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FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR THE
AMARGOSA FARM ROAD
SOLAR ENERGY PROJECT
(NVN-084359)

Prepared for and under the Direction of:
Bureau of Land Management
Pahrump Field Office

Prepared by:
EPG, Inc.

On Behalf of:
Solar Millennium, LLC

October, 2010

BLM/NV/PA/ES-10/16+1793

BLM Mission Statement

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

BLM/NV/PA/ES-10/16+1793

DOI No. FES 10-53



United States Department of the Interior



BUREAU OF LAND MANAGEMENT
Southern Nevada District
Pahrump Field Office
4701 N. Torrey Pines Drive
Las Vegas, NV 89130
<http://www.blm.gov/nv/st/en/fo/lvfo.1.html>

In Reply Refer To:
N-084359 2800 (NVS3100)

October 2010

Dear Reader:

Enclosed for your review is the *Amargosa Farm Road Solar Energy Project Final Environmental Impact Statement* (EIS). The Bureau of Land Management (BLM) Pahrump Field Office has prepared this Final EIS in response to a right-of-way application submitted by Solar Millennium, LLC to construct and operate two concentrated solar thermal parabolic trough power plant facilities on public lands in Amargosa Valley, approximately 80 miles northwest of Las Vegas, in Nye County, Nevada. Cooperating agencies for this Final EIS include the Department of Defense, Department of Energy, National Park Service, U.S. Army Corps of Engineers, Nevada Department of Wildlife, and Nye County. The purpose of this Final EIS is to assist BLM in its decision-making process with respect to the requested right-of-way.

This Final EIS considers the expected environmental effects associated with granting the right-of-way on public land and subsequent construction and operation of the Amargosa Farm Road Solar Energy Project. There was a 45 day comment period following the publication of the Draft EIS, during which comments were received via email, fax, and postal mail. There were also 4 public meetings held for comments to be received and entered into the public record. Overall 37 comment documents were received, and all of the comments have been addressed and can be found in Appendix G.

The Amargosa Farm Road Solar Energy Project Final EIS will be available for 30 days. A description of new or missed information within the Final EIS may be submitted within thirty days to:

BLM, Pahrump Field Office
Attn: Greg Helseth
Renewable Energy Project Manager
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Las Vegas, NV 89130
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Environmental Impact Statement for the Amargosa Farm Road Solar Energy Project

Draft

Final

Lead Agency: United States Department of the Interior
Bureau of Land Management

Cooperating Agencies: Department of Defense
Department of Energy
National Park Service
United States Army Corps of Engineers
Nevada Department of Wildlife
Nye County

Counties Directly Affected: Nye County, Nevada

Environmental Impact Statement Contact:

Greg Helseth
Renewable Energy Project Manager
4701 N. Torrey Pines Drive
Las Vegas, NV 89130

Date Final EIS filed with U.S. Environmental Protection Agency: October 8, 2010

Abstract

The Bureau of Land Management (BLM) Pahrump Field Office has prepared this Final Environmental Impact Statement (EIS) in response to a right-of-way application submitted by Solar Millennium, LLC to construct and operate the Amargosa Farm Road Solar Energy Project (Project). The proposed Project would be located on BLM- administered lands, approximately 80 miles northwest of Las Vegas, in the Amargosa Valley in Nye County, Nevada. Some portions of the proposed Project would be located on private lands, including a 40-acre parcel at the south end of the Project area and possibly the water pipeline(s) that would supply water to the Project site.

The Project area is located approximately five miles south of U.S. Highway 95 and five miles west of NV 373. The majority of the proposed Project area would be located north of Amargosa Farm Road and east of Valley View Boulevard. Solar Millennium's original right-of-way request of 7,670 acres was refined to include only 6,320 acres based on biological and cultural resources surveys conducted during the spring 2009. Because the results were consistent throughout the proposed Project right-of-way, the acreage was reduced to the preliminary design configuration.

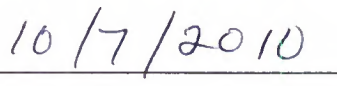
Project facilities would be located on approximately 4,350 acres and would include the solar fields, power blocks (one power block located in the center of each solar field), an office and maintenance building, parking area, lay-down area, stormwater detention basin, and switchyard.

This Final EIS considers the expected environmental effects associated with granting a right-of-way on public land and subsequent construction and operation of the proposed Project. The BLM will use the EIS when rendering a decision about the requested right-of-way. The BLM's decision will be to grant, grant with modifications, or deny the request for a right-of-way on public lands administered by the BLM. This Final EIS satisfies the requirements of the National Environmental Policy Act, which mandates that federal agencies analyze the environmental consequences of major federal actions.

Official responsible for the EIS:



Gayle Marrs-Smith



Date

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ACRONYMS AND ABBREVIATIONS

°C	Celcius
°F	Fahrenheit
AC	alternating current
ACEC	Area of Critical Environmental Concern
afy	acre-feet per year
amsl	above mean sea level
APE	Area of Potential Effect
APVE	Area of potential visual effect
BA	Biological Assessment
BAPC	Bureau of Air Pollution Control
BLM	Bureau of Land Management
BMP	Best Management Practices
BWPC	Bureau of Water Pollution Control
BWQP	Bureau of Water Quality Planning
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFATS	Chemical Facility Antiterrorism Standard
CFR	Code of Federal Register
CMI	Conservation Management Institute
CO	carbon monoxide
CO ₂	carbon dioxide
CWA	Clean Water Act
dB	Decibel
dba	A-weighted decibel
DC	direct current
DCS	Distributed Control System
DOD	U.S. Department of Defense
DOE	Department of Energy
DOI	U.S. Department of the Interior
DVRFS	Death Valley Regional Flow System
EIS	Environmental Impact Statement
EJ	environmental justice
EO	Executive Order

Acronyms and Abbreviations

EPA	Environmental Protection Agency
EPAct	Energy Policy Act
EPCRA	Emergency Planning and Community Right to Know Act of 1986
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
et seq.	"and the following"
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act
FMU	Fire Management Unit
FSC	Field Supervisor Controller
GIS	geographic information system
HAZCOM	Hazard Communication
HCE	heat collection element
HMA	herd management area
HTF	heat transfer fluid
IMPLAN	Impact Analysis for Planning
IMV	Industrial Mineral Ventures
IPCC	Intergovernmental Panel on Climate Change
KOP	key observation point
kV	kilovolt
Ldn	day-night average sound exposure
LEPC	Local Emergency Planning Committee
LPG	Liquefied petroleum gas
MBTA	Migratory Bird Treaty Act
MMBtu/hr	British thermal units per hour
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAICS	North American Industry Classification System
NBMG	Nevada Bureau of Mines and Geology
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Agency

Acronyms and Abbreviations

NHPA	National Historic Preservation Act
NNHP	Nevada Natural Heritage Program
NO ₂	nitrogen dioxide
NOI	Notice of Intent
NO _x	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NV	Nevada State Route
NWR	National Wildlife Refuge
O ₃	ozone
OHV	off-highway vehicle
OSHA	Occupational Safety and Health Administration
Pb	lead
PEC	Preferred Equities Corporation
PEIS	Programmatic EIS
PEL	Permissible Exposure Limit
PFYC	Potential Fossil Yield Classification
PL	Public Law
PM	particulate matter
PM ₁₀	particulate matter less than 10 microns
PM _{2.5}	particulate matter less than 2.5 microns
POD	Plan of Development
PPE	personal protective equipment
Project	Amargosa Farm Road Solar Energy Project
Proponent	Solar Millennium, LLC
PRPA	Paleontological Resources Preservation Act of 2009
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RMP	Resource Management Plan
RO	reverse osmosis
ROD	Record of Decision
ROI	Region of Influence
SAD	Surface Area Disturbance

Acronyms and Abbreviations

SAMM	Southern Amargosa Embedded Model
SARA	Superfund Amendments and Reauthorization Act of 1986
SCA	solar collector assembly
SDWA	Safe Drinking Water Act
SEGS	Solar Energy Generating Systems
SERC	State Emergency Response Commission
SHPO	State Historic Preservation Office
SLRU	Sensitivity Level Rating Unit
SO ₂	sulfur dioxide
SOI	Statement of Interest
SPCC	Spill Prevention, Control, and Countermeasure
SQRU	Scenic Quality Rating Unit
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
TDS	total dissolved solids
TWA	Time weighted average
US 95	United States Highway 95
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VEA	Valley Electric Association, Inc.
VOC	volatile organic compounds
VRI	Visual Resource Inventory
VRIC	Visual Resource Inventory Classes
VRM	Visual Resource Management
WEG	wind erodibility group
WEI	wind erodibility index
Western	Western Area Power Administration

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EXECUTIVE SUMMARY

The Pahrump Field Office of the Bureau of Land Management (BLM) has prepared this Final Environmental Impact Statement (EIS) in response to a right-of-way application submitted by Solar Millennium, LLC (Proponent) to construct and operate the Amargosa Farm Road Solar Energy Project (Project). The proposed Project includes the construction and operation of two dry-cooled solar power plants, each with a nameplate capacity of 250-megawatt (MW) and a net output of approximately 232 MW, equipped with thermal energy storage capability and associated ancillary linear facilities. Facilities located within the Project area would occupy approximately 4,350 acres and would include solar fields, power blocks, an office and maintenance building, parking area, lay-down area, switchyard, evaporation ponds and a stormwater detention basin.

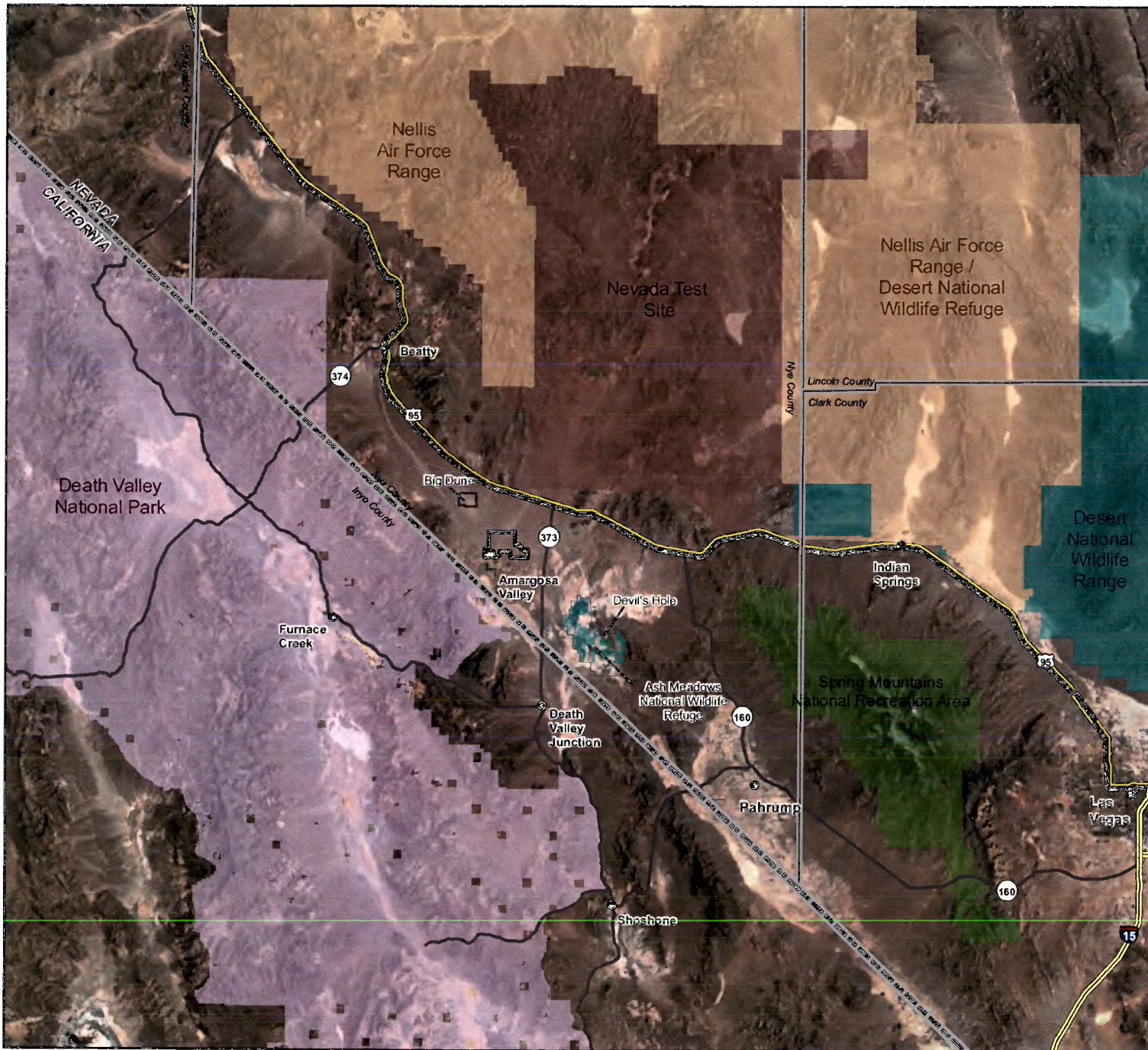
The proposed Project would utilize parabolic trough solar thermal technology to produce electrical power using steam turbine generators fed by solar steam generators. The main element of a parabolic trough power plant is the solar field. The solar field consists of numerous parallel rows of solar collectors, arranged on a north-south axis. The solar collectors follow the path of the sun from east to west during the day to keep the sun's rays continuously focused on a receiver tube. The reflectors consist of parabolic mirrors made from transparent, silver-coated glass, which concentrate the incident solar radiation 80-fold, focusing it onto the receiver tube in the solar collector. The receiver tube contains a heat transfer fluid, which is temperature-stable synthetic oil in a closed circuit that can be heated to temperatures of up to 752 degrees Fahrenheit (400 degrees Celsius). Once heated, the oil is pumped to a centrally located power block, where it flows through a heat exchanger.

The remainder of the process is similar to the steam cycle used in conventional power plants. The steam produced by the heat exchanger is used to drive a turbine connected to a generator, which produces electricity to be fed into a substation. With solar thermal technology, the heat is stored (referred to as thermal storage) and used during periods of cloud cover and up to 4.5 hours after sundown.

At this time, it is anticipated the proposed Project would be built in two separate phases, with the construction of the first phase beginning in 2011, or immediately following issuance of the BLM right-of-way grant and other federal, state, and local permits and approvals. Project construction is expected to occur over a total of 39 months. The Proponent would phase construction so that the first power plant would be operational approximately one year before the second power plant becomes operational.

ES-1.1 PROJECT OVERVIEW

The proposed Project is located on BLM-administered lands, approximately 80 miles northwest of Las Vegas, in the Amargosa Valley in Nye County, Nevada (Figure ES-1). Some portions of the proposed Project would be located on private property, including a 40-acre parcel south of Amargosa Farm Road and the well and pipelines to be used to supply water to the proposed Project.



Amargosa Farm Road
Solar Energy Project
(NVN-84359)

Project Vicinity
Figure ES-1

LEGEND

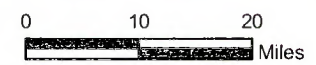
- Project Area
- Surface Management
- Department of Defense
 - Department of Energy
 - National Park Service
 - US Fish and Wildlife Service
 - US Forest Service

- General Reference Features
- Interstate
 - US Highway
 - State Highway
 - State Boundary
 - County Boundary
 - City / Town



Source: Surface Management - BLM, 2007;
Ash Meadows - USFWS, 2005;
Highways, Imagery - ESRI, 2009

February 2010



The Project area is located approximately 5 miles south of United States Highway 95 (US 95) and 3 miles west of NV 373. The majority of the Project area would be located north of Amargosa Farm Road, and east of Valley View Boulevard. The Proponent’s initial application for a right-of-way and subsequent Plan of Development erroneously stated the area of the right-of-way to be 7,810 acres. The actual area, by legal description, is 7,630 acres.

On August 6, 2009, the Proponent sent a letter to the BLM requesting a reduction in the acreage from 7,630 acres to 6,320 acres. The Proponent’s decision to release a portion of the lands from further consideration was based upon refinement of the Project layout following surveys conducted in the spring of 2009. The lands released from further consideration are shown on Figure ES-2, Project Area. The legal description of BLM-administered lands requested under the Proponent’s request is provided in Table ES-1-1.

Township (T)	Range (R)	Section/Portion
T16 South	R48 East	Sec. 1 and 12 – all
T16 South	R48 East	Sec. 2, 11, 13, and 14 – Partial Section
T16 South	R49 East	Sec. 6, 7, and 17 – all
T16 South	R49 East	Sec. 5, 8, 9, 16 18 – Partial Section

ES-1.2 PURPOSE AND NEED FOR ACTION

ES-1.2.1 Bureau of Land Management Purpose and Need

The BLM’s purpose and need is to respond to Solar Millennium’s application under Title V of the Federal Land Policy and Management Act (FLPMA) (43 USC § 1701-1782) for a right-of-way grant to construct, operate and decommission a 500-MW solar thermal generation facility and associated infrastructure in accordance with FLPMA, BLM right-of-way regulations (43 Code of Federal Register [CFR] Part 2800), and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a right-of-way grant to Solar Millennium for the proposed Project. That is, the decision the BLM will make is whether or not to grant the requested right-of-way, and if so, under what conditions.

ES-1.2.2 Proponent’s Proposal

According to the 2005 Nevada Renewable Energy and Energy Conservation Task Force Annual Report to the Legislature and the Governor, Nevada utilities will need in excess of 3,000 gigawatt hours per year of new renewable energy generation capability over the next 10 years to meet the state’s renewable energy needs (2005).

Amargosa Farm Road Solar Energy Project (NVN-84359)

Project Area Figure ES-2

LEGEND

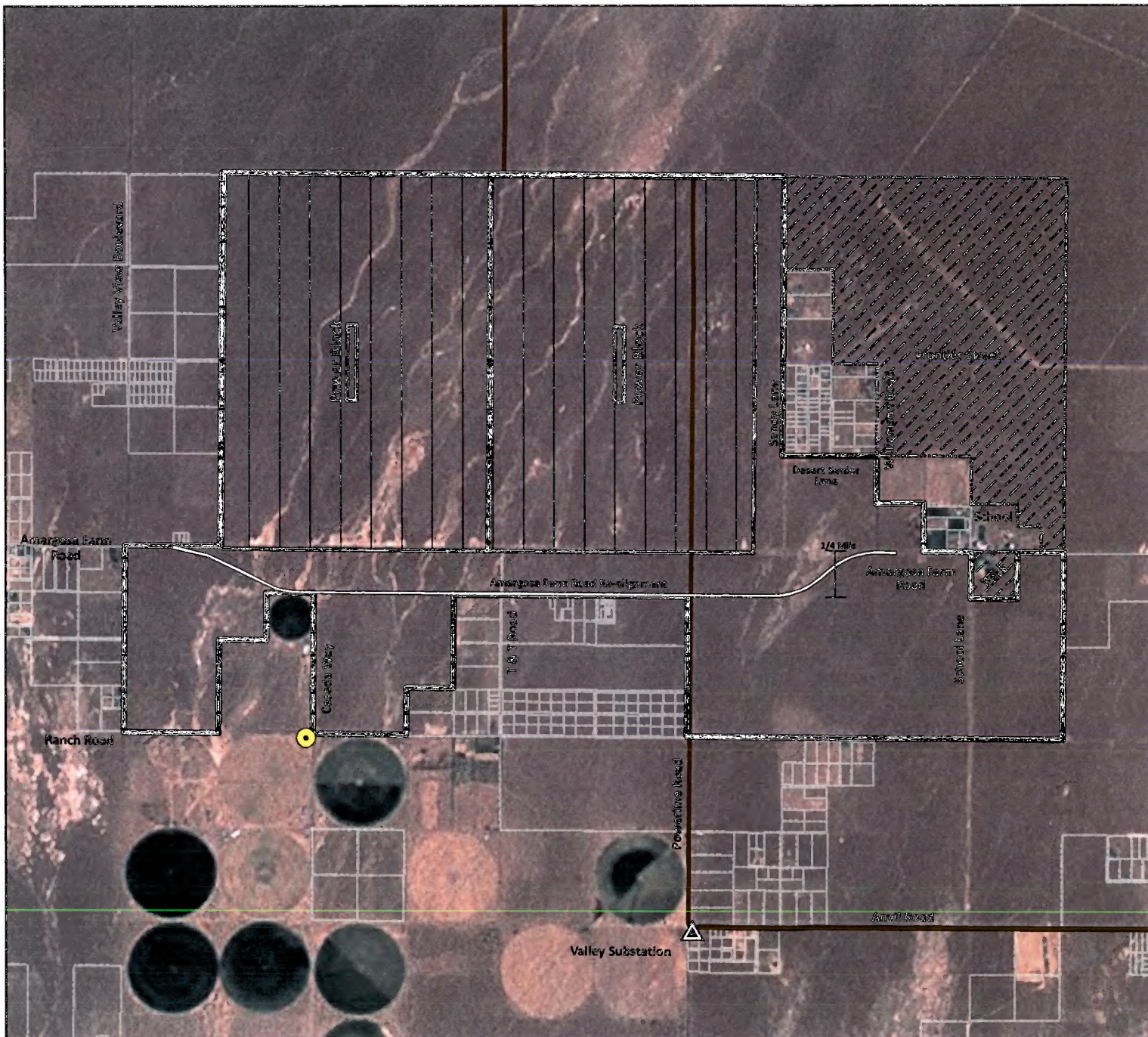
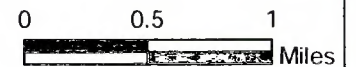
-  Initial Right-of-way Limits (November 2007)
-  Revised Right-of-way Limits (August 2009)
-  Lands Released from Consideration for Project
-  Proposed Solar Field
-  Proposed Project Well
-  Existing Substation
-  Existing Transmission Line (<230kV)
-  Private Parcel Line

Note: The Power Block contains the steam turbine, salt storage tanks and other power generating equipment as described in the Plan of Development.



Source: Project Facilities - Solar Millennium, 2009;
Wells - Nevada State Engineer, 2008;
Substation, Transmission Line - Platts, 2009;
imagery - ESRI, 2009

September 2010



The State of Nevada has established a Renewable Portfolio Standard that all public utilities must meet by investing in, and partnering with, commercial project developers to purchase renewable generated power, and participate in turnkey projects and/or co-development of renewable projects. This standard mandates that 12 percent of retail sales come from renewable resources by 2009-2010; 15 percent by 2011-2012; 18 percent by 2013-2014; 20 percent by 2015-2019; 22 percent by 2020-2024; and 25 percent by 2025.

Of the total amount of electricity that the provider is required to generate, acquire, or save from renewable portfolio energy systems or efficiency measures during each calendar year, not less than 5 percent of that amount must be generated or acquired from solar renewable energy systems. Beginning in 2016, this percentage increases to 6 percent. It is expected that at least 1,000 MW of new solar power will be required annually to meet this need. Because of the intermittent nature of solar generation, there is particular interest in technologies that can expand capacity through thermal storage to help utilities balance loads.

Further, the Nevada Renewable Energy and Conservation Task Force has estimated that by increasing in-state renewable energy production to just 15 percent of the state's generation, over 5,000 new jobs could be created, with an average annual Gross State Product effect of \$665 million through 2035 (2005).

Additional solar generation will also be required to meet California's needs. Under Senate Bills 1078 (2002) and 107 (2006), electric corporations must obtain 20 percent of their energy from renewable sources by 2010. On November 17, 2008, the Governor of California signed Executive Order S-14-08 which increased the requirement to 33 percent by 2020.

Following the Report of the Nevada Renewable Energy Transmission Access Advisory Committee (2009), California is examining the possibility of meeting the 33 percent Renewable Portfolio Standard requirement through out-of-state generation. To do so would assume a potential of 34 terawatts of energy routed to California from or through Nevada by 2020. This energy transfer is equivalent to approximately 12,900 MW of capacity from wind or concentrated solar power resources, assuming a 30 percent capacity factor (Nevada Renewable Energy Transmission Access Advisory Committee 2009).

The Proponent's objectives and purpose for the proposed Project are to:

- Develop a utility-scale parabolic trough solar thermal energy facility that optimizes power generation efficiency and provides energy at a reasonable and competitive cost.
- Construct and operate an environmentally compatible, economically sound, and operationally reliable solar power generation facility that will contribute approximately one million MW hours of clean, renewable solar energy per year to meet state, regional, and national renewable energy goals and mandates.
- Locate the Project in an area with high solar insolation (i.e., high intensity of solar energy) and other characteristics suitable for the development of a 500-MW solar thermal facility.

- Minimize environmental impacts, infrastructure needs, and costs by locating the plant near existing infrastructure, such as a transmission line, a substation, an adequate water supply, and highways/access roads, and by using designated corridors to the maximum extent possible.
- Develop a power-generation facility with the technical capability and flexibility to continue producing electricity when the solar resource is not optimal (i.e., during cloud cover and early evening hours) to better match the load demands of utility offtakers.
- Develop a solar thermal energy facility that will qualify for, and benefit from, the EPAct Section 1703 loan guarantee program, as well as the EPAct Section 1603 American Reinvestment and Recovery Act of 2009 Tax Grant Program if the deadline for construction under Section 1603 is extended.
- Support the economy of southern Nevada and the region by helping to ensure an adequate supply of renewable electrical energy, while creating additional tax revenues, employment, and expenditures in local businesses.

ES-1.3 PUBLIC PARTICIPATION AND AGENCY CONSULTATION

ES-1.3.1 Public Participation

Public scoping is an integral part of the NEPA process. It provides “an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action” (40 CFR 1501.7). Initiation of the EIS process and the public scoping meetings for the proposed Project were announced through the Federal Register Notice of Intent, published on July 13, 2009 (Volume 74, Number 132, Page 33458), which marked the beginning of the public scoping period for the Project EIS.

