be greater than those of either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative.

The No Action Alternative would not contribute to the cumulative impacts to vegetation and wildlife habitat.

Summary

The existing condition of biological resources that exists in the Ivanpah Valley area today is that habitat for wildlife and vegetation have been removed and/or fragmented due to human development, including the Primm Casinos, Primm Valley Golf Course, I-15 and other roads, recreational activities, and various transmission lines and pipelines.

The impact to this baseline from the reasonably foreseeable future projects is that additional habitat degradation and fragmentation is expected to occur, with cumulative habitat losses totaling 22,227 to 23,104 acres. Of this total, the proposed ISEGS project would contribute an additional 4,073 acres of habitat disturbance. Loss of 4,073 acres of habitat due to the ISEGS project would contribute to the cumulative loss of Ivanpah Valley's native Mojave Desert plant and wildlife communities, including the threatened desert tortoise and other special-status species. The impact to the baseline from the Mitigated Ivanpah 3 Alternative, in combination with the reasonably foreseeable future projects, would be lower than that for the proposed project, due to the reduction in acreage to 3,564 acres, and the movement of the northern boundary of the facility further from the Clark Mountain Range. Implementation of the Modified I-15 Alternative would reduce these cumulative impacts even further by replacing the use of high quality habitat in the current Ivanpah Unit 3 location with lower quality habitat adjacent to I-15. These adverse cumulative impacts to desert tortoise habitat may be avoided or minimized with appropriate levels of compensatory mitigation, as discussed in Mitigation Measure **BIO-17**. However, the No Action Alternative would not contribute to any potential adverse cumulative impact.

5.2.4 Cultural Resources

Cumulative impacts would occur locally if ISEGS project impacts combined with the impacts of projects located within the Ivanpah Valley. Therefore the geographic extent for the analysis of *local* cumulative impacts is defined as the Ivanpah Valley. The proximity of cultural resources to the ISEGS project would be of interest only to the extent that such proximity would considerably affect the context or integrity of cultural resources. This geographic scope is appropriate because it is likely that cultural resources similar to those in the ISEGS project area of analysis are present throughout this area.

The construction, operation, maintenance, closure, and decommissioning of a number of projects presently proposed and under consideration in the Ivanpah Valley area would result in an adverse cumulative impact on at least one known historical resource, the Hoover Dam-to-San Bernardino transmission line (CA-SBR-10315H), and may further effect other cultural resources of the types now known for the ISEGS project area. The proposed project, along with the effect of the EITP project discussed above, which is the proposed reconstruction by the SCE of approximately 36 miles of the Eldorado leg of the Eldorado-Baker-Coolwater-Dunn Siding-Mountain Pass transmission line, the line which now includes the remaining portion of the original Hoover Dam-to-San Bernardino transmission line, would contribute to an adverse cumulative impact, and the effect of the subject reconstruction on CA-SBR-10315H would be adverse. The subject reconstruction would entail one portion of the Eldorado leg being removed from the proposed project area approximately northeast to the Eldorado Substation. The original proposal of the California ISO was to reconstruct the removed portion of the line to facilitate a higher transmission capacity of 220 kV (CH2M Hill 2008c, pp. ii–iii). There appears to be other plans to modify the Hoover Dam-to-San

Bernardino line, through the project area. The applicant has related that SCE also plans to remove the portion of the transmission line from the project area southwest to the Mountain Pass Substation and to replace it with two, double-circuit, 115-kV pole lines (CH2M Hill 2008n, p. 6). Given that the California ISO assigns approximately 400 MW of the approximately 1,900-MW capacity of the modified transmission line to the proposed project, the contribution of the proposed project to the partial destruction of the Hoover Dam-to-San Bernardino transmission line would be approximately 21 percent.

BLM proposes to offset this adverse impact of the proposed transmission line reconstruction on CA-SBR-10315H through the implementation of Mitigation Measures **CUL-8** and **CUL-9**, measures which are expected to be appropriate to the scale and character of the effect of the proposed project on the subject historical resource. The mitigation proposed in measures **CUL-8** and **CUL-9** would consist of the Historic American Engineering Record (HAER) recordation of the tower types and the cabling system of the portion of the Hoover Dam-to-San Bernardino transmission line that traverses the project area. While the proposed mitigation would result in the recordation of less than the approximate 21 percent share of the destruction to which the proposed project would contribute, the scope of the mitigation reasonably takes into account the likelihood that the historical resource would undergo HAER recordation as a result of the NEPA analysis that the BLM would conduct in conjunction with its planning for and authorization of SCE's modifications to the Hoover Dam-to-San Bernardino transmission line. The mitigation would also be sufficient to compensate for any modifications to the line that would be necessary to accommodate only the proposed project if SCE were to downgrade the scale of the modifications to the line to take into account any of the other presently proposed projects withdrawing from the California ISO queue.

The construction of other projects in the same vicinity as the proposed project could affect *unknown* cultural resources of the types that the ISEGS project would affect. A large number of other projects are proposed and under consideration in the Ivanpah Valley area, and many would involve ground disturbance and visual intrusion. For example, the FirstSolar Stateline project would involve ground disturbance across 4,160 acres of land adjacent to the project site, and construction of the Southern Nevada Supplemental Airport would disturb 5,934 more acres. The use of the 17,000-acre Noise Compatibility Area is unknown, but this area could also be developed, and resources disturbed. Therefore, it appears that the ISEGS project does have the potential to contribute to a cumulative impact in the Ivanpah Valley. However, project proponents for other future projects in the area may be able to avoid causing substantial adverse changes to NRHP-eligible cultural resources through deliberate project planning, or avoid or reduce such impacts to presently unknown cultural resources by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for resources evaluated to be NRHP-eligible. Such avoidance or mitigation of potentially adverse impacts to presently unknown cultural resources would render the potential contribution of the ISEGS project to cumulative impacts on such resources negligible.

Unknown, unrecorded cultural resources may be found at nearly any development site. As they are discovered, resources are recorded and information retrieved. If the nature of the resource requires it, the resource is protected. When discovered, cultural resources are treated in accordance with applicable federal and state laws and regulations as well as in compliance with the mitigation measures and permit requirements applicable to a project. It is not known what cultural resources, if any, would be affected by development of all present and future projects within the Ivanpah Valley, however, it is reasonable to assume that cultural resources exist and could be expected to be uncovered at some of these sites. As would be done during ISEGS construction, should resources be discovered during the construction of current and future projects, they would be subject to legal requirements designed to protect them, thereby reducing the effect of impacts. Therefore ISEGS impacts, when combined with impacts from past, present and reasonably foreseeable projects would not cause adverse cumulative impacts to presently unknown cultural resources.

Alternatives

Because no direct or indirect impacts to cultural resources would be associated with either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts to these resources. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.5 Hazardous Materials Management

The potential for impacts due to a simultaneous release of any of the hazardous chemicals from the proposed ISEGS with other existing or foreseeable nearby facilities, as listed in **Tables 5-1** and **5-2**, was evaluated. Because of the small amounts of the hazardous chemicals to be stored at the facility, there would be no possibility of producing an offsite impact. Also, because no nearby facilities use large amounts of hazardous chemicals, there is little (if any) possibility that vapor plumes would mingle (combine) to produce an airborne concentration that would present a threat. It is unlikely that wastes generated or released at the ISEGS project site would be transported (by wind or surface waters) across intervening mountain ranges.

Alternatives

Because no direct or indirect impacts associated with hazardous materials would result from either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts resulting from hazardous materials management. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.6 Land Use

Ivanpah Valley, Nevada, and to a lesser extent, Ivanpah Valley, California, have undergone development since the 1800s. Population centers in the area include State Line (renamed as Primm), Jean, Sloan, Goodsprings, and Nipton. Commercial and industrial facilities include casinos in Primm and Jean; retail facilities in Primm, Jean, and Goodsprings; and industrial facilities in Jean and west of Primm. The Southern Nevada Correctional Facility and South Clark County Regional Airport are located near Jean. Primm Golf Course is located in Ivanpah Valley, California. Undeveloped lands currently are used for recreational purposes, including organized off-road racing in Nevada. Overall, approximately 5 square miles (3,500 acres) have been developed within the valleys. Additional lands that have been affected by development include mine sites, utility ROWs, I-15, and the UPRR.

Development of the ISEGS, Stateline Solar, DesertXpress, NextLight Solar, the Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport would permanently impact 25,632 to 26,141 acres (40 to 41 square miles) within Ivanpah Valley, California and Nevada (see **Table 5-4**). An additional undetermined amount of land would be temporarily impacted as part of project development. Lands occupied by the ISEGS project (regardless of alternative) would represent approximately 100 to 120 percent of those that currently are developed or 13 percent of those that would be developed in the foreseeable future.

The ISEGS project area would cover portions of Utility Corridors D and BB. To protect the public interest, BLM must optimize the use of utility corridors to best accommodate multiple existing and future projects, minimize adverse environmental impacts, and minimize duplication or proliferation of similar facilities. The establishment of the ISEGS project along with other future foreseeable projects, such as the 4,160-acre FirstSolar photovoltaic project immediately east of ISEGS, could conflict with or eliminate other future uses in the designated Utility Corridors D and BB.

Development of the ISEGS project would preclude and in some cases, unduly restrict existing and future multiple uses such as recreation, wildlife habitat, livestock grazing, and open space on 4,073 acres of public land designated MUC L. Land use impacts of the ISEGS project, when combined with impacts of the other foreseeable projects which will use extensive land area (the solar projects and the Southern Nevada Supplmental Airport), would result in adverse cumulative land use impacts within the Ivanpah Valley which cannot be mitigated.

Construction of ISEGS would contribute to the cumulative modification of project area land uses from one that is dominated by open space and available for casual recreational use to an area that is industrialized. The addition of reasonably foreseeable future projects would further contribute to the industrialization of the area.

Alternatives

The contribution of the Mitigated Ivanpah 3 Alternative and the Modified I-15 Alternative to cumulative land use impacts in the Ivanpah Valley, and southern California desert in general, would be almost exactly the same as those identified for the proposed project. Although the acreage associated with these alternatives would be reduced by approximately 12.5 percent from that of the proposed project, this reduction is not so substantial that it would eliminate the magnitude of the contribution of the ISEGS facility to cumulative land use impacts. The No Action Alternative would not contribute to this reduction in available land use in the area.

Summary

The existing condition of land use that exists in the Ivanpah Valley area today is that a very small portion of the area (approximately 3,500 acres) has been developed, leaving the vast majority of the area available as wildlife and vegetation habitat, for recreational uses, or for other future development.

The impact to this baseline from the reasonably foreseeable future projects is that approximately 22,000 acres of currently undeveloped land would be developed, substantially increasing the amount of land that has been removed from other land uses in the area. The ISEGS project would add an additional 4,073 acres to this cumulative land use impact. The impact to the baseline from the Mitigated Ivanpah 3 and Modified I-15 Alternatives, in combination with the reasonably foreseeable future projects, would be approximately the same as each other, and as the proposed project, at 3,564 acres. The No Action Alternative would not contribute to this reduction in available land use in the area.

5.2.7 Noise and Vibration

Cumulative noise impacts could occur only locally because the ISEGS project impacts cannot combine with impacts of projects beyond this region. The geographic area impacted by cumulative noise impacts is generally limited to areas within approximately one-quarter mile of the ISEGS project. This area is appropriate because noise impacts would generally be localized, mainly within approximately 500 feet from any noise source; however it is possible that noise from different sources within one-quarter mile of each other could combine to create an adverse impact to receptors at any point between the projects. At distances greater than one-quarter mile, steady construction noise from the project would generally dissipate into quiet background noise levels.

Only one of the reasonably foreseeable projects identified in **Table 5-2** would be located near enough to the ISEGS project to pose a potential for cumulative noise impacts. The FirstSolar Stateline project is proposed to be located directly adjacent to the ISEGS site. The nearest sensitive receptor to the ISEGS project is the Primm Valley Golf Course, located approximately 0.5 mile northeast of the site, and one mile from the FirstSolar photovoltaic project. As discussed in Section 4.7, noise generated during construction of the ISEGS projects could reach levels of 50 to 55 dBA Leq at the Primm Valley Golf Course, but such levels are not likely to be annoying to golfers. Noise from the FirstSolar photovoltaic project could combine with noise generated by the ISEGS project. Because doubling the distance from a noise source reduces the sound pressure level by 6 dB, noise from construction of the FirstSolar project would be expected to be roughly 6 dB quieter at the golf course than noise from ISEGS. Combined construction noise from the two projects would thus reach levels of 51 to 56 dB at the golf course, an unnoticeable increase over noise from one project alone. Noise impacts of the ISEGS project would thus not combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to adverse cumulative impacts related to noise.

Alternatives

Because no direct or indirect impacts from noise and vibration would result from either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts from noise and vibration. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.8 Public Health and Safety

Cumulative impacts would occur locally if ISEGS project impacts combined with impacts of projects located within the Ivanpah Valley. For purposes of the cumulative analysis, the emissions from construction or operation of the ISEGS project could potentially combine with emissions from past, present and reasonably foreseeable projects to result in adverse health effects to the public. Cumulative impacts to public health could occur as a result of implementation of the ISEGS project on both a local and regional level. The geographic extent for the analysis of local cumulative impacts associated with the ISEGS project includes the MDAB and the Ivanpah Valley Air Basin (IVAB). The shared nature of air resources warrants consideration of emissions occurring outside of the local air basin (MDAB).

Cumulative Impact Analysis

The applicant requested from the MDAQMD a list of all existing or planned emission sources (with construction permits or in the permitting process) within a 6-mile radius. The information received in response from the MDAQMD indicates that the only existing or planned emission source within six miles of the proposed project is a small existing gasoline dispensing system at the Primm Valley Golf Club. The permit for this source limits ROG/VOC emissions to 0.45 tons per year. Another emission source (the Molycorp Minerals facility) is approximately 6 miles from the proposed ISEGS, but the MDAQMD indicated that almost all equipment is located beyond the 6-mile radius (CH2ML 2008a, Attachment DR11-1). The applicant stated that due to the lack of existing or planned projects within a 6-mile radius for which emission data is available, no cumulative impact analysis would be prepared (CH2M Hill 2008g, Response to Data Requests 11 and 12). BLM has analyzed the public health and safety effects of existing and foreseeable projects listed in **Tables 5-1** and **5-2** as follows.

Local Projects

The maximum cancer risk for emissions from ISEGS is 2.9 in one million located at an isolated area in the adjacent desert with no buildings or residences nearby. The maximum impact location occurs where pollutant concentrations from ISEGS with all combustion sources operating at the same time would theoretically be the highest. Even at the maximum impact location, and in consideration of the existing natural gas-fired Bighorn Electric Generating Station, a proposed natural gas-fired Ivanpah Energy Center, both near Primm, and the proposed FirstSolar photovoltaic electric generation facility east of ISEGS, there would be no change in lifetime risk to any person. The increase does not represent any real contribution to the average lifetime cancer incidence rate due to all causes (environmental as well as life-style and genetic). Modeled facility-related residential risks are lower at more distant locations, and actual risks are expected to be much lower since worst-case estimates are based on conservative assumptions and thus overstate the true magnitude of the risk expected. Therefore, the incremental impact of the additional risk posed by the ISEGS does not present an adverse direct, indirect, or cumulative impact.