The scoping period, required to be a minimum of 30 days, was announced as ending on August 12, 2009. Public scoping meetings were not conducted within this time period; therefore, a second notice was published in the Federal Register on September 17, 2009 (Volume 74, Number 179, Page 47820), reopening public scoping. This reopened scoping period was announced as ending on October 19, 2009.

Four scoping meetings were held from August 17 through August 24, 2009, and one information meeting, following the reopened scoping period, was held on September 22, 2009. During the public scoping period, a total of 151 comment documents were received, with a total of 1,175 comments provided. A comment document is defined as a method of response recorded as part of a public scoping transcript, email, fax, letter, or comment form. Because some documents had more than one comment, the total number of comments is greater than the number of respondents or individuals who submitted comments. A summary of comments received is provided in Chapter 1.9. Copies of the individual comments received during the scoping period are available for review at the BLM Pahrump Field Office.

The 45-day comment period for public review of the Draft EIS began with the publication of the Notice of Availability in the Federal Register on Friday, March 19, 2010. The BLM distributed press releases announcing the dates, locations, and times of the public meetings to local and regional print and broadcast media, as well as online. The Draft EIS was distributed to individuals and agencies that requested copies, and posted on BLM's website at: http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/proposed_solar_millennium.html.

Four public meetings were held during the public comment period (from March 19, 2010 – May 3, 2010) to receive comments on the Draft EIS. During the 45-day comment period, the BLM received 37 comment documents (e.g., letters, emails, faxes, etc.) from individuals, private companies, interest groups, and federal and state agencies commenting on the Draft EIS. A list of comment documents received, the content of each letter, and the BLM's responses to comments are contained in Appendix G of the Final EIS. Each comment letter was assigned a reference number, and each comment was identified with a number. Where appropriate, changes and additions are reflected in the Final EIS to respond to comments.

This Final EIS has been distributed with the publication of the Notice of Availability in the Federal Register. Copies of this Final EIS have been distributed to those parties requesting the Draft EIS, including those listed in Section 5.4. In addition, the Final EIS is available at: http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/proposed_solar_millennium.html.

ES-1.3.2 Agency and Tribal Consultation

Federal and state agencies were contacted individually to gather input for the EIS. Other resource management agencies at the federal and state levels were consulted to identify common concerns related to the Proposed Action or Alternatives. Cooperating agencies on this EIS include the U.S. Department of Defense, DOE, National Park Service, United States Army Corps of Engineers, Nevada Department of Wildlife, and Nye County. Consultations with federal, state, and local resource management and regulatory agencies, as well as interested Tribal governments are ongoing.

A Biological Assessment has been prepared for the Proposed Action and was submitted in May 2010 to the U.S. Fish and Wildlife Service (USFWS) as required by Section 7 of the Endangered Species Act of 1973 (16 USC §§ 1531-1544). A species list was requested from the USFWS which identified flora and fauna listed as threatened, endangered, or candidate that occur and have the potential to occur within the Project area and its vicinity. At the request of the USFWS, rare plant and Desert Tortoise surveys have been conducted within the Project area. Consultation with the USFWS was triggered once the Biological Assessment was submitted.

The BLM conducts consultation and coordination with American Indian Tribal governments for proposed projects that may affect their ancestral lands. On June 17, 2009 the BLM distributed formal consultation letters to the following groups:

- Pahrump Paiute Tribe
- Las Vegas Paiute Tribe
- Chemehuevi Indian Tribe

- Colorado River Indian Tribes
- Timbisha Shoshone Tribe

The notification letter informed them of six separate renewable energy projects being proposed in the Pahrump and Amargosa Valleys of Nye County, Nevada, including the proposed Project. The tribes were invited to provide input on any potential impacts to any culturally significant areas within the proposed solar project areas, including the proposed Amargosa Farm Road Project area. The Tribes were also informed of when scoping meetings were to occur if they wanted to make any project comments. A field visit with the Timbisha Shoshone Tribe was conducted on September 17, 2009. No Tribal comments opposing the Project's proposed action have been received by the BLM.

A Memorandum of Agreement between the BLM and Nevada State Historic Preservation Office (SHPO) will be completed prior to the ROD. The Memorandum of Agreement ensures that mitigation of any adverse effects to the single identified National Register of Historic Places (NRHP) eligible site will be completed under a prepared Historic Properties Treatment Plan prior to implementation of the Project in that area. If unanticipated cultural resources, human remains, or funerary items are inadvertently discovered during the Project activities, the standard procedures outlined in the 2009 State Protocol Agreement between the BLM and the Nevada SHPO would be implemented.

ES-1.4 PROPOSED ACTION AND ALTERNATIVES

ES-1.4.1 Proposed Action – Dry-Cooled Alternative

The Proposed Action alternative includes the construction and operation of a two-unit dry-cooled parabolic trough solar thermal power plant, with a nameplate capacity of 250 MW and a net output of 232 MW. The plant will consist of a conventional steam Rankine-cycle power block, a parabolic trough solar field, a heat transfer fluid and steam generation system, a nitrate salt thermal energy storage system, as well as a variety of ancillary facilities (sometimes referred to collectively as “balance-of-plant”), such as conventional water treatment, electrical switchgear, administration, warehouse, and maintenance facilities. The electric output of the plant will be provided entirely by solar energy. No electricity will be generated by the use of fossil fuels.

The Proponent’s original right-of-way request of 7,630 acres was refined to include only 6,320 acres. Project facilities would only be located on approximately 4,350 acres and would include the solar fields, power blocks, an office and maintenance building, parking area, lay-down area, stormwater detention basin, evaporation ponds, and switchyard.

A land survey of the proposed right-of-way will be performed to determine the final boundary and extent of the Project area. A topographic survey was performed to obtain one-foot contours for final engineering design for grading and drainage-related requirements. A preliminary geotechnical study of the Project site will be conducted to evaluate general subsurface conditions, seismicity, and other geological hazards and to provide recommendations for design and construction of the foundations for Project structures.

Executive Summary

As shown on Figure ES-2, the solar field will occupy the majority of the Project footprint. The final layout will be determined based on engineering design and in consideration of resource constraints and opportunities. All plant facilities will be designed, constructed, and operated in accordance with applicable laws, ordinances, regulations, and standards. All generating facilities will be located within the facility fence line. General facility dimensions for both the dry- and wet-cooled alternatives are listed in Table ES-1-2.

Table ES-1-2 Preliminary Facility Dimensions - Proposed Alternative and Wet-Cooled Alternative			
Project Component	Approximate Dimensions / Acreage	Proposed Alternative (Dry-Cooled)	Wet-Cooled Alternative
Solar Fields	Two fields, Approximately 7,800 feet east-west by 11,000 feet north-south. Each field has a collector aperture area of approximately 1,970 acres.	X	X
Power Blocks	<u>Dry-cooled</u> – One power block located in the center of each solar field (28 acres each). Dimensions of each power block is 2,500 feet x 490 feet; tallest major structure is the air-cooled condenser at 144 feet high <u>Wet-cooled</u> – One power block located in the center of each solar field (28 acres each). Dimensions of each power block is 2,500 feet x 490 feet; tallest major structure is the water-cooled condenser at 55 feet high.	X	X
Switchyard	400 feet x 400 feet (3.7 acres)	X	X
Assembly Hall/Maintenance Building	394 feet x 164 feet x 46 feet (1.5 acres)	X	X
Main Office Building	200 feet x 53 feet x 12 feet (.24 acres)	X	X
Parking Area	250 feet x 100 feet (0.5 acres)	X	X
Stormwater Detention Basin	1,200 feet x 1,200 feet (33 acres) – providing 122-acre-feet of storage assuming 4-foot-deep basin)	X	X
Evaporation Pond(s)	<u>Dry-cooled</u> – Two 4-acre evaporation ponds per power block (16 acres total for the project) <u>Wet-cooled</u> - Three 8.3 acre evaporation ponds (25 acres total for the project)	X	X
Bioremediation Area	400 feet x 800 feet (7.3 acres total for the project)	X	X
Fencing	Wind fencing on east and west side of facility: 30 feet high x approximately 11,000 feet long per side Perimeter fencing on north side of facility: 9 feet high x approximately 15,500 feet long Perimeter fencing on south side of facility: 8 feet high x approximately 17,500 feet long	X	X

Water use in a dry-cooled plant would include water for solar collector mirror washing, makeup for the solar steam generator feedwater, dust control, water for cooling plant auxiliary equipment, potable water, and fire protection. The total annual operational water usage for the dry-cooled alternative is 400 acre-feet per year (afy). During construction, approximately 600 afy will be needed. Water needed during construction and operation will be obtained from a private well located south of the Project site. On March 18, 2010, the Proponent filed Application 79699 with the Nevada State Engineer to change the manner and place of use of a portion of the water right associated with this well. In addition, the Proponent filed another application (Application 79783) on April 15, 2010 to change the point of diversion to a new well, to be located approximately 300 feet west of the existing well.

To address the National Park Service, USFWS, and BLM concerns that the proposed groundwater withdrawals associated with the proposed Project—in combination with existing withdrawals in the vicinity of Devils Hole and the Ash Meadows National Wildlife Refuge (NWR) —may adversely affect federal rights and resources, the Proponent has agreed to acquire an additional 236 afy of existing water rights within the Amargosa Desert Hydrographic Basin. The 236 afy consists of 204 afy identified as “Minimization Water Rights” (see Appendix A), and an additional 32 afy to offset the potential reduction in groundwater return flow as a result of changing the manner of use from agricultural to industrial. The acquisition of the additional 236 afy of existing groundwater in the basin will most likely be obtained from existing water rights permitted for agricultural use. At this time, it is unknown where the additional water rights will be obtained.

In addition, to ensure Project pumping does not exceed the levels indicated by the Proponent as necessary for operations, the Proponent will report water use by meters installed and operated on the points of diversions associated with the leased water right. Metering will be no less than quarterly to the Nevada State Engineer and the BLM.

ES-1.4.2 Wet-Cooled Alternative

Under the wet-cooled alternative, the Proponent would construct and operate two wet-cooled solar power plants, each with a nameplate capacity of 250-MW and a net output of approximately 242 MW. Each solar plant would be equipped with thermal storage capability and associated linear facilities. Construction and operation of a wet-cooled project would be similar to a dry-cooled plant. Plant components and layout are similar under both the wet- and dry-cooled alternatives; the primary differences are the amount of water used for plant operations, the need for cooling towers for heat rejection from the steam cycle for the wet-cooled alternative, and the larger area needed for evaporation ponds under the wet-cooled alternative. Table ES-1-2 lists the plant components for both the wet- and dry-cooled alternatives.

Water use in a wet-cooled plant would include water needed for the cooling tower to cool the steam cycle; water for solar collector mirror washing; makeup for the solar steam generator feedwater; dust control, potable water and fire protection. The average total annual water usage for the wet-cooled alternative is estimated to be approximately 4,600 afy. Under the wet-cooled alternative, the well identified for use under the dry-cooled alternative would supply a portion of

the water required for operations. However, additional water supplies would be required under the wet-cooled alternative.

The source of this additional water would be dependent on the availability of other water rights available for lease or sale in the Amargosa Desert Hydrographic Basin.

The wet-cooled alternative would provide better (i.e., more efficient) performance than the dry-cooled alternative. Specifically, the wet-cooled alternative would offer approximately 11 MW greater electrical output during peak summer ambient temperature conditions. The performance of the wet-cooled alternative is enhanced because wet-cooling relies primarily on evaporative cooling to remove heat from the circulating water.

In contrast, a dry-cooled alternative uses convective heat transfer, which operates similar to a car's radiator. In the dry-cooled alternative, an air cooled condenser using a large array of fans that force air over finned tube heat exchangers cools the steam turbine-generator exhaust steam. The disadvantages of dry-cooling are higher capital costs, higher auxiliary operating power requirements, and an overall lower plant performance, especially on hot days, when the peak power is needed most. A dry-cooled plant provides about 5 percent less electric energy on an annual basis than a wet-cooled plant because of this reduced performance on hot summer days. The cost of electricity produced by a dry-cooled plant is approximately 6 to 9 percent higher than the electricity produced by a wet-cooled plant. Thus, dry-cooling of a trough plant minimizes water use, but at a 6 to 9 percent cost penalty.

ES-1.4.3 No Action Alternative

NEPA regulations require that EIS alternative analyses "include the alternative of no action" (40 CFR §1502.14(d)). The No Action Alternative provides a useful baseline for comparison of the environmental effects of the other alternatives. For this analysis, no action means that the BLM would reject the Proponent's proposal and would not grant the requested right-of-way. Because the Project facilities would not exist, the Project's potential adverse environmental effects would not occur. However, any beneficial effects such as reduced fossil fuel use also would not occur.

ES-1.4.4 Other Alternatives Considered But Not Evaluated in Detail

In accordance with 40 CFR §1502.14, and consistent with guidance in BLM's NEPA Handbook, alternatives were not carried forward for further analysis if the alternative:

- would be ineffective (it would not respond to the BLM's purpose and need)
- would be technically or economically infeasible
- is inconsistent with the basic policy objectives of the Las Vegas Resource Management Plan
- would involve remote or speculative implementation

- is substantially similar in design to an alternative that is analyzed
- would have substantially similar effects to an alternative that is analyzed

ES-1.4.4.1 Alternative Sites

As part of its siting process, the Proponent used a refined set of criteria to screen, identify, and prioritize potential land sites for eventual solar development. Criteria include all aspects of feasibility, including the physical characteristics of the site, environmental considerations, and economic factors. Each of these criteria was applied during the screening phase for the proposed Project, which led to the selection of the current site.

These criteria included:

- **Solar Resource** – The site needs to be located where high solar insolation is available to maximize the plant’s output and allow efficient utilization of the land area affected by project development. For a project to be economically viable, solar insolation levels of greater than 7 kilowatt-hours per square meter per day are desirable.
- **Size and Shape** – The site must be large enough (at least 4,000 contiguous acres) and of adequate proportions to include two 250 MW parabolic trough solar thermal plants. The shape of the site should also support an efficient and cost-effective layout of the project facilities.
- **Slope** – The site should be relatively flat, with a slope of 2 percent or less, to minimize the need for extensive grading and a large volume of cut and fill.
- **Environmental sensitivity** – The site should not be highly pristine or biologically sensitive (e.g., not within a designated wilderness area or Area of Critical Environmental Concern).
- **Availability of Infrastructure and Water** – To minimize cost and potential environmental impacts, the site should be located where water resources are available and interconnection to an existing transmission system is possible without the construction of lengthy transmission lines. In addition, the site should be in reasonable proximity to suitable transportation infrastructure to allow easier access during both construction and operation without creating the need for additional road construction.
- **Site Control** – The land must be available for sale or lease/right-of-way, at a reasonable cost and be free of conflicting encumbrances. Land with many different owners does provide adequate site control.
- **Labor Availability** – The site should be close enough to areas with large construction labor pools to maximize the number of construction workers within daily commuting range.

- Economic Viability** – The Project must be economically viable and competitive with other renewable technology projects, including wind, geothermal, and other solar projects. To be viable, the site should be located on property currently available at a reasonable cost, be as close as possible to transmission and transportation infrastructure, and have a high solar resource value.

The selected Project site is located in an area with an excellent solar resource and is large enough to accommodate two 250 MW plants in an optimal layout. In addition, the Project site is relatively flat; is not located in any wildlife management or conservation areas; has access to transmission infrastructure and water resources; and was available for an application for a right-of-way from the BLM. Finally, the Project site allows for access to skilled labor and other industrial infrastructure from nearby Pahrump and Las Vegas.

Three alternative sites in the regional area were considered. The three sites include a site southeast of Pahrump (Sandy Hills), a site a few miles south of the proposed Project along Anvil Road in Amargosa Valley (Anvil Road), and a site near the Beatty Airport (Beatty Airport). Right-of-way applications were filed for each of these sites in 2007 and 2008. The right-of-way applications for each of these sites were ultimately withdrawn after the Proponent conducted due diligence and preliminary studies on each site and determined the alternative sites did not meet the above criteria. Table ES-1-3 summarizes the weaknesses and strengths of each of the alternative sites.

Alternative Site	Solar Resources	Size and Shape	Slope	Environmental Sensitivity	Availability of Infrastructure	Site Control
Sandy Hills Site	Yes	Yes	No	No	Yes	No
Anvil Road Site	Yes	No	Yes	Yes	Yes	No
Beatty Airport Site	Yes	No	Yes	Yes	No	Yes
Yes – Site met criteria; No – Site did not meet criteria						

The Sandy Hills site consisted of approximately 8,000 acres in Pahrump Valley approximately 20 miles southeast of Pahrump. Although the site was large enough to accommodate two 250-MW solar power plants, the site was eliminated from further consideration due to the slope of the site, as well as the existence of sensitive vegetation and wildlife, conflicting encumbrances, and water availability. Construction and operation of a solar thermal power plant at this site would result in higher environmental impacts than the Proposed Action, while not offering any offsetting advantages.

The Anvil Road site consisted of approximately 1,000 acres, located a few miles south of the selected Project site. The site was flat and had good access to transmission and water infrastructure but was too small to accommodate one 250 MW plant, let alone two of them. The Proponent explored acquiring additional private land surrounding the site but determined that the

acquisition of sufficient lands was not economically viable. Due to the number of parcels that would have to be acquired to accommodate two 250-MW solar power plants would make obtaining site control more challenging (in comparison to obtaining a right-of-way grant to use BLM lands). This, combined with the size and existing encumbrances on the site, made the site not viable.

The Beatty Airport site consisted of approximately 2,500 acres located adjacent to the Beatty Airport (approximately 35 miles north of the Project site). It was flat and had good solar resource, but it was too small for two 250 MW plants, and had existing encumbrances. The Proponent also determined that access to transmission and water would be more difficult and costly than the Project site that was ultimately selected.

During the 45-day public comment period, the BLM received several comments requesting the agency conduct a full analysis of other sites considered by the Proponent. As described above, the Proponent evaluated several sites before selecting the proposed Project site. The BLM concurred with the Proponent's conclusions to dismiss the alternative sites from further consideration.

The Proponent also considered the alternative of developing the proposed Project as a single 250 MW plant. Generally, building one plant would have fewer environmental impacts when that plant is considered in isolation. However, given the infrastructure requirements associated with building a single plant, building two plants allows for economies of scale and reduces the infrastructure impacts, including transmission access, and water development. In addition, a single 250 MW plant would be substantially less effective than two 250-MW plants in meeting renewable energy mandates and objectives, and attaining the Project objective of supporting those mandates and goals. For these reasons, the development of a smaller project was rejected.

During the scoping and the public comment periods, several comments were received requesting that the Proponent move the Project site further north, at least 0.5 to 2 miles away from existing residential or public buildings. The BLM land immediately north of the Project area has a pending solar energy development right-of-way application on file with the BLM Pahrump Field Office (Cogentrix - NVN-083150). The Proponent filed an overlapping or "second-in-line" right-of-way application on these lands (NVN-087366); however, subsequent discussions between Cogentrix and BLM staff indicate Cogentrix intends to seek approval to develop a solar energy project at this location within the next 2 to 3 years. Although the BLM's right-of-way regulations provide that conflicting applications may be resolved through a competitive process (see 43 CFR §§ 2804.23(c), 2806.50, it is unlikely that the Proponent's overlapping application could be processed in a timeframe that met the Proponent's objectives.

ES-1.4.4.2 Alternative Solar Technology

The Proponent has requested a right-of-way to construct and operate a dry-cooled, solar thermal parabolic trough project. Solar thermal parabolic trough technology has a history of successful operation in the United States. The Solar Energy Generating Systems (SEGS), located in California's Mojave Desert, is the largest solar energy generating facility in the world. It consists of nine solar power plants with an installed capacity of 354 MW. The SEGS facilities have

operated successfully over the past 30 years. Although other solar thermal technologies are under active development, none of these technologies have the construction and operating experience of parabolic trough technology. Building upon this experience base significantly reduces much of the construction and operational risk associated with a project of this magnitude. In addition, the Proponent has significant experience and expertise in siting, constructing, and operating parabolic trough plants. The Proponent is a wholly owned subsidiary of Solar Trust of America, LLC, a joint venture between Solar Millennium AG and Ferrostaal AG. Solar Millennium AG is an international developer and supplier of parabolic trough collector technology used in powering solar thermal power plants. Solar Millennium AG developed and designed the first parabolic trough power plants, Andasol 1-3, in Spain. The Andasol 1 plant began operating in December 2008, the Andasol 2 plant is currently in the commissioning phase, and the Andasol 3 plant, is currently under construction. When the entire Andasol complex is completed in 2011, it is expected to generate enough electricity to serve 150,000 Spanish households or about 600,000 people. Ferrostaal AG is a worldwide provider of industrial services and plant construction and engineering.

Although all of the SEGS and Andasol projects are wet-cooled plants, a dry-cooled alternative is the Proponent's preferred alternative. Dry-cooled technology has been used successfully on large thermal generating plants in the United States for almost 30 years dating back to its use on the 330 MW, coal-fired, Wyodak power plant in Wyoming. The largest dry-cooled power plant installation in the world, the 4,000 MW coal-fired Matimba plant in South Africa, has successfully operated for over 10 years. Dry-cooled technology has been proposed because it is a well proven technology for this scale of power generation in desert environments.

ES-1.4.5 Agency-Preferred Alternative

The BLM preferred alternative is the Proposed Action – Dry-cooled Alternative. The environmental consequences of the Proposed Action and Alternatives are summarized and compared in Table ES-1-4 below.

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Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
Air Quality and Climate – Sections 3.1 and 4.1		
<p>Direct effects on air quality would occur from earthmoving activity during construction (fugitive dust, particulate matter less than 10 microns [PM₁₀] and particulate matter less than 2.5 microns [PM_{2.5}]) and tailpipe emissions from heavy construction equipment and worker vehicles (particulate matter, nitrogen oxide, sulfur dioxide, carbon monoxide [CO], and volatile organic compounds). The Proponent would comply with Federal and State air quality standards. Particulate emissions during construction would be temporary and mitigated through adherence to the recommended mitigation measures.</p> <p>The construction and operation of the solar power plant will not cause or contribute to a violation of any applicable NAAQS or Potential for Significant Deterioration (PSD) increment. The Project's operation would not cause new violations of any nitrogen dioxide, sulfur dioxide, PM_{2.5} or CO ambient air quality standards.</p>	<p>Impacts to air quality from construction and operation of a wet-cooled solar plant would be similar to the impacts described below for the Proposed Action (dry-cooled alternative). The primary difference is the additional PM₁₀ and PM_{2.5} emissions from the cooling tower associated with a wet-cooled plant due to solids in the entrained moisture in the cooling tower drift.</p>	<p>Under the No Action Alternative, there would be no short-term construction-related exhaust or fugitive dust impacts. No impacts to air quality would occur under the No Action Alternative.</p>
Geological Hazards and Mineral Resources – Sections 3.2 and 4.2		
<p>The Proposed Action would not result in impacts to geological resources. However, seismic activity and ground subsidence in the region could potentially impact structures constructed and operated under the Proposed Action. All project components and facilities would be constructed in accordance with applicable regulations, engineering protocols, and safety standards to minimize potential impacts from seismic activity. The Proposed Action would not result in impacts to mineral resources, as no active claims, mines, or quarries are present within the Project area.</p>	<p>Impacts to geological hazards and mineral resources from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative).</p>	<p>Under the No Action Alternative, no Project-related impacts to geological hazards or mineral resources would occur.</p>
Soils – Sections 3.3 and 4.3		
<p>Up to 4,350 acres of desert land will be cleared and graded to accommodate construction of the solar facility and ancillary facilities. The removal of vegetation and soil crusts would expose soil and increase the potential for wind- and water-driven erosion.</p>	<p>Impacts to soils from construction and operation of a wet-cooled solar plant would be similar to impacts described for the Proposed Action (dry-cooled alternative).</p>	<p>Under the No Action Alternative, no Project-related impacts to soil resources would occur.</p>

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Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
<p>Watering or use of BLM-approved dust suppressants is expected to reduce the potential for fugitive dust from construction activities. Site-appropriate stormwater and erosion control protection measures will be implemented during construction to reduce erosion and sedimentation. The selected erosion and sediment control BMPs and environmental protection measures would be based on the type of disturbance expected, soil type, and the location of the site relative to sensitive resources.</p> <p>Following construction, permanent erosion and sediment control BMPs would include continued watering for dust control, use of diversion berms, and redirection of stormwater flows into a detention/sediment or settling basin prior to discharging off-site.</p>		
Water Resources – Sections 3.4 and 4.4		
<p>The Proposed Action (dry-cooled alternative) would require up to 600 afy, or 1,950 acre-feet of groundwater over the 39-month construction period. During operations, water requirements would be 400 afy. The proposed source of construction and operation water is an existing well south of the Project site. The Proponent has filed an application with the Nevada State Engineers Office to change the place and manner of use of the water right. The Proponent has requested that 400 acre-feet of the 603 acre-feet annual duty is changed from agricultural to industrial use.</p> <p>Following approval by the Nevada State Engineer, the Proponent intends to drill a new well approximately 300 feet west of the existing well, and move 400 acre-feet from its current point of diversion to the new well. The remaining 203 acre-feet will remain with the existing well. This will allow for redundancy should one of the wells fail. During construction, the Proponent will lease the full annual duty (603 afy) from the water rights holder for the Project well. During this period, the water rights holder will fallow farmlands that were previously irrigated.</p>	<p>Under this alternative, the demand for water would be 4,600 afy, which is substantially more than that required for the Proposed Action. Construction-related impacts on surface and groundwater resources for this alternative would be the same as the Proposed Action (dry-cooled alternative). Plant components and layout are similar under both the wet- and dry-cooled alternatives, the primary difference being the amount of water used for plant operations, the need for cooling towers for heat rejection from the steam cycle, and the size and number of evaporation ponds. Impacts to surface and groundwater quality and jurisdictional waters would be similar to the Proposed Action.</p> <p>It is assumed that the water that could be acquired for the wet-cooled option would have been used on an annual basis by the current water rights owner(s) at the same volume. New wells would be drilled on-site and changes in the points of diversion, place of use and manner of use would be required to be approved by the</p>	<p>Under the No Action Alternative, no Project-related impacts to water resources would occur.</p>

Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
<p>After construction, the water rights holder may continue to irrigate up to 40 acres of farmland with the 203 acre-feet assigned to the existing well.</p> <p>To address the NPS, USFWS, and BLM concerns that the proposed groundwater withdrawals associated with the proposed Project—in combination with existing withdrawals in the vicinity of Devils Hole and the Ash Meadows National Wildlife Refuge (NWR) — may adversely affect federal rights and resources, the Proponent has agreed to acquire an additional 236 afy of existing water rights within the Amargosa Desert Hydrographic Basin. The 236 afy consists of 204 afy identified as “Minimization Water Rights” (see Appendix A), and an additional 32 afy to offset the potential reduction in groundwater return flow as a result of changing the manner of use from agricultural to industrial. The Proponent would sign over the minimization water rights (204 afy) to Nye County upon a signed Memorandum of Understanding (MOU). Though details yet to be determined by the MOU, Nye County, in cooperation with the other MOU signatories and other appropriate agencies shall perform studies to better understand how the use of the minimization water rights would impact area resources. These include Devil’s Hole, Ash Meadows, and overall local and regional water levels. The details and ultimate goals of the studies shall be agreed upon by Nye County, BLM, NPS, and USFWS.</p> <p>The acquisition of the additional 236 afy of existing groundwater in the basin will most likely be obtained from existing water rights permitted for agricultural use. At this time, it is unknown where the additional water rights will be obtained.</p> <p>The water to be used during construction will be piped from the Project well to temporary water storage tanks to be located throughout the construction site. Meters will be placed on both wells to ensure there is no exceedance of the permissible annual duty.</p> <p>Under the dry-cooled alternative, four 4-acre evaporation ponds will be required for boiler blowdown. The evaporation ponds would be</p>	<p>Nevada Division of Water Resources. Water acquisitions would be required to comply with Nevada State Engineer Ruling No. 1197 and any other Nevada state regulations and policies.</p>	

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Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
<p>double-lined and would be constructed in accordance with NDEP requirements.</p> <p>The section of the Fortymile Wash that traverses the Project area will be rechanneled and designed to intercept the 100-year storm event and convey the concentrated flow to historic discharge locations south of the Project site. The Proponent is coordinating these activities with the BLM, Nye County, and the United States Army Corps of Engineers.</p> <p>Potential impacts to water resources during construction would be primarily associated with surface disturbing activities, but could also be a result of accidental spills and handling and storage of hazardous chemicals. Mitigation measures are proposed to prevent spills of chemicals, as well as to respond to spills should they occur.</p>		
Noise – Sections 3.5 and 4.5		
<p>Throughout the construction of the proposed Project, temporary noise impacts are expected to briefly radiate within the defined boundaries of the Project site. Under Environmental Protection Agency guidelines for outdoor noise impacts to residential property lines, the noise impacts are considered to be less than significant and no mitigation will be required for the temporary construction operations.</p> <p>Operational activities of the Proposed Action were evaluated to determine the worst-case daily operational noise impacts. Under Environmental Protection Agency noise threshold guidelines, the impacts were found to be less than significant and require no mitigation.</p> <p>Employees working within the operational areas may be exposed to areas considered as a sensitive noise receptor location. Under Occupational Safety and Health Administration Standards the impact of worst-case calculated noise exposure levels the impacts is considered less than significant.</p>	<p>Impacts to noise levels from construction and operation of a wet-cooled solar plant may be similar to the impacts described for the Proposed Action (dry-cooled alternative). The noise producing mechanical equipment is situated at a lower height in a wet-cooled solar plant and, as such, may result in slight decreases in operational noise as compared to the dry-cooled alternative.</p>	<p>Under the No Action Alternative, no Project-related impacts to noise levels would occur.</p>

Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
Biological Resources – Sections 3.6 and 4.6		
<p>VEGETATION RESOURCES: Up to 4,350 acres of creosote bush-dominated native vegetation will be completely cleared for the life of the project to accommodate construction of the solar facility and ancillary facilities. Construction activities could promote the proliferation of non-native invasive weeds into the Project area. In consultation with BLM biologists, the Proponent will prepare a Project-specific Weed Management Plan prior to commencing construction activities.</p> <p>No potential habitats for federally listed threatened or endangered plant species occur within the Project area; however, two state protected cacti species are present and would need to be salvaged in accordance with NRS 527.060-120.</p> <p>WILDLIFE RESOURCES: Direct impacts on wildlife resources can result from ground disturbance caused by construction-related activities, which can impact wildlife habitat by removing vegetation, altering plant composition or structure (e.g., non-native invasive species replacing native species), causing fragmentation, loss of connectivity for wildlife, increased predation, and altering soil characteristics. Removal of vegetation, alteration of Fortymile Wash, and placement of fencing around perimeter of the solar fields, could impede travel opportunities for wildlife.</p> <p>The Project area contains low quality, but suitable habitat for Desert Tortoise. Four old Class IV burrows were located within the Project area. Efforts will be made to ensure that the area is clear of any active burrows and all live tortoises prior to any construction being conducted. Pre-construction clearance surveys would be conducted to ensure that activities associated with the construction and operation of the Project would not cause mortality or other harm to Desert Tortoise by collapsing dens and burrows, entombing adults, eggs, and young. Mortality could also occur from collisions with equipment and</p>	<p>VEGETATION RESOURCES: Impacts to vegetation from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative).</p> <p>Similar to the dry-cooled alternative, there would be no new groundwater pumping under the wet-cooled alternative. Water for Project construction and operations, would be obtained from existing water rights and converted to industrial use.</p> <p>WILDLIFE RESOURCES: Impacts to wildlife resources from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative). The primary difference would be the number and size of evaporation ponds for each alternative. Under the wet-cooled alternative, three 8.3 acre evaporation ponds would be needed.</p> <p>Similar to the dry-cooled alternative, there would be no new groundwater pumping under the wet-cooled alternative. Water for Project construction and operations, would be obtained from existing water rights and converted to industrial use. New wells would be drilled on-site and changes in the points of diversion, place of use and manner of use would be required to be approved by the Nevada Division of Water Resources.</p>	<p>Under the No Action Alternative, no direct Project-related impacts to biological resources would occur.</p>

Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
<p>vehicles. Predation could increase as construction displaces wildlife from protected cover to uncovered habitat. Direct impacts on Desert Tortoise can result from loss of tortoise habitat, including loss of old burrow sites, located in the northwest quarter of the Project area.</p> <p>Construction activities may impact suitable habitat for nesting and burrowing birds including Burrowing Owl, a BLM Sensitive species and a Nevada animal species considered to be at risk in all counties in Nevada. Old burrowing Owl burrows were found in the Project area. For other nesting bird species, direct impacts could include eliminating potential nesting habitat and loss of individuals. The Migratory Bird Treaty Act applies to species that would be impacted during the construction phase of the Project.</p> <p>There would be direct impacts to LeConte’s Thrasher by eliminating suitable nesting habitat. Loss of native vegetation would directly impact at least 12 snake and lizard species that were found in the Project area. Two such species include, Desert Iguana, included on the Nevada Natural Heritage Program Animal Watch List, and Nevada Shovel-nosed Snake, included as a conservation priority species in Nevada.</p> <p>Under the dry-cooled alternative, four 4-acre evaporation ponds will be required for boiler blowdown. Evaporation ponds would introduce a potential threat to wildlife. Since the tortoise-proof perimeter fencing will restrict most terrestrial wildlife from entering the plant site, it is anticipated that birds will face the greatest potential risk from constituents in the evaporation ponds. Species at risk are those with the potential for nesting at the facility, residents of the area that would drink and forage from the ponds or feed on insects associated with the ponds, and migrants that would use the ponds for a stopover during migration. To reduce the potential for impacts from the ponds, the ponds would be placed within the existing Project footprint, would be double-lined, and covered with narrow-mesh netting to prevent access by ravens and migratory birds in accordance with applicable regulations. Additionally, the operational design of the ponds will make it difficult for perching birds and/or shorebirds to access the</p>		

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Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
water.		
Historic and Cultural Resources – Sections 3.7 and 4.7		
<p>Sixteen cultural resource sites were identified within the Area of Potential Effects of the Proposed Action. Only one site has been determined eligible for listing on the NRHP under Criterion D. Direct effects to this site could occur as a result of ground disturbing activities associated with the construction of the proposed Project.</p> <p>An Historic Properties Treatment Plan describing the mitigation measures that would be employed to resolve any adverse effect to the one NRHP eligible site has been prepared. A Memorandum of Agreement between the BLM and Nevada State Historic Preservation will be implemented to ensure the Historic Properties Treatment Plan will mitigate any adverse effect to the single NRHP-eligible site.</p> <p>Treatment of the site would occur prior to any project implementation. If unanticipated cultural resources, human remains, or funerary items are inadvertently discovered during Project activities, the standard procedures outlined in the 2009 State Protocol Agreement between the BLM and the Nevada SHPO would be implemented.</p>	<p>Impacts to cultural resources from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative).</p>	<p>Under the No Action Alternative, no Project-related impacts to cultural resources would occur.</p>
Paleontological Resources – Sections 3.8 and 4.8		
<p>No paleontological localities have been identified within the Project area. The two geological units present in the Project area both have a low potential for containing paleontological resources. There would be no impacts to paleontological resources as a result of operation or maintenance of the components or facilities under the Proposed Action.</p>	<p>Impacts to paleontological resources from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative).</p>	<p>Under the No Action Alternative, no Project-related impacts to paleontological resources would occur.</p>
Socioeconomic Resources – Sections 3.9 and 4.9		
<p>Construction of the proposed Project would last 39 months. Construction is expected to directly create an average of about 650 annual full-time employment over 39 months, with a peak monthly</p>	<p>Socioeconomic effects under the wet-cooled alternative would be the same as the Proposed Action (dry-cooled alternative).</p>	<p>Under the No Action Alternative, the right-of-way would not be granted. However,</p>

Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
<p>employment of approximately 1,300 full-time employees. Operation is anticipated to employ between 170 to 200 full-time employees. This direct employment will create both indirect and induced secondary employment in the regional area. For all projects in the region, temporary housing facilities would be needed and the added population during construction could place a burden on local social and public services.</p> <p>The construction payroll has been estimated at approximately \$58.6 million annually over the 39 period. Capital expenditures and local spending on construction materials and equipment within the Region of Influence are estimated to total approximately \$50 to \$75 million annually. During construction, the proposed Project could generate up to \$30 million in property taxes, and pay approximately \$35 million in sales tax to the State of Nevada for the Local School Support Tax.</p> <p>During operation, it is expected that the annual purchases for materials supplies, equipment, and services delivered and purchased within the Region of Influence would total approximately \$16.9 million. For example, if all purchases are delivered to and made within Nye County, which has a current tax rate of 7.1 percent, these expenditures would generate approximately \$1.2 million in annual sales tax revenue.</p>		<p>the land on which the Project is proposed would become available to other uses that are consistent with BLM’s land use plan, including another renewable energy project. The beneficial impact on the regional economy from construction and operation of the proposed Project would not occur.</p>
Environmental Justice – Sections 3.10 and 4.10		
<p>Potential direct and indirect impacts associated with the Proposed Action would not have a disproportionate effect on low-income or minority populations. There are no special issues, such as housing, transportation, access, or resource use in the Project area that would affect the environmental justice (EJ) population disproportionately.</p>	<p>Impacts to EJ under the wet-cooled alternative would be same as those described under the Proposed Action (dry-cooled alternative).</p>	<p>Under the No Action Alternative, no Project-related impacts to EJ would occur.</p>

Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
Land Use, Recreation, Transportation and Access – Sections 3.11 and 4.11		
<p>LAND USE: Construction and operation of the Proposed Action would permanently disturb approximately 4,350 acres, and would make this acreage unavailable to be developed for other uses. No residential, commercial, or industrial land uses would be directly impacted by construction or operation of the proposed Project.</p> <p>TRANSPORTATION AND ACCESS: The proposed Project would have short-term impacts on traffic flows and volumes on area roadways. Increased construction traffic on local unimproved roads may contribute to road deterioration and mitigative actions may be required. No access to commercial or residential areas would be restricted; however construction activity could potentially delay users’ daily commute times within the Valley’s transportation network. Scheduling construction activities could mitigate those delays. Operation of the Proposed Action would have long-term, cumulative impacts on traffic flows and volumes on roadways when combined with the other proposed energy projects and the commercial activity associated with increased industry in the area. All disturbance areas not covered by project facilities would be reclaimed in accordance with BLM protocols.</p> <p>RECREATION and SPECIAL MANAGEMENT AREAS: The proposed Project would not preclude the use of recreation and special management areas, but would remove land currently available for dispersed recreation on the Project site. Operation and maintenance of the Project facilities would not limit public access to recreation opportunities in the surrounding area.</p>	<p>Impacts to land use, recreation, transportation, and access under the wet-cooled alternative would be the same as those described under the Proposed Action (dry-cooled alternative).</p>	<p>Land use would not change on federal lands. However, land use changes could continue on adjacent private lands. Under the No Action Alternative, no Project-related impacts to transportation and access would occur. Under the No Action Alternative, no Project-related impacts to Areas of Critical Environmental Concern wilderness, or other special use areas would occur. No project-related impacts to recreational use of public lands would occur.</p>
Visual Resources – Sections 3.12 and 4.12		
<p>Visual impacts would occur during the construction of the proposed Project based on the introduction of construction equipment, higher</p>	<p>Impacts to visual resources under the wet-cooled alternative would be similar to those described for the</p>	<p>Under the No Action Alternative, no Project-related</p>

Table ES-1-4 Summary of Impacts by Resources for the Amargosa Farm Road Solar Energy Project Proposed Action, Wet-Cooled Alternative, and No Action Alternative

Proposed Action – Dry-Cooled Alternative	Wet-Cooled Alternative	No Action Alternative
<p>levels of traffic, potential fugitive dust, and new forms of night lighting in the foreground distance zone of high sensitivity residential viewers along Sandy Lane and adjacent to Valley View Estates. Long term impacts would be based on the introduction of moderate/strong visual contrast associated with Project components (e.g., solar troughs, power block, transmission lines, and ancillary buildings) within a rural to natural setting that would be visible to moderate and high sensitivity viewers. The majority of long term impacts are anticipated to range from low to moderate based on the relatively low profile of the Project and the occurrence of various existing landscape features (i.e., topography, mature vegetation, and structures associated with the town of Amargosa Valley) that would screen the Project and reduce contrast from moderate and high sensitivity viewers. Limited occurrences of high impacts would occur where moderate to high sensitivity viewers would have unobstructed views of the Project in the foreground distance zone (i.e., Sandy Lane and Valley View Estates residences). Potential effects to dark-sky that would result from the nighttime operations of the Project are anticipated. Compliance is anticipated with BLM Visual Resource Management Class IV objectives.</p>	<p>Proposed Action with the following exception. Because a wet-cooling unit is less than half the height of a dry-cooled unit, the contrast for key observation points with views of the power block would be less visible to sensitive viewers under the wet-cooled alternative. High impacts would remain for residences located along Sandy Lane and within Valley View Estates; however, impacts would be reduced for all other identified sensitive viewers and residences with views of the Project area.</p>	<p>impacts to visual resources would occur as no project facilities would be constructed on BLM lands.</p>
<p>Health and Safety/Hazardous Materials – Sections 3.13 and 4.13</p>		
<p>Potential wastes that could be generated at the site include domestic non-hazardous solid waste, hazardous wastes or materials, and used wastes that can be recycled. These types of substances, materials, and wastes most likely would be present during stages of construction, development, and operation of the facility. During all stages of plant construction and operation, strict compliance with all federal, state, and local regulations governing the management of hazardous materials is required by law.</p>	<p>Impacts from hazardous materials and solid waste under the wet-cooled alternative would be same as those described under the Proposed Action.</p>	<p>There would be no Project-related hazardous materials or solid waste produced under the No Action Alternative.</p>

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CHAPTER 1 - INTRODUCTION, PURPOSE AND NEED

1.1 INTRODUCTION

In Executive Order (EO) 13212 of May 18, 2001 (Actions to Expedite Energy-related Projects), President George W. Bush ordered that executive departments and agencies take appropriate actions “to expedite projects that will increase the production, transmission, or conservation of energy.” Section 211, of the Energy Policy Act of 2005 (EPAAct). (Public Law [PL] 109-58) states “...that the Secretary of the Interior should, before the end of the 10-year period beginning on enactment of this Act, seek to have approved non-hydropower renewable energy projects located on public land with a generation capacity of at least 10,000 megawatts (MW) of electricity.”

According to the U.S. Department of the Interior (DOI), federal public lands offer some of the highest renewable energy potential in the nation. The DOI manages 500 million acres of land, one-fifth of the land mass of the United States. On March 11, 2009, Secretary of the Interior Ken Salazar issued a Secretarial Order that made facilitating the production, development, and delivery of renewable energy on public land a top priority for the DOI. Within the DOI, the Bureau of Land Management (BLM) administers approximately 253 million acres of public land in the United States. The BLM has identified approximately 23 million acres in the Southwest as containing high solar energy potential.

The BLM Solar Energy Development Policy establishes a framework to process applications for rights-of-way, and directs the BLM to be responsive to solar energy project applicants, while maintaining its commitment to resource protection. In 2007, the BLM issued Instruction Memorandum Number 2007-097, which established policy for the processing of right-of-way applications for solar energy development projects on public land administered by the BLM. Under this policy, the BLM strives to balance the financial and social benefits from solar energy development with minimizing impacts to other resources.

According to the 2005 Nevada Renewable Energy and Energy Conservation Task Force Annual Report to the Legislature and the Governor, Nevada utilities will need in excess of 3,000 gigawatt hours per year of new renewable energy generation capability over the next 10 years to meet the state’s renewable energy needs. The State of Nevada has established a Renewable Portfolio Standard that all public utilities must meet by investing in, and partnering with, commercial project developers to purchase renewable generated power, and participate in turnkey projects and/or co-development of renewable projects. This standard mandates that 12 percent of retail sales come from renewable resources by 2009-2010; 15 percent by 2011-2012; 18 percent by 2013-2014; 20 percent by 2015-2019; 22 percent by 2020-2024; and 25 percent by 2025.

Of the total amount of electricity that the provider is required to generate, acquire, or save from renewable portfolio energy systems or efficiency measures during each calendar year, not less than 5 percent of that amount must be generated or acquired from solar renewable energy systems. Beginning in 2016, this percentage increases to 6 percent. It is expected that at least 1,000 MW of new solar power will be required annually to meet this need. Because of the

intermittent nature of solar generation, there is particular interest in technologies that can expand capacity through thermal storage, in order to help utilities balance loads.

Further, the Nevada Renewable Energy and Conservation Task Force has estimated that by increasing in-state renewable energy production to just 15 percent of the state's generation, over 5,000 new jobs could be created, with an average annual Gross State Product effect of \$665 million through 2035 (2005).

Additional solar generation will also be required to meet California's needs. Under Senate Bills 1078 (2002) and 107 (2006), electric corporations must obtain 20 percent of their energy from renewable sources by 2010. On November 17, 2008, the Governor of California signed Executive Order S-14-08 which increased the requirement to 33 percent by 2020. Following the Report of the Nevada Renewable Energy Transmission Access Advisory Committee (July 1, 2009), California is examining the possibility of meeting the 33 percent Renewable Portfolio Standard requirement through out-of-state generation. To do so would assume a potential of 34 terawatts of energy routed to California from or through Nevada by 2020. This energy transfer is equivalent to approximately 12,900 MW of capacity from wind or concentrated solar power resources, assuming a 30 percent capacity factor.

Solar Millennium, LLC (Proponent) is pursuing economic stimulus funding for the proposed Project under Section 1703 of the EPAct. Section 1703 authorizes loan guarantees for renewable energy projects and certain other projects. To be eligible for a loan guarantee under Section 1703, a project must "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gasses" and "employ new or significantly improved technologies" in comparison to commercial technologies currently used in the United States. A loan guarantee would reduce the cost financing required for the Amargosa Farm Road Solar Energy Project (Project), and therefore the gross Project cost over the Project's lifetime. In addition, the Proponent may pursue funding under Section 1603 of the EPAct, which was established pursuant to the American Reinvestment and Recovery Act of 2009 (PL No. 111-5). Section 1603 provides a 30 percent tax grant for eligible renewable energy projects that commence construction by the end of 2010. The U.S. Congress may extend this deadline.

1.2 PROJECT OVERVIEW

The Proponent submitted a right-of-way application to the BLM Pahrump Field Office to construct and operate the proposed Project on BLM-managed land in Amargosa Valley, Nevada.

The proposed Project includes the construction and operation of two 250-MW dry-cooled solar power plants equipped with thermal energy storage capability and associated ancillary linear facilities. Facilities located within the Project area would occupy approximately 4,350 acres and would include solar fields, power blocks, an office and maintenance building, parking area, lay-down area, switchyard, evaporation ponds, and a stormwater detention basin. Additional elements of the proposed Project would include access roads and optional water pipelines.

The Proponent's proposed Project would utilize parabolic trough solar thermal technology to produce electrical power using steam turbine generators fed by solar steam generators. The main element of a parabolic trough power plant is the solar field. The solar field consists of numerous

parallel rows of solar collectors, arranged on a north-south axis. The solar collectors follow the path of the sun from east to west during the day to keep the sun's rays continuously focused on a receiver tube. The reflectors consist of parabolic mirrors made from transparent, silver-coated glass, which concentrate the incident solar radiation 80-fold, focusing it onto the receiver tube in the solar collector. The receiver tube contains a heat transfer fluid (HTF), which is a temperature-stable synthetic oil in a closed circuit that can be heated to temperatures of up to 752 degrees Fahrenheit (°F) (400 degrees Celsius [°C]). Once heated, the oil is pumped to a centrally located power block, where it flows through a heat exchanger.

The remainder of the process is similar to the steam cycle used in conventional power plants. The steam produced by the heat exchanger is used to drive a turbine connected to a generator, which produces electricity to be fed into a substation. The steam in the turbine condenses back into the water and the water is re-circulated through the solar field. With solar thermal technology, the heat is stored (referred to as thermal storage) and used during periods of cloud cover and up to 4.5 hours after sundown.

At this time, it is anticipated the proposed Project would be built in two separate phases, with the construction of the first phase beginning in 2011, or immediately following issuance of the BLM right-of-way grant and other federal, state, and local permits and approvals. The Proponent would phase construction so that the first power plant would be operational approximately 1 year before the second power plant becomes operational.

1.3 PROJECT LOCATION

The proposed Project is located on BLM-administered lands, approximately 80 miles northwest of Las Vegas, in the Amargosa Valley in Nye County, Nevada (Figure 1-1). Some portions of the proposed Project would be located on private property, including a 40-acre parcel south of Amargosa Farm Road and the well and pipelines to be used to supply water to the proposed Project.

The Project area is located approximately 5 miles south of United States Highway 95 (US 95) and 3 miles west of Nevada State Route (NV) 373. The majority of the proposed Project area would be located north of Amargosa Farm Road, and east of Valley View Boulevard. The initial right-of-way application and subsequent Plan of Development (POD) erroneously stated the area of the right-of-way to be 7,810 acres. The actual area, by legal description, is 7,630 acres. On August 6, 2009, the Proponent sent a letter to the BLM requesting a reduction in the acreage from 7,630 acres to 6,320 acres. The Proponent's decision to release a portion of the requested lands from further consideration was based upon refinement of the Project layout following surveys conducted in the spring of 2009. The lands released from further consideration are shown on Figure 1-2.