ISEGS would minimally contribute to cumulative impacts to public health and safety within Ivanpah Valley. Construction of reasonably foreseeable future projects would increase the likelihood for the release of hazardous materials and increase the potential for exposure of such materials to the public. Due to the complexity and size of the project, the proposed Southern Nevada Supplemental Airport likely would present a greater hazard to public health and safety than that of ISEGS or other reasonably foreseeable future projects. Airport operations would require the presence of de-icing chemicals, lubricants, and fuels. Containment of such substances and cleanup of incidental spills would be incorporated into airport design and minimize such occurrences. Detailed risk assessments would be needed to fully quantify the range and level of risks associated with the airport and other projects. Public health impacts of the ISEGS project would not combine with impacts of any past, present, or reasonably foreseeable projects to result in adverse cumulative impacts. Therefore, no mitigation is recommended to address potential cumulative project impacts.

Alternatives

Because no direct or indirect impacts to public health and safety would be associated with either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts to public health and safety. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.9 Socioeconomics and Environmental Justice

Cumulative impacts would occur locally if ISEGS project impacts combined with impacts of projects located within the Ivanpah Valley. Cumulative impacts could also occur as a result of regional development of large-scale projects. The geographic extent of cumulative impacts related to socioeconomics includes San Bernardino County, California and Clark County, Nevada and the cities contained therein. This geographic extent is appropriate because local jurisdictions or districts provide socioeconomic factors, such as public services, and the labor force and housing market potentially impacted is expected to come primarily from within these counties.

Cumulative Impact Analysis

Local Projects

Despite the potential for construction schedule overlaps with known projects within the proposed ISEGS study area, no adverse cumulative socioeconomic effects are anticipated from either the construction or operation of the proposed ISEGS. As discussed in Section 4.9, an assumed maximum peak labor force of 959 construction workers represents 0.4 percent of the total construction workforce within the study area. Operation of the proposed ISEGS would require only 90 full-time, permanent employees, which represents a small portion of the available local labor force.

Therefore, because the proposed ISEGS requires such a small number of workers relative to the amount of available workers for both construction and operation, its contribution to socioeconomic impacts resulting from an influx of non-local workers and their dependents would not result in an adverse cumulative impact.

As shown in **Tables 5-1** and **5-2**, only one identified existing or foreseeable local project contains residential housing, a mixed-use development in Jean, Nevada (identified as Cumulative Project G in **Table 5-2**). The number of housing units associated with this project is unknown. In addition, those existing and foreseeable local projects would create job stimulus within the local area that could increase population. Large development projects such as the Southern Nevada Supplemental Airport would likely result in an increase in population and require the need for new housing and expanded public service facilities. However, as the ISEGS project would not result in any project specific adverse socioeconomic impacts, it would have no contribution to any potential local cumulative adverse socioeconomic impacts. Furthermore, because the proposed ISEGS would not result in any impacts to socioeconomic resources, it would not result in any individually minor but collectively significant actions taking place over a period of time that could result in cumulative socioeconomic impacts on a local level. In addition, the long-term payment of taxes and fees and distribution of O&M and payroll dollars is expected to have a cumulative benefit to San Bernardino County, California, and Clark County, Nevada, by increasing the amount of public funds available to the counties for community projects. The cumulative benefits would be increased when combined with the revenues accrued as a result of current and future reasonably foreseeable development projects as a result of the proposed ISEGS.

Regional Projects

Regional impacts would occur if impacts from the ISEGS combined with impacts of the projects that are currently proposed in the commuting area for the ISEGS project. Large scale renewable energy projects, such as Cogentrix Solar Services LLC: 1,000 MW solar generation facility on approximately 19,000 acres in Nevada, NextLight Renewable Power, LLC: two solar trough projects (one 200 MW project and one 500 MW project at the Nevada/California border), Ivanpah Energy Center 500 MW gas-turbine combined-cycle power plant in Primm, Nevada, and the Wind Energy power plant projects (75 MW on 2,330 acres and 50 MW on 3,360 acres) in Mountain Pass will require a large construction workforce and lengthy construction duration. Construction workers would likely commute from larger urban centers in surrounding communities during construction activities. Solar energy generation and wind energy generation facilities do not require large numbers of operational staff, therefore it is very unlikely that these projects would induce substantial growth in any of the communities in which they are proposed to be constructed. As such, these projects would be extremely unlikely to generate the need for new housing or substantially affect revenues of local businesses or agencies. In fact, construction of these facilities would likely result in increased revenues to local businesses during construction. Therefore, while large scale regional renewable energy projects will occur within the ISEGS geographic area for socioeconomic effects, as the ISEGS project would not result in any project specific adverse socioeconomic impacts it would not cumulatively contribute or combine with those of the future solar and wind development projects proposed to be constructed in desert areas of southeastern California and southern Nevada to result in adverse cumulative socioeconomic impacts. Furthermore, because the proposed ISEGS would not result in any impacts to socioeconomic resources, it would not result in any individually minor but collectively significant actions taking place over a period of time that could result in cumulative socioeconomic impacts on a regional level.

Alternatives

Because no direct or indirect adverse impacts to socioeconomics or environmental justice would be associated with either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts to these resources. The contribution of these alternatives to beneficial impacts to socioeconomics would be approximately the same as those for the proposed project. The No Action Alternative also would not contribute to any potential cumulative impacts, including the beneficial impacts associated with the proposed project, Mitigated Ivanpah 3 Alternative, and Modified I-15 Alternative.

5.2.10 Soil and Water Resources

Storm Water and Sediment

Construction and operation of the proposed project, including the grading, filling, and rerouting of ephemeral streams, would disturb approximately 4,100 acres of land and increase the transport of storm water and colloidal sediment to the Ivanpah playa. Smaller scale projects previously constructed in the project vicinity include the Union Pacific railroad track, a power transmission line, Interstate Highway 15, the Nevada Energy Bighorn power plant, Molycorp evaporation ponds, the Primm Valley Golf Club, and commercial development in Primm. No adverse storm water and sediment transport impacts from these developments to the Ivanpah playa has occurred. Water management has been a concern during the planning for the Southern Nevada Supplemental Airport. Current plans call for excavation of three large off-site retention basins to control surface water inflow to the playa and Roach Lake. The basins would occupy approximately 1,300 acres and would be approximately 40-feet-deep.

The construction and operation of reasonably foreseeable projects within the project vicinity that could result in increase storm water and sediment transport impacts are listed below in **Table 5-5**. The projects most likely to contribute to stormwater and sediment impacts would be those occupying large land areas on active alluvial fans, including the planned solar projects and the Southern Nevada Supplemental Airport. However, all of these projects would be subject to existing laws and regulations and would be designed to avoid, manage, and mitigate potential storm water and sediment impacts. Likewise, the proposed project has been designed to be in compliance with existing laws and regulations and would use a storm water and sediment pass though design that would result in a minor increase of sediment downgradient of the proposed project. Also, approximately 5 square miles of Ivanpah Valley (California and Nevada) have undergone development. Although development has increased the relative amount of impervious surface within the valley and contributing watershed drainages, flooding has not been reported as a problem. Therefore, the construction and operation of the proposed ISEGS project would not result in adverse cumulative impacts to downgradient resources from erosion, storm water, or sediment aggradation or degradation.

Groundwater Consumption

A summary of reasonably foreseeable projects in the Ivanpah Valley and their potential water use is presented below in **Table 5-5.** These projects and cumulative impacts were analyzed in detail in the Regional Groundwater Supply section in Section 4.10.

Table 5-5
Large-Scale Projects under Development or Reasonably Foreseeable in the Ivanpah Valley

Potential New Groundwater Users	Estimated Water Use	
	During Construction	During Operation
Desert Xpress Rail Line A proposed high-speed rail from Victorville to Las Vegas.	Unknown (limited duration)	Negligible
Mixed-Use Development (near Jean) Demolition of the Nevada Landing Casino and redevelopment of this and adjoining land as a 166-acre master-planned community of affordable housing, commercial businesses, shops, and a new-hotel casino. This development is contingent on the construction of the new Ivanpah Valley Airport.	Unknown (limited duration)	Unknown
Ivanpah Energy Center A 500-MW, air-cooled, gas-turbine, combined-cycle power plant. Although the facility would be using up to 50 AFY of water, this water would be recycled water from the WWTP.	Unknown (limited duration)	15 AFY from an Undisclosed Groundwater Source 35 AFY from Recycled Water
Las Vegas Valley Water District Pipeline Proposed construction and operation of a water supply pipeline from the existing 2420 Zone Bermuda Reservoir (located in southern Las Vegas) to Jean, Primm, the Southern Nevada Correctional Center, and the proposed Ivanpah Valley Airport.	Unknown (limited duration)	Negligible The use of imported surface water in the Ivanpah Basin would result in additional discharges of wastewater. At least a portion of this wastewater would likely infiltrate to the groundwater basin, increasing groundwater recharge in the basin.
Southern Nevada Supplemental Airport (Ivanpah Valley Airport) The proposed airport is anticipated to use water supplied by the Las Vegas Valley Water District pipeline for both construction and operation activities	None	None
Eldorado-Ivanpah Transmission Project	Unknown (limited duration)	Negligible
Reoperation of the Molycorp Mine	Negligible	400 AFY
NextLight Silver State North and South Photovoltaic Power Plant (250-MW)	Unknown (limited duration)	Estimated 14 AFY
FirstSolar Photovoltaic Power Plant	Unknown (limited duration)	Estimated 6 to 30 AFY
Primm Outlet Mall New Fast-Food Restaurant	Negligible	Estimated at 15 AFY

Potential New Groundwater Users	Estimated Water Use	
	During Construction	During Operation
To be located adjacent to the Primm Outlet Mall		

Sources: CH2M Hill 2007; BLM.

Water supply uses during construction of Ivanpah 1, 2, and 3 would be limited in duration and quantity. The applicant estimates that the annual average water demand during construction of Ivanpah 1 and 2 would be 111 AFY, and 217 AFY for Ivanpah 3, with up to an additional 47,000 gallons used for hydrostatic testing of the projects' piping. Each power plant is estimated to take 24 months to complete.

During operation, the project would use groundwater for potable and plant processes at the rate of approximately 100 AFY. Over the next 50 years, the use of groundwater in the IVGB is expected to increase. However, the project's groundwater use would contribute only 1.8 percent to the existing and only 1.7 percent of the reasonable foreseeable cumulative pumping volume in the IVGB. Because it is such a small percentage, the project's proposed contribution to the cumulative groundwater pumping in the IVGB would not be adverse. The reasonably foreseeable groundwater use in the IVGB may increase nominally by 450 to 470 AFY. With this nominal increase, water use in the IVGB would not exceed the estimated annual recharge, and therefore, would not result in adverse long-term impacts.

Alternatives

Although project-related impacts associated with stormwater events could potentially occur, these impacts would be localized, and would not combine with similar effects from any other past, existing, or reasonably foreseeable future development. Therefore, Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative would not contribute to any cumulative impacts associated with stormwater flood events. The No Action Alternative also would not contribute to any potential cumulative impacts associated with stormwater flooding.

Both alternatives would constitute a consumptive use of groundwater in a location in close proximity to other groundwater users, specifically, the Primm Valley Golf Course. The location of the ISEGS supply wells proposed in the original application was modified, in part, to move them further from the Primm Valley Golf Course wells, and thus reduce the potential for overlapping water use conflicts. Because the amount of groundwater use is expected to be small compared to the volume of groundwater available in the basin, the Mitigated Ivanpah 3 and Modified I-15 alternatives would not contribute to any cumulative impact to groundwater availability. Monitoring of groundwater levels, as required in Mitigation Measures, would help to ensure that cumulative impacts do not occur. The No Action Alternative would not use groundwater, so would also not contribute to any potential cumulative impacts to groundwater resources.

5.2.11 Traffic and Transportation

Cumulative impacts can occur if implementation of the ISEGS project could combine with those of other local or regional projects. Cumulative impacts would occur locally if ISEGS project impacts combined with impacts of projects located within the Ivanpah Valley. Cumulative impacts could occur to both the local roadway network and the regional roadway network. Local impacts are impacts that would occur to the transportation system in the immediate vicinity of the project site, such as damage to local roadways, traffic delays due to road closures, and increased congestion from project-related traffic. Cumulative impacts to the local roadway network would occur if project impacts combined with impacts of projects located within the same general vicinity of the ISEGS site. Therefore, the analysis of cumulative traffic and transportation impacts is evaluated for the local roadway network, defined as the area up to two miles from the ISEGS project site.

Cumulative impacts could also affect the regional roadway network, based on potential impacts that would occur to I-15. Primary access to the project site would be provided via I-15, which is an interstate highway that connects Los Angeles, California to Las Vegas, Nevada, as well as California to Nevada, Utah, Idaho, and Montana. Existing traffic on I-15 is mostly attributable to commuter, commercial, and tourist traffic that originates from well beyond the project area, such as Las Vegas, Nevada; Barstow, California; Victorville, California; and Los Angeles, California. However, a comprehensive analysis of traffic generated by projects in such distant locations is beyond the scope of this analysis. Therefore, the geographic extent for the analysis of cumulative traffic and transportation impacts to the regional roadway network is defined as the area up to 30 miles from the project.

Local Impacts

Construction related commuter traffic and equipment deliveries for the ISEGS project would generate up to 243 additional daily trips to roadways in the immediate vicinity of the site (Yates Well Road, Coliseum Road, and the I-15 (regional impacts to I-15 are discussed below) on- and off-ramps located at Yates Well Road) throughout the 48-month construction period. The addition of these trips to local roadways would not result in adverse impacts with respect to delays to local traffic, congestion, roadway hazards, and damage to roadways. Only one of the foreseeable projects presented on **Table 5-2**, the FirstSolar photovoltaic project, has the potential to add traffic to the same local roadways as the ISEGS project. Although the environmental review process has not yet begun for the FirstSolar photovoltaic project and there is currently no publicly available information regarding the potential construction schedule of this project, because construction of the ISEGS project would be ongoing for approximately four years, it is likely that there would be at least some overlap between the construction schedules of the two projects.

There is currently no available data regarding construction traffic of the proposed FirstSolar project, however, it is reasonable to assume that this project would require a level of workforce and equipment deliveries roughly equal to that of the ISEGS project. Due to the extremely low volume of traffic on Yates Well and Colosseum Roads, the combined effect of traffic from the ISEGS and FirstSolar projects would be unlikely to result in adverse impacts related to congestion and level of service of these roadways. The combined effect of traffic from both projects would likely increase the potential for damage to these roadways; however, similar to Mitigation Measure **TRANS-4**, it is assumed that the FirstSolar project would be required to repair any damaged roadways attributable to the FirstSolar project. Therefore, impacts of the ISEGS project are not expected to combine with impacts from the FirstSolar photovoltaic project to result in adverse cumulative impacts to local roadways.

Regional Impacts

Several projects presented on **Table 5-2** with the potential to result in increased congestion on I-15 are located within 15 miles of the ISEGS project. Projects that have the potential to be under construction at the same time as the ISEGS are the Southern Nevada Supplemental Airport, the Desert Xpress Train, the FirstSolar photovoltaic project, and the Caltrans Joint Port of Entry projects. Construction of each of these projects would result in increased vehicle trips on I-15. It is highly likely that some, if not all of these projects would result in additional vehicle trips on northbound I-15 on Friday afternoons. Additionally, because it is proposed to facilitate tourist travel to Las Vegas, operation of the Southern Nevada Supplemental Airport would likely result in a substantial increase in vehicle traffic on northbound I-15 on Friday afternoons.

I-15 currently operates at a congested level of service (LOS F) on Friday afternoons due to the high volume of commuter and tourist traffic traveling from California to Las Vegas, Nevada. Although implementation of **TRANS-1** would reduce the congestive effects of ISEGS-related traffic on I-15 at the Yates Well Road on-ramp, implementation of the project would still add an additional 227 vehicles to I-15 on Friday afternoons. The above referenced cumulative projects would also result in the addition of vehicles to northbound I-15 on Friday afternoons. While some projects would contribute a higher number of additional trips to I-15 than others, the combined effect of additional traffic from all of the identified cumulative projects would cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of I-15. The existing congestion on northbound I-15 on Friday afternoons would be exacerbated, and is therefore considered to be an adverse cumulative impact. No additional mitigation measures are available to avoid or reduce the ISEGS project's contribution to this adverse cumulative impact.

It should be emphasized that the adverse cumulative impact identified above is the result of the *combined effects* of existing conditions, ISEGS traffic, and traffic from the cumulative projects listed above (Southern Nevada Supplemental Airport, the Desert Xpress Train, the FirstSolar photovoltaic project) throughout the 30-mile geographic extent of cumulative impacts; whereas the direct ISEGS project impact identified in Section 4.11 only considers the effect of ISEGS traffic on existing conditions in the immediate vicinity of the proposed project. This cumulative effect is related to increased traffic and public safety concerns resulting from the combined congestive effect to northbound traffic on Friday afternoons.

The Applicant indicated that “other published reports” indicate that traffic on I-15 peaks at midnight on Friday and again noon on Saturday and suggested that if this is true, then dayshift traffic leaving project site would not contribute adversely to the most congested peak period. The Applicant also noted that it is important to consider that the peak condition is seasonal, with the greatest impact in August and much less in January. The Applicant concluded that "when the LOS condition is accurately described, the LOS condition on eastbound I-15 at 5:00 p.m. on Friday may not be "F" for most, if not all of the year".

It should be noted that the "other published report" cited by the Applicant's is dated 1999. Per industry standards, impact analysis is conducted in consideration of the most recently available data. Traffic volumes cited in this EIS were collected in 2006 and 2007 and are considered to be more representative of current conditions than data from 1999. Furthermore, the applicant has acknowledged in its AFC that I-15 operates at LOS F on Friday afternoons, at which time proposed construction activities would conclude and when construction workers would begin commuting from the project site. Therefore, according to data prepared by the Applicant and verified by Caltrans, the proposed project construction would result in the addition of traffic trips to a roadway at a time that the roadway operates at LOS F.

With regard to seasonal traffic flows, the analysis presented in Section 4.11 represents a "worst-case" scenario to ensure that impacts are not understated. For example, although the number of construction workers traveling to the project site would fluctuate throughout the overall construction period, the analysis addressed the number of workers that would travel to the site during peak construction. Similarly, while I-15 may not operate at LOS F every Friday of the year, according to the 2007 Annual Traffic Report prepared by the Nevada Department of Transportation (NDOT 2007), traffic volumes on I-15 in the vicinity of the California / Nevada state line exceeded the annual average daily traffic from April through August, and exceeded 94% of the annual average daily traffic volume in February, March, September, November and December. Therefore, although northbound I-15 may not operate at LOS F every Friday of the year, it is reasonable to assume that it operates at LOS F on most Fridays.

Traffic and transportation impacts of the ISEGS project would not combine with impacts of any past, present, or reasonably foreseeable projects to result in adverse cumulative impacts to local streets in the immediate vicinity of the ISEGS project site. However, traffic and transportation impacts of the ISEGS project would combine with impacts of past, present, or reasonably foreseeable projects to result in adverse impacts to traffic on northbound I-15.

Alternatives

The contribution of the Mitigated Ivanpah 3 and Modified I-15 Alternatives to cumulative impacts on LOS on I-15 on Friday afternoons would be approximately the same as those of the proposed project. Although the duration of cumulative impacts associated with construction and decommissioning would be reduced in the alternatives, the impacts associated with operations would be the same for both alternatives. The No Action Alternative would not contribute to any potential cumulative impacts.

Summary

The existing condition of traffic that exists today is that there is no impact to services on local roads. However, I-15 currently operates at a congested level of service (LOS F) on Friday afternoons due to the high volume of commuter and tourist traffic traveling from California to Las Vegas, Nevada.

The impact to this baseline from the reasonably foreseeable future projects would be the contribution of additional traffic to I-15, including during the Friday afternoon period when traffic is already impacted. The ISEGS project would contribute incrementally to that impact, due to worker traffic during construction and operations. Because their workforce sizes would be similar, the contribution of the Mitigated Ivanpah 3 and Modified I-15 Alternatives to this cumulative impact would be similar to each other, and to those of the proposed project. The No Action Alternative would not contribute to this cumulative impact to traffic on I-15.

5.2.12 Transmission Line Safety and Nuisance

The analysis of cumulative impacts related to transmission line operation considered the potential for impacts due to field and non-field impacts from the proposed ISEGS with other existing or foreseeable nearby facilities as listed in **Tables 5-1** and **5-2**. Numerous high voltage transmission lines extend through Ivanpah Valley from the Bighorn Generating Facility (west of Primm) and substations in Eldorado Valley and Hoover Dam to southern California and other localities. The evaluation of cumulative impacts has been limited to address continued service along those lines and impacts of reconstruction of the Eldorado – Ivanpah Transmission Line. Many existing high voltage transmission lines that extend through Ivanpah Valley have been in operation since construction of Boulder (Hoover) Dam. They include several high capacity, high voltage lines that are constructed on large lattice structures. Lower voltage (230-kV) lines originate at Bighorn Generating Station and extend to Arden Substation (southern Las Vegas) and Pahrump. The recently constructed Intermountain 500-kV Direct Current Transmission Line extends across a portion of the Ivanpah Playa (Nevada), near the proposed Southern Nevada Supplemental Airport site. At the present time, it appears that all existing transmission lines (including the Eldorado – Ivanpah Transmission Line), except the Intermountain Line, would remain along current alignments.

When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. Since the proposed project transmission lines would be designed, built, and operated according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed line design would be assessed from the results of the field strength measurements specified in Mitigation Measure **TLSN-2**. Therefore, there would not be any contribution by ISEGS to a field or non-field impact of electric power lines.

Alternatives

Because no direct or indirect impacts resulting from transmission line safety and nuisance would be associated with either the Mitigated Ivanpah 3 Alternative or the

Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts resulting from transmission lines. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.13 Visual Resources

ISEGS and Past Projects

Past and present projects in the Ivanpah Valley were analyzed in the evaluation of the existing project setting in Section 4.13. To summarize that analysis briefly, the existing Ivanpah Valley setting, though the site of existing development, is considered to be predominantly intact scenically, and was assigned a moderate overall level of visual sensitivity. Cumulative effects of past projects in combination with ISEGS are thus as described in Section 4.13. Past projects that have resulted in similar impacts in this area include the existing railroad track, the Primm Valley Golf Course, a transmission line, the I-15 freeway, the Bighorn electric generating station, Chevron-Texaco evaporation pond and commercial development in Primm, NV.

ISEGS and Foreseeable Future Projects

Table 5-2 lists foreseeable future projects within the Ivanpah Valley. All of the projects listed in **Table 5-2**, with the exception of the mixed-use development near Jean, Nevada, and the two wind energy projects on Mountain Pass, would lie within the viewshed of the ISEGS project. The Southern Nevada Supplemental Airport would be located at a sufficiently great distance as to have limited visual interaction with the ISEGS project. On the other hand, the ISEGS, Stateline, and Nextlight Silver State solar projects, the EITP and other transmission lines, along with the existing Bighorn Generating Station, proposed Ivanpah Energy Project, and City of Primm, would simultaneously be visible within middle-ground distance to I-15 motorists, and also be cumulatively dominant from viewpoints in the Clark Mountains, including KOP 10, within the Mojave National Preserve. This cumulative effect would be substantially more adverse than the adverse impacts of the ISEGS project alone, or the future projects without ISEGS, both from I-15 and from the Preserve.

For I-15 motorists the cumulative effect of the existing Primm Valley Golf Course together with the ISEGS, Joint Port of Entry, and Desert Xpress projects would be substantially adverse, converting the majority of the western highway frontage within the valley to a more urbanized, developed foreground view with potential to intrude into scenic westward highway views of the Clark Mountains. BLM does not have detailed plans of the Port of Entry Project. However, if it is of a scale and character similar to other like facilities, that project could be of considerable scale and visual effect, including not only the port structures themselves, but a large area of additional lanes and other paving, numerous trucks, and bright night lighting. Regarding the Desert Xpress project, although the specific technology that would be utilized is not known, the most common High Speed Rail technologies in current use require continuous above-ground catenary power lines that are highly urban in character, similar to light rail systems, as well as continuous safety fencing and other ancillary project features. If a final alignment paralleling the edge of I-15 were to be selected, these continuous vertical and linear features could intrude into the foreground of views of Clark Mountain as seen from the highway. Other foreseeable projects include the proposed natural gas-fired combined cycle Ivanpah Energy Center Project, which would be prominent from the highway; and most importantly, two additional solar projects, which like ISEGS would be extensive in area, adding substantially to the amount of development in the valley as seen from I-15 and the Clark Mountains. These projects, taken together, would result in a marked transformation of the existing Ivanpah Valley landscape into a more urbanized visual setting, particularly as seen by I-15 motorists in the northern portion of the valley in the vicinity of the ISEGS project. In addition, there would be some likelihood of cumulative light pollution impacts due to an accumulation of night-time light sources, including the ISEGS aircraft lighting, Joint Port of Entry, and new and existing power plant lighting.

In the EITP Draft EIS/EIR, BLM determined that EITP construction would likely overlap with that of Ivanpah SEGS, DesertXpress, NextLight Solar, and potentially the FirstSolar and Calnev pipeline expansion projects. The coincidence of these construction projects within the same viewshed at the same time would introduce new color, texture, and lines in the viewshed that would be considered an adverse impact to visual resources. The operation of all of these projects would also permanently alter the existing landscape, as seen from numerous KOPs.

The anticipated visual impacts of the ISEGS project in combination with foreseeable future local projects in the Ivanpah Valley are thus considered to present an adverse cumulative impact.

Alternatives

In general, the contribution of the Mitigated Ivanpah 3 Alternative to cumulative impacts to visual resources would be lower than those associated with the proposed project. This contribution would be reduced because of the reduction in the number of power towers from seven to three, the reduction in the size of the heliostat fields, and the placement of the northern boundary of Ivanpah Unit 3 in a location further away from sensitive receptors in the Mojave National Preserve. However, the overall conclusion that the project would contribute incrementally to an increase in the industrial character of the area would remain the same for the Mitigated Ivanpah 3 Alternative.

The contribution of the Modified I-15 Alternative to cumulative impacts to visual resources would be slightly different than that of the proposed project and the Mitigated Ivanpah 3 Alternative. Similar to the Mitigated Ivanpah 3 Alternative, the reduction of the number of power towers and heliostats would reduce the visual impacts below that associated with the proposed project. Also, by entirely eliminating the proposed Ivanpah Unit 3 location, the northern boundary of the facility would be placed even further from sensitive viewers in the Mojave National Preserve than in the Mitigated Ivanpah 3 Alternative. However, the reconfiguration of Ivanpah Unit 3 four miles to the south would result in an increase in the magnitude of impacts to viewers on I-15. Also, the overall conclusion that the project would contribute incrementally to an increase in the industrial character of the area would remain the same for the Modified I-15 Alternative.

The No Action Alternative would not contribute to any potential cumulative impacts to visual resources.

Summary

The existing condition of visual resources that exists today is that the area is considered to be predominantly intact scenically, and was assigned a moderate overall level of visual sensitivity. The viewscape currently includes the Bighorn Generating Station, Primm Casinos, and transmission lines.

The impact to this baseline from the Stateline and Nextlight Silver State solar projects and the EITP transmission line is that each of these projects would simultaneously be visible within middle-ground distance to I-15 motorists, and also be cumulatively dominant from viewpoints in the Clark Mountains, including KOP 10, within the Mojave National Preserve. This cumulative effect would be substantially more adverse than the adverse impacts of the ISEGS project alone, or the future projects without ISEGS, both from I-15 and from the Preserve.

The impact to the baseline, coupled with the reasonably foreseeable future projects, of the Mitigated Ivanpah 3 Alternative, would be slightly lower than that associated with the proposed project. This is because of the reduction in the number of power towers and heliostats, as well as the placement of the northern boundary of the facility further from the Mojave National Preserve. The contribution to the impact resulting from the Modified I-15 Alternative may be greater than that of the proposed project and Mitigated Ivanpah 3 Alternative, due to the placement of heliostats directly along I-15 for a distance of 1.8 miles. The No Action Alternative would not result in an increase in the industrial character of the area, so would not contribute to the adverse cumulative visual impact in the area.

5.2.14 Waste Management

The geographic extent for the analysis of the cumulative waste management impacts associated with the ISEGS includes San Bernardino County, California and Clark County, Nevada. This geographic scope is appropriate because waste generated by the ISEGS would be disposed of in one or both of these counties.

The ISEGS would generate nonhazardous solid waste that would add to the total waste generated in San Bernardino County, California and Clark County, Nevada. Nonhazardous solid waste generated by all of the past, present, and reasonably foreseeable projects presented in **Tables 5-1** and **5-2** would also be disposed of within these counties. However, project wastes would be generated in modest quantities, waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. Most of the reasonably foreseeable projects identified in **Table 5-2** are of similar or smaller scale than the ISEGS and would therefore be expected to generate a similar or smaller volume of nonhazardous waste as the ISEGS. Reconstruction of the Eldorado – Ivanpah Transmission Line would create minimal quantities of waste materials that would be used to package and transport insulators and other hardware. Approximately 7.2 existing steel H-frame structures per mile (assuming a current nominal spacing of 736 feet) would be disassembled and removed as scrap and existing conductor and static wire would be removed. It is assumed that the structures, conductor, and static wires would be recycled.

The total amount of available solid waste landfill capacity in San Bernardino County as of June 2008 is 222 million cubic yards according to the San Bernardino County Solid Waste Management Division (Rozzi 2008). The Nevada Division of Environmental Protection Solid Waste Management Plan reports that Clark County, where the cities of Las Vegas and Sloan are located, has landfill capacity of 935 million cubic yards (Campbell 2008). Therefore, even if all of these reasonably foreseeable projects were constructed, the waste generated by the ISEGS would not result in adverse cumulative waste management impacts.

As discussed in Section 4.14, the four tons of hazardous waste from the ISEGS requiring off-site disposal would be far less than the capacity remaining at the probable Class I waste facilities. The hazardous waste, in addition to hazardous wastes that would potentially be generated by the reasonably foreseeable projects would not result in adverse cumulative waste management impacts.

The amount of non-hazardous and hazardous wastes generated during construction and operation of the ISEGS, would add to the total quantity of hazardous and non-hazardous waste generated in the states of California and Nevada. However, ISEGS project wastes, in addition to waste that would potentially be generated by the reasonably foreseeable projects, would not result in adverse cumulative waste management impacts either locally or regionally.