Amargosa Farm Road Solar Energy Project (NVN-84359)

Project Vicinity
Figure 1-1







LEGEND

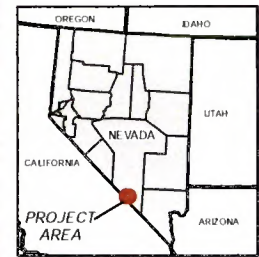
 Project Area

Surface Management

-  Department of Defense
-  Department of Energy
-  National Park Service
-  US Fish and Wildlife Service
-  US Forest Service

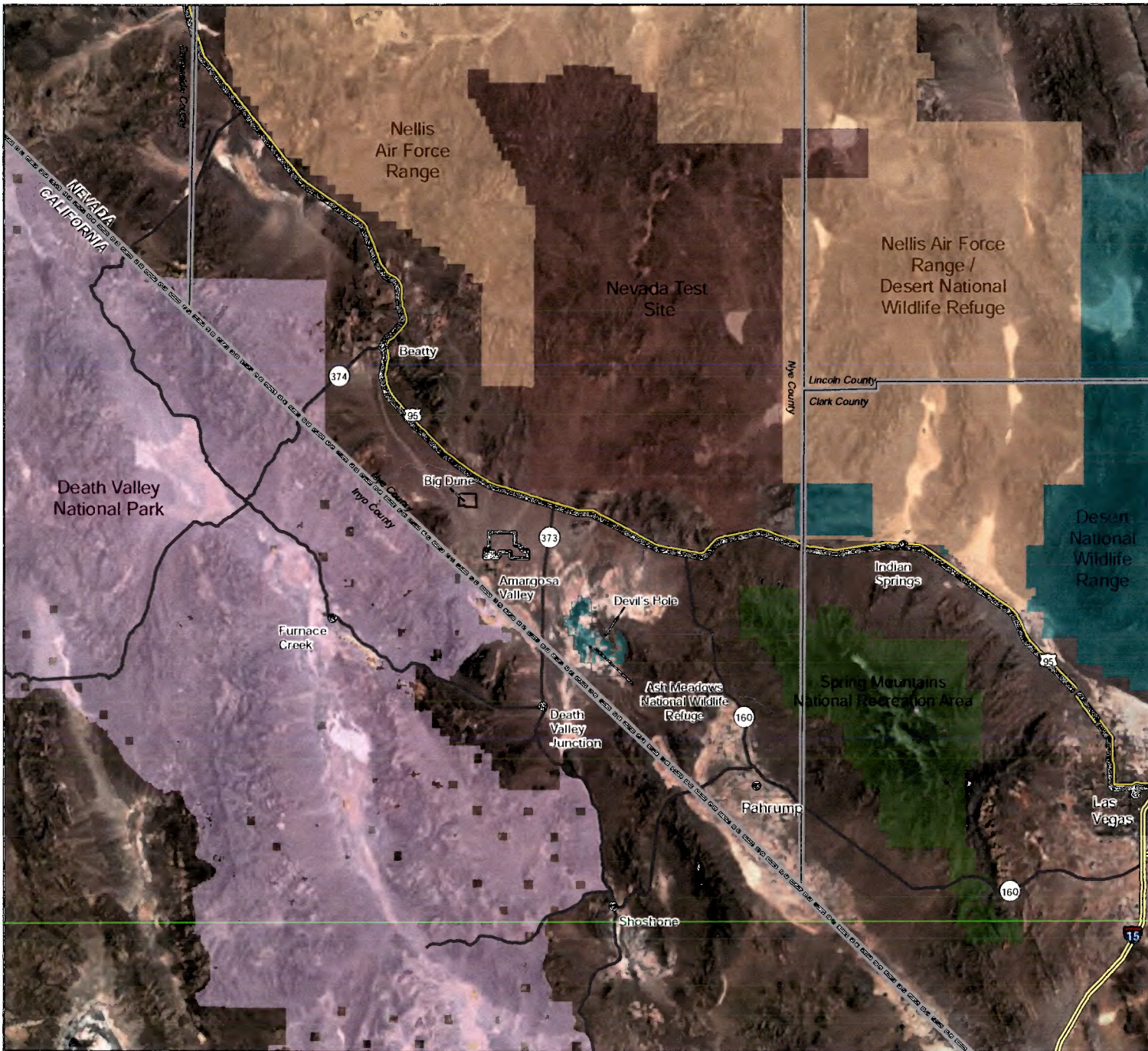
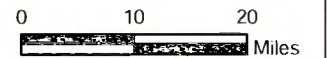
General Reference Features

-  Interstate
-  US Highway
-  State Highway
-  State Boundary
-  County Boundary
-  City / Town



Source: Surface Management - BLM, 2007;
Ash Meadows - USFWS, 2005;
Highways, Imagery - ESRI, 2009

February 2010



Amargosa Farm Road Solar Energy Project (NVN-84359)

Project Area Figure 1-2

LEGEND

-  Initial Right-of-way Limits (November 2007)
-  Revised Right-of-way Limits (August 2009)
-  Lands Released from Consideration for Project
-  Proposed Solar Field
-  Proposed Project Well
-  Existing Substation
-  Existing Transmission Line (<230kV)
-  Private Parcel Line

Note: The Power Block contains the steam turbine, salt storage tanks and other power generating equipment as described in the Plan of Development.



Source: Project Facilities - Solar Millennium, 2009;
Wells - Nevada State Engineer, 2008;
Substation, Transmission Line - Platts, 2009;
Imagery - ESRI, 2009

September 2010

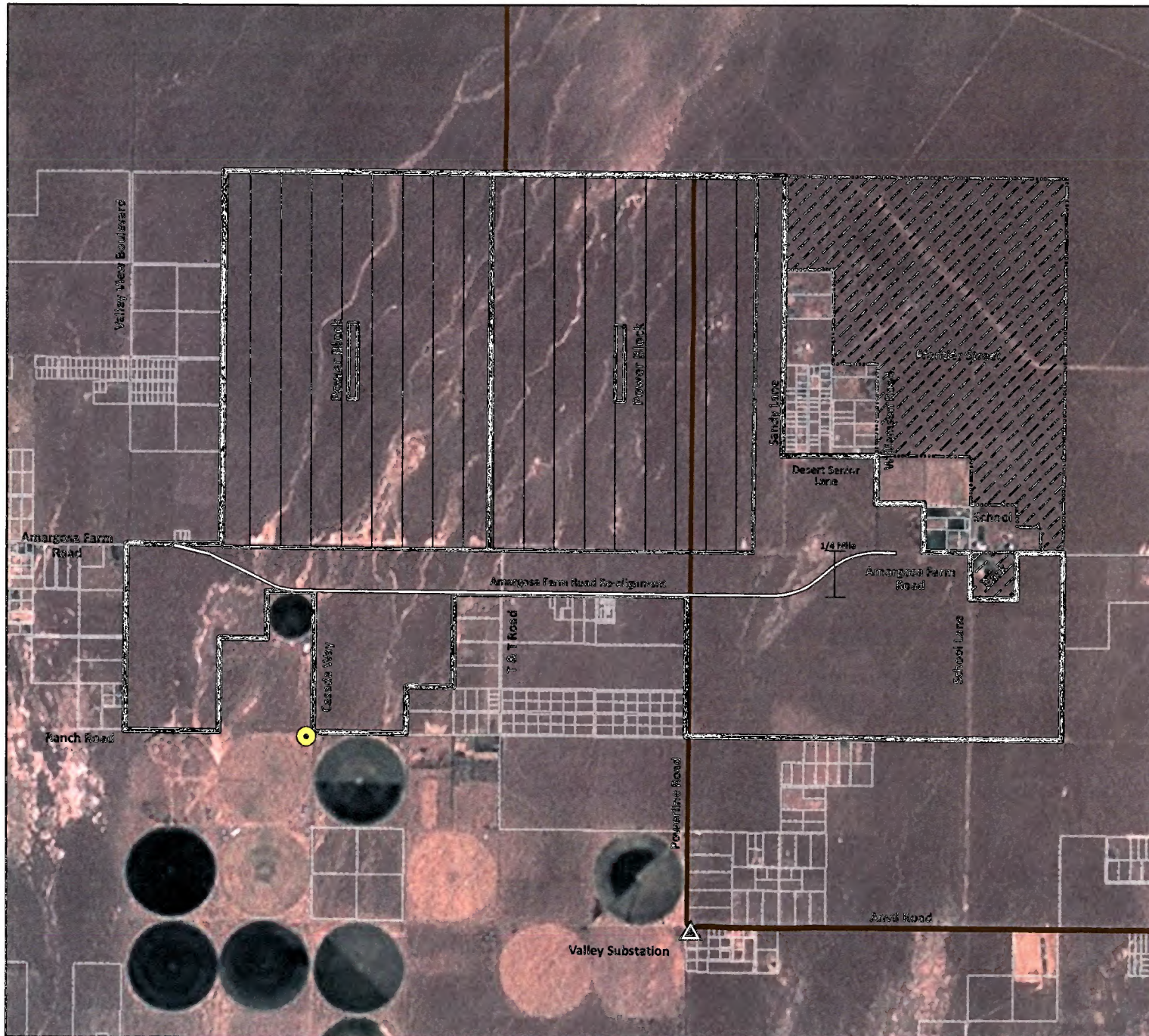
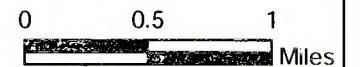


Table 1-1 Legal Description of Proposed Project		
Township (T)	Range (R)	Section/Portion
T16 South	R48 East	Sec. 1 and 12 – all
T16 South	R48 East	Sec. 2, 11, 13, and 14 – Partial Section
T16 South	R49 East	Sec. 6, 7, and 17 – all
T16 South	R49 East	Sec. 5, 8, 9, 16 18 – Partial Section

1.4 PURPOSE AND NEED FOR ACTION

1.4.1 Bureau of Land Management Purpose and Need

The BLM's purpose and need is to respond to the Proponent's application under Title V of the Federal Land Policy and Management Act (FLPMA) (43 United States Code [USC] § 1701-1782) for a right-of-way grant to construct, operate and decommission a 500 MW solar thermal generation facility and associated infrastructure in accordance with FLPMA, BLM right-of-way regulations (40 Code of Federal Register [CFR] Part 2800), and other applicable federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a right-of-way grant to the Proponent for the proposed Project. That is, the decision the BLM will make is whether or not to grant the requested right-of-way, and if so, under what conditions.

1.4.2 Proponent's Proposal

The Proponent's objectives and purpose of the proposed Project are to:

- Develop a utility-scale parabolic trough solar thermal energy facility that optimizes power generation efficiency and provides energy at a reasonable and competitive cost.
- Construct and operate an environmentally compatible, economically sound, and operationally reliable solar power generation facility that will contribute approximately one million MW hours of clean, renewable solar energy per year to meet state, regional, and national renewable energy goals and mandates.
- Locate the Project in an area with high solar insolation (i.e., high intensity of solar energy) and other characteristics suitable for the development of a 500-MW solar thermal facility.
- Minimize environmental impacts, infrastructure needs, and costs by locating the plant near existing infrastructure, such as a transmission line, a substation, an adequate water supply, and highways/access roads, and by using designated corridors to the maximum extent possible.

- Develop a power-generation facility with the technical capability and flexibility to continue producing electricity when the solar resource is not optimal (i.e., during cloud cover and early evening hours) to better match the load demands of utility offtakers.
- Develop a solar thermal energy facility that will qualify for, and benefit from, the EPC Act Section 1703 loan guarantee program, as well as the EPC Act Section 1603 American Reinvestment and Recovery Act of 2009 Tax Grant Program, if the deadline for construction under Section 1603 is extended. Support the economy of southern Nevada and the region by helping to ensure an adequate supply of renewable electrical energy, while creating additional tax revenues, employment, and expenditures in local businesses.

1.5 SCOPE OF ANALYSIS

The NEPA process consists of an evaluation of the environmental effects of a federal project or action undertaking. Under NEPA, federal agencies must consider the environmental effects of their actions. NEPA directs federal agencies to “utilize a systematic, interdisciplinary approach ... in planning and decision-making, which may have an impact on man’s environment,” to ensure that environmental amenities and values ... be given appropriate consideration in decision-making along with economic and technical considerations,” and to “study, develop, and describe appropriate alternatives to recommended courses of action..” This mandate applies to all “major federal actions” (Title 43, Part 1500 CFR). As a result, NEPA affects most decisions regarding the use of public lands.

The preparation of an EIS follows a highly formalized process, consisting of eight major steps:

1. Issue the Notice of Intent (NOI) to prepare an EIS
2. Conduct public and agency scoping
3. Prepare the interdisciplinary analysis of the issues and alternatives
4. Issue the Draft EIS
5. Conduct the public review and comment period
6. Issue the Final EIS, which includes responses to comments on the Draft EIS
7. 30-day waiting period
8. Issue the ROD

1.5.1 The Environmental Impact Statement Decision Framework

This EIS analyzes and discloses the environmental impacts of the proposed Project, as well as alternatives chosen by the BLM as detailed in Chapter 2. The EIS provides an analysis of impacts that would result from the implementation of the proposed Project or alternatives. The EIS process is designed to encourage public participation in the BLM’s decision-making process and identifies mitigation measures to address environmental consequences.

1.5.2 Decisions to be Made After this Environmental Impact Statement

In the EIS, in addition to the proposed Project (Proposed Action), several alternatives to the proposed Project are identified and analyzed. The decisions made regarding the Proposed Action and alternatives will be documented in a ROD signed by the authorized officer. The BLM decision will only apply to public lands.

Within the ROD, the authorized officer will determine whether:

- the analysis contained in this EIS is adequate for the purposes of reaching an informed decision regarding authorizing a right-of-way
- to approve the Proposed Action, select a different alternative, select a combination of alternatives, or deny the right-of-way request
- the Proposed Action and alternatives are in conformance with applicable land and resource management plans (RMP)

1.6 RELATIONSHIP TO BLM AND NON-BLM POLICIES, PLANS, AND PROGRAMS

If approved, the Proposed Action must be consistent with the BLM Las Vegas RMP/EIS, approved by a ROD dated October 5, 1998 (BLM 1998). The RMP/EIS has been reviewed and it is determined the proposed Project conforms with adopted management objectives and directions as summarized in the RMP and the ROD under the authority of the FLPMA of October 21, 1976, as amended (43 USC §§1701-1782).

This EIS was prepared in compliance with: CEQ regulations for implementing the NEPA (40 CFR §§ 1500-1508; 43 CFR Part 46); the BLM NEPA Handbook, H-1790-1; FLPMA Sections 201, 202, and 206 (43 USC §§ 1711, 1712, 1716; see also 43 CFR § 1600 et seq.); and the BLM Land Use Planning Handbook (BLM Handbook H-1601-1). The BLM also has Instruction Memorandum 2004-105, 149, 231, and 2005-105, which set NEPA compliance policy for the BLM.

Applications for commercial solar energy facilities on BLM-administered lands are processed as a right-of-way authorization under Title V of FLPMA. Title V states that, in “designating right-of-way corridors and in determining whether to require that the right-of-way be confined to them, [BLM] shall take into consideration national and state land use policies, environmental quality, economic efficiency, national security, safety, and good engineering and technological practices.” FLPMA further directs that each right-of-way permit contain terms and conditions to protect federal property and economic interests, protect lives and property, and otherwise protect the public interest in the lands traversed by the right-of-way or adjacent to them (43 USC § 1765).

Table 1-2 is a representative list of federal, state, and local laws, statutes, and EOs that may apply to the siting, construction and operation of the proposed Project. If the Project were approved, the Proponent and its contractors would comply with requirements set forth in these directives, as applicable.

Table 1-2 Laws, Statutes, Regulations, and Executive Orders with which the Proposed Action and All Alternatives Must Conform
Federal Statutes
American Indian Religious Freedom Act of 1978 (PL 95-341; 42 USC 1996)
Archaeological and Historic Data Preservation Act of 1974 (PL 93-253, as amended by PL 93-291; 16 USC 469)
Archaeological Resources Protection Act of 1979 (PL 96-95; 16 USC 470aa-mm)
Bald and Golden Eagle Protection Act of 1940 (16 USC 668-668d, 54 Stat. 250) as amended (PL 95-616 [92 Stat. 3114]) November 8, 1978
Clean Air Act of 1990 (as amended by PL 92-574; 42 USC 4901)
Federal Water Pollution Control Act (Clean Water Act) (33 USC 1251-1387)
Department of Transportation Act of 1966, (PL 89-670; 49 USC Section 303)
Endangered Species Act of 1973 (ESA) (PL 85-624; 16 USC 1531-1544)
EPAct of 2005 (PL 109-58)
Farmland Protection Policy Act (PL 97-98 and 7 CFR Part 658)
FLPMA of 1976, Section 201(a) (PL 94-579; 43 USC 1701 et seq.)
Federal Water Pollution Control Act of 1972, Section 404 (PL 92-500; 33 USC 1344, as amended)
Historic Sites Act of 1935 (PL 292-74; 16 USC 461-467)
Land and Water Conservation Fund Act of 1965 (PL 88-578)
Migratory Bird Treaty Act of 1918 (MBTA) (16 USC 703-712, as amended)
NEPA of 1969 (PL 91-190; 42 USC 4321; 43 CFR Part 46)
National Historic Preservation Act of 1966 (NHPA), Section 106, (PL 89-665; 16 USC 407(f))
Native American Graves Protection and Repatriation Act of 1990 (PL 101-601)
Paleontological Resources Preservation Act 2009 (PRPA) (PL 111-11; 16 USC 470aaa)
Executive Orders
EO 11296 Flood Hazard Evaluation Guidelines
EO 11514 Protection and Enhancement of Environmental Quality
EO 11593 Protection and Enhancement of the Cultural Environment
EO 11988 Floodplain Management (43 CFR 6030)
EO 11990 Protection of Wetlands
EO 12898 Federal Actions to address Environmental Justice (EJ) in Minority Populations and Low-income Populations

Table 1-2 Laws, Statutes, Regulations, and Executive Orders with which the Proposed Action and All Alternatives Must Conform
EO 13007 Indian Sacred Sites
EO 13186 Responsibilities of Federal Agencies to Protect Migratory Birds
EO 13212 Actions to Expedite Energy-related Projects
EO 13287 Preserve America
EO 123772 Intergovernmental Review of Federal Programs
Federal Regulations
40 CFR Parts 1500-1508 CEQ implementation of the NEPA
33 CFR 320-331 and 40 CFR Part 230, Section 404 of the Clean Water Act (CWA) and its Implementing Regulations
36 CFR Part 800, as amended, Protection of Historic Properties
7 CFR Part 658, as amended, Prime and Unique Farmlands
43 CFR Part 2800, as amended, Right-of-way Principles and Procedures
State Laws and Statutes
NAC 503.015-104 Classification and Taking of Wildlife
NRS 527.060-120 Protection and Preservation of Timbered Lands, Trees, and Flora – Definitions Cactus and Yucca
NRS 527.270 List of species declared to be threatened with extinction; special permit required for removal or destruction
NRS 503.584-589 Protection and Propagation of Native Fauna
NRS 503.430 Water pollution: Deposit of substance deleterious to fish or wildlife; penalties
NRS 503.597 Introduction or removal of aquatic life or wildlife: Approval required; investigation; regulations
NRS 503.620 Protection of birds included in the MBTA
NRS 533.030 Adjudication of Vested Water Rights; Appropriation of Public Waters – Appropriation for beneficial use; use for recreational purpose declared beneficial; limitations and exceptions
NRS 533.035 Adjudication of Vested Water Rights; Appropriation of Public Waters – Beneficial use; Basis, measure and limit of right to use
NRS 534.020 Underground waters that belong to the public and are subject to appropriation for beneficial use; declaration of legislative intent
NRS 555.005 Agriculture – Control of Insects, Pests, and Noxious Weeds, Definitions
Definitions: NAC – Nevada Administrative Code; NRS – Nevada Revised Statute; et seq. – “and the following”

The Proponent, or its designees, is responsible for applying for and acquiring the federal, state, and local permits and approvals listed in Table 1-3.

Table 1-3 Authorizations, Permits, Reviews, and Approvals			
Action Requiring Permit, Approval, or Review	Permit/Approval or Review	Accepting Authority/ Approving Agency	Statutory Reference
Federal			
Temporary Land Use Permit; Form 2920	Temporary Use Permit (pre-operational activities on BLM land)	BLM	43 USC 1201; 43 CFR Part 2920
Rights-of-way Over Land Under Federal Management; Form SF-299	Right-of-way Grant	BLM	FLPMA (PL 94-579) USC. 1761-1771 and 43 CFR 2800
NEPA Compliance to Process Right-of-way Application	EIS and ROD	BLM	NEPA, 40 CFR 1500 et. seq.
NHPA Compliance to Process Rights-of-way Application	Section 106 Compliance or Consultation	BLM/Nevada State Historic Preservation Office (SHPO)	NHPA, 36 CFR part 800; 16 USC 47; NRS Chapter 384
Compliance with the ESA	Review by BLM to initiate Section 7 consultation	BLM/U.S. Fish and Wildlife Service (USFWS)	ESA Section 7 Consultation, 50 CFR Part 17, 16 USC 1536
Dredge or Fill Activities in Waters of the United States; Dry Wash Crossings	Jurisdictional Delineation Report Concurrence, Nationwide or Individual Permit	U.S. Army Corps of Engineers (USACE)	33 USC 1344
Project Component Height Relative to Air Traffic	No Hazard Declaration required if any structure is more than 200 feet	Federal Aviation Administration	49 USC 1501, 14 CFR Part 77
U.S. Environmental Protection Agency (EPA) ID Number	Compliance with federal hazardous waste management requirements	EPA	40 CFR Part 124, 260, and 270
Oil Pollution Prevention – Spill Prevention, Control, and Countermeasure (SPCC) Plan	If total aboveground storage capacity of oil is greater than 1,320 gallons, then a SPCC Plan is required.	EPA – Office of Emergency Services	40 CFR Part 112, and Section 311(j) of the CWA
Review of Project for its potential impact on military over flights and operations	U.S. Department of Defense (DOD) R 2508 Complex Sustainability Office	U.S DOD	U.S. DOD
State of Nevada			
Permit to Construct a Public Utility in Nevada	Utility Environment Protection Act – Permit to Construct	Nevada Public Utility Commission	NRS 704.820 – 704.900, NAC 703.415 – 703.427

Table 1-3 Authorizations, Permits, Reviews, and Approvals

Action Requiring Permit, Approval, or Review	Permit/Approval or Review	Accepting Authority/ Approving Agency	Statutory Reference
Discharge of Stormwater to Waters of the State	Construction Stormwater General Permit (NVR 100000)	Nevada Division of Environmental Protection (NDEP) – Bureau of Water Pollution Control (BWPC)	40 CFR122.26(b)(14), NRS 445A.465
Section 401 Certification	Required if Section 404 permit is needed – State certification that federal permit does not violate water quality standards	NDEP – Bureau of Water Quality Planning (BWQP)	Section 401 of CWA
Separate Stormwater Permit for operations	General Stormwater Permit for Industrial Activities	NDEP – BWPC	NRS 445A.465
Temporary permit needed for groundwater discharge associated with construction	Groundwater Discharge Permit	NDEP – BWPC	NRS 445A.465
Operating Permit Class I, II, or III (depending on Calculated Potential to Emit)	Air Quality Operating Permit	NDEP – Bureau of Air Pollution Control (BAPC)	NRS 445B.100 through 445B.640, NAC 445B.001 through 445B.3689 (operating permits outside Clark County)
Construction activities disturbing more than 5 acres	Stand-alone Surface Disturbance Permit	NDEP – BAPC	NAC 445B
Permit to Store, Use of Manufacture Hazardous Materials at a Facility	Hazardous Materials Permit	State Fire Marshal	NAC 477.323, NAC 477.325
Permit to Appropriate Water; Change of Use	Permit to Appropriate the Public Water of the State of Nevada	Nevada Division of Water Resources (NDWR)	NRS 533 and 534
Public Water System Permit	Non-community Water System	NDEP – Bureau of Safe Drinking Water	NRS 445, NAC 445A.450 through 445A.673I
Use of a Highly Hazardous Substance	Chemical Accident Prevention Program/ Authority to Construct and Permit to Operate	NDEP	NRS 459.380
Management of Hazardous Waste	Hazardous Waste Management Permit	NDEP – Bureau of Waste Management	NRS 459.400 through 459.600
Transporting of Hazardous	Hazardous Materials	Nevada Department of	NRS 459.400 through

Table 1-3 Authorizations, Permits, Reviews, and Approvals			
Action Requiring Permit, Approval, or Review	Permit/Approval or Review	Accepting Authority/ Approving Agency	Statutory Reference
Materials	Transportation Permit	Transportation (NDOT)	459.600
Solid Waste Class II Wavered Landfill Authorization	Approval to Operate a Solid Waste System	NDEP – Bureau of Waste Management	NRS 444.440 through 444.645
General Permit to Operate Septic System	On-site Sewage Disposal System	NDEP BWPC	NRS 445A, NAC 445A
Construction of Evaporation Ponds	Industrial Artificial Pond Permit	Nevada Department of Wildlife (NDOW)	NRS 502.390, NAC 502.460 through 502.495
Disturbance of any Native Plant Species and/or Native Plant Habitat Regarded as Threatened with Extinction	Conditional Permit for Disturbance or Destruction of Critically Endangered Plants	Nevada Division of Forestry	NAC 527.260 through 527.300
Disturbance of Wildlife and/or Wildlife Habitat (Not specific to endangered species)	Written Approval Prior to Handling Any Wildlife as Defined by the State of Nevada	Nevada Division of Wildlife	NRS 445, 501.181, and NRS 503.597; NAC 503.093 and 504.520
Encroachment or Construction Activities within Highway Right-of-way	Right-of-way Occupaney Permit	NDOT	NAC 408
Pressure vessel specification and certifications	Boiler & Pressure Vessel Certificate	Nevada Industrial Relations Division	NRS 455C.100
Required for extraordinarily large or oversized equipment traveling on state roads or unusual impacts to traffic are anticipated	NDOT Super Load Permit	NDOT	NRS 484.471
Nye County			
Building and operation fire safety	Fire Safety Compliance Certification	Nye County Bureau of Fire Prevention	Nye County Code
Certification of flood zone location	Flood Damage Prevention Permit	Nye County Planning Department	Nye County Code
Type, location, duration of encroachment onto public roadway	Encroachment Permit	Nye County Department of Public Works	Nye County Code
Building Permit (for structures)	Building Permit	County Building Division	Nye County Code

1.7 AGENCY COORDINATION

1.7.1 Cooperating Agencies

Cooperating agency status provides a formal framework for governmental agencies to engage in active collaboration with a federal agency to implement the requirements of the NEPA (42 USC §4321 et seq.). Federal and state agencies and local and tribal governments may qualify as cooperating agencies because of “jurisdiction by law or special expertise” (40 CFR §§1501.6-1508.5).

The BLM invited nine agencies to consider becoming a cooperating agency. Agencies invited to participate include:

1. USFWS
2. U.S. DOD, Regional Environmental Coordination Office
3. DOE, National Nuclear Security Administration
4. Federal Highway Administration
5. National Park Service (NPS), Death Valley National Park
6. USACE, Sacramento District
7. NDOW
8. NDOT
9. Nye County

The U.S. DOD, DOE, NPS, USACE, NDOW, and Nye County have formally requested to be cooperating agencies for the Proposed Action. Each of these agencies has agreed to participate as a cooperating agency and review material for the EIS pertaining to their legal and regulatory responsibilities. The Federal Highway Administration, USFWS, and NDOT declined the invitation.

1.7.2 Native American Consultation

The BLM conducts consultation and coordination with American Indian tribal governments for proposed projects that may affect their ancestral lands. On June 17, 2009, the BLM sent formal consultation letters to representatives of the Timbisha Shoshone Tribe, the Pahrump Paiute Tribe, the Las Vegas Paiute Tribe, the Chemehuevi Indian Tribe, and the Colorado River Indian Tribes describing six proposed solar energy projects in the Amargosa and Pahrump Valleys, Nye County, including the proposed Project. On August 5, 2009, the same tribes were e-mailed information about the Project’s scoping meetings if they wished to attend and make comments. A field visit was conducted with the Timbisha Shoshone in the Project area to review the archaeological resources identified during the cultural resource inventory on September 17, 2009. At this time, no religious or cultural concerns have been brought forth to the BLM concerning this proposed Project or Project area by any of the Tribes contacted.

1.7.3 Section 7 Consultation

A species list was requested from the USFWS, which identified flora and fauna listed as threatened, endangered, or candidate under the ESA and that occur or have the potential to occur within the Project area and its vicinity. At the request of the USFWS, rare plant and Desert Tortoise surveys were conducted within the Project area. A Biological Assessment (BA) has been prepared for the Proposed Action and was submitted in May 2010 to the USFWS as required by Section 7 of the ESA. Consultation with the USFWS was triggered once the BA was submitted. Consultation with the USFWS is ongoing. However, a Biological Opinion will be issued prior to the ROD for this Project.

1.8 PUBLIC INVOLVEMENT

Chapter 5, Consultation and Coordination, contains an in-depth discussion of the public involvement process and the issues raised by the public and other agencies during that process.

1.9 CHANGES BETWEEN THE DRAFT AND FINAL EIS

In response to public comments on the Draft EIS, the BLM has made a number of changes to the Final EIS. The most substantive changes are listed below, and, as many comments requested, they provide greater certainty regarding the proposed Project's features and potential impacts. Editorial and grammatical changes to improve accuracy, clarity, consistency, and improved readability also have been made to the Final EIS based on public comment and internal review. Please refer to Appendix G for a compilation of all public comments received during the comment period and how they have been specifically addressed in the Final EIS.

Selection of Project Well – The Draft EIS evaluated the use of three separate wells for Project use. However, following issuance of the Draft EIS, the Proponent determined that only one of the wells considered would be needed for construction and operation (see Section 2.3.6). The well, with associated certificated water right 5717, has an annual duty of 603 acre-feet. On March 18, 2010, the Proponent filed an application (No. 79699) with the Nevada State Engineer's Office to change the place and manner of use of the water right. The Proponent has requested that 400 acre-feet of the 603 acre-feet annual duty be changed from agricultural to industrial use. Following approval of a second application (No. 79783) by the Nevada State Engineer, the Proponent intends to drill a new well approximately 300 feet west of the existing well and move 400 acre-feet from its current point of diversion to the new well. The remaining 203 acre-feet will remain with the existing well. This will allow for redundancy should one of the wells fail. During construction, the Proponent will lease the full annual duty (603 acre-feet per year [afy]) from the water rights holder for the Project well. During this period, the water rights holder will fallow farmlands that were previously irrigated. After construction, the water rights holder may continue to irrigate up to 40 acres of farmland with the 203 acre-feet assigned to the existing well.

Addition of Evaporation Pond(s) to Manage Industrial Wastewater Flow – Through refinement of the Project design and subsequent to the issuance of the Draft EIS, the Proponent has informed the BLM that the Proposed Action would require the construction and operation of

four 4-acre (16 acres total) evaporation ponds for boiler blowdown. These evaporation ponds would be placed within the existing Project footprint and would disturb no additional land surface areas beyond what was previously analyzed. While the residue in the evaporation ponds represents an additional waste stream that would require off-site disposal, the volume and frequency of such disposal would not be substantially different than previously analyzed. Evaporation ponds are a primary concern for biological resources, particularly impacts resulting from the attraction of migratory and resident avian species, which could lead to inadvertent poisoning due to concentrated salt and other minerals or accidental drowning. Evaporation ponds also have the potential to impact water quality. The Proponent will coordinate the construction and operation of the evaporation ponds in consultation with NDEP to ensure the project is designed and operated to meet all federal, state, and local laws and regulations. At a minimum, the evaporation ponds would be double-lined and covered with narrow-mesh netting to prevent access by ravens and migratory birds in accordance with applicable regulations. Air quality impacts of construction and operation of the evaporation ponds would not be substantially different than previously analyzed.

Project-specific Air Quality Modeling – Emission tables in the Final EIS have been revised to reflect project-specific impacts. In the Draft EIS, the air quality modeling was for a facility in California that utilized similar technology in a similar climate. Because Nevada and California have different regulations for air quality monitoring and reporting, there is some inconsistency between what was reported in the Draft EIS and what is now reported in the Final EIS. Air quality modeling has now been completed for the proposed Project. The emission tables provided in Chapter 4.1 of the Final EIS reflect the results of modeling that was done for the proposed Project, which will be regulated by NDEP – BAPC.

Water Resources Mitigation Measures – Following issuance of the Draft EIS and as part of the Section 7 ESA consultation between the BLM and USFWS, minimization measures specifically designed to reduce impacts to sensitive species occurring at the Ash Meadows NWR and Devils Hole were developed and agreed to by the Proponent, BLM, USFWS, NPS, and Nye County (see Section 2.3.6 and Appendix A). To address the NPS, USFWS, and BLM concerns that the proposed groundwater withdrawals associated with the proposed Project—in combination with existing groundwater withdrawals in the vicinity of Devils Hole and the Ash Meadows NWR - may adversely affect federal rights and resources, the Proponent has agreed to acquire no less than 236 afy of preferably senior groundwater rights in the vicinity of the water right to be used for the proposed Project, or closer to Devils Hole and Ash Meadows NWR. The 236 afy consists of 204 afy identified as “Minimization Water Rights” (see Appendix A), and an additional 32 afy to offset the potential reduction in groundwater return flow as a result of changing the manner of use from agricultural to industrial. Preference will be given to rights that are currently used for agricultural purposes. The acquired rights will preferably be historically fully utilized. If fully utilized rights totaling 236 afy are unavailable for purchase, sufficient rights will be purchased such that the cumulative total of the historic pumping average is no less than 236 afy. This may result in the purchase of more than 236 afy of water rights. At this time, it is unknown where the additional water rights will be obtained.

1.10 ORGANIZATION OF THE FINAL EIS

This EIS follows the CEQ recommended organization per 40 CFR 1502.10, and BLM guidelines as described in the BLM Handbook, H-1790-1. Table 1-4 describes the organization of the Final EIS.

Table 1-4 Organization of the Final EIS	
Chapter 1 – Introduction, Purpose and Need	This chapter provides a description of the purpose of, and need for, the Proposed Action, the role of the BLM in the EIS process, and the required regulatory actions for the proposed Project. The Final EIS includes a summary of changes between the Draft and Final EIS.
Chapter 2 – Proposed Action and Alternatives	This chapter describes the Proposed Action and alternatives analyzed in the EIS, including the No Action Alternative. Alternatives that were considered but eliminated from further analysis are described, with a discussion of why they were not considered further.
Chapter 3 – Affected Environment	This chapter describes the existing environment that could be affected by granting the rights-of-way requested by the Proponent. The existing environment includes the social and natural environment.
Chapter 4 – Environmental Effects	This chapter describes possible environmental consequences of the Proposed Action and alternatives analyzed in the EIS. Direct, indirect, and cumulative effects of the Proposed Action and alternatives are assessed and described in order to allow for comparative impact evaluation. Impacts are compared to the social and natural environment that would be expected to exist if no action were taken (the No Action Alternative).
Chapter 5 – Consultation and Coordination	This chapter describes public participation undertaken to date, and additional opportunities that would occur throughout the EIS process. It also lists agencies and organizations that will receive copies of the Draft EIS for review and lists the preparers of the document.
Chapter 6 – References	This chapter includes a list of references used in the preparation of the Final EIS.
Chapter 7 – Glossary	This chapter includes a glossary of technical terms used.
Chapter 8 – Index	Index listing of keywords used in the Final EIS.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This chapter presents a description of the alternatives analyzed in this EIS. The Proposed Action alternative includes the features of the proposed Project including the two, dry-cooled, 250 MW solar plants with thermal storage and their associated facilities. A second alternative considers the construction and operation of two wet-cooled 250 MW solar plants with thermal storage and their associated facilities. Under the No Action Alternative, there would not be a solar facility constructed and the environmental and social setting would be unchanged from with current conditions. Other alternatives were considered but eliminated from detailed study as explained in this section.

2.1.1 Regulatory Framework for Alternatives

The BLM is required by NEPA to evaluate not only the Proposed Action, but reasonable alternatives including the No Action Alternative (40 CFR §1502.14). Section 1502.14(a) requires Federal agencies to explore a reasonable range of alternatives, “and for alternatives that were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.” The CEQ Guidance concerning the NEPA regulations adds that reasonable alternatives include those that are “practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant” (CEQ NEPA’s 40 Most Asked Questions, Answer to Question #2).

When granting a right-of-way, FLPMA Title V requires BLM to include in the right-of-way terms and conditions that minimize environmental impacts. Specifically, such terms shall “minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment ... require compliance with applicable air and water quality standards established by or pursuant to applicable federal or state law; and ... require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation and maintenance of” the right-of-way. Consideration of such terms and conditions will be part of the alternatives analyzed in this Final EIS.

2.2 ALTERNATIVES DESCRIPTION

Based on issues, concerns, and opportunities raised during public scoping, interdisciplinary interaction among resource professionals, and collaboration with interested agencies, a range of potential alternatives to be considered in the EIS were identified and evaluated by the BLM. Based on meetings and discussion with resource professionals and Project staff, three alternatives were chosen to be evaluated in detail in the EIS.

Alternatives to be evaluated in detail in this EIS include: (1) the Proposed Action as described in the Proponent’s POD, using the dry-cooled option; (2) the Proposed Action as described in the Proponent’s POD, using the wet-cooled option; and (3) the No Action Alternative.

The following section describes the alternatives considered and eliminated from further consideration, followed by a discussion of the Proposed Action (dry-cooled alternative), the Wet-Cooled Alternative, and the No Action Alternative.

2.2.1 Alternatives Eliminated from Further Analysis

In accordance with 40 CFR §1502.14, and consistent with guidance in BLM's NEPA Handbook, alternatives were not carried forward for further analysis if the alternative:

- would be ineffective (it would not respond to the BLM's purpose and need)
- would be technically or economically infeasible
- is inconsistent with the basic policy objectives of the Las Vegas RMP/EIS
- would involve remote or speculative implementation
- is substantially similar in design to an alternative that is analyzed
- would have substantially similar effects to an alternative that is analyzed

2.2.1.1 Alternative Sites

As part of its siting process, the Proponent used a refined set of criteria to screen, identify, and prioritize potential land sites for eventual solar development. Criteria include the physical characteristics of the site, environmental considerations, and economic factors. Each of these criteria was applied during the screening phase for the proposed Project, which led to the selection of the current site.

These criteria included:

- **Solar Resource** – The site needs to be located where high solar insolation is available to maximize the plant's output and allow efficient utilization of the land area affected by project development. For a project to be economically viable, solar insolation levels of greater than 7 kilowatt-hours per square meter per day are desirable.
- **Size and Shape** – The site must be large enough (at least 4,000 contiguous acres) and of adequate proportions to include two 250 MW parabolic trough solar thermal plants. The shape of the site should also support an efficient and cost-effective layout of the project facilities.
- **Slope** – The site should be relatively flat, with a slope of 2 percent or less, to minimize the need for extensive grading and a large volume of cut and fill.

- **Environmental sensitivity** – The site should not be highly pristine or biologically sensitive (e.g., not within a designated wilderness area or Area of Critical Environmental Concern [ACEC]).
- **Availability of Infrastructure and Water** – To minimize cost and potential environmental impacts, the site should be located where water resources are available, and interconnection to an existing transmission system is possible without the construction of lengthy transmission lines. In addition, the site should be in reasonable proximity to suitable transportation infrastructure to allow easier access during both construction and operation without creating the need for additional road construction.
- **Site Control** – The land must be available for sale or lease/right-of-way, at a reasonable cost and be free of conflicting encumbrances. Land with many different owners does not provide adequate site control.
- **Labor Availability** – The site should be close enough to areas with large construction labor pools so as to maximize the number of construction workers within daily commuting range.
- **Economic Viability** – The Project must be economically viable and competitive with other renewable technology projects, including wind, geothermal, and other solar projects. To be viable, the site should be located on property currently available at a reasonable cost, be as close as possible to transmission and transportation infrastructure, and have a high solar resource value.

The selected Project site is located in an area with an excellent solar resource and is large enough to accommodate two 250 MW plants in an optimal layout. In addition, the Project site is relatively flat; not located in any wildlife management or conservation areas; has access to transmission infrastructure and water resources; and was available for an application for a right-of-way from the BLM. Finally, the Project site allows for access to skilled labor and other industrial infrastructure from nearby Pahrump and Las Vegas. Based on these criteria, the present Project site was selected.

Three alternative sites in the regional area were considered. The three sites include a site southeast of Pahrump (Sandy Hills), a site a few miles south of the proposed Project along Anvil Road in Amargosa Valley (Anvil Road), and a site near the Beatty Airport (Beatty Airport). Right-of-way applications were filed for each of these sites in 2007 and 2008. The right-of-way applications for each of these sites were ultimately withdrawn after the Proponent conducted due diligence and preliminary studies on each site and determined the alternative sites did not meet the above criteria. Table 2-1 summarizes the weaknesses and strengths of each of the alternative sites.

Table 2-1 Alternative Sites Considered						
Alternative Site	Solar Resources	Size and Shape	Slope	Environmental Sensitivity	Availability of Infrastructure	Site Control
Sandy Hills Site	Yes	Yes	No	No	Yes	No
Anvil Road Site	Yes	No	Yes	Yes	Yes	No
Beatty Airport Site	Yes	No	Yes	Yes	No	Yes
Yes – Site met criteria; No – Site did not meet criteria						

The Sandy Hills site consisted of approximately 8,000 acres in Pahrump Valley approximately 20 miles southeast of Pahrump. Although the site was large enough to accommodate two 250-MW solar power plants, the site was eliminated from further consideration due to the slope of the site, as well as the existence of sensitive vegetation and wildlife, conflicting encumbrances, and water availability. Construction and operation of a solar thermal power plant at this site would result in higher environmental impacts than the Proposed Action, while not offering any offsetting advantages.

The Anvil Road site consisted of approximately 1,000 acres, located a few miles south of the selected Project site. The site was flat and had good access to transmission and water infrastructure but was too small to accommodate one 250 MW plant, let alone two of them. The Proponent explored acquiring additional private land surrounding the site but determined that the acquisition of sufficient lands was not economically viable. Due to the number of parcels that would have to be acquired to accommodate two 250-MW solar power plants would make obtaining site control more challenging (in comparison to obtaining a right-of-way grant to use BLM lands). This, combined with the size and existing encumbrances on the site, made the site not viable.

The Beatty Airport site consisted of approximately 2,500 acres located adjacent to the Beatty Airport (approximately 35 miles north of the Project site). It was flat and had good solar resource, but it was too small for two 250 MW plants, and had existing encumbrances. The Proponent also determined that access to transmission and water would be more difficult and costly than the Project site that was ultimately selected.

During the 45-day public comment period, the BLM received several comments requesting the agency conduct a full analysis of other sites considered by the Proponent. As described above, the Proponent evaluated several sites before selecting the proposed Project site. The BLM concurred with the Proponent’s conclusions to dismiss the alternative sites from further consideration.

The Proponent also considered the alternative of developing the proposed Project as a single 250-MW plant. Generally, building one plant would have fewer environmental impacts, when that plant is considered in isolation. However, given the infrastructure requirements associated

with building a single 250 MW plant, building two plants allows for economies of scale and reduces the infrastructure impacts, including transmission access and water development. In addition, a single plant would be substantially less effective in meeting the Project objective of supporting attainment of renewable energy mandates and objectives, and attaining the Project objective of supporting those mandates and goals. For these reasons, the development of a smaller project was rejected.

During the scoping and 45-day public comment periods, several comments were received requesting that the Proponent move the Project site further north; at least 0.5 to 2 miles away from existing residential or public buildings. The BLM land immediately north of the Project area has a pending right-of-way application on file with the BLM Pahrump Field Office (Cogentrix - NVN-083150). The Proponent filed an overlapping or “second-in-line” right-of-way application on these lands (NVN-087366); however, subsequent discussions between Cogentrix and BLM staff indicate Cogentrix intends to seek approval to develop a solar energy project at this location within the next 2 to 3 years. Although the BLM’s right-of-way regulations provide that conflicting applications may be resolved through a competitive process (see 43 CFR §§ 2804.23(c), 2806.50, it is unlikely that the Proponent’s overlapping application could be processed in a timeframe that met the Proponent’s objectives.

2.2.1.2 Alternative Solar Technology

The Proponent has requested a right-of-way to construct and operate a dry-cooled solar thermal parabolic trough project. The dry-cooled alternative is the Proponent’s preferred alternative primarily because it is a well proven technology for this scale of power generation. Solar thermal parabolic trough technology has a history of successful operation in the United States, removing much of the construction and operational risk from construction and operation of the proposed Project. In addition, the Proponent has significant experience and expertise in developing and constructing parabolic trough plants. The Proponent is a wholly owned subsidiary of Solar Trust of America, LLC, a joint venture between Solar Millennium AG and Ferrostaal AG. Solar Millennium AG is an international developer and supplier of parabolic trough collector technology used in powering solar thermal power plants. Solar Millennium AG developed and designed the first parabolic trough power plants, Andasol 1-3, in Spain. Ferrostaal AG is a worldwide provider of industrial services and plant construction and engineering.

Construction and operation of a solar thermal parabolic trough plant using wet-cooling is an alternative that is considered in this Final EIS. Wet-cooling technology has performance advantages in comparison to dry-cooling. Performance is enhanced because wet-cooling relies primarily on evaporation to remove heat from the circulating water, while dry-cooling technology uses an air cooled condenser that cools the steam turbine-generator exhaust steam using a large array of fans that force air over finned tube heat exchangers. The disadvantages of dry-cooling are higher capital costs, higher auxiliary operating power requirements and an overall lower plant performance, especially on hot days, when the peak power is needed most. A dry-cooled plant produces about 5 percent less electric energy on an annual basis than a wet-cooled plant, because of this reduced performance on hot summer days. The cost of electricity produced by a dry-cooled plant is approximately 6 to 9 percent higher than the cost of electricity

produced by a wet-cooled plant. Thus dry-cooling of a trough plant minimizes water use, but at a 6 to 9 percent cost penalty.

2.3 PROPOSED ACTION ALTERNATIVE – DRY-COOLED ALTERNATIVE

The Proposed Action alternative includes the construction and operation of a two-unit parabolic trough solar power plant, with each unit having a net output of 250 MW. The plant will consist of two conventional steam Rankine-cycle power blocks, a parabolic trough solar field, a HTF and steam generation system, a nitrate salt thermal energy storage system, and a variety of ancillary facilities (sometimes referred to collectively as “balance-of-plant”), such as conventional water treatment, electrical switchgear, administration, warehouse, and maintenance facilities. The electric output of the plant will be provided entirely by solar energy. No electricity will be generated by the use of fossil fuels.

Project facilities would be located on approximately 4,350 acres and would include the solar fields, power blocks (located in the center of each solar field), an office and maintenance building, parking area, lay-down area, stormwater detention basin, evaporation ponds, and switchyard. The assembly hall, administration building, laydown area, septic field, detention basin(s), and switchyard will be located north of the realigned portion of Amargosa Farm Road. Amargosa Farm Road is an existing public roadway maintained by Nye County Public Works. The roadway consists of 24 feet of asphalt/concrete pavement and roadside ditches on both sides. Amargosa Farm Road will be realigned, approximately 1,320 feet (0.25 mile) south of the existing roadway and would extend from the vicinity of Sandy Lane to Valley View Boulevard; a distance of approximately 3.5 miles. The proposed roadway alignment would be coordinated with Nye County Public Works and be reconstructed in conformance with current standards and stipulations outlined in the Development Agreement between Nye County and the Proponent.

Preliminary Project site plans depicting the alignment alternatives for both the dry-and wet-cooled alternatives are provided in Figure 2-1 (wet-cooled layout) and Figure 2-2 (dry-cooled project layout). The final plant layout will be determined based on engineering design and in consideration of resource constraints and opportunities. General facility dimensions are listed in Table 2-2.

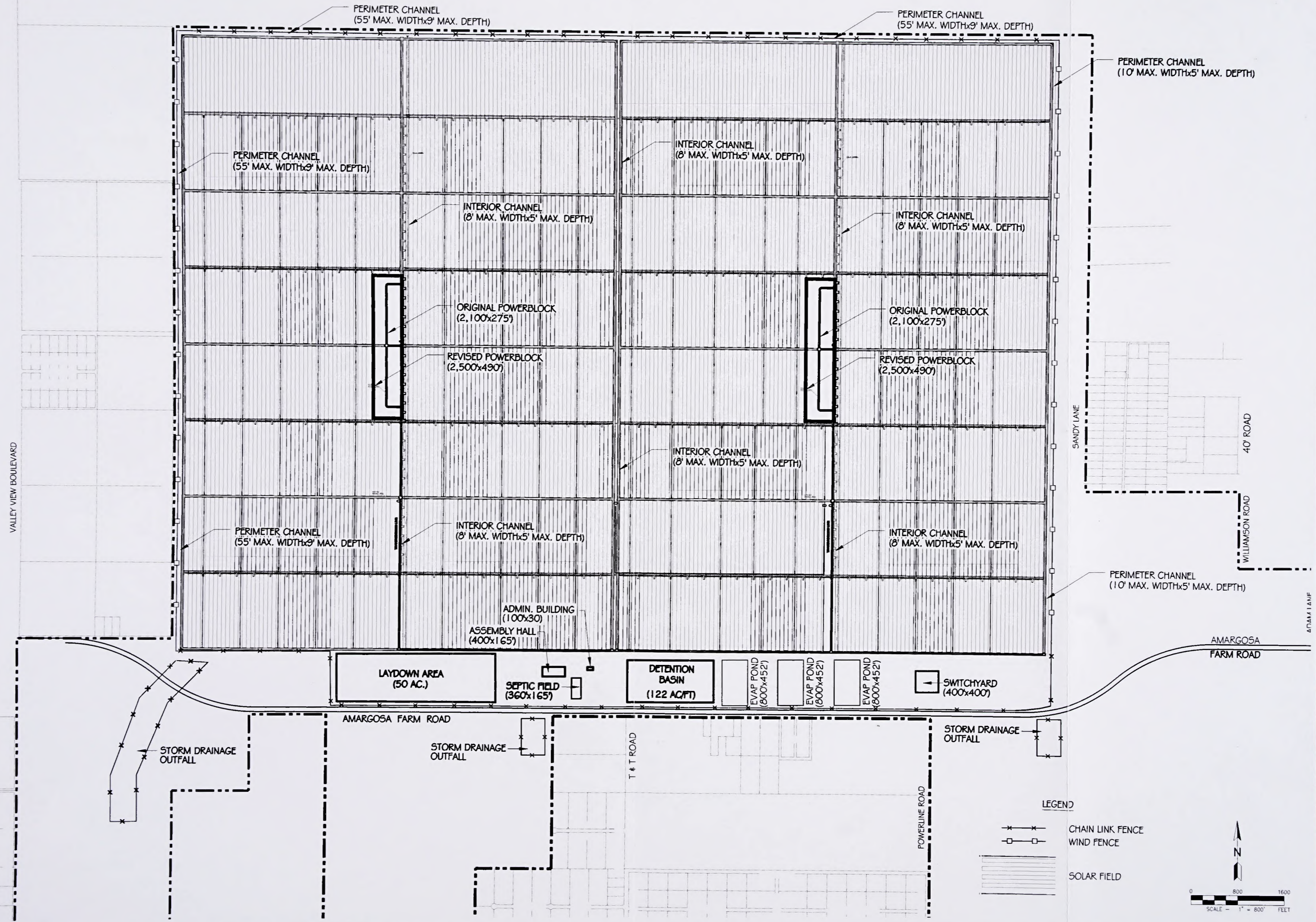
A land survey of the proposed right-of-way is being performed to determine the final boundary and extent of the Project area. A topographic survey was performed to obtain one-foot contours for final engineering design for grading and drainage-related requirements. A preliminary geotechnical study of the Project site will be conducted to evaluate general subsurface conditions, seismicity, and other geological hazards and to provide recommendations for design and construction of the foundations for Project structures.

NO.	DESCRIPTION	DATE	BY	APP.