<u>Alternatives</u>

Because no direct or indirect impacts associated with waste management would result from either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts resulting from waste management. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.15 Worker Safety and Fire Protection

BLM reviewed the impacts on the fire and emergency service capabilities of the SBCFD attributable to the construction and operation of ISEGS in conjunction with other existing and foreseeable projects as listed in **Tables 5-1** and **5-2**. For the ISEGS project alone, the limited fire risks and potential for hazardous materials incidents at the proposed facility do not pose substantial added demands on local fire protection services. However, as discussed in Section 4.15, information regarding impacts to County fire and emergency response services is contradictory. Information obtained by BLM from the SBCFD during the DEIS process indicated that the proposed project would not cause an adverse impact to County fire, hazardous materials, and emergency response services. In public comments on the DEIS, the SBCFD disagreed with the DEIS statement that the project would have no adverse impact on these services, and stated that the County would provide their own evaluation of the financial implications of this impact. In an attempt to rectify the contradictory information provided by the SBCFD, BLM submitted a letter to the County requesting additional information on the specific impacts, and the County's financial estimate. However, as of the time of publication of this FEIS, the requested information has not been received. Without additional information, it is assumed that the ISEGS would not contribute to an adverse cumulative impact on existing local fire protection services.

Alternatives

Because no direct or indirect impacts to worker safety and fire protection would result from either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts to these resources. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.16 Geology, Paleontology, and Minerals

Most cumulative impacts related to geology and paleontology only have the potential to occur within boundaries of the project site itself because geologic materials occur at specific locales and are unaffected by activities not acting on them directly. Most geologic impacts of the ISEGS project would be site-specific and would therefore not have the potential to combine with impacts from other projects.

Geologic Hazards

Local subsidence in the form of sinkholes has been observed at the site and along the northern edge of Ivanpah Dry Lake. While its cause can sometimes be attributed to groundwater withdrawal as well as other causes, in this case, the cause is believed to be from dehydration of clays between the soil surface and the water table that can result in a major loss of volume, and thus the collapse of overlying soils (Broadbent 2009). In Section 4.10, the analysis demonstrated that groundwater withdrawal is not causing a local lowering of the water table, and thus would not contribute to subsidence. The project's groundwater use would contribute only 1.8 percent to the existing and only 1.7 percent of the reasonable foreseeable cumulative pumping volume in the Ivanpah Valley Groundwater Basin. The project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level. The Ivanpah Valley Groundwater Basin would still have a surplus outflow to the Las Vegas Valley of approximately 1,351 to 2,666 acre-feet per year (AFY). Therefore, the groundwater pumping associated with ISEGS would not contribute to subsidence in the Ivanpah Valley. When combined with impacts of past, present, and reasonably foreseeable projects, ISEGS would not contribute to adverse cumulative impacts.

Mineral Resources

The proposed project site is currently not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals. Sand and gravel resources are present at the site; however, such materials are present throughout the region and the ISEGS should not have an adverse impact on the availability of such resources. In addition, the potential resource would become available again following decommissioning of the project. Construction of ISEGS or other reasonably foreseeable projects (except the Eldorado – Ivanpah Transmission Line) would eliminate the opportunity for mineral extraction from 25,632 to 26,141 acres of land. Although mining could be carried out in an additional 17,000-acre Southern Nevada Supplemental Airport NCA, it is unlikely that Clark County would permit such operations. Cumulative effects on mining from ISEGS and other foreseeable future projects would total approximately 43,000 acres. Actual impacts to the mining industry likely would be minimal due to the scope and extent of mining opportunities in the southern Nevada region. As a result, the ISEGS project would not impact any current or reasonably foreseeable development of geologic or mineral resources.

Paleontological Resources

As discussed in Section 4.16, no paleontological resources have been documented on the ISEGS project site or at the proposed lay down area. However, based on the geology of the site and because paleontological resources have been discovered on sites within two miles of the ISEGS project, the probability of encountering paleontological resources is considered to be generally high on portions of the ISEGS site. For the same reasons, it is likely that paleontological resources have been uncovered during construction of past projects in the Ivanpah Valley and will likely be uncovered during construction of at least some of the reasonably foreseeable projects presented in **Table 5-2**. However, Mitigation Measures would require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists, which would require that earthwork be halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the mitigation measures yield a net gain to the science of paleontology, since fossils that would not otherwise have been discovered can be collected, identified, studied, and properly curated. It is reasonable to assume that the reasonably foreseeable projects presented in **Table 5-2** would include similar measures to identify, study, and curate any paleontological resources discovered during construction. Therefore, implementation of past, present, and reasonably foreseeable projects would likely result in a net gain to the science of paleontology, and would not combine to result in adverse cumulative impacts to paleontological resources.

Impacts of the ISEGS project would not have the potential to combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to adverse cumulative impacts to mineralogical and/or paleontological resources.

Alternatives

Because no direct or indirect impacts to geology, paleontology, and mineral resources would result from either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts to these resources. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.17 Livestock Grazing

In addition to the proposed Ivanpah SEGS facility, there are other reasonably foreseeable future actions that could contribute to impacts to the Clark Mountain Allotment. Regionally, impacts to livestock grazing in the planning area have been occurring for 100 years or more. Authorized and unauthorized vehicle use and maintenance and construction of utility rights of way can have an impact to livestock grazing by removal of vegetation utilized for forage, and there is always a danger of vehicle collisions with cattle. The impact of the proposed and probable development projects (mineral production, solar projects, rail lines, and airports) may be more substantial if they require substantial reductions in the acreage of existing allotments.

Examples of recent and future development and land use changes in the Ivanpah area that may impact the allotment include:

- Other solar projects, including the proposed FirstSolar facility that would also be located within the Clark Mountain Allotment;
- The proposed Port-of-Entry to be constructed by the California Department of Transportation (CalTrans) near the Yates Well exit on Interstate 15; and
- Various proposed high-speed rail lines connecting Las Vegas to the Los Angeles area, including the Desert Xpress rail line, and proposed Maglev projects.

The proposed ISEGS project, by itself, would reduce the area of the Clark Mountain Allotment by approximately 4% and would reduce the AUMs permitted on the allotment by 4.7%. This impact would occur on the lower elevations of the allotment, an area which provides lower quality forage than the higher elevation areas. Although the exact size and footprint of the proposed FirstSolar facility has not been finalized, it is likely to be of the same or smaller size than ISEGS, and is also located on the lower slopes of the alluvial fan. The Port-of-Entry would comprise an area of less than 150 acres, and also would occur on the lower elevations. Therefore, the combination of these three items would constitute a reduction of approximately 8% of the lower quality portion of the allotment.

The future route of the proposed high-speed rail lines, especially the proposed Desert Xpress, is not known to the extent necessary to evaluate its contribution to the cumulative impact on the Clark Mountain Allotment. One proposed alignment of the Desert Xpress would be located to the north and west of ISEGS and the proposed FirstSolar project. Because the route would need to be fenced to keep cattle away from the rail system, the proposed rail line would remove a much greater percentage of the land area available within the Clark Mountain Allotment. In addition, this proposed alignment would be located at a higher elevation on the alluvial fan, so the eliminated acreage would be of higher quality than that affected by ISEGS.

With respect to NEPA, the overall impact of the proposed projects in the area may be adverse if the proposed Desert Xpress line is constructed. However, the contribution of the proposed ISEGS project to that cumulative impact is relatively small.

Alternatives

Because they would each reduce the project footprint by 433 acres, both the Mitigated Ivanpah 3 and Modified I-15 Alternatives would have a reduced contribution to cumulative impacts to the Clark Mountain Grazing Lease, as compared to the proposed project. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.18 Wild Horses and Burros

The cumulative impact analysis area for burros is their range within the Clark Mountain HMA boundary. In addition to the proposed ISEGS facility, there are many other past, present, or reasonably foreseeable future actions that contribute to impacts to burros on the Clark Mountain HMA, or on other HMAs within the Mojave Desert as listed in **Tables 5-1** and **5-2**. Examples of recent and future development and land use changes in the Ivanpah area that may impact burros include:

- Authorized and unauthorized vehicle use.
- Maintenance and construction of utility rights of way.
- Mineral exploration and production.
- Other solar projects, including the proposed FirstSolar facility that would also be located within the Clark Mountain Allotment.
- The proposed Desert Xpress rail line.
- The proposed Southern Nevada Supplemental Airport facility at Jean, Nevada.

Regionally, impacts to burros in the CDCA planning area have been occurring for 100 years or more. Authorized and unauthorized vehicle use and maintenance and construction of utility rights-of-way can have a slight impact to burros by removal of vegetation utilized for forage, and there is always a danger of vehicles colliding with burros. The impact of the proposed and probable development projects (mineral production, solar projects, rail lines, and airports) would cumulatively remove and isolate potential grazing sites for burros.

Alternatives

Because no direct or indirect impacts to wild horses and burros would result from either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative, these alternatives would not contribute to any cumulative impacts to these resources. The No Action Alternative also would not contribute to any potential cumulative impacts.

5.2.19 Recreation

The cumulative impact analysis area for recreation includes the Ivanpah Valley region including the surrounding mountain ranges. The period for the analysis is long term. In addition to the proposed ISEGS facility, there are many other past, present, or reasonably foreseeable future actions that contribute to both positive and negative impacts to recreational use of the Ivanpah Valley area as listed in **Tables 5-1** and **5-2**.

Examples of recent and future development and land use changes in the Ivanpah area that may impact recreational use of the area include:

- Authorized and unauthorized vehicle use.
- Maintenance and construction of utility rights of way.
- Mineral exploration and production.
- Other solar projects, including the proposed FirstSolar and NextLight facilities that would also be located within Ivanpah Valley.
- Various proposed high-speed rail lines connecting Las Vegas to the Los Angeles area, including the Desert XPress rail line, and proposed Maglev projects.
- The proposed Southern Nevada Supplemental Airport facility at Jean, Nevada.

Regionally, there have been both positive and negative impacts to recreational resources as a result of development projects within Ivanpah Valley. Improvement of highway access to the Valley, through the construction of I-15, provided direct vehicular access to open desert scenery for residents throughout southern California and Las Vegas. This increased access certainly improved the recreational experience for some users by making the area more accessible, and detracted from the recreational experience for other users who preferred remote camping, hiking, and hunting away from populated areas. Some industrial and commercial development projects, including the proposed project, would remove some lands from potential recreational use, and would provide an impact on the viewscape that would diminish the recreational experience to some degree. Other development projects, including the Primm casinos and Primm Valley Golf Course, have been successful in drawing people to the area for different recreational activities.

Overall, the impact to recreationists from these projects is subjective, because some may be drawn to the development, while others would seek to avoid it. Recreational use of the Primm Casinos and Primm Valley Golf Course is likely to be unaffected, or possibly increase, due to increased ease of access and development of other similar attractions. Conversely, visitors looking to enjoy quality hiking, camping, and other outdoor activities in the surrounding area will be impacted by the diminished natural setting during their drive to those locations, but will be able to continue to enjoy those opportunities recognizing a degraded visual background in some settings.

Recreational use of Ivanpah Dry Lake for land sailing and related events may be impacted if the unique character of the Dry Lake surface is modified through these developments, although this is not likely to occur, based on information currently available. Mitigation Measures for Hazardous Materials Management **HAZ-1 through HAZ-6**, Waste Management **WASTE-1 through WASTE-7**, and **Soil&Water-5** would address the potential for stormwater modification of the Dry Lake surface, as well as transport of hazardous materials, waste or debris to the Dry Lake surface as attributable to the ISEGS project. Therefore, the proposed project would not contribute to adverse cumulative impacts to the Ivanpah Dry Lake.

The combined projects would eliminate recreation within 25,632 to 26,141 acres. If Clark County were to restrict access to the 17,000-acre NCA, cumulative recreation lands affected would total approximately 43,000 acres. The cumulative loss of recreation opportunities likely would place pressure on other Mojave Desert lands that are not subject to development. Displaced recreational users likely would turn to lands that currently are not used for recreation purposes. As currently unused lands become used more, they would degrade accordingly. Under such circumstances, direct and indirect adverse cumulative impacts to recreation would occur.

Alternatives

Although the project acreage and overall visual impact would be lower for the Mitigated Ivanpah 3 and Modified I-15 Alternatives, as compared to the proposed project, the impact on the quality of the recreational experience would be expected to be about the same. This is because the contribution of the alternatives to the change of the area to a more industrial character would about the same as that for the proposed project. The No Action Alternative would not contribute to any potential cumulative impacts to recreation.

Summary

The existing condition of recreation resources that exists today is that there have been both positive and negative impacts to recreational resources as a result of development projects within Ivanpah Valley. Improvement of highway access to the Valley, through the construction of I-15, provided direct vehicular access to open desert scenery for residents throughout southern California and Las Vegas. This increased access improved the recreational experience for some users by making the area more accessible, but likely detracted from the recreational experience for other users who preferred remote camping, hiking, and hunting away from populated areas. Some existing projects have removed land from potential recreational use and impacted the viewscape in a manner that diminishes the recreational experience to some degree. However, other development projects, including the Primm casinos and Primm Valley Golf Course, have been successful in drawing people to the area for different recreational activities.

The impact to this baseline from the reasonably foreseeable future projects is that these projects are not likely to add recreational opportunities, but would increase the industrialization of the valley, likely reducing the quality of recreational experiences in the area. The impact of the proposed project, in addition to the reasonably foreseeable future projects, would be similar. The proposed project may draw persons to the area to view the solar facility, and will likely not detract from the experience of recreationists attracted to the area for the casinos, golfing, and land sailing. However, the contribution of the ISEGS project to the industrial nature of the area, along with the other proposed projects, is likely to contribute to an overall adverse cumulative impact to recreation. Because their size and visual appearance would be similar, the contribution of the Mitigated Ivanpah 3 and Modified I-15 Alternatives to this cumulative impact would be similar to each other, and to those of the proposed project. The No Action Alternative would not contribute to cumulative impacts to recreation.

5.3 Summary of Cumulative Impacts

The proposed ISEGS project and other reasonably foreseeable future projects would potentially contribute to adverse cumulative impacts to air quality, biological resources, land use, traffic, visual resources, and recreation. Those impacts are summarized in the following text and **Table 5.6**.

Construction of ISEGS temporarily would contribute to airborne PM_{10} and equipment exhaust emissions within Ivanpah Valley. Simultaneous construction of ISEGS and the Eldorado – Ivanpah Transmission Line likely would result in cumulative increases in PM_{10} levels and exhaust emissions. It is possible that other reasonably foreseeable future projects, such as NextLight, would be constructed during the same time-frame as ISEGS. If so, the contribution of these additional projects to air quality impacts would likely be mitigated by the same type of measures proposed for ISEGS, and would be of the same magnitude as ISEGS. Operation of ISEGS would contribute fossil fuel combustion products emissions. Cumulative impacts from fossil fuel combustion would result from operations at the Southern Nevada Supplemental Airport and the Southern Nevada Heliport.

Development within Primm, Jean, Sloan, and other areas has eliminated habitat within approximately 3,500 acres within Ivanpah Valley. Installation of ISEGS and other reasonably foreseeable future projects would result in cumulative impacts to biological resources within Ivanpah Valley. Habitat losses from ISEGS would total 3,196 to 4,073 acres (depending on alternative); total cumulative losses from all reasonably foreseeable projects would total 22,000 to 23,000 acres. Cumulative impacts would affect the desert tortoise, other terrestrial species, nesting avian species, and would contribute to increased presence of noxious and invasive weeds.