SOLAR MILLENNIUM, LLC.
AMARGOSA FARM ROAD SOLAR PROJECT
FIGURE 2-1 WET COOLED ALTERNATIVE

DATE:	08-26-10
DRAFTER:	NL
DESIGNER:	NL
CHECKED:	BDP
PROJECT NO.:	SML0801.000

FIG. 2-1
 SHEET 1 OF 1
 ###



LEGEND

- X --- CHAIN LINK FENCE
- □ --- WIND FENCE
- ||||| SOLAR FIELD

N

0 800 1600

SCALE - 1" = 800' FEET

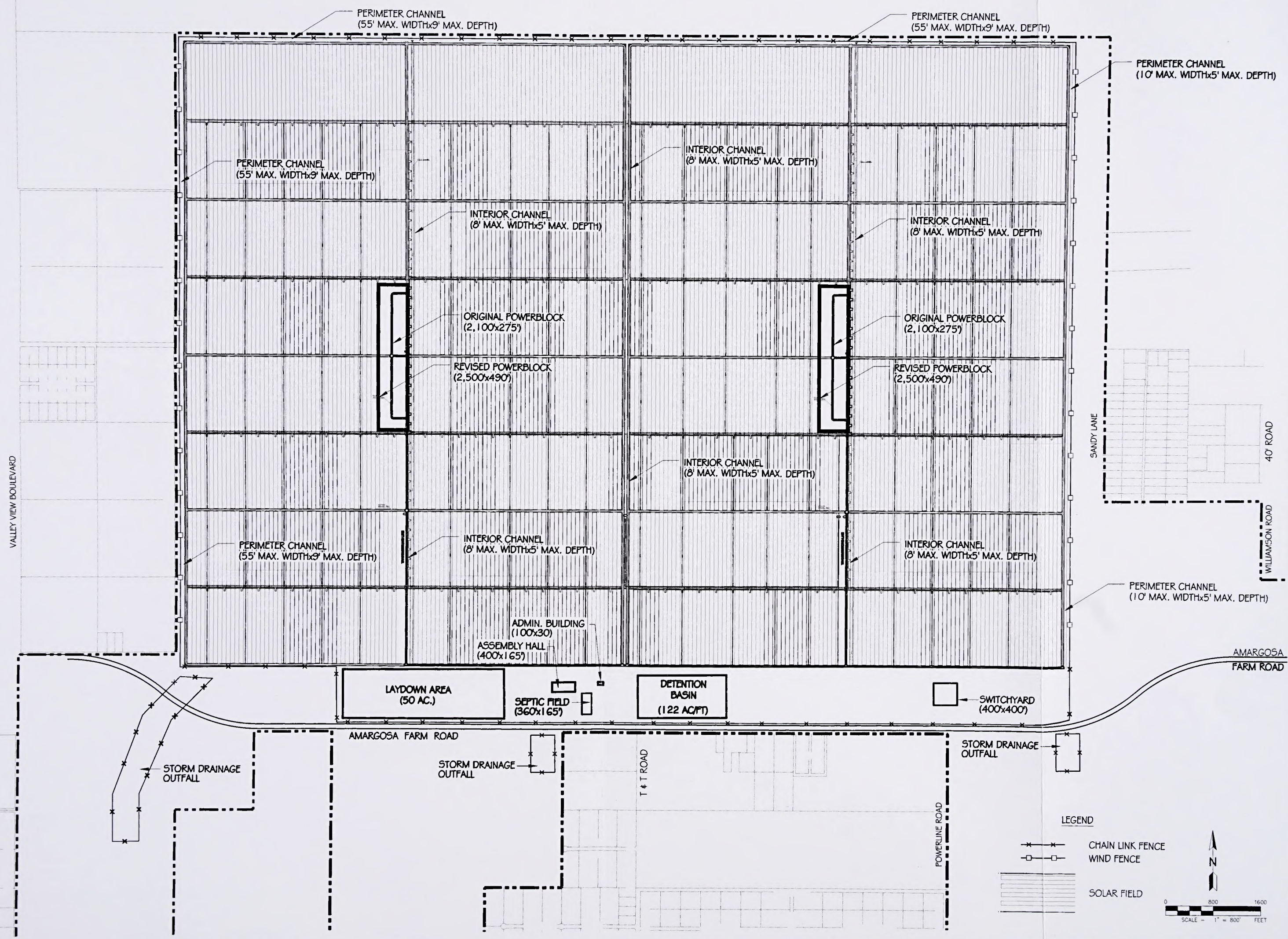
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NO.	DESCRIPTION	DATE	BY	APP.

SOLAR MILLENNIUM, LLC.
AMARGOSA FARM ROAD SOLAR PROJECT
FIGURE 2-2 PROPOSED ACTION - DRY COOLED ALTERNATIVE

DATE:	01-21-10
DRAFTER:	NL
DESIGNER:	NL
CHECKED:	BOP
PROJECT NO.	SML0801.000

FIG. 2-2
 SHEET 1 OF 1
 ###



LEGEND

- CHAIN LINK FENCE
- WIND FENCE
- SOLAR FIELD

SCALE - 1" = 800' FEET

0 800 1600

N

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 NL

Table 2-2 Preliminary Facility Dimensions			
Project Component	Approximate Dimensions / Acreage	Proposed Alternative (Dry-Cooled)	Wet-Cooled Alternative
Solar Fields	Two fields, Approximately 7,800 feet east-west by 11,000 feet north-south. Each field has a collector aperture area of approximately 2 million square meters. (1,970 acres)	X	X
Power Blocks ¹	<u>Dry-cooled</u> – One power block located in the center of each solar field (28 acres each). Dimensions of each power block is 2,500 feet x 490 feet; tallest major structure is the air-cooled condenser at 144 feet high <u>Wet-cooled</u> – One power block located in the center of each solar field (28 acres each). Dimensions of each power block is 2,500 feet x 490 feet; tallest major structure is the water-cooled condenser at 55 feet high	X	X
Switchyard	400 feet x 400 feet (3.7 acres)	X	X
Assembly Hall/Maintenance Building	394 feet x 164 feet x 46 feet (1.5 acres)	X	X
Main Office Building	200 feet x 53 feet x 12 feet (.24 acres)	X	X
Parking Area	250 feet x 100 feet (0.5 acres)	X	X
Stormwater Detention Basin	1,200 feet x 1,200 feet (33 acres) – providing 122-acre-feet of storage assuming 4-foot-deep basin)	X	X
Evaporation Pond(s)	<u>Dry-cooled</u> – Two 4-acre evaporation ponds per power block (16 acres total for the project) <u>Wet-cooled</u> - Three 8.3-acre evaporation ponds (25 acres total for the project)	X	X
Bioremediation Area	400 feet x 800 feet (7.3 acres total for the project)	X	X
Fencing	Wind fencing on east and west side of facility: 30 feet high x approximately 11,000 feet long per side Perimeter fencing on north side of facility: 9 feet high x approximately 15,500 feet long Perimeter fencing on south side of facility: 8 feet high x approximately 17,500 feet long	X	X

¹ Components contained within the power block area are shown on Figure 2-4.

All plant facilities will be designed, constructed, and operated in accordance with applicable laws, ordinances, regulations, and standards. All generating facilities will be located within the facility fence line. Project-related linear facilities located outside the plant site fence line include the access road off of Valley View Boulevard, and the water pipeline to convey water to the Project site.

2.3.1 General Process Description

The solar power plant cycle basically consists of three distinct, coupled systems: the solar field and HTF system, the thermal energy storage system, and the power block. At the basic level, the HTF moves accumulated solar heat from the parabolic trough solar field to drive the turbine generator. The system distributes cold HTF from the power block to solar field collector loops, and collects hot HTF from the solar field, and inputs the collected heat to the feedwater/steam cycle. A schematic depicting this process is shown on Figure 2-3.

Next Step Thermocline Storage

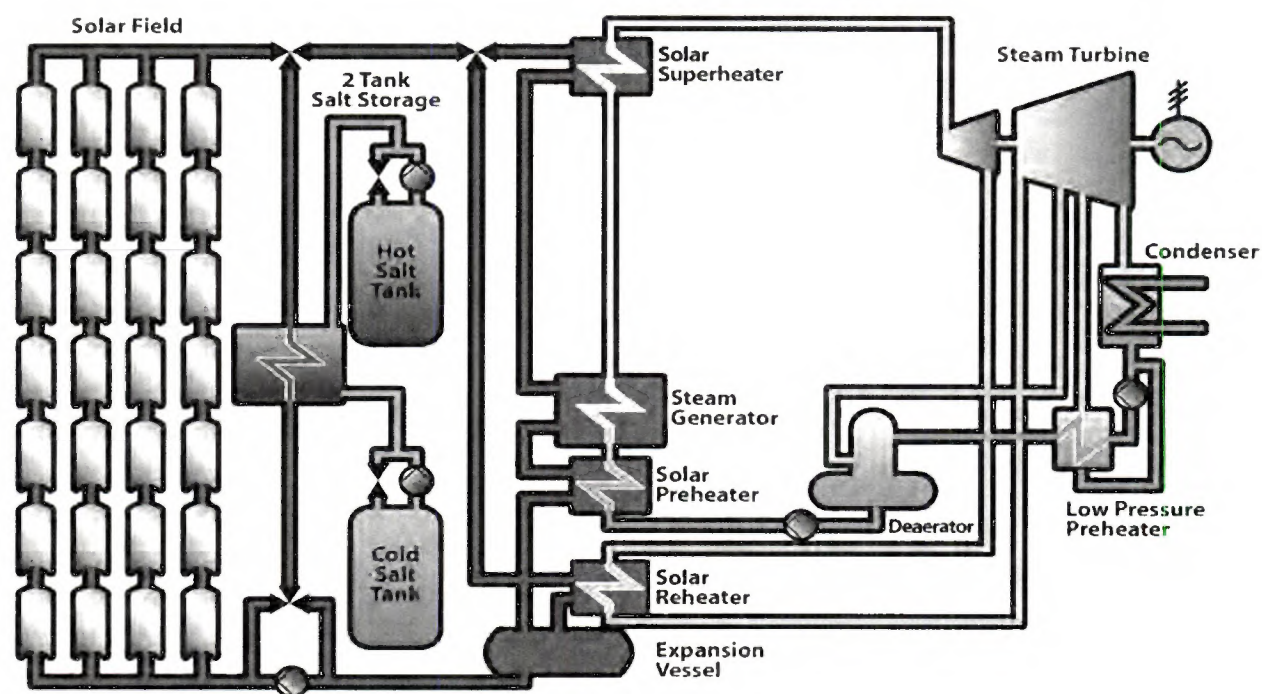


Figure 2-3 Plant Schematic Diagram (with thermal storage)

The HTF cycle is driven by two parallel pump stations. The nominal flow rate is approximately 2,800 kilograms per second (6,200 pounds per second). During operation, the HTF temperature varies from 739 °F (393 °C) [hot] after heating by the solar field to 565 °F (296 °C) [cold] leaving the power block heat exchangers. The hot HTF flows to parallel steam generation trains. Each train includes a preheater, steam generator, superheater and reheater. In normal operation, the hot HTF stream is split between the trains. It is also possible to remove each train from the loop via motor control valves.

As the solar field begins tracking the sun and the HTF heats up, its thermal expansion is accommodated in an expansion vessel. If the HTF in this vessel reaches its design working level it flows into overflow vessels. If thermal input to the HTF stops, the HTF begins to contract. The HTF level in the expansion vessel falls, and the overflow return pumps transfer the HTF from the overflow vessels back into the expansion vessel to maintain sufficient content at that location.

2.3.2 Solar Fields

Approximately 90 percent of the plant footprint is taken by the two parabolic trough solar fields. The solar fields will be modular, distributed systems of 4 solar collector assemblies (SCA), or *loops*, connected in a series-parallel arrangement via a system of insulated pipes. A loop is approximately 72 feet wide and 2,790 feet long, and is designed to raise the temperature of the heat collection fluid by approximately 175 °F (79.4 °C). The collectors will be equipped with a sun tracking mechanism that moves the reflecting panels toward the sun to the optimum angle for solar energy collection.

2.3.2.1 Solar Collector Assemblies

The SCAs are oriented north and south and rotate east to west to track the sun as it moves across the sky throughout the day. The SCAs collect heat by means of linear troughs of parabolic reflectors that focus sunlight onto a straight line of heat collection elements (HCE) welded along the focus of the parabolic trough. Each SCA includes local measurement instrumentation, a hydraulic drive system, and a controller that independently tracks the sun to maintain mirror focus on the HCEs and protects the HCEs from overheating.

Each SCA will be supported by structures (stands) that connect the parabolic troughs to the drive mechanism. Each array will be supported by multiple individual foundations with a foundation located approximately every 63 feet, along the assembly. Foundation design will be based on site-specific geotechnical conditions to ensure that the SCA stands are able to support all loading conditions (including wind loading) at the Project site.

2.3.2.2 Parabolic Trough Collector Loop

Each of the collector loops consist of two adjacent rows of SCAs, each row about 1,200 feet long. The two rows are connected by a crossover pipe. The HTF is heated to a high temperature as it circulates through the receiver tube and returns to a series of heat exchangers in the power block where the fluid is used to generate high-pressure superheated steam. The superheated steam is then fed to a conventional power block, consisting of a reheat steam turbine generator to produce electricity, and carried to a nearby substation via a project-specific transmission line. In normal operation, HTF enters the field at 565 °F (296 °C) and leaves the field at 739 °F (393 °C).

The HTF is a synthetic hydrocarbon liquid mixture of diphenyl ether and biphenyl oxide. Similar formulations are marketed by different manufacturers under the names of Therminol or Dowtherm. The HTF is not classified as a hazardous material by the U.S. Department of

Transportation (USDOT), and is not listed under EPA Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations. It has a crystallizing (freezing) point of about 54 °F (12 °C). Freeze protection is routinely accomplished by circulating HTF at a very low flow rate through the solar field using hot HTF from the vessel as a source.

2.3.2.3 Parabolic Mirrors

The parabolic mirrors to be used in the solar fields are low-iron glass mirrors, and are known to be one of the most reliable components in the SCAs. No long-term degradation of the mirrors has been observed at other solar thermal plants, and older mirrors can be brought back to nearly full reflectivity with simple cleaning. The typical life spans of the reflective mirrors is 30 or more years. The HCEs of the solar plant are comprised of a steel tube surrounded by an evacuated glass tube insulator. The steel tube has a coated surface that enhances its heat transfer properties with a high absorptivity for direct solar radiation, accompanied by low emissivity. Glass to metal seals and metal bellows are incorporated into the HCE to ensure a vacuum-tight enclosure. The enclosure protects the coated surface and reduces heat losses by acting as an insulator.

The glass tube cylinder has anti-reflective coating on both the inner and outer surfaces to reduce reflective losses off the glass tube, thereby increasing the transmissivity. Usually, to maintain the tube's insulating properties, getters, or scavengers, are installed in the vacuum space to absorb hydrogen and other gases that may permeate into the vacuum cylinder over time.

2.3.2.4 Process Control of the Solar Field

The solar field system operates under the control of the Field Supervisor Controller (FSC), a computer located in the central control room that communicates with each SCA and with the plant's Distributed Control System (DCS). The FSC collects information from each SCA and from the DCS, and issues instructions to the field as a whole, and/or modular instructions to SCA loops or individual SCAs. It deploys the solar field during the day when weather and plant availability permit, and stows it at night and during high winds.

A weather station located in the power block area provides real-time measurements of weather conditions that affect the solar field operation. Radiation data are used to determine the performance of the solar field. Wind speed data are needed since under high wind conditions the solar field must be stowed. The FSC communicates with the plant's DCS, which coordinates and integrates power block, HTF system, and solar-field operation. The DCS communicates with all subsystem controls, including electrical system equipment, steam cycle controllers, variable frequency drives and balance of plant system controllers via serial data communications. It receives analog and digital inputs/outputs from all instruments and equipment not served directly by dedicated local controllers.

The DCS enters solar field control mode automatically after completing warm-up mode. At the beginning of warm up, the HTF is circulated through a bypass around the power block heat exchangers until the outlet temperature reaches the residual steam temperature in the heat exchangers. The HTF is then circulated through the heat exchangers and the bypass is closed. As

the HTF temperature at the solar field outlet continues to rise, steam pressure builds up in the heat exchangers until the minimum turbine inlet conditions are reached, upon which the turbine can be started and run up to speed. The turbine is synchronized and loaded according to the design specification until its power output matches the full steady state solar field thermal output.

The DCS regulates the flow by controlling the HTF main pump speeds to maintain the solar field outlet temperature of approximately 739 °F (393 °C). Several HTF pumps will be operated in parallel, at the speed required to provide the required flow in the field. However in exceptional cases (e.g., during maintenance), lower numbers of pumps may be used alone, providing up to 70 percent of full flow at nominal pump capacity. If the thermal output of the solar field is higher than the design capacity of the steam generation system, the HTF flow is directed to the salt heat exchanger train. Cold salt is circulated from the cold salt tank, through the HTF heat exchangers, and into the hot salt storage tank. If both the steam generation train and salt heat exchanger trains are fully loaded, collectors within the solar field are de-focused to maintain design operating temperatures.

If the minimal thermal input to the turbine required by the operating strategy cannot be met under the prevalent weather conditions, then shutdown is indicated. Operators would track all solar collectors into the stow position, reduce the number of HTF main pumps to a minimum, and stop the HTF flow to the power block heat exchangers.

During periods when the solar power generating facility is shutdown, the HTF is circulated through the piping in the solar fields at a low flow rate. For most of the year, under typical weather conditions, no supplemental heat is required to keep the HTF flowing freely. However, it is anticipated that on colder winter nights, supplemental heat will be required to ensure the HTF doesn't freeze in the piping. A gas-fired HTF heater, with a rated capacity of 35 million British thermal units per hour (MMBtu/hr), will be provided as part of the HTF system. It is expected that the HTF heater will need to operate approximately 50 hours per year to keep the HTF from freezing.

2.3.3 Power Blocks

The power blocks, including the steam cycle, HTF system and thermal storage system, are located at the center of each solar field. The electrical and local control buildings, workshop buildings, electrical equipment buildings, and water treatment facilities will be located within the power blocks. A list of components contained within each power block, and their general location are shown in Figure 2-4. Major components specific to the power block are briefly described in the following section.

2.3.3.1 Solar Steam Generator System

The solar steam generator system transfers heat from the HTF to the feed water (see Figure 2-3). The steam generated in the solar steam generator is piped to a Rankine-cycle reheat steam turbine. Heat exchangers are included as part of the solar steam generator system to preheat and boil the condensate, superheat the steam, reheat the steam, which is then sent to the steam turbine generator.

The steam expands through the steam turbine generator turbine blades to drive the steam turbine that, in turn, drives the generator, which converts mechanical energy to electrical energy. The Project's steam turbine generator is expected to be a three-stage casing type with high-pressure, intermediate-pressure, and low-pressure steam sections. The steam turbine generator is equipped with accessories required to provide efficient, safe, and reliable operation. Major components include steam stop and control valves, a gland seal system, lubricating and jacking oil systems, thermal insulation, and control instrumentation.

The solar steam generator system and steam turbine generator will be located outdoors and supported on reinforced, concrete mat foundations. The steam turbine generator foundation will include a reinforced concrete pedestal.

2.3.3.2 Power Block HTF System

In addition to the HTF piping in the solar field, the HTF system within the power block includes three elements: (1) the HTF heater, (2) the HTF expansion and overflow vessels and (3) the HTF ullage system. To eliminate the problem of HTF freezing, an HTF heater will be installed and used to ensure system temperature stays above 54 °F (12 °C) whenever the unit is off-line. An expansion vessel is required to accommodate the volumetric change that occurs when heating the HTF to the operating temperature.

During plant operation, the HTF will degrade into components of high and low boilers (substances with high and low boiling points). The low boilers are removed from the process through the ullage system. The HTF is removed from the HTF surge tank and flashed, leaving behind high boilers and residual HTF. The flashed vapors are condensed and collected in the ullage system.

Leak detection of HTF will be accomplished in various ways. Visual inspection throughout the solar field on a daily basis will detect small leaks occurring at ball joints or other connections. Such leaks can be corrected via minor repairs or repacking of joints and valves. The configuration of the looped system, allowing different sections of the loops to be isolated, will facilitate the repair of small leaks. Since larger leaks are of a greater concern, detection of large leaks is being proposed by using remote pressure sensing equipment and remote operating valves to allow for isolation of large areas of the loops in the solar field. Details of the design will be developed in the design detail process.

2.3.3.3 Thermal Energy Storage

Each plant will include thermal storage, consisting of three dual, two-tank molten salt systems, sufficient to support approximately 4.5 full load-equivalent hours of electric energy after sundown and on cloudy days. The thermal energy storage system contains hot and cold storage tanks connected via two parallel trains of six oil-to-salt heat exchangers in series. For charging the storage, the salt is heated up to approximately 726.8 °F (386 °C), and for discharging it is cooled down again to approximately 557.6 °F (292 °C).

The salt freezes at approximately 429.8 °F (221 °C). Freezing of the salt must be avoided to prevent damage of components. The freeze protection system, which uses the hot HTF, keeps the salt at a minimum temperature of 500 °F (260 °C). To avoid freezing of the salt in non-working periods, the heat exchangers are equipped with electrical heat tracing.

2.3.3.4 Cooling Systems

The proposed Project will utilize a dry-cooling system for heat rejection from the steam cycle consisting of a forced draft air-cooled condenser. In the dry-cooled alternative, the auxiliary cooling water system uses a small wet-cooling tower to cool plant auxiliary equipment, including the steam turbine generator lubrication oil cooler, the steam turbine generator cooler, steam cycle sample coolers, and large pumps. The water picks up heat from the various equipment items being cooled and *rejects* the heat to the cooling tower. This auxiliary cooling system will allow critical equipment such as the generator and HTF pumps to operate cooler and at their design ratings during hot summer months when the Project's power output is most valuable. An average of 130,000 gallons per day of water per day (108 afy) will be consumed by the auxiliary cooling water system; the maximum rate of consumption is estimated to be 197,500 gallons per day during the summer.

2.3.3.5 Buildings within the Power Block

Each power block will contain electrical and local control buildings, workshop buildings, and electrical equipment buildings. All of these buildings will be of pre-engineered metal frame construction and assembled on site. Accessibility to buildings will be in full compliance with applicable codes and standards including the Americans with Disabilities Act. The total footprint area of the buildings in each power block is approximately 31,200 square feet.

2.3.3.6 Buildings within the Shared Facilities Area

Other site buildings will include the main office building, the assembly/warehouse building, and the water treatment building, as well as a number of small, pre-engineered enclosures housing mechanical and electrical equipment. Building columns will be supported on reinforced concrete mat foundations or individual spread footings and the structures will rest on reinforced concrete slabs.

All site buildings will be designed to industrial standards. To minimize visual impacts and improve aesthetics, all site buildings will be painted with appropriate colors to minimize visual contrast with the surrounding landscape. Colors would be selected from the "BLM Standard Environmental Color Chart (CC-001, June 2008)" and/or in consultation with applicable BLM visual resource management staff. For the administration buildings, the layout should incorporate design concepts outlined in the BLM Guidelines for a Quality Built Environment (draft 2010) which includes the effective use of color, form and textures as well as landscaping treatments that reduce contrast and increase aesthetics. Electrical System

The Project electrical components consist of the solar field electrical systems, the electrical system within the power blocks, and the Project switchyard. Transmission of power from the proposed Project will be “wheeled” through Valley Electric Association, Inc.’s (VEA) existing and proposed transmission lines. The proposed point of interconnection will be to a new 230 kilovolt (kV) switchyard to be constructed near Amargosa Farm Road and Power Line Road adjacent to the power plant. In addition to the new substation, VEA will widen its existing transmission right-of-way to accommodate a new, 26.5 mile, double circuit 230kV transmission line from the proposed VEA switchyard adjacent to the Project site to the planned Johnnie substation located on VEA’s Mead to Northwest 230kV transmission line approximately 7.5 miles north of Pahrump, Nevada. VEA is responsible for upgrading its transmission system and is preparing a separate NEPA review for that action.

Temporary construction power will be obtained from VEA over one of the 12.47kV transmission lines that feeds out of VEA’s Valley substation. Peak construction power requirements are estimated at approximately 3 to 4 MW. Temporary construction power will be distributed within the Project site over the site’s internal 12.47kV distribution system.

2.3.3.7 Electrical Generation

Roughly 10 percent of the steam turbine generator output would be used on site for plant auxiliary loads such as motors, heaters, control systems, and general facility loads including lighting and heating, ventilation, and air conditioning. Some of the power needed for on-site uses would be converted from alternating current (AC) to direct current (DC) for power plant control systems and emergency backup systems. Power would be generated by the steam turbine generator (size and generation voltage is dependent on the final generator selection) and stepped up by a fan-cooled generator step-up transformer.

The steam turbine-generators would electrically connect to a 230kV on-site switchyard. The steam-turbine-generators generate electricity at 18kV. This voltage would be increased (stepped-up) in the switchyard to 230kV via a generator step-up transformer. The generator step-up transformer would rest on a concrete pad with a perimeter berm designed to contain the transformer insulating oil in the event of a leak or spill.

The plant site switchyard would be located in the southeast corner of the Project site and would require an overhead steel-reinforced, aluminum conductor unit tie line for the connection to each unit’s generator step-up transformer. The switchyard would consist of 230kV switchyard circuit breakers with 230kV disconnect switches on each side of the breaker for breaker maintenance.

The switchyard ground grid will be connected to the generation plant ground grid and will consist of copper conductor throughout the yard with ground rods installed around the perimeter and near major equipment. A layer of aggregate will be installed above grade to increase contact resistance within the fenced switchyard area.

2.3.3.8 Direct Current Power Supply System

An uninterruptible power system will be provided in each unit. The power system will service emergency lighting, the DCS, electrical breakers, and relays. The DC power system will serve as a temporary bridge to the more robust emergency diesel AC power supply in the event external power is suddenly lost.

2.3.3.9 Essential Service Alternating Current System

A 120-volt essential service AC power distribution system serves critical equipment loads, lighting and alarms, and loads that protect equipment from potential damage in the event of sudden loss of station service. This system is served through an inverter that receives power from the DC power supply system.

2.3.3.10 Telecommunications

Site voice and data communications will be supplied from an AT&T fiber optic line located adjacent to the Project site. This will be supplemented with wireless voice communications to meet the construction and operations needs in the solar fields.

2.3.4 Fuel Supply and Use

The auxiliary boiler and HTF heaters will be fueled by propane. Propane will be delivered to the plant site via truck from a local distributor and stored in 18,000-gallon aboveground tanks (one in each power block). The estimated propane usage for the auxiliary boiler per unit for normal operation is approximately 9 MMBtu/hr overnight and approximately 34 MMBtu/hr for 30 minutes during startup each morning. The estimated maximum propane usage for the HTF heater is an additional 41 MMBtu/hr per unit is for approximately 50 hours per year during the winter.

A fuel depot would be constructed within the laydown area to refuel, maintain, and wash construction vehicles, and would occupy an area of approximately 75 feet by 150 feet. It would consist of a fuel farm with two on-road vehicle diesel tanks, each having a 2,000-gallon capacity; two 8,000-gallon off-highway vehicle (OHV) diesel tanks; one 1,000-gallon gasoline tank; and a wash water holding tank. The fuel farm would include secondary spill containment; a covered maintenance area, also with secondary containment; and a concrete pad for washing vehicles.

2.3.5 Water Supply and Use

Under the Proposed Action, the Project would use dry-cooled technology. Water use in a dry-cooled plant would include water for solar collector mirror washing, makeup for the solar steam generator feedwater, dust control, water for cooling plant auxiliary equipment, potable water and fire protection.

2.3.5.1 Water Source

On March 18, 2010, the Proponent filed Application 79699 with the NDWR Nevada State Engineers Office to change the manner of use and place of use of a portion of an existing certificated water right near the Project site. The water right has an annual duty of 603 afy, which has been pumped approximately 413.88 afy on average over the last 25 years (Table 2-3). In addition, the Proponent filed Application 79783 on April 15, 2010 for a new point of diversion for a combined duty with Application 79699 of 400 afy. The Proponent intends to lease the underlying water rights from the water rights holder or Lessor, to withdraw up to 400 afy of groundwater from the Amargosa Desert Hydrographic Basin for a period of 30 years for industrial purposes in connection with the construction and operation of the proposed Project.

Application No.	Certificate No.	Location	Annual Duty (afy)¹	25-year Average Pumpage (afy)¹
15893	5717	NE ¼ NE ¼ Sec 23, T16S, R48E	603.00	413.88
¹ One acre-foot equals 325,851 gallons Source: NDWR 2009a				

The Proponent intends to drill a new well and move the point of diversion to a location just west of the current well. This will allow for redundancy should one of the wells fail. Meters will be placed on both wells to ensure there is no exceedance of the permissible annual duty.

A new pipeline will be constructed from the existing points of diversion to the Project site. Pipeline diameters will vary by need and would be sized upon final engineering design. It is estimated that pipeline sizes will range from 8 to 14 inches, depending upon the required flows. The pipeline route would cross the area subject to the proposed right-of-way as well as private lands adjacent to that area. A main waterline will be constructed from the existing point of diversion, located approximately 50 feet southwest of the northeast section corner of Section 23, Township 16 South, Range 48 East. The line will depart the point of diversion (across a private right-of-way) and head in a northeasterly direction approximately 100 feet to fall within the proposed Project right-of-way; it will then head in a northerly direction to the Project power blocks, assembly hall and office building.

To address the NPS, USFWS, and BLM concerns that the proposed groundwater withdrawals associated with the proposed Project—in combination with existing withdrawals in the vicinity of Devils Hole and the Ash Meadows National Wildlife Refuge (NWR)—may pose a risk of adversely affecting federal rights and resources, the Proponent has agreed to acquire an additional 236 afy of existing water rights within the Amargosa Desert Hydrographic Basin. The 236 afy consists of 204 afy identified as “Minimization Water Rights” (see Appendix A), and an additional 32 afy to offset the potential reduction in groundwater return flow as a result of changing the manner of use from agricultural to industrial. The acquisition of the additional 236 afy of existing groundwater in the basin will most likely be obtained from existing water

rights permitted for agricultural use. At this time, it is unknown where the additional water rights will be obtained.

2.3.5.2 Water Treatment

Water used for power (steam) cycle feedwater makeup, mirror washing, ancillary equipment heat rejection, and domestic uses would require treatment for reduction of total dissolved solids (TDS). The groundwater will first be treated by a clarifier, followed by reverse osmosis (RO) and a demineralized process prior to being directed to a demineralized water storage tank. Demineralization is accomplished by either a distillation processes (evaporation/condensation) or membrane processes such as RO or electrodialysis reversal. Selection of the demineralization process to be used at the Project would be made during the final design process, but would not change the assessment of environmental effects included in this Final EIS.

In order to provide the demineralized water quality needed for power cycle makeup, it would be necessary to use ion exchange demineralization as a final treatment step after RO. Ion exchange demineralization can be done using either permanently installed equipment or portable demineralizers. Permanently installed equipment requires regeneration on site, which requires storage and disposal of significant quantities of sulfuric acid and sodium hydroxide (caustic). Alternatively, portable demineralizers are taken off-site for regeneration at the supplier's facility, so no on-site storage of chemicals and disposal of regeneration wastes is required. Off-site regeneration is proposed for the Project. This would eliminate the need to store regeneration chemicals on site and minimize on-site production of hazardous wastes. These demineralizers would be provided as forklift-moveable fiberglass bottles that would be traded out when exhausted and returned to the supplier for regeneration. Demineralization systems would be installed at each power block to minimize piping and provide the best water quality.

To minimize water consumption in the dry-cooled process (see Figure 2-5), process water from the RO unit used to reduce the dissolved mineral content of soften well water may be used for either dust suppression or as make up water for the auxiliary cooling tower. Blowdown from the steam cycle will be used as makeup to the small cooling tower. Blowdown from the auxiliary cooling tower will be sent to the evaporation ponds for disposal.

Reject water is water that has reach a high concentration of solids and is not longer suitable process water use. Reject water will be directed to the evaporation ponds for disposal. Process water is treated water of high quality suitable for cooling water, steam cycle water and dust control.

Up to three covered water tanks would be constructed at each power block. These include a service water tank, a demineralized water tank, and a RO reject water storage tank and dust control water storage tank. Final capacities will be determined during detailed engineering. Each tank will be a vertical, cylindrical, field-erected steel tank supported on foundations, consisting of either a reinforced concrete mat or a reinforced concrete ring wall with an interior bearing layer of compacted sand supporting the tank bottom.

Water from the Project well will be used as a potable water source and may require treatment to meet public health requirements for domestic potable water supplies. The Proponent would use a

desalination process for water treatment. Following desalination, the water would require addition of chlorine to prevent growth of pathogenic organisms. A Public Water System Permit for a non-community water system would be obtained from the NDEP – Bureau of Safe Drinking Water (NRS 445, NAC 445A, 450 through 445A.6731).

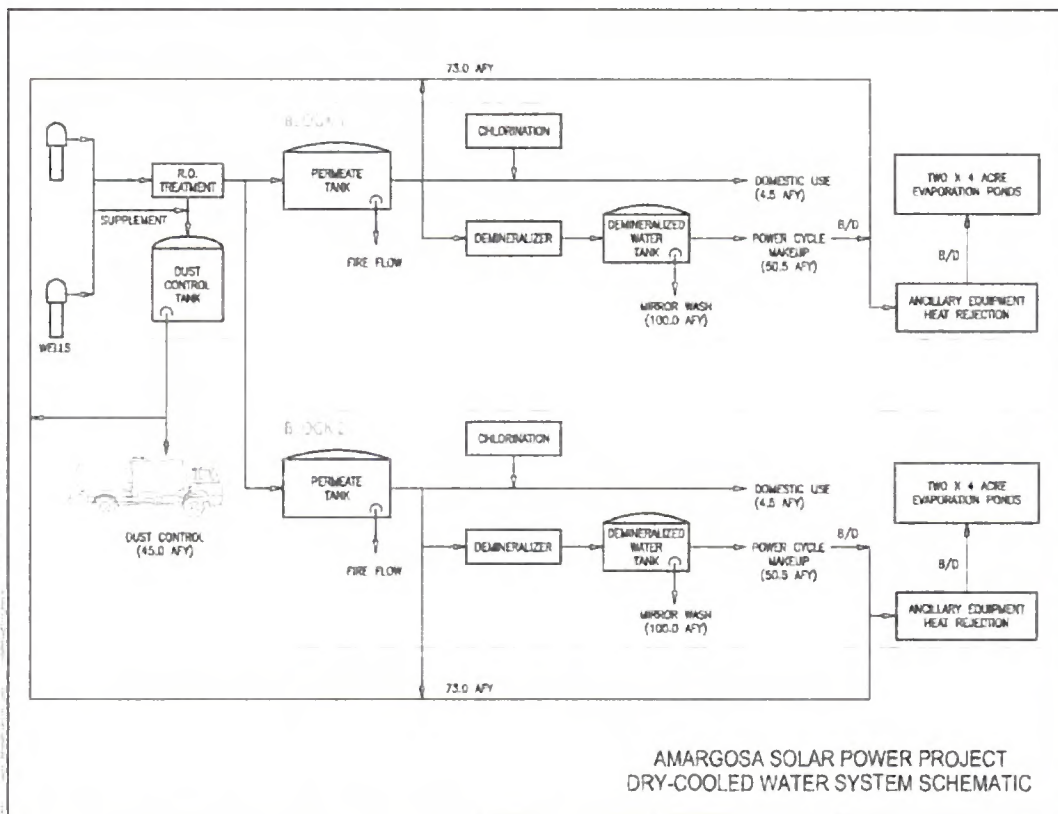


Figure 2-5 Dry-Cooled Water System Schematic

2.3.5.3 Water Needs during Construction

Project construction is expected to occur over a total of 39 months. Average construction water use at the site is estimated to be approximately 752,000 gallons (about 2.3 afy) per working day. Total water use for the duration of the construction phase of the Project is estimated to be approximately 600 afy (1,950 acre-feet over the 39 month construction period). Construction water will be sourced from a well within close proximity to the site and piped to the site for use by the contractor. Potable water during construction will be brought to the site in trucks and held in day tanks. Temporary easements on private land will be in place for the duration of the construction period for access to water wells.

Water needs for construction related activities include:

- Dust control for areas experiencing construction work as well as mobilization and demobilization

- Dust control for roadways
- Water for grading activities associated with both cut and fill work
- Water for soil compaction in the utility and infrastructure trenches
- Water for soil compaction of the site grading activities
- Water for soil stockpile sites
- Water for the various building pads
- Water for concrete pours on site

Dust control during grading will require considerable amounts of water during construction. By minimizing the period of time between initial ground disturbance and installation of the completed solar arrays, water used for construction dust control would be minimized. Sequencing of the grading activities in the solar fields will be performed to minimize the need for dust control water as illustrated in Figure 2-6 below.

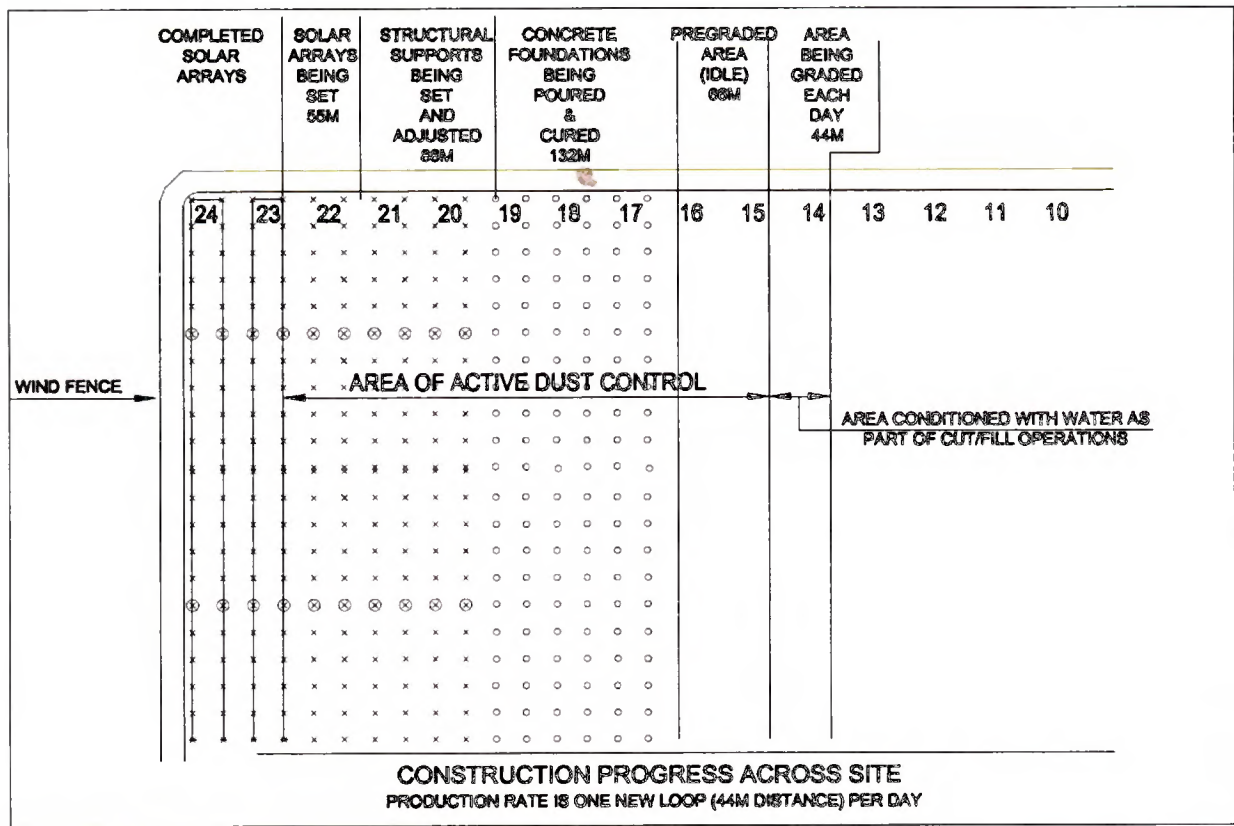


Figure 2-6 Construction Progress Across Site

The NDEP is responsible for administering the state’s stormwater management program. The state has also delegated authority to local entities to develop and implement stormwater plans. The NDEP requires all construction sites disturbing more than 1 acre to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage under the federal CWA.

Best Management Practices (BMP) for the minimization of construction water (i.e., the covering of stockpiles of soil, stabilizing roadways, etc.) will also be employed. The *Nevada BMP Guide*, a publication of the NDEP, will be used as a reference in establishing Project-specific BMPs.

2.3.5.4 Water Needs during Operations

Water needs during operation for both the preferred dry-cooled and wet-cooled alternatives are summarized in Table 2-4. Operational water needs for the dry-cooled preferred design and the wet-cooled alternative design are virtually identical for all uses except for the very large additional demand for water for steam cycle condensing of the wet-cooled design.

The average total annual water usage under the dry-cooled option is estimated to be approximately 400 afy, which corresponds to an average flow rate of about 248 gallons per minute. Usage rates will vary during the year and would be higher in the summer months when the peak maximum flow rate could be as much as about 50 percent higher for the ancillary equipment heat rejection process. Equipment sizing would be consistent with peak daily rates to ensure adequate design margin.

Rate of Use	Annual Average (afy)	Annual Average (afy)
	Dry-Cooled	Wet-Cooled
Power Cycle Heat Rejection	0	4,409
Power Cycle Makeup Water *	101	101
Mirror Wash Water	200	200
Domestic Potable Water	9	9
Dust Suppression Water	45	45
Ancillary Equipment Heat Rejection	146	0**
Totals (rounded)	400	4,600
* Power cycle makeup will be recycled and is not included in the consumptive use total		
** Ancillary equipment will be cooled with cooling water from the main cooling tower		

Cooling constitutes the most significant water use ranging from 4,409 afy for a wet-cooled plant to 146 afy for the dry-cooled alternative. Mirror washing constitutes the largest and second largest water use (200 afy) for dry-cooled and wet-cooled plants, respectively. To facilitate dust and contaminant removal, water from the primary desalination process, RO water, would be used to spray clean the solar collectors on a weekly or as-needed basis, determined by the reflectivity monitoring program. This mirror washing operation is done at night and involves a water truck spraying demineralized water on the mirrors in a drive-by fashion. It is expected that the mirrors will be washed weekly in winter and twice weekly from mid-spring through mid-fall. The

mirrors are angled down for washing therefore water does not accumulate on the mirrors. Wash water falls from the mirrors to the ground and, due to the small volume, soaks in or evaporates with no appreciable runoff. Remaining rinse water from the washing operation is expected to evaporate on the mirror surface.

Power cycle makeup water (101 afy) is water used to replace water lost from low-pressure steam venting at the deaerator, minor leaks in the steam and condensate piping systems, and blowdown from the steam generator drum. The volume of steam cycle makeup water would be similar for both the wet- and dry-cooled options.

For both the wet- and dry-cooled alternatives, the by-product of the RO process, RO process water, may be beneficially reused as water for dust suppression or in the dry-cooled alternative makeup to the auxiliary cooling tower. Dust suppression (45 afy) and domestic potable water use (9 afy) also are similar for both the wet-cooled and dry-cooled options.

2.3.6 Waste Generation and Management

Project wastes would be comprised of non-hazardous wastes including solids and liquids and lesser amounts of hazardous wastes and universal wastes. The non-hazardous solid waste would primarily consist of construction and office wastes, as well as liquid and solid wastes from the water treatment and blowdown systems. Blowdown systems are typically used on the boiler and cooling tower to control dissolved solids concentrations of the working fluids by simply removing or blowing down some of the liquid with a high dissolved solids concentration and replacing it with makeup water, which has a relatively lower concentration of dissolved solids. Non-hazardous solid wastes from the blowdown process include a concentration of the dissolved solids found in the well water plus any chemical additives used to control corrosion, biofouling or scaling in the boiler or cooling tower. Non-hazardous solid wastes would be trucked to the nearest landfill, which is a Class I landfill located in Pahrump with no limit to the amount of daily waste. The alternate disposal location is Las Vegas if a Class II or Class III landfill is required.

Non-hazardous liquid wastes would consist primarily of domestic sewage and process wastewater. To manage the non-recyclable non-hazardous domestic sewage wastes, a septic tank and leach field would be installed. Process waste water streams include RO system reject water, boiler blowdown, and auxiliary cooling tower blowdown. Boiler blowdown will be used as part of the makeup water for the auxiliary cooling tower. Auxiliary cooling tower blowdown will be sent to the evaporation ponds for concentration and disposal.

2.3.6.1 Hazardous Materials Management

Hazardous materials to be used during construction will include gasoline, diesel fuel, oil, lubricants, paint, and paint-related products (e.g., primer, paint thinner, other solvents). All hazardous materials used during construction and operation would be stored on site in storage tanks/vessels/containers that are specifically designed for the characteristics of the materials to be stored.

Secondary containment structures will be provided around any oil-filled transformers located outdoors, steam turbine generator lube oil tanks, HTF overflow and expansion vessels and any other oil containing tanks over 55 gallons without double walls or vendor supplied secondary containment. The containment will be sized to contain 125 percent of the fluid in the transformer or vessels with appropriate freeboard required per code. Additional equipment (such as HTF pumps, feedwater pumps, etc.) will be provided with 6-inch-tall curbs as appropriate.

Both construction and operation-phase hazardous waste will be recycled and reused to the extent possible.

Site-specific, safety-related plans and programs would be developed and implemented to ensure safe handling, storage, and use of hazardous materials (i.e., Hazardous Material Business Plan). Plant personnel would be supplied with appropriate personal protective equipment (PPE) and would be properly trained in the use of PPE and the handling, use, and cleanup of hazardous materials used at the facility, as well as procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials would be stored on site.

The preparation of the SPCC Plan is the responsibility of the facility owner/operator (in this case, Solar Millennium); however, it must be certified by a professional engineer. By certifying the SPCC Plan, the Professional Engineer, having examined the facility in question, attests that: (1) he/she is familiar with the requirements of part 112; (2) he/she or an agent has visited and examined the facility; (3) the Plan has been prepared in accordance with good engineering practices, including consideration of applicable industry standards, and with the requirements of part 112; (4) procedures for required inspections and testing have been established; and (5) the Plan is adequate for the facility. Regardless of who prepares the SPCC Plan, it is the owner/operator who is responsible for complying with the Rule. A copy of the Rule is available at www.epa.gov/oilspill.

2.3.6.2 Wastewater

The preferred dry-cooled Project would produce four primary wastewater streams:

- Non-reusable sanitary wastewater produced from administrative centers and operator stations;
- Non-reusable cooling tower blowdown and;
- Partially recyclable boiler blowdown (to be used as cooling tower makeup) shall be directed to the evaporation ponds.

The amount of non-reusable sanitary wastewater produced depends on the number of people using the facilities, how the water is used (e.g., toilets, showers, kitchen sinks, etc.), and the types of facilities provided (e.g., port-a-johns, low-flush toilets, potable drinking water, etc.). Up to 9 afy will be required for potable water use.

Under either alternative, RO process water will be beneficially reused in conjunction with BLM-approved palliatives for dust control and as make up to the auxiliary cooling tower.

2.3.6.3 Wastewater Treatment

Waste stream associated with a dry-cooled plant include (1) auxiliary cooling tower blowdown, (2) boiler blow down, and (3) RO/ Demineralizer water reject. These waste streams will be recycled as much as possible to a RO system for recovery. The RO system is a high efficiency reverse osmosis system designed primarily for handling high total dissolved solids waste water streams. The RO system will recover 70 percent or more (depending on water quality) of this waste stream and will significantly limit the size of the required evaporation pond(s). In certain operational conditions such as during start up, some of the waste water sources such as auxiliary cooling tower blowdown or boiler blowdown, may not be recoverable and would be sent directly to an evaporation pond.

The waste water treatment system would require two 4-acre evaporation ponds per power block. Two ponds were selected for reliability. The plant would operate on one pond for approximately 24 months, and then switch to the second pond. Approximately 18 months would be required for one pond to evaporate and be ready for use again. If a pond requires maintenance or solids removal, the plant still could operate with the other pond. The evaporation ponds would be double-lined and covered with narrow-mesh netting to prevent access by ravens and migratory birds in accordance with applicable regulations. If required, residual non-hazardous solid wastes would be trucked to the nearest landfill, which is a Class I landfill located in Pahrump. The alternate disposal location is Las Vegas if a Class II or Class III landfill is required. The above waste streams will be determined in the 401 Wastewater permit decision.

Sanitary wastes produced during construction would be held in chemical toilets and transported off-site for disposal by a commercial chemical toilet service. Any other wastewater produced during construction such as equipment rinse water would be collected by the construction contractor in Baker tanks and transported off-site for disposal in a manner consistent with applicable regulatory requirements.

During operations, sanitary wastes would be collected for treatment in septic tanks and disposed via leach fields located at the power block and at the administration and warehouse areas. Smaller septic systems would be provided for the control room buildings to receive sanitary wastes at those locations. Based on the current estimated average of 185 employees on a 24-hour, 7 day per week work schedule, a total leach field area of approximately 16,500 square feet would be required. It might be economical and expedient to provide permanent, portable, chemical toilets at remote areas of the operational Project site.

At this time, the leach field is anticipated to be sited adjacent to the bioremediation field. However, the final location will be determined following additional engineering design. The Proponent would coordinate the development of the leach field and bioremediation facility with NDEP as part of their permitting and approval process with that agency.

2.3.7 Bioremediation Unit

The HTF for the solar fields will be diphenyl/biphenyl oxide. Dowtherm A and Solutia VP-1 are commercial products that have been used in concentrated solar trough plants to date. The diphenyl/biphenyl oxide mixture is not classified as a hazardous material by the USDOT, nor is

it listed under EPA CERCLA regulations. However, this material, when discarded, may be a hazardous waste as that term is defined by the Resource Conservation and Recovery Act (RCRA), 40 CFR § 261.24, due to its toxicity characteristic.

While the collector design has advanced to an excellent level of performance and reliability, occasional small spills of HTF can occur, primarily due to equipment failures. Spill management procedures would be implemented to report, contain and clean up any such spill. If a line worker or other staff observes a spill or release, the system operators in the power block would be notified and the affected collector loop promptly shut down. An appropriately equipped crew would make any necessary equipment repairs and remove any hazardous wastes to an on-site bioremediation facility that utilizes indigenous bacteria to digest the hydrocarbon contamination.

The two solar fields would share the same bioremediation unit to bio-remediate or land farm soil contaminated from releases of HTF. Each bioremediation facility would comprise an area of about 400 feet by 800 feet (7 acres total). Each bioremediation facility would utilize naturally occurring bacteria to metabolize hydrocarbons contained in HTF contaminated soil. A combination of nutrients, water, and aeration facilitates the bacterial activity where microbes restore contaminated soil within 2 to 4 months. If required, remediated soils will be disposed of in an approved off-site landfill following decontamination.

2.3.8 Fire Protection

A Construction Fire Protection and Prevention Plan will be developed and followed throughout all phases of construction. The permanent facility fire protection system would be put into use during construction as soon as is practicable. Prior to the availability of this system, fire extinguishers and other portable fire-fighting equipment would be available on site. All equipment would be National Fire Protection Association (NFPA) and Occupational Safety and Health Administration (OSHA) compliant. Locations of portable firefighting equipment may include portable office spaces, welding areas, flammable chemical areas, and vehicles and other mobile equipment.

Once the Project is operational, an on-site fire protection system, designed in conformance with the NFPA and International Fire Code 2006 edition with Nevada State Fire Marshal Amendments, would be provided to limit personnel injury, property loss, and downtime in the event of a fire. The system would include a fire protection water system and portable fire extinguishers. Separate fire flow storage tanks would be sited within each of the two power blocks and an additional storage tank may be required for the Assembly Hall depending upon the final location of the structure. Firewater would be sourced from the Project well, and would be pumped to the site and stored in tanks for fire suppression. On-site fire pumps would be required to deliver water to the fire protection piping network for each of the buildings located within the power blocks.

During operations, all personnel who are actively involved in facility operations, such as plant operators, power plant maintenance personnel, security guards, solar field technicians and service personnel, will be trained to NHPA standards and provided information on the location and use of all onsite fire protection equipment and systems.