Previous construction within Ivanpah Valley has changed approximately 3,500 acres of native desert to industrial and commercial use. Construction of ISEGS would change 3,564 to 4,073 acres of relatively undisturbed native desert to an industrial use. Construction of ISEGS and other reasonably foreseeable projects would cumulatively change 25,632 to 26,141 acres. Development of the Southern Nevada Supplemental Airport could affect an additional 17,000 acres of native desert, if Clark County were to develop the NCA for industrial use.

Development within southern Nevada has contributed to traffic congestion along I-15 and traffic levels on local roads. Development of ISEGS and several other reasonably foreseeable future projects within Ivanpah Valley would contribute cumulative impacts to traffic congestion along I-15 and local roads. Cumulative impacts could be reduced to some extent by operation of DesertXpress. Reconstruction of the Eldorado – Ivanpah Transmission Line could result in temporary impacts to local transportation.

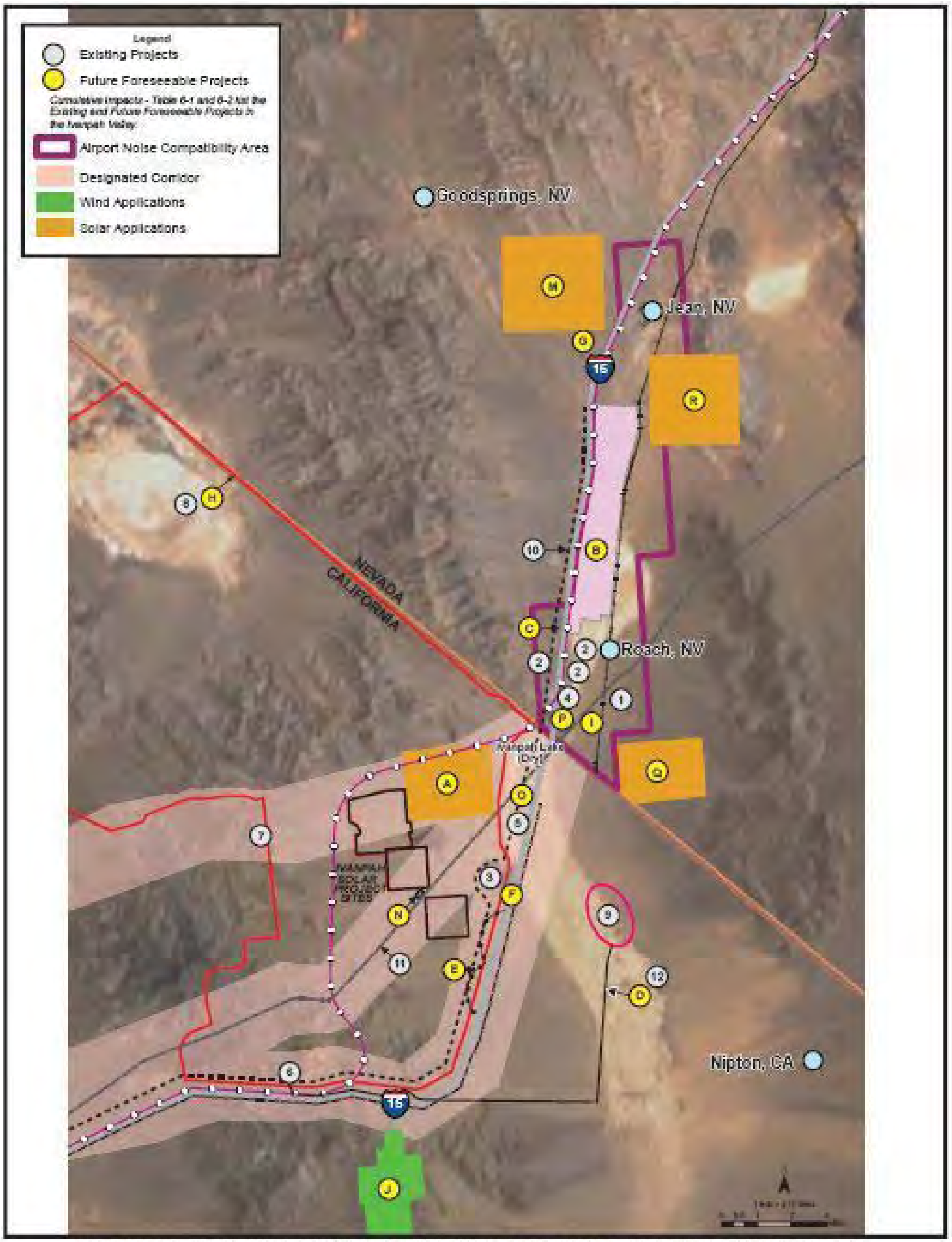
The anticipated visual impacts of the ISEGS project in combination with foreseeable future local projects in the Ivanpah Valley would contribute to an adverse cumulative impact, due to the increasingly industrial character of the area. This impact is also expected to impact some recreational uses of the area, including camping, hiking, and hunting in the Mojave National Preserve.

Table 5-6
Summary of Cumulative Impacts by Resource Category

Resource	Eldorado – Ivanpah Transmission Line	State Line Solar	DesertXpress	NextLight Solar	Southern Nevada Supplemental Airport	Southern Nevada Regional Heliport
Air Quality	Temporary increase in particulate matter during construction. If projects are constructed concurrently, impacts would be cumulative. Each project would be subject to mitigation measures and permit conditions to reduce emissions.					
	No long-term impacts to air quality.	Long-term increase in particulate matter during operations due to absence of vegetative cover and ongoing land-disturbing activities. Cumulative air quality emissions impacts from ISEGS, Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport would be partially offset by DesertXpress operations and reduced I-15 traffic.				
Greenhouse Gases	No impacts to greenhouse gas and climate change	Some projects (Stateline Solar, NextLight Solar, and DesertXpress), in combination with ISEGS, cumulatively benefit greenhouse gas emissions.				
Biological	Temporary displacement of wildlife and habitat fragmentation during construction	Cumulative loss of desert tortoise habitat totaling approximately 22,000 to 23,000 acres, increased cumulative potential for invasive and noxious weeds, cumulative impacts to wildlife due to habitat loss and fragmentation				
Cultural	Limited effect would be mitigated by measures required for each project.					
Land Use	No cumulative ISEGS effect	Loss of 4,168 acres of public-use lands	Loss of 2,424 acres of public use lands	Loss of 7,840 acres of public use lands	Loss of 7,400 to 30,800 acres of public use lands[1]	Loss of 236 acres of public use lands
Noise and Vibration	No direct and quantifiable cumulative ISEGS effect					
Public Health and Safety	No direct and quantifiable cumulative ISEGS effect					
Socioeconomics and Environmental Justice	No cumulative ISEGS effect	Slight beneficial impact to local economy from project operations and maintenance			Major beneficial economic impact to southern Nevada	Beneficial economic impact to southern Nevada
Soil and Water Resources	No long-term cumulative ISEGS effect	Increased soil erosion and increased surface water flows to area playas from Stateline Solar, DesertXpress, NextLight Solar and Southern Nevada Supplemental Airport projects is expected to be mitigated through Best Management Practices, permit conditions, and mitigation measures.				No cumulative ISEGS effect
Traffic and Transportation	No cumulative ISEGS effect	Limited cumulative ISEGS effect	Beneficial cumulative effect due to reduced highway vehicle numbers	Limited cumulative ISEGS effect	Probable adverse impacts to surface transportation	Limited cumulative ISEGS effect
Transmission Line Safety	No cumulative ISEGS effect	No cumulative ISEGS effect			No cumulative ISEGS effect.	No cumulative ISEGS effect
Visual Resources	Moderate contribution to cumulative effect	Adverse cumulative visual impacts to approximately 26,000 acres that would become industrialized due to the Stateline Solar, DesertXpress, NextLight Solar, Southern Nevada Supplemental Airport, and the Southern Nevada Regional Heliport projects				
Waste Management	No cumulative ISEGS effect	Short-term temporary impacts to landfills during construction. Minor impacts to landfills during operations				
Worker Safety and Fire Protection	No cumulative ISEGS effect					
Geology, Paleontology, and Minerals	No cumulative ISEGS effect	Long-term loss of mining opportunities within approximately 50,000 acres				
Livestock Grazing	No cumulative ISEGS effect					
Wild Horses and Burros	No cumulative ISEGS effect					
Recreation	No cumulative ISEGS effect	Loss of recreation opportunities on 26,000 to 50,000 acres of public land. Displacement of the public to other recreational areas.				

[1]Airport footprint 7,400 acres, Noise Compatibility Area 17,000 acres, Transportation and Utility Corridor 6,400 acres

Figure 5-1
Ivanpah Solar Electric Generating System - Ivanpah Valley Existing and Future/Foreseeable Projects



U.S. BUREAU OF LAND MANAGEMENT and CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Data Response - Cumulative Impacts - Figure 3

6.0 Other NEPA Considerations

This section includes discussions of other topics as required by NEPA, including identification of unavoidable adverse impacts, a discussion of irreversible and irretrievable commitment of resources, growth-inducing effects, and the relationship between short-term use and long-term productivity.

6.1 Unavoidable Adverse Impacts

The environmental consequences of the proposed project are described in Section 4. The environmental consequences section analyzes impacts that are significant, whereas this section identified those adverse impacts that cannot be avoided should the proposal be implemented. The adverse environmental effects that cannot be avoided should the project be implemented are associated with biological resources, land use, and visual resources.

6.1.1 Biological Resources

The ISEGS project would have adverse environmental impacts to the biological resources of the Ivanpah Valley, affecting many sensitive plant and wildlife species and eliminating a broad expanse of relatively undisturbed Mojave Desert habitat. Approximately 4,073 acres of occupied desert tortoise habitat would be permanently lost and a minimum of 25 desert tortoises would need to be translocated to a location approved by BLM, USFWS, and CDFG. Impact avoidance and minimization measures described in BLM's analysis and included in the mitigation measures would help reduce impacts to sensitive biological resources.

The No Action Alternative would avoid these impacts. These impacts would be reduced through either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative due to their reduced acreage, and to the avoidance of higher quality habitat associated with Ivanpah Unit 3. However, both alternatives would still impact approximately 3,564 acres of habitat for wildlife and vegetation.

6.1.2 Land Use

Impacts of the ISEGS project would combine with impacts of present and reasonably foreseeable projects to result in a contribution to cumulative impacts in the Ivanpah Valley area related to land use. The existing condition of land use that exists in the Ivanpah Valley area today is that a very small portion of the area (approximately 3,500 acres) has been developed, leaving the vast majority of the area available as wildlife and vegetation habitat, for recreational uses, or for other future development.

The impact to this baseline from the reasonably foreseeable future projects is that approximately 22,000 acres of currently undeveloped land would be developed, substantially increasing the amount of land that has been removed from other land uses in the area. The ISEGS project would add an additional 4,073 acres to this cumulative land use impact. This impact cannot be avoided or reduced through mitigation.

The No Action Alternative would avoid these impacts. These impacts would be reduced through either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative due to their reduced acreage. However, both alternatives would still remove approximately 3,564 acres of land from other multiple uses.

6.1.3 Visual Resources

The proposed project would result in a substantial adverse impact to existing scenic resource values as seen from several Key Observation Points in the Ivanpah Valley and Clark Mountains, including:

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

The potential adverse visual impacts at the Primm Valley Golf Course (KOPs 1 and 2) could be avoided or minimized through mitigation over the long term. However, adverse impacts at the other locations cited above could not be avoided or reduced through mitigation, and would thus result in unavoidable adverse impacts if the proposed project is implemented.

The No Action Alternative would avoid these impacts. These impacts would be reduced through either the Mitigated Ivanpah 3 Alternative or the Modified I-15 Alternative due to their reduced acreage, number of power towers, number of heliostats, and location of the facility with respect to sensitive viewers. However, both alternatives would still contribute to an overall increase in the industrial character of the Ivanpah Valley area.

6.2 Irreversible and Irretrievable Commitment of Resources

Section 40 CFR 1502.16 of the NEPA regulations requires a discussion of any irreversible or irretrievable commitments of resources which would be involved in the proposed project.

Implementation of the proposed project would result in the consumption of energy as it relates to the fuel needed for construction-related activities. Large amounts of gasoline, diesel, and jet fuel would be required for project construction. Additionally, construction would require the manufacture of new materials, some of which would not be recyclable at the end of the lifetime of the proposed project. The raw materials and energy required for the production of these materials would also result in an irretrievable commitment of natural resources. Operation of the proposed project would not cause a substantial increase in the consumption or use of non-renewable resources. The No Action Alternative would not require any non-renewable resources to implement. The Mitigated Ivanpah 3 and Modified I-15 Alternatives would both use non-renewable resources on approximately the same scale as the proposed project.

Implementation of the proposed project would require the loss of approximately 4,073 acres of vegetation and habitat. The loss of this habitat would be long-term, enduring throughout the proposed 50-year lifespan of the facility. Following decommissioning, restoration would be conducted which would involve removal of structures, restoration of topography, and revegetation, all of which would work towards restoration of the original habitat. However, it is likely that restoration of native vegetation would be slow, and the success uncertain. Therefore, the loss of desert tortoise habitat is assumed to be permanent since restoration of vegetation for which they depend for foraging and other factors affecting the quality of the restored habitat are uncertain. There would be no habitat degradation associated with the No Action Alternative. Although both the Mitigated Ivanpah 3 Alternative and the Modified I-15 Alternative would impact a reduced area of habitat (3,564 acres), both would still create large-scale impacts to tortoise habitat that would be assumed to be permanent. By reconfiguring the location of Ivanpah Unit 3 away from high quality habitat, and towards lesser quality habitat along I-15, the Modified I-15 Alternative would likely have the least effect on habitat of any of the three project-building alternatives.

The majority of access required for construction and operation of the proposed project would utilize existing public ROWs and access roads. The proposed project would require re-routing the existing Colosseum Road through the construction logistics area, but the re-routed road would re-connect with the existing road to the west of the facility. Therefore, the project would not affect opportunities for public access. The routes would not be affected under the No Action Alternative. Both the Mitigated Ivanpah 3 and Modified I-15 Alternatives would require closure and re-routing or currently existing roads, but the scale of this re-routing would be approximately the same as that for the proposed project.

Construction and operation of the proposed project would require the use of a limited amount of hazardous materials such as fuel, lubricants, and cleaning solvents. All hazardous materials would be stored, handled, and used in accordance with Best Management Practices proposed by the applicant, and by compliance with applicable, federal, state, and local regulations, including a construction-phase SWPPP and an operational-phase SWPPP. Assuming appropriate implementation of these plans and practices as are recommended in the mitigation measures, potential degradation of the environment due to accidental spills associated with the proposed project's use of hazardous materials would be minimized to the extent practicable. The No Action Alternative would involve no risks associated with hazardous materials use. The risks associated with the use of hazardous materials for the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be approximately the same as those for the proposed project.

The loss of visual quality associated with the project site would be adverse and long-term, enduring throughout the proposed 50-year lifespan of the facility. After the end of the project's useful life, it would be decommissioned as described in the applicant's Draft Closure, Revegetation, and Rehabilitation Plan. The facility would be removed, original contours restored, and the site revegetated. However, the removal of the existing facility would leave a very prominent visual impact over the entire site due to the strong color contrast created between graded, disturbed soil areas and undisturbed soil areas in the vicinity of the project site. In addition, revegetation of areas in this desert region are difficult and generally of limited success. Thus, visual recovery from land disturbance of closure and decommissioning would likely occur only over a very long period of time. The No Action Alternative would have no long-term visual impacts. The visual impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would, like the proposed project, continue long after the projects are decommissioned. In both cases, the size of the disturbed area would be smaller than that for the proposed project, due to the reduction of 433 acres in the size of the projects. However, in the case of the Modified I-15 Alternative, the long-term impact could be more visible to viewers on I-15 because the disturbed area would be located directly adjacent to the highway.

6.3 Growth-Inducing Effects

Section 1508.8(b) of NEPA requires that an EIS discuss growth-inducing impacts of a project. The discussion must address how a proposed project may remove obstacles to growth, or encourage or facilitate other activities that could adversely impact the environment, either individually or cumulatively. Typically, the growth-inducing potential of a proposed project would be considered adverse if it fosters growth or a concentration of population above what is assumed in local and regional land use plans, or in projections made by regional planning authorities. Adverse growth-inducing impacts could also occur if a project adds infrastructure or service capacity which could accommodate growth levels which exceed those permitted by local or regional plans and policies.

The proposed project would employ up to 959 construction personnel and 90 operations personnel. Research shows that construction workers would commute as much as two hours each direction from their communities rather than relocate, and operations workers would commute as much as one hour (EPRI 1982). BLM reviewed the socioeconomics data for counties within the one-hour and two-hour commute ranges, which is within the study area and includes San Bernardino County and Clark County. **Table 4.9-3** indicates that a total of 231,000 construction workers are available within the study area. In addition, a total of 90 workers would account for a negligible amount of the total San Bernardino County and Clark County total labor force. As all workers would reside within the study area, no impacts to existing population levels would occur. Because the number of operational workers required represents such a small portion of the local available labor force, no adverse impacts to the study area population or employment base would result from proposed project operation. Because employment levels associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be approximately the same as those for the proposed project, the potential impacts would also be the same.

As discussed in Section 2, the primary need for the proposed project is driven by Federal and state requirements regarding the generation of renewable energy. According to the Energy Commission, peak electricity demand within California is projected to increase at a rate of 1.35% per year from 2008 through 2018 (CEC 2007c), and therefore, additional generating capacity from new sources will be required. The proposed project is not intended to supply power related to growth for any particular development, either directly or indirectly, and would not result in direct growth-inducing impacts. However, the proposed project could facilitate growth indirectly through the additional increased capacity of electric power that it would make available. Because the Mitigated Ivanpah 3 and Modified I-15 Alternatives would generate a reduced amount of power (370 MW) as compared to the proposed project (400 MW), the potential for these alternatives to facilitate growth would also be slightly lower.

6.4 The Relationship Between Short-Term Use and Long-Term Productivity

The proposed project would result in adverse, short-term impacts due to construction-related activities. Short-term impacts are those that would occur only during the period of construction, and would then cease at the end, or shortly after the end, of construction. Many adverse impacts, as discussed below, would occur throughout the 50-year operational life of the proposed project. Some adverse impacts, especially those associated with the removal of vegetation (such as biological and visual impacts), would continue for many years following site decommissioning.

Adverse short-term impacts to air quality would occur as a result of emissions from construction vehicles, commuting for construction workers, and fugitive dust emissions from active grading and wind erosion of exposed soils. Most of these impacts would cease at the end of construction. Fugitive dust emissions from erosion of exposed soils would continue for a short period after construction ceases, but decrease as revegetation of temporarily disturbed areas takes place. Following construction, adverse air quality impacts associated with operations would continue, but at a level reduced from that associated with construction. Both construction and operation-related emissions would be reduced through a combination of applicant-proposed mitigation measures, Energy Commission conditions, and compliance with federal, state, and local regulations. Following decommissioning, air quality impacts associated with emissions would cease. None of these impacts would occur as a result of the No Action Alternative. The level and duration of impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be the same as those for the proposed project.

The biological resources impacts associated with the proposed project would result primarily from the removal of wildlife and vegetation from the project area, fencing of the project area to keep wildlife out of the area, and operations of the facility. As such, all biological resource impacts discussed in Section 4.3 would be expected to endure throughout the 50-year operational life of the facility. Following decommissioning of the facility, some potential impacts associated with operations, such as impacts to bird collisions with power towers and heliostats, would cease immediately. However, adverse impacts to vegetation and wildlife associated with site disturbance would continue for many years following decommissioning, and the duration of the impacts would depend on the rate of success of site revegetation efforts. None of these biological resources impacts would occur with the No Action Alternative. The duration of impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be the same as those for the proposed project.

The adverse land use impacts associated with the proposed project are also related to the fencing of the project area, and its removal from other uses during its operational life. As such, these impacts would endure throughout the 50-year operational period. Following site decommissioning, the project fence would be removed, and the site would immediately be made available for other multiple land uses. However, return of the site to its current use as undisturbed habitat would take much longer, due to the length of time required for site revegetation efforts. No adverse land use impacts would occur as a result of the No Action Alternative. The duration of adverse land use impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be the same as those for the proposed project.

Socioeconomic impacts associated with the proposed project are expected to be beneficial, due to the payment of taxes and increased employment. These beneficial impacts would be greatest during project construction, when employment levels are highest, and would then continue at a reduced level during project operations. These beneficial impacts would cease when the project is decommissioned. There would be no beneficial socioeconomic impacts associated with the No Action Alternative. The duration of beneficial socioeconomic impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be the same as that for the proposed project.

Adverse impacts to visual resources would begin immediately when project construction begins, and continue for many years following project decommissioning. However, the source and type of visual impacts would change throughout the life cycle of the project. During the construction phase, adverse visual impacts would be associated with the change in color and texture of the project area as vegetation is removed and bare soil is revealed. Once the project becomes operational, the primary visual components would become the industrial appearance of the power towers and heliostat fields, including potential glare from reflective surfaces. Following decommissioning, the visual appearance of the project area is likely to continue to be different from the surrounding areas for many years, due to the length of time required for revegetation efforts. There would be no adverse visual impacts associated with the No Action Alternative. The adverse visual impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would have the same duration, and undergo the same types of changes through time, as those of the proposed project.

The magnitude and type of adverse impacts to traffic from the proposed project would also change through time. The level of these adverse impacts would be at their highest during project construction, due to the highest levels of employment and equipment deliveries during this time. Once the project became operational, adverse traffic impacts associated with worker commuting and deliveries would continue, but at a reduced level. Traffic impacts could temporarily increase during decommissioning, but would then cease immediately following decommissioning. No adverse traffic impacts would occur as a result of the No Action Alternative. The duration of adverse traffic impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives, including the change in impacts in the different phases of the project, would be the same as those for the proposed project.

The adverse impacts to recreation identified in Section 4.19 were primarily a result of the change of the visual character of the Ivanpah Valley area from undeveloped desert to a more industrial character. Therefore, the duration of the recreation impacts would be approximately the same as the duration of the visual impacts.

7.0 Standard BLM Terms and Conditions and Mitigation

7.1 Introduction

As described in Section 4.0 of the FEIS, the ISEGS project contains measures to mitigate or reduce impacts. These measures have been developed through a number of sources. The mitigation measures include a combination of the following:

- Measures that have been proposed by the applicant;
- Conditions of Certification proposed by the California Energy Commission;
- The project's General Conditions for Compliance 1 through 14 found in Appendix C
- Regulatory requirements of federal, state, and local agencies;
- USFWS terms and conditions identified in the Biological Opinion; and
- Additional BLM-proposed mitigation measures and standard ROW grant terms and conditions.

This section addresses the Standard BLM Terms and Conditions that would be contained in any right-of-way grant approved for the project. These terms and conditions are not directly tied to any specific resource impact as a mitigation measure but are nonetheless necessary for administration of any right-of-way authorization that is approved for the facility.

1. The holder shall construct, operate, and maintain the facilities, improvements, and structures within this right-of-way in strict conformity with the Plan of Development which was approved and made part of the grant on ________________. Any relocation, additional construction, or use that is not in accord with the approved plan of development, shall not be initiated without the prior written approval of the authorized officer. A copy of the complete right-of-way grant, including all stipulations and approved plan of development, shall be made available on the right-of-way area during construction, operation, and termination to the authorized officer. Noncompliance with the above will be grounds for immediate temporary suspension of activities if it constitutes a threat to public health and safety or the environment.
2. The holder will not initiate any construction or other surface disturbing activities on the ROW without prior written authorization of the Authorized Officer. Such authorization will be a written Notice to Proceed (NTP) (Form 2800-15) issued by the Authorized Officer or his delegated representative. Each NTP will authorize construction or use only as therein expressly stated and only for the particular location or use therein described, i.e., a construction spread by number or compressor station by name. The Authorized Officer will issue a NTP subject to such terms and conditions as deemed necessary when the design, construction, use, and operation proposals are in conformity with the terms and conditions of these stipulations.

3. The Authorized Officer may suspend or terminate (in writing) in whole or in part any NTP which has been issued, when in his judgment, unforeseen conditions arise which result in the approved terms and conditions being inadequate to protect the public health and safety or to protect the environment.
4. The holder will be in compliance with the Biological Opinion for listed and proposed species associated with this project signed by the US Fish and Wildlife Service on ___________________.
5. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate actions to prevent the loss of significant cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation measures will be made by the authorized officer after consulting with the holder.
6. Unless otherwise agreed to by the authorized officer in writing, powerlines shall be constructed in accordance to standards outlined in "Suggested Practices for Raptor Protection on Powerlines," Raptor Research Foundation, Inc., 1996. The holder shall assume the burden and expense of proving that pole designs not shown in the above publication are "eagle safe." Such proof shall be provided by a raptor expert approved by the authorized officer. The BLM reserves the right to require modifications or additions to all powerline structures placed on this right-of-way, should they be necessary to ensure the safety of large perching birds. Such modifications and/or additions shall be made by the holder without liability or expense to the United States.
7. The holder will attend preconstruction conference(s) prior to the holder's commencing construction and/or surface disturbing activities on the ROW. The holder and/or his representatives will attend this conference. The holder's contractor, or agents involved with construction and/or any surface disturbing activities associated with the ROW, will also attend this conference to review the stipulations of the grant including the plan(s) of development, as applicable.
8. The holder shall designate a representative who shall have the authority to act upon and to implement instructions from the authorized officer. The holder’s representative shall be available for communication with the authorized officer within a reasonable time when construction or other surface disturbing activities are underway.
9. The holder shall start construction of the initial phase of development within 12 months after issuance of a Notice to Proceed but no later than 2 years after the effective date of the issuance of the right-of-way authorization. The holder shall complete construction within the timeframes approved in the ROW grant and Plan of Development, but no later than 24 months after start of construction.

10. If a ROW grant and approved Plan of Development provides for a phased development, construction of each subsequent phase must begin within 3 years of the start of construction of the previous phase.

11. During operations, the holder shall maintain all onsite electrical generation equipment and facilities in accordance with the design standards in the approved Plan of Development. Any idle, improperly functioning, or abandoned equipment or facilities that have been inoperative for any continuous period of 3 months must be repaired, placed into service, and/or removed from the site within 30 days from receipt of a written Notice of Failure to Ensure Diligent Development, unless the holder is provided an extension of time by the BLM Authorized Officer.

12. Failure of the holder to comply with any diligent development provision of the authorization may cause the BLM authorized officer to suspend or terminate the authorization in accordance with 43 CFR 2807.17 and 18, and use the posted Performance and Reclamation bond to cover the costs for removal of any idle or abandoned equipment and/or facilities.

13. A bond, acceptable to the authorized officer, in the amount of $____________ shall be furnished by the holder prior to receiving a Notice to Proceed or at such earlier date as may be specified by the authorized officer. This bond must be maintained in effect until removal of improvements and restoration of the ROW have been accepted by the authorized officer. The only bond instruments acceptable to BLM are cash, cashier’s, or certified check, certificate or book entry deposits, negotiable U.S. Treasury bonds equal in value to the bond amount, or surety bonds from the approved list of sureties (U.S. Treasury Circular 570) payable to the Bureau of Land Management.

    The holder agrees that all monies deposited with the authorized officer as security for holder's performance of the terms and conditions of this grant may, upon failure on the holder's part to fulfill any of the requirements herein set forth or made a part hereof, be retained by the United States to be applied as far as may be needed to the satisfaction of the holder's obligations assumed hereunder, without prejudice whatever to any other rights and remedies of the United States.

    Should the bond delivered under this grant become unsatisfactory to the authorized officer, the holder, shall, within 30 days of demand, furnish a new bond.

    In the event of noncompliance with the terms and conditions of the ROW grant, the BLM will notify the holder that the surety (if one is used) or other bond instrument is subject to forfeiture and will allow the holder 15 days to respond before action is taken to forfeit the bond.

14. The holder shall protect all survey monuments found within the right-of-way. Survey monuments include, but are not limited to, General Land Office and Bureau of Land Management Cadastral Survey Corners, reference corners, witness points, U.S. Coastal and Geodetic benchmarks and triangulation stations, military control monuments, and recognizable civil (both public and private) survey monuments. In the event of obliteration or disturbance of any of the above, the holder shall immediately report the incident, in writing, to the

authorized officer and the respective installing authority if known. Where General Land Office or Bureau of Land Management right-of-way monuments or references are obliterated during operations, the holder shall secure the services of a registered land surveyor or a Bureau cadastral surveyor to restore the disturbed monuments and references using surveying procedures found in the Manual of Surveying Instructions for the Survey of the Public Lands in the United States, latest edition. The holder shall record such survey in the appropriate county and send a copy to the authorized officer. If the Bureau cadastral surveyors or other Federal surveyors are used to restore the disturbed survey monument, the holder shall be responsible for the survey cost.

15. Use of pesticides shall comply with all applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses within limitations imposed by the Secretary of the Interior. Prior to the use of the pesticides, the Holder shall obtain from the Authorized Officer, written approval of a Pesticide Use Proposal Plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, locations of storage and disposal of containers, and any other information deemed necessary by the Authorized Officer.

16. Only those chemicals (pesticides and herbicides) listed on the BLM approved label list are authorized for use on public lands. A Pesticide Use Proposal (PUP) must be submitted for each chemical used, and it cannot be used until approval has been obtained in writing from the BLM authorized officer. The report needs to include any surfactants or dyes used in the spraying operation. Applicator(s) of chemicals used must have completed the pesticide certification training and have a current up to date Certified Pesticide Applicator's License. Pesticide Application Records for the areas and acres treated must be submitted to the BLM ______________Field Office each year. This includes the following:

    - Brand or Product name
    - EPA registration number
    - Total amount applied (use rate #A.I./acre)
    - Date of application
    - Location of application
    - Size of area treated
    - Method of treatment (air/ground)
    - Name of applicator
    - Certification number and dates
    - Costs to treatment
    - Amount of surfactants or dyes used in spraying operation

    The record information must be recorded no later than 14 days following the pesticide application and must be maintained for ten years.

17. Construction sites shall be maintained in a sanitary condition at all times; waste materials at those sites shall be disposed of promptly at an appropriate waste disposal site. 'Waste' means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment. A litter policing program shall be implemented by the holder which covers all roads and sites associated with the right-of-way.

18. The holder will be liable for all fire suppression costs resulting from fires caused during construction. All guidelines and restrictions imposed by agency fire control officials will be followed.