Personnel will have access and the support of the facility fire protection systems that address functional operations. The systems include a fire protection water system, foam generators, foam trucks, carbon dioxide fire protection systems, and portable fire extinguishers. Firewater would be supplied from water storage tanks located at each of the two power blocks on the site. One electric and one diesel-fueled backup firewater pump, each with a capacity of 5,000 gpm, would deliver water to the fire protection piping network. The piping network would be configured in a loop so that a piping failure can be quickly isolated with shutoff valves without interrupting water supply to other areas in the loop. Fire hydrants would be placed at intervals throughout the project site that would be supplied with water from the supply loop. The water supply loop would also supply firewater to a sprinkler deluge system at each unit transformer, HTF expansion tank and circulating pump area and sprinkler systems at the steam turbine generator and in the administration building. The use of foam trucks for HTF related incidents will be the primary response in combination with valve closures. Fire protection for each solar field would be provided by zoned isolation of the HTF lines in the event of a rupture that results in a fire.

In the event additional fire support is needed, the Amargosa Valley Volunteer Fire Department would be contacted. The Amargosa Valley Volunteer Fire Department Station is located at 851 E. Amargosa Farm Road, which is approximately 1.3 miles from the southeast corner of the solar field. If needed, mutual aid would be provided by the Beatty, Pahrump and Mercury fire departments.

Finally, as per the Nye County Development Agreement (Appendix F): “Developer shall annually, for as long as the ASPP is operating, provide emergency and fire protection training for up to four (4) individuals identified by County. County shall give priority to individuals who serve in the Amargosa Volunteer Fire Department. Such training shall be the equivalent of training provided to Developer’s on-site personnel.” In addition, the “Developer shall provide County, in a location selected by Developer, for as long as the ASPP is operating, access to a water supply for County’s use in responding to fires within the Town of Amargosa. County agrees to utilize the water supply only for such purposes.”

2.3.9 Telecommunications and Telemetry

The Project would have telecommunications service from providers who serve the Amargosa Valley area. Voice and data communications would be supported by a fiber optic system. This system would be augmented with wireless telecom equipment, particularly to support communication with Project staff dispersed throughout the large Project site.

With respect to telemetry, the Project would utilize electronic systems to control equipment and facilities operations throughout the Project site. Detailed information about the telemetry system to be used has not yet been developed at the current stage of the Project engineering design process. Information will be available once final engineering designs are complete.

2.3.10 Lighting System

On-site nighttime lighting for safety and security will be required during construction and operation. To reduce off-site lighting effects, as well as to reduce the energy requirements, an illumination study of proposed luminaries will be completed prior to the completion of a lighting plan design for optimum lighting placement. Lamp efficiency will also be factored into the lighting plan design, ensuring the avoidance of white-light bulbs. Luminaires will emit less than 1 percent of luminous flux above the horizon by incorporating the following design features:

- flat lens or full-shields
- luminaries classified as ‘full cutoff’
- installation of luminaries under overhangs where feasible
- aim lighting where it is most needed for safety
- use timers and motion sensors to extinguish lights not in use
- set specific hours for lighting use for typical nights

AC lighting will be the primary form of illumination, but DC lighting will be included for activities or emergency egress required during an outage of the plant’s AC system.

2.3.11 Roads, Fencing, and Security

Access to the Project site will be from Amargosa Farm Road via Valley View Boulevard. As stipulated in the Nye County Development Agreement (Appendix F), prior to commencement of construction, the Proponent is required to submit a Master Traffic Impact Analysis for review and approval by the County. The analysis will assess the construction and operations traffic and the impacts, if any, of the transportation of employees and equipment to and from the Project site. If the study determines that improvements are required, the Proponent will provide improvements required in the approved Master Traffic Impact Analysis in order to mitigate the traffic impacts of the Project.

The locations of the principal site entry gates for both the construction and the commercial operating period will be evaluated in consultation with the BLM, NDOT and Nye County Public Works to ensure that ingress and egress from the site does not have adverse impacts on existing traffic flow patterns.

Amargosa Farm Road is an existing public roadway maintained by Nye County Public Works. The roadway consists of 24 feet of asphalt/concrete pavement and roadside ditches on both sides. Amargosa Farm Road would be realigned, approximately 1,320 feet (0.25 mile) south of the existing roadway. The proposed roadway alignment would be coordinated with Nye County Public Works and be reconstructed in conformance with current standards.

Only a small portion of the overall plant site would be paved. Paved areas would include the site access road, the service roads to the power blocks, and portions of the power block (paved parking lot and roads encircling the steam turbine generator and solar steam generator areas). The remaining portions of the power block would be gravel surfaced. The solar field would remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic. An approved dust-suppression coating would be used on the dirt roadways within and around the solar field. Roads and parking areas located within the power block area and adjacent to the administration building and warehouse would be paved with asphalt.

The solar field and support facilities perimeter would be secured with a combination of chain-link and wind fencing. Chain-link, metal-fabric security fencing, 8-feet tall, with barbed or razor wire on top would be installed along the north and south sides of the facilities. Thirty-foot-tall wind fencing comprised of A-frames and wire and fabric mesh would be installed along the east and west sides of each solar field. The wind fence would be designed to serve two purposes; protect the solar field from blowing dust and sand and partially screen the solar facilities from surrounding properties and viewsapes. Controlled access gates would be located at the site entrance. In addition, the Project site will be surrounded by tortoise-proof fencing to prevent any Desert Tortoise from becoming entrapped by the flood control channels or impacted by work occurring within the facility.

Along the east side of the Project area, an introduced landscape buffer will be added between the perimeter fencing and Sandy Lane as per the Nye County Development Agreement (Appendix F). The buffer will include walking trails and vegetation.

2.3.12 Temporary Construction Workspace, Yards, Staging Areas

An assembly hall would be built for field fabrication facilities and storage of equipment. This building, to be located south of the Amargosa Road realignment, might become permanent depending on the need for additional permanent warehouses for spare parts or maintenance work. Indoor storage space would be required only for weather sensitive items such as control/electrical panels, or small parts that could easily be misplaced. Some space for material requiring temperature and humidity control would be provided. Other items would be stored outdoors on raised platforms with proper covers or temporary shelters. Construction-area lighting will be provided at the warehouse locations. At the areas designated on the site laydown plan, construction subcontractors would provide their own warehousing facilities needed for their materials.

In addition to the permanent plant roads and parking, construction roads and parking would be required to provide access to construction facilities and the laydown area. Construction parking space would be provided near the construction office complex and construction laydown areas. Temporary roads would be all-weather, gravel surfaced; have sufficient width; and be effectively located to accommodate high-efficiency construction traffic. The parking area would have barriers to control parking patterns. The construction parking area, which will be used for both phases of construction, would accommodate approximately 400 vehicles.

Following construction, temporary use areas would be revegetated and restored following BLM guidelines. Restoration efforts will minimize soil erosion and the potential for fugitive dust from disturbed sites.

2.3.13 Site Drainage and Earthwork

The existing topographic conditions of the Project site show an average slope of approximately 1 foot in 200 feet (0.5 percent) and general sloping in a southwesterly direction. The site consists of desert shrub and is traversed by numerous intermittent and braided washes within the Fortymile Wash watershed. The Fortymile Wash consists of an approximate 330-square-mile drainage area measured to the southern property line of the Project site. The section of the Fortymile Wash impacting the site is considered alluvial, based on site field investigation and review of aerial photography. The apex of the Fortymile Wash is clearly identifiable approximately 0.5 mile north of US 95. Under existing conditions, three primary discharge locations along the southern property boundary are apparent. It is the objective of the Project's stormwater management plan to perpetuate stabilized discharge in both quantity and manner at these three historic locations. A conceptual Stormwater Drainage Plan is provided in Appendix E.

The Project site would be graded generally following the existing contours of the site in order to minimize the amount of disturbance and to allow a balanced distribution of material. Flood protection of the property from off-site flows would be provided by means of a continuous concrete lined channel around the northern and western perimeter of the site, within the fence line. The channel would be designed to effectively intercept the 100-year storm event off-site runoff and convey the concentrated flow to the southwest corner of the property. The southwest corner of the property has been identified as one of the historic discharge locations of the Fortymile Wash. The channel would discharge within the property limits and energy dissipation facilities would be provided in order to disperse the concentrated flow back to a shallow sheet flow condition before the flow leaves the property boundary.

Additionally, a concrete lined channel is proposed along the eastern side of the solar field, inside the fence line, in order to intercept and collect flows impacting the site from the east (see Figure 2-1 and Figure 2-2). Similar to the Fortymile Wash channel, the concentrated flow would be released on the property in its historic location and an energy dissipation facility would be provided in order to return the flow to a shallow sheet flow condition before the flow leaves the property. Perimeter channels are recommended to be concrete lined due to the high velocity potential and for maintenance reasons. Off-site flows would be intercepted and conveyed around the site to ensure no direct contact with on-site stormwater runoff.

Due to the size of the solar field area, the site itself has potential to generate large storm flows during a rain event. For this reason, stormwater control facilities would be constructed to protect on-site facilities, and to convey stormwater runoff to historic discharge locations in both quantity and manner of flow.

The four primary (major) onsite channels, traversing the site north to south, provide 100-year event stormwater runoff interception from four equal divisions of the entire Project site. The two

power block areas contain the most sensitive equipment on the site and are therefore each located along one of the primary channels; thus achieving flood protection during a 100-year storm event. The stormwater runoff generated between the primary channels would be collected in a series of swales and small channels that would direct the flow to the appropriate primary channel.

All minor channels within each section would be designed to intercept and convey the 25-year storm event. Stormwater runoff in areas between the primary channels and in excess of the 25-year event would consist of sheet flow (shallow depth, low velocity) below the solar trough systems. This flow would eventually be intercepted by an appropriate primary channel prior to impacting a power block area. This concept was selected in order to reduce costs for on-site drainage facilities, while still providing desired flood protection.

All primary channels would be concrete lined. Concrete lined channels have been proposed for the following reasons: (1) to achieve channel reliability and integrity; (2) to provide a means for routine maintenance and sediment deposition removal; and (3) to achieve necessary channel width in conformance with the site design space limitations. Various culvert facilities would be utilized to convey storm flow below essential on-site and off-site roads for access and movement around the site.

In addition to conveyance facilities, an on-site detention basin would be used to limit post-development flows to pre-development limits. In 2009, a regional flood control alternative was presented to the BLM and Nye County staff. This alternative would provide a regional off-site detention basin at the apex of the Fortymile Wash located north of US 95 and would effectively and considerably reduce existing condition peak storm flow downstream of US 95. Reducing off-site peak flows impacting the site allows for a reduction in the size of the perimeter flood control facilities needed to protect the Project site. All properties downstream of the detention basin would benefit from this approach. Although all parties agreed to pursue this approach, coordinated funding, schedule variations, and design responsibility for such a facility were determined to be an overwhelming challenge at this time. Therefore, the alternative of building a regional detention basin north of US 95 is unlikely and the Project is proposing independent flood protection.

The power blocks would generally drain by sheet flow or swales to a small detention basin located near the power block. These basins would be designed to retain for a short duration prior to outfall to the nearest primary channel. Oil and chemical storage areas within the power blocks would have their own containment features.

The preliminary site grading plan is designed to be balanced; no import or export of soil is expected for general earthwork. When the geotechnical investigation report is available for the site, the grading plan would be adjusted to account for any loss in elevation that could occur. Engineered fill would be provided as required for equipment and structure foundations if recommended by the geotechnical report. Only soil material that has been approved by the BLM, in consultation with a licensed geotechnical engineer would be used for structural fill. Additionally, granular material might need to be imported for the use as road base and possible use below foundations. Grading of the site would commence at the beginning of the construction period and last over a period of approximately 24 months. Such an extended grading period

would require less water on a daily basis for grading operations and would require dust control over a smaller area at any given time. The total amount of cut is estimated to be approximately 7,500,000 cubic yards. The total amount of fill is currently estimated at approximately 8,900,000 cubic yards. As discussed above, once the final geotechnical report is available, the final grading plan will be prepared. The final grading plan will be adjusted to achieve a balanced site, with minimal to no import or export of material.

During construction and operation, a comprehensive system of management controls, including permanent and temporary site-specific BMPs, to minimize stormwater contact with contaminants and sediment transport would be implemented. An NOI application and Stormwater Pollution Prevention Plan (SWPPP) in accordance with the State of Nevada, NPDES Stormwater General Permit NVR 100000 will be filed with the NDEP prior to the initiation of any construction activities. The SWPPP will utilize BMPs for the environmental control of stormwater discharges to off-site areas that may be attributed to Project activities. The SWPPP will contain a comprehensive procedure for inspecting and repairing BMPs. The management controls may include:

- Erosion and sediment control BMPs during construction activities such as silt fence, straw wattles, gravel bags, dust control, inlet protection, and sediment traps
- Employee training program
- Good housekeeping programs
- Preventive maintenance programs
- Structural BMPs:
 - Temporary containment during maintenance activities
 - Permanent erosion and sediment control BMPs such as detention/sediment basin, diversion berms, riprap stabilization, concrete lined channels, and energy dissipation devices
 - Permanent secondary containment structures at chemical storage and process areas
- Materials, equipment and vehicle management practices
- Spill prevention and response programs
- Inspection programs

2.3.14 Construction Schedule, Manpower, and Sequencing

Construction would be managed by the Proponent. Several dozen major and minor subcontractors would be hired to undertake the myriad of mechanical, civil and electrical construction tasks. Prior to mobilization for construction, a detailed construction plan will be developed to define the construction supervisory and technical field organizations and staffing levels required for the Project. Major milestones of the planned construction schedule are as follows:

- Begin construction: fourth quarter 2011
- Unit #1 start of commercial operations: mid 2014
- Unit #2 start of commercial operations: by mid 2014/2015

Project construction is expected to occur over a total of 39 months. The Proponent would phase construction so that the first power plant would be operational approximately 1 year before the second plant becomes operational. Project construction will require an average of 650 employees over the entire 39-month construction period, with manpower requirements peaking at approximately 1,300 workers in Month 17 of construction. The construction workforce would consist of a range of laborers, craftsmen, supervisory personnel, support personnel, and management personnel. Chapter 3.9 – Socioeconomics provides a breakdown of the construction workforce by skill over the entire construction period.

Temporary construction parking areas would be provided within the power plant site adjacent to the laydown area. The plant laydown area would be used throughout the build out of the two solar units. The construction sequence for plant construction includes the following general steps:

- Site Preparation: This includes detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features. Grading for the solar field, power block, and drainage channels would be completed during the first 24 months of the construction schedule. Pre-construction survey work would consist of staking/flagging right-of-way and site area boundaries, work areas (permanent and short term), cut and fill staking, access and roads, transmission structure centers, foundation structure staking, and desert tortoise/endangered plants offsets. Staking/flagging would be maintained until final cleanup or reclamation.
- Linears: This includes the site access road and telecommunication line. The site access road and telecommunication line would be constructed during the first 6 months of the construction schedule in conjunction with site-preparation activities.
- Foundations: This includes excavations for large equipment, footings for the solar field, and ancillary foundations in the power block.
- Major Equipment Installation: Once the foundations are complete, the larger equipment will be installed. The solar field components would be assembled in an on-site erection facility and installed on their foundations.
- Balance of Plant: With the major equipment in place, the remaining fieldwork would be piping, electrical, and smaller component installations.
- Testing and Commissioning: Testing of subsystems would be conducted as they are completed. Major equipment would be tested once all supporting subsystems are installed and tested.

2.3.15 Operations and Maintenance

The Project site would be staffed 24 hours a day, 7 days per week during operations. A total estimated workforce of 100 full-time employees would be needed to staff the first phase of the Project (Unit #1). When the second of the 2 units comes online, a total of 170 to 200 full-time staff would be needed. The operations workforce would consist of plant operators and maintenance technicians working 12-hour shifts, and administrative personnel working 8-hour shifts per day.

Maintenance activities during operations would include daily inspection of field components, condition assessment of critical equipment, and routine lubrication of equipment. Some specialized maintenance would be performed by the equipment provider or other specialist contractors. Long-term maintenance would be performed against a defined service and replacement schedule.

Mirror washing would be conducted at night and involves a water truck spraying treated water on the mirrors in a drive-by fashion. It is expected that the mirrors would be washed weekly in winter and twice weekly from mid- spring through mid-fall.

Under normal circumstances, the plant switchyard would be controlled remotely, and routine inspections by personnel would occur on a monthly basis or as needed under emergency conditions. In addition, all of the switchyard structures would be inspected from the ground on an annual basis for corrosion, misalignment, and foundation condition. Ground inspection would include the inspection of hardware, insulator keys, and conductors. This inspection also would check conductors and fixtures for corrosion, breaks, broken insulators, and bad splices.

Road maintenance would be performed as needed. Paved roads would be swept, sealed, and/or overlaid as needed. Grading and drainage would be maintained for gravel and earthen roads.

A noxious weed management plan will be developed by the Proponent in consultation with the BLM. This plan will be implemented throughout the life of the Project to prevent the introduction and spread of noxious weeds as a result of Project activities.

2.3.16 Decommissioning

The lifespan of the proposed Project is expected to be at least 30 years. At the end of the Project's useful lifespan, the facilities would be either repowered or decommissioned. Due to the excellent solar resource at the Project site, repowering is a viable option. This might involve replacing the existing parabolic troughs with components that are more efficient, thereby extending the useful lifespan of the Project. Decommissioning would adhere to the requirements of appropriate governing authorities and would be in accordance with all applicable federal, state, and local law, regulations, and permits, including any reclamation requirements BLM specifically adopts for utility-scale solar projects. For this particular site, the decommissioning process would involve steps to dismantle and remove equipment, permanently stabilize soil and drainages, and regrade and reshape features as necessary. Consistent with BLM requirements, a detailed decommissioning plan would be developed in a manner that both protects public health and safety and is environmentally acceptable.

If approved, the right-of-way authorization for the proposed Project would include a required “Performance and Reclamation” bond to ensure compliance with the terms and conditions of the right-of-way authorization, consistent with the requirements of 43 CFR 2805.12(g). The “Performance and Reclamation” bond will consist of three components. The first component will be hazardous materials, the second component will be the decommissioning and removal of improvements and facilities, and the third component will address reclamation, revegetation, restoration and soil stabilization.

2.4 WET-COOLED ALTERNATIVE

Under the wet-cooled alternative, the Proponent would construct and operate two wet-cooled solar power plants, each with a nameplate capacity of 250-MW and a net output of approximately 242 MW. Each solar plant would be equipped with thermal storage capability and associated linear facilities. Construction and operation of a wet-cooled project would be similar to a dry-cooled plant. Plant components and layout are similar under both the wet- and dry-cooled alternatives; the primary differences are the amount of water used for plant operations, the need for cooling towers for heat rejection from the steam cycle for the wet-cooled alternative, and the area needed for the evaporation ponds. Table 2-2 lists the plant components for both the wet- and dry-cooled alternatives.

The wet-cooled alternative provides more efficient performance than the dry-cooling alternative. Specifically, the wet-cooled alternative offers approximately 11 MW greater electrical output during peak summer conditions than the dry-cooled alternative. The performance of the wet-cooled alternative is enhanced because wet-cooling relies primarily on evaporative cooling to remove heat from the circulating water. In contrast, a dry-cooled alternative uses convective heat transfer, which operates similar to a car’s radiator. In the dry-cooled alternative, an air cooled condenser using a large array of fans that force air over finned tube heat exchangers cools the steam turbine-generator exhaust steam.

2.4.1 Water Source

Under the wet-cooled alternative, the well identified for use under the dry-cooled alternative, would supply a portion of the water required for operations. However, additional water supplies would be required under the wet-cooled alternative. The Proponent would either lease or purchase existing certified water rights for water needs during construction and operation of the proposed Project. The source of this additional water would be dependent on the availability of other water rights available for lease or sale in the Amargosa Desert Hydrographic Basin.

2.4.2 Water Use and Treatment

Water use under the wet-cooled alternative would include water needed for the wet cooling tower used to cool the steam cycle; water for solar collector mirror washing; makeup for the solar steam generator feedwater; dust control, potable water and fire protection. The large cooling tower required for the wet-cooled design replaces the small auxiliary cooling tower and the air-cooled condenser used in the dry-cooled thermal power plant design. Well water treated

in a water softening process will be used as the primary makeup water source for the cooling tower. In addition blowdown from the steam cycle would be used as a feed stream to the cooling tower (Figure 2-7). The greater volume of blowdown generated with the wet-cooled system, would be sent to evaporation ponds for disposal.

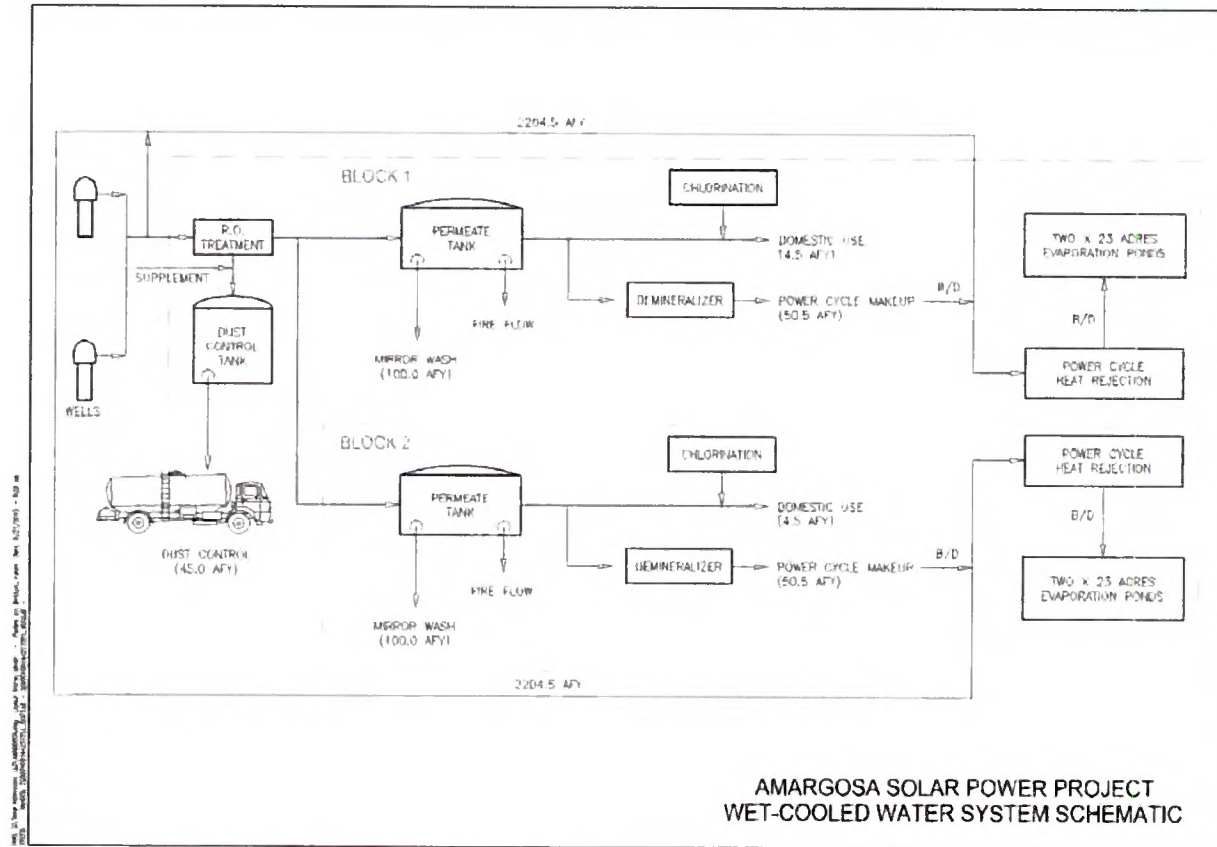


Figure 2-7 Wet- Cooled Water System Schematic

To maintain the chemistry of the water circulated in the cooling tower within an acceptable range, a combination of chemical addition, comprised primarily of an acid feed to inhibit scaling and a biocide to prevent biological growth, and continuous blowdown to control the concentration of total dissolved solids, would be used. Approximately 6 percent of the cooling tower flow would be blowdown and treated in a high efficiency RO system. Approximately 80 percent of this water would return to the cooling tower after processing. The remaining, high conductivity, RO reject water, approximately 88 afy, would be sent to evaporation ponds for disposal.

2.4.3 Wastewater

The wet-cooled alternative Project would produce similar wastewater streams as the dry-cooled alternative. The sanitary wastewater and reuseable water streams will be similar to the preferred dry-cooling option, with the exception that excess RO reject water and some of the steam generator blowdown would be used to supplement makeup flows into the large cooling tower. Cooling tower blowdown will be treated in a similar RO system as used in the dry-cooled alternative and recycled to the extent possible. As with the dry-cooled system, the waste stream from the RO system will be sent to the evaporation ponds for disposal.

2.5 NO ACTION ALTERNATIVE

NEPA regulations require that EIS alternative analyses “include the alternative of no action” (40 CFR §1502.14(d)). The No Action alternative must be included in the analysis so that the EIS clearly evaluates the consequences between the alternative methods of developing the proposed Project and the option of no development. In other words, the No Action Alternative provides a useful baseline for comparison of the environmental effects of the other alternatives. For this analysis, no action means that the BLM would reject the Proponent’s proposal and would not grant the requested the right-of-way. Because the Project facilities would not exist, potential adverse environmental effects would not occur.

2.6 AGENCY-PREFERRED ALTERNATIVE

The BLM preferred alternative is the Proposed Action – Dry-cooled Alternative. The environmental consequences of the Proposed Action and Alternatives are described in Chapter 4 and summarized and compared in Table ES-1-4.

CHAPTER 3 - AFFECTED ENVIRONMENT

This chapter describes the affected environment associated with the construction and operation of the proposed Project. The affected environment is the physical area that bounds the environmental, sociological