19. The Holder shall fund and implement a third party Compliance Program with the Authorized Officer in accordance with the Compliance Monitoring Plan. The project's General Compliance Mitigation Measures will be integrated into a BLM Compliance Monitoring Plan (hereafter referred to as the Compliance Plan) to assure compliance with the terms and conditions of any approved ROW grant, including the approved Plan of Development (POD)

    The Compliance Plan is composed of elements that:

    - set forth the duties and responsibilities of BLM's Authorized Officer, the project owner, delegate agencies, and others;
    - set forth the requirements for handling confidential records and maintaining the compliance record;
    - list procedures for settling disputes and making post-authorization changes;
    - list procedures for requesting and approving ROW Grant or POD changes;
    - list the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all BLM approved mitigation measures;
    - establish requirements for modifications or amendments to facility Closure, Revegetation, and Restoration Plans; and
    - specify additional BLM mitigation measures for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure.

Definitions

The following terms and definitions are used to establish when Mitigation Measures are implemented.

BLM Authorized Officer

The BLM Authorized Officer for the Project is the BLM Needles Field Manager or his designated Compliance Inspector that is responsible for oversight and inspection of all construction and operational related activities on public land.

Pre-Construction Site Mobilization

Site mobilization is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

Construction

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

Grading, Boring, and Trenching

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring and trenching above, construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in “Construction” 1, 2, 3, or 4 above.

Start of Commercial Operation

For compliance monitoring purposes, “commercial operation” begins after the completion of start-up and commissioning, when each of the power plants has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

7.2 BLM’s Authorized Officer Responsibilities

BLM’s Authorized Officer shall oversee the compliance monitoring and is responsible for:

1. Ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of BLM’s ROW

2. Resolving complaints
3. Processing post-authorization changes to the mitigation measures
4. Documenting and tracking compliance filings
5. Ensuring that compliance files are maintained and accessible

BLM's Authorized Officer is the contact person for BLM and will consult with appropriate responsible agencies when handling disputes, complaints, and amendments. All project compliance submittals are submitted to BLM's Authorized Officer or his designated representative for processing.

Chief Building Official Responsibilities

The CBO shall serve as BLM's and the Energy Commission's delegate to assure the project is designed and constructed in accordance with BLM's Right-of-Way Grant, BLM mitigation measures, the Energy Commission's Decision including Conditions of Certification, California Building Standards Code, local building codes and applicable laws, ordinances, regulations and standards to ensure health and safety. The CBO is typically made-up of a team of specialists covering environmental, civil, structural, mechanical and electrical disciplines whose duties include the following:

1. Performing design review and plan checks of all drawings, specifications and procedures;
2. Conducting construction inspection;
3. Functioning as BLM's and the Energy Commission's delegate including reporting noncompliance issues or violations to the BLM Authorized Officer for action and taking any action allowed including issuing an Immediate Temporary Suspension of activities, to ensure compliance;
4. Exercising access as needed to all project owner construction records, construction and inspection procedures, test equipment and test results; and
5. Providing weekly reports on the status of construction to BLM's Authorized Officer.

8.0 Summary

8.1 Comparison of Impacts Between Alternatives

A comparison of the impacts associated with the proposed project, Mitigated Ivanpah 3, Modified I-15, and No Action Alternatives is presented in **Table 8-1** below.

Although the proposed project would achieve all project objectives, and generate the maximum amount of beneficial socioeconomic, greenhouse gas, and air pollutant impacts, it would also result in the greatest number and magnitude of adverse impacts. These would include impacts to Biological Resources, Soil and Water Resources, and Visual Resources that could not be completely mitigated.

Selection of the Mitigated Ivanpah 3 Alternative would accomplish all of the objectives of the purpose and need, including meeting power demand, as well as federal and state objectives for renewable energy development. It would also achieve almost all of the beneficial impacts of the proposed project, including socioeconomic benefits of increases in employment and fiscal resources, and displacement of greenhouse gas and air pollutant emissions associated with fossil-fueled power plants. While meeting these objectives and providing these beneficial impacts, the adverse impacts of the Mitigated Ivanpah 3 Alternative would be much lower than the proposed project, especially in the areas of Biological Resources, Soil and Water Resources, and Visual Resources.

Selection of the Modified I-15 Alternative would also accomplish all of the objectives of the purpose and need, including meeting power demand, as well as federal and state objectives for renewable energy development. It would also achieve almost all of the beneficial impacts of the proposed projects, including socioeconomic benefits of increases in employment and fiscal resources, and displacement of greenhouse gas and air pollutant emissions associated with fossil-fueled power plants. While meeting these objectives and providing these beneficial impacts, the adverse impacts of the Modified I-15 Alternative would be lower than the proposed project in some areas, but would be increased in other areas. With respect to Biological Resources, the Modified I-15 Alternative would have a reduced impact on high quality desert tortoise habitat, as a result of moving Ivanpah Unit 3 to a location which partially overlaps the lower quality habitat adjacent to Interstate 15. However, impacts to Visual Resources and potential glare impacts for viewers on Interstate 15 would increase, due to the placement of heliostat fields within 1,000 feet of the highway for a distance of 1.8 miles. The Modified I-15 Alternative could also result in an increase in impacts to recreational access as compared to the proposed project, due to the greater length of existing OHV trails that would be included within the project footprint.

Most of the impacts associated with the Mitigated Ivanpah 3 and Modified I-15 Alternatives would be very similar to each other, based on the similar size, technology, and configuration of the facility. The only physical difference between the two alternatives would be the location of Ivanpah Unit 3, which would border the northern portion of the facility in the Mitigated Ivanpah 3 Alternative, and the southern portion of the facility in the Modified I-15 Alternative. This difference in location results in potentially different impacts to several resources, as follows:

- Biological Resources

  The difference in location has the potential to impact different habitat, wildlife, and plants in the two different locations. The northern location of Ivanpah Unit 3 in the Mitigated Ivanpah 3 Alternative is likely to have a higher density of tortoises and rare plants, and therefore a higher potential for impacts, than the southern location of Ivanpah Unit 3 in the Modified I-15 Alternative.

- Land Use

  Both the Mitigated Ivanpah 3 and Modified I-15 Alternatives would partially occupy designated utility corridors; however, the corridors involved are different from each other. Under the Mitigated Ivanpah 3 Alternative, Ivanpah Unit 3 would occupy a portion of utility corridor D, while Ivanpah unit 3 in the Modified I-15 Alternative would partially occupy corridor B. In both cases, portions of the corridors would remain available for other uses.

- Soil and Water

  Based on a review of topographic information and stormwater modeling that covers a portion of the Modified I-15 site, it is likely that the position of the Modified I-15 site is similar to, or possibly slightly more favorable than, the Mitigated Ivanpah 3 site with respect to potential stormwater damage.

- Traffic and Transportation

  The potential issue of distraction to drivers on Interstate 15 due to glare from the heliostats and power tower receivers cannot be quantified, and is difficult to predict. If this issue should occur, it would likely be more disruptive at the Modified I-15 location than the Mitigated Ivanpah 3 location, due to the closer proximity of the heliostats and power towers to Interstate 15.

- Visual Resources

  With respect to the position of viewers located on Clark Mountain or the Stateline Wilderness to the north and west of the facility, visual impacts associated with the Modified I-15 Alternative would be lower than those for the Mitigated Ivanpah 3 Alternative. This would be due to the more distal location of Ivanpah Unit 3 in the Modified I-15 Alternative. For the same reason, visual impacts to viewers on Interstate 15 would be higher for the Modified I-15 Alternative, due to the situation of Ivanpah Unit 3 within 1,000 feet of the highway, for a distance of approximately 1.8 miles.

- Recreation

  Both the Mitigated Ivanpah 3 Alternative and the Modified I-15 Alternative would occupy land that currently includes designated OHV trails used for recreation. In both cases, the trails would be re-routed around the outside of the facilities. The length of trails that would be affected would be 8,100 feet (1.5 miles) for the

Mitigated Ivanpah 3 Alternative, and 12,270 feet (2.4 miles) for the Modified I-15 Alternative.

Although it would have no adverse impacts, the No Action Alternative would not accomplish project objectives of meeting the demand for power, or contribute to meeting state and federal objectives for renewable energy development. It also would not provide the beneficial impacts associated with the proposed project and Mitigated Ivanpah 3 Alternative, including the socioeconomic benefits. By not contributing to the development of renewable energy, the No Action Alternative would cause the state to continue to rely on fossil-fueled energy sources, with the associated greenhouse gas and air pollutant emissions.

8.2 Identification of Preferred Alternative

Public comments received on the Supplemental DEIS included additional information and opinions regarding the relative merits of the four alternatives. A detailed discussion of these comments is provided in Appendix A-2. The following summarizes the major points of the comments with respect to the identification of a preferred alternative:

- Many commentors, including the applicant, public officials, labor unions, and individuals favor the proposed project because it would meet the growing electricity needs of the region, would generate that power without releasing greenhouse gases, and would provide jobs. However, numerous other commentors, including environmental organizations and individuals, either oppose the proposed project, or desire that it be modified, due to the adverse impacts that the project would have on biological resources, visual resources, recreation, air quality, and land uses.
- The applicant and individuals provided comments in support of the Mitigated Ivanpah 3 Alternative. These comments supported this alternative for the reasons cited for the proposed project above, as well as the fact that the alternative would result in a reduction of adverse impacts to biological resources. Several of the environmental organizations and individuals who were opposed to the proposed project also opposed the Mitigated Ivanpah 3 Alternative, primarily because they felt that the reduction in adverse impacts associated with this alternative was not as great as could be achieved through the Modified I-15 Alternative.
- The Modified I-15 Alternative was supported by several environmental organizations, including the Sierra Club, primarily because placement of the facility closer to I-15 would minimize adverse impacts to biological resources. The applicant opposed the Modified I-15 Alternative for several technical and impact-related reasons. In their comments on the Supplemental DEIS, the applicant noted that the Modified I-15 Alternative could not be made technically or financially feasible for them to implement to meet ARRA deadlines. This is due primarily to the length of time that would be needed to re-design and re-configure the engineering design for the project. The applicant also cited increased visual impacts in their opposition to the Modified I-15 Alternative.

- Numerous commentors, including environmental organizations and individuals, supported the No Action Alternative. This was primarily due to concerns with placing the facility in a currently undeveloped location, the likelihood that the facility would incrementally add to industrialization of Ivanpah Valley, and the lack of suitable mitigation and compensation for desert tortoises. Some commentors, such as the Center for Biodiversity, stated a preference for the No Action Alternative, but stated that if a facility must be built, then they preferred the Modified I-15 Alternative.

Based on the comparative analysis of the ability of each alternative to meet the purpose and need, and the environmental impacts that would be associated with each alternative as discussed in this FEIS and as summarized above, the Mitigated Ivanpah 3 Alternative is identified as the preferred alternative.

Table 8-1
Comparison of Impacts Between Alternatives

Resource	Proposed Project	Mitigated Ivanpah 3 Alternative	Modified I-15 Alternative	No Action Alternative
Air Quality	• Potential impacts could occur, would be mitigated • Beneficial impact is the avoidance of greenhouse gas and pollutant emissions associated with fossil-fueled power plants	• Potential impacts could occur, would be mitigated • Lower overall air emissions than proposed project, same as Modified I-15 • Higher short-term NOx concentrations than proposed project, same as Modified I-15 • Beneficial avoidance of greenhouse gas and pollutant emissions would be lower than proposed project, same as Modified I-15	• Potential impacts could occur, would be mitigated • Lower overall air emissions than proposed project, same as Mitigated Ivanpah 3 • Higher short-term NOx concentrations than proposed project, same as Mitigated Ivanpah 3 • Beneficial avoidance of greenhouse gas and pollutant emissions would be lower than proposed project, same as Mitigated Ivanpah 3	• No adverse impacts • Would not achieve beneficial impact of avoiding greenhouse gas and pollutant emissions associated with fossil-fueled power plants
Biological Resources	• Direct adverse impacts to desert tortoise • Potential impacts to MBTA and Special Status bat species • Potential impacts to Special Status plant species	• Tortoise impacts reduced from proposed project, but likely still higher than Modified I-15 • Potential impacts to MBTA and Special Status bat species • Special status plant impacts reduced from proposed project. Existing information suggests rare plant impacts would be higher at Mitigated Ivanpah 3 than Modified I-15; however, field surveys required at Modified I-15 to confirm this.	• Tortoise impacts reduced from proposed project, and likely also reduced from Mitigated Ivanpah 3 • Potential impacts to MBTA and Special Status bat species • Special status plant impacts likely reduced from proposed project. Existing information suggests rare plant impacts would be lower at Modified I-15 than at Mitigated Ivanpah 3; however, field surveys required at Modified I-15 to confirm this.	• No adverse impacts

Resource	Proposed Project	Mitigated Ivanpah 3 Alternative	Modified I-15 Alternative	No Action Alternative
Cultural Resources	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project reduced due to reduced acreage of disturbance • Impacts likely to be similar to Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project reduced due to reduced acreage of disturbance • Impacts likely to be similar to Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts
Hazardous Materials Management	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction • Impacts likely to be similar to Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction • Impacts likely to be similar to Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts
Land Use	• Conforms with land use plans • Partially covers designated utility corridors • Contributes to cumulative removal of land from other land uses	• Conforms with land use plans • Reduced impact on designated utility corridors, as compared to proposed project • Utility corridor impacts in different location than Modified I-15, but of the same magnitude • Reduced contribution to cumulative removal of land from other land uses when compared to proposed project • Contribution to cumulative removal of land similar to Modified I-15	• Conforms with land use plans • Reduced impact on designated utility corridors, as compared to proposed project • Utility corridor impacts in different location than Mitigated Ivanpah 3, but of the same magnitude • Reduced contribution to cumulative removal of land from other land uses • Contribution to cumulative removal of land similar to Mitigated Ivanpah 3	• No adverse impacts

Resource	Proposed Project	Mitigated Ivanpah 3 Alternative	Modified I-15 Alternative	No Action Alternative
Noise and Vibration	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced duration of construction • Impacts likely to be similar to Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced duration of construction • Impacts likely to be similar to Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts
Public Health and Safety	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction • Impacts likely to be similar to Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction • Impacts likely to be similar to Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts
Socioeconomics and Environmental Justice	• No adverse impact • Beneficial impact on employment and fiscal resources	• Beneficial impacts would be lower than proposed project, but the same as Modified I-15	• Beneficial impacts would be lower than proposed project, but the same as Mitigated Ivanpah 3	• No adverse impacts • No beneficial impacts
Soil and Water Resources	• Potential adverse impact due to stormwater damage to facility • Potential impacts on groundwater use and quality could be mitigated	• Stormwater damage impacts would be much lower than proposed project due to reduced acreage and disturbance of active drainages • Stormwater impacts likely to be the same or higher than those in Modified I-15 • Groundwater use and quality impacts would be lower than proposed project, but the same as Modified I-15, and could be mitigated.	• Stormwater damage impacts likely lower than proposed project due to reduced acreage • Stormwater impacts likely to be the same or lower than those in Mitigated Ivanpah 3 • Groundwater use and quality impacts would be lower than proposed project, but the same as Mitigated Ivanpah 3, and could be mitigated.	• No adverse impacts

Resource	Proposed Project	Mitigated Ivanpah 3 Alternative	Modified I-15 Alternative	No Action Alternative
Traffic and Transportation	• Direct and cumulative impact on I-15 traffic on Fridays • Unable to determine impact from potential glare distraction	• Impacts would be lower than proposed project, due to reduced duration of construction, and the same as Modified I-15 • Impacts during operations would be the same as the proposed project and Modified I-15 • Unable to determine impact from glare, but it would be lower than the proposed project and Modified I-15	• Impacts would be lower than proposed project, due to reduced duration of construction, and the same as Mitigated Ivanpah 3 • Impacts during operations would be the same as the proposed project and Mitigated Ivanpah 3 • Unable to determine impact from glare, but it could be higher than the proposed project and Mitigated Ivanpah 3 due to placement of heliostats adjacent to I-15	• No adverse impacts
Transmission Line Safety and Nuisance	• Potential impacts could be mitigated	• Impacts would be equal to the proposed project and Modified I-15, and could be mitigated	• Impacts would be equal to the proposed project and Mitigated Ivanpah 3, and could be mitigated	• No adverse impacts
Visual Resources	• Direct, adverse impact to sensitive viewing locations • Contributes to cumulative increase in industrial character of area	• Adverse impacts would occur, but would be lower than proposed project • Impacts to viewers on I-15 would be lower than Modified I-15	• Impacts to viewers in recreation areas to the west and north would be reduced from proposed project and Mitigated Ivanpah 3, but still adverse • Impacts to viewers on I-15 would be increased from proposed project and Mitigated Ivanpah 3	• No adverse impacts
Waste Management	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts

Resource	Proposed Project	Mitigated Ivanpah 3 Alternative	Modified I-15 Alternative	No Action Alternative
Worker Safety and Fire Protection	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts
Geology, Paleontology, and Minerals	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts
Livestock Grazing	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction • Impacts would be in slightly different location than Modified I-15, but of the same magnitude • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction • Impacts would be in a slightly different location than Mitigated Ivanpah 3, but of the same magnitude • Impacts could be mitigated	• No adverse impacts
Wild Horses and Burros	• Potential impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Modified I-15 • Impacts could be mitigated	• Potential impacts would be lower than proposed project due to reduced acreage and duration of construction, and the same as Mitigated Ivanpah 3 • Impacts could be mitigated	• No adverse impacts

Resource	Proposed Project	Mitigated Ivanpah 3 Alternative	Modified I-15 Alternative	No Action Alternative
Recreation	• Potential impacts to recreation access and Ivanpah Dry Lake bed could be mitigated • Would contribute to cumulative reduction of recreational experience by increasing industrial character of the area	• Potential impacts to recreation access and Ivanpah Dry Lake bed would be lower than proposed project due to reduced acreage and disturbance of active drainages • Contribution to cumulative reduction of recreational experience would be approximately equal to proposed project and Modified I-15	• Potential impacts to recreation access would be higher than proposed project and Mitigated Ivanpah 3 due to increased length of existing trails • Contribution to cumulative reduction of recreational experience would be approximately equal to proposed project and Mitigated Ivanpah 3	• No adverse impacts
Engineering Characteristics	• Potential impacts could be mitigated	• Would have higher level of land use efficiency than proposed project • Characteristics would be the same as Modified I-15	• Would have higher level of land use efficiency than proposed project • Characteristics would be the same as Mitigated Ivanpah 3	• No adverse impacts

9.0 Public Participation

Both the BLM's NEPA process and the Energy Commission's CEQA-equivalent process provide opportunities for public participation in the scoping of the environmental analysis. For the Energy Commission, this outreach program is primarily facilitated by the PAO. As part of the coordination of the environmental review process required under the Energy Commission/BLM California Desert District MOU, the agencies have jointly held public meetings and workshops which accomplish the public coordination objectives of both agencies. This is an ongoing process that to date has involved the following efforts.

Libraries

The AFC was sent to the main county libraries in San Bernardino, Barstow, Fresno, and Eureka; the main branches of the San Diego and San Francisco public libraries; the University Research Library at UCLA; the California State Library, and the Energy Commission's library in Sacramento.

Outreach Efforts

BLM solicited interested members of the public and agencies through the NEPA scoping process. BLM published a Notice of Intent to develop the EIS and amend the CDCA Plan in the Federal Register, Vol. 72, No. 214, page 62671, on November 6, 2007. The initial Public Scoping meeting was held on January 4, 2008, and coincided with the Informational Hearing held by the Energy Commission. On January 9, 2009, BLM published notice of an extension of the public scoping period, and an additional joint public scoping meeting was held on January 25, 2008.

Following the scoping period, the Energy Commission and BLM held additional joint Issue Resolution workshops which were announced and made available to the public. These workshops were held on June 23, 2008 in Primm, Nevada, and on July 31 and December 15, 2009 in Sacramento, California. The Energy Commission continued to accept and consider public comments, and granted petitions to intervene to eight interested groups including Defenders of Wildlife, Sierra Club, Basin and Range Watch, and Center for Biological Diversity (June 2, 2009), California Native Plant Society, Western Watersheds, CURE, and San Bernardino County. Although not officially part of BLM's NEPA process, BLM's NEPA analysis was supported by information received through these activities.

The BLM public participation process included soliciting comments regarding the scope of the analysis from other government agencies, the public, and non-governmental organizations.

The Notice of Availability of the DEIS was published on November 10, 2009; the 90-day public review and comment period ended on February 11, 2010. During the public comment period, a variety of activities occurred in which BLM received additional information regarding the proposed project and potential alternatives, impacts, and mitigation measures. These activities included:

- Receipt of comments from the public, and other local, state, and federal agencies during the public comment period;
- Public testimony by Energy Commission staff and consultants, BrightSource staff and consultants, and intervenors associated with the Energy Commission certification process for ISEGS;
- Workshops, involving BLM staff and consultants as well as the above groups, to consider and evaluate impact analyses and mitigation approaches; and
- Submittal of additional technical reports, project design information, impact analyses, and applicant-proposed mitigation measures by BrightSource.

The Notice of Availability of the SDEIS was published on April 16, 2010; the 45-day public review and comment period ended on June 1, 2010.

The applicant's Application for Certification to the Energy Commission (CH2M Hill 2007), the Energy Commission's PSA, and the joint BLM/Energy Commission FSA/DEIS are all publicly available on the Energy Commission website at http://www.energy.ca.gov/sitingcases/ivanpah/index.html.

Summary of DEIS Public Comments

BLM received comments on the DEIS from 37 individuals, groups, and agencies. These comments are summarized in Appendix A-1 of this FEIS. These include hundreds of comments received both in favor of the project, and in opposition to the project, in the form of mass mailings and e-mails. The summary in Appendix A-1 of those comments includes a description of how each comment was evaluated and responded to by BLM. Also, where a comment is particularly relevant to the text of the FEIS (either comments resulting in revision to the FEIS, or comments dissenting from important conclusions of the FEIS), that information has been incorporated into the FEIS.

For a full list of the DEIS comments and BLM's responses, see Appendix A-1. The items below provide a brief summary of the more substantial comments.

Alternatives

Many commenters raised objections to the number and range of alternatives considered in the DEIS. This included general objections to the limited number of alternatives, objections to the number of alternatives being limited by a narrow purpose and need statement, and opinions regarding other alternatives that should have retained for more detailed analysis. In response to these comments, BLM re-reviewed the rationale for eliminating all of the identified alternatives from detailed analysis, including specific analysis of each alternative against BLM's criteria for retaining alternatives in the BLM National Environmental Policy Act Handbook H-1790-1, Page 52.

As a result of this review, the following actions were taken:

- Two alternatives (the Reduced Acreage alternative and the I-15 Alternative) that had been eliminated from detailed evaluation were retained, and that additional analysis was presented in the Supplemental DEIS published in April, 2010.

- Two alternatives that had not been identified in the DEIS (Ivanpah Playa and Phased Approval) were added to the list of alternatives considered.
- The rationale for elimination for all other alternatives was reviewed, and the text describing the rationale revised to be consistent with the BLM NEPA Handbook.
- The introductory text of the alternatives analysis was modified to more accurately describe the difference between the initial alternatives identification and screening process, and the more detailed environmental evaluation of the retained alternatives.

Cumulative Impact Analysis

A variety of comments were received regarding the scope and methodology used for the cumulative impact analysis. This included specific comments regarding the relationship of the EITP project to the Ivanpah SEGS project, recommendations for other projects that needed to be considered, recommendations for additional quantitative analysis, and concerns regarding the format in which the analysis was presented. In response to these comments, the following modifications were made:

- Additional information regarding the EITP project, including project description information that was not available at the time of the DEIS, and environmental impact analysis information contained in the April 2010 EIR/EIS for the EITP project, was added in several locations in the FEIS. This included the proposed project description, the section on Transmission Line Safety and Nuisance, and the cumulative impacts analysis section. The FEIS indicates that the EITP is considered a cumulative action with respect to Ivanpah SEGS.
- The format in which the cumulative analysis was presented was modified. In the DEIS, the projects considered in the analysis were presented in a stand-alone Cumulative Scenario section, and the actual discussion and analysis was included within the impact analysis sections. As noted in may comments, this resulted in a lack of consistency in the projects considered, and in the level of analysis, among the technical sections. These issues were corrected by developing a single section that defines all of the projects considered up front, and then presents all of the technical analyses together.
- The level of quantitative analysis in the cumulative analysis was improved, primarily through the availability of new data since the publication of the DEIS. At the time of the DEIS, no environmental analysis documents existed for the EITP, the Silver State solar projects, the DesertXPress project, or the Southern Nevada Supplemental Airport project. Subsequent to the publication of the DEIS, much of this information became publicly available, and it has now been in corporate into the FEIS.

Impacts to Biological Resources

A primary focus of the comments on the DEIS regarded the sufficiency of analysis of biological resource impacts, and the scope of the alternatives and mitigation measures developed to address these impacts. The comments focused on the desert tortoise and rare plants, but also included comments on birds, insects, cryptobiotic crusts, bighorn sheep, gila monsters, burros, and other species. The comments ranged from a desire for BLM to consider alternatives that would protect biological resources on the project site indefinitely, a desire for more quantitative analysis of impacts, and objections to the range and sufficiency of proposed mitigation measures. In response to these comments, the following modifications were made in the FEIS:

- In an attempt to reduce the magnitude of the impact of the proposed project on desert tortoise and rare plants, BLM cooperated with the Energy Commission, the applicant, and the intervenors to develop and analyze two alternatives, the Mitigated Ivanpah 3 and Modified I-15 Alternatives, which were specifically intended to reduce impacts to tortoises and rare plants. The Mitigated Ivanpah 3 Alternative, which would reduce the magnitude of impacts to these resources, has been identified by BLM as the preferred alternative.
- BLM considered other comments related to evaluation of alternatives that would preclude future development of the project area, and concluded that these alternatives were outside of the scope of BLM's requirement to evaluate the proposed project.
- The format of the biological resources section was modified to more clearly define those species within the scope of BLM's analysis, and to reach an impact conclusion for each resource.
- Additional data and analyses were added, as needed to incorporate the newest information related to various species. This included addition of recent requirements for golden eagles, recent decisions reached by USFWS and CDFG regarding acceptable desert tortoise compensation, and addition of analysis related to the MBTA.

General Industrialization, and placement of Project in Currently Undeveloped Area

Many of the public comments, including those associated with alternatives, cumulative impacts, and biological resources above, generally opposed the project because it would develop a currently undeveloped property and could, through growth inducing impacts, contribute to a general industrialization of the Ivanpah Valley area. These impacts were identified and disclosed in the DEIS, SDEIS, and FEIS, including the reduction in habitat for sensitive species, the change of the visual character of the area from undeveloped to industrialized, and the impact of this change on land use and recreation in the area. These impacts were all considered in BLM's selection of a preferred alternative.

Additional Comments

Other substantial comments were received with respect to impacts to the Mojave National Preserve, to air traffic associated with the Southern Nevada Supplemental Airport, and to socioeconomic impacts to San Bernardino County. BLM considered these comments, and the following summarizes the results of BLM's review of these comments:

- With respect to impacts to the Mojave National Preserve, BLM reviewed the impact analyses in the DEIS to verify that they appropriately considered receptors associated with the Preserve. In some case, such as visual and biological resources, BLM concluded that the DEIS appropriately considered these receptors. In other cases, such as air quality and noise, BLM performed additional analysis of potential receptors in the Preserve. However, with respect to a request for a stand-alone section analyzing the Preserve, it was concluded that analysis of receptors within the Preserve was most appropriately performed in the technical sections.

- The County's comments regarding socioeconomic impacts, including impacts to County fire and emergency response services, contradicted information that was originally provided by the County during the DEIS process. In response, BLM sent a letter to the County requesting additional information. The County did not respond to that letter in time to incorporate a revision to the FEIS. However, the text of the FEIS was revised to include the new information from the County.
- The Clark County Department of Aviation's comments regarding the impact of the proposed project on the Southern Nevada Supplemental Airport were reviewed. In most cases, it was determined that the information requested in the comments was already present in the DEIS. However, BLM also responded by sending a letter to the FAA requesting additional information on their concerns, if any. FAA did not respond to that letter in time to incorporate a revision to the FEIS.

Summary of Supplemental DEIS Public Comments

BLM received comments on the Supplemental DEIS from 20 individuals, groups, and agencies. These comments are summarized in Appendix A-2 of this FEIS. These include hundreds of comments received both in favor of the project, and in opposition to the project, in the form of mass mailings and e-mails. The summary in Appendix A-2 of those comments includes a description of how each comment was evaluated and responded to by BLM. Also, where a comment is particularly relevant to the text of the FEIS (either comments resulting in revision to the FEIS, or comments dissenting from important conclusions of the FEIS), that information has been incorporated into the FEIS.

For a full list of the DEIS comments and BLM's responses, see Appendix A-1. The items below provide a brief summary of the more substantial comments.

Alternatives

The comments received on the SDEIS repeated many of the comments on the DEIS with respect to the limitations on the number of alternatives considered. Also, detailed comments were received providing rationale in favor and in opposition to both the Mitigated Ivanpah 3 and Modified I-15 Alternatives. No text or analysis changes were made in response to these comments. However, the information in the comments was considered in the selection of BLM's preferred alternative.

Cumulative Impact Analysis

The SDEIS did not include any revision of the cumulative impact analysis that had been provided in the DEIS, including cumulative analysis of the additional alternatives. Therefore, many of the comments on the SDEIS repeated earlier DEIS comments on the scope of the cumulative analysis. BLM addressed these comments through the revision of the format and scope of cumulative analysis, which is now included in Section 5 of the FEIS.

Biological Resources

Many comments were received on the value of the Mitigated Ivanpah 3 and Modified I-15 Alternatives in reducing impacts to biological receptors, specifically the desert tortoise and rare plants. These comments were considered, and additional information was presented in these analyses where applicable.

10.0 List of Preparers

10.1 Draft EIS Project Team

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Michael W. Ahrens	Supervisory Outdoor Recreation Planner/OHV
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Kenneth G. Downing	Geologist/Soil and Water
Sarah C. Murray	Archaeologist
BLM California Desert District Office	
Lawrence F. LaPre	Biologist
BLM California State Office	
Sandra McGinnis	Planning and Environmental Coordinator
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Robert Dover	Project Manager
Serkan Mahmutoglu	Soil and Water Resources
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James Jewell	Traffic and Transportation
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William Kanemoto	Visual Resources
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Shahab Koshmashrab	Facility Design, Power Plant Efficiency
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10.2 Supplemental and Final EIS Project Team

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Justin Butler	Comment Management and Response
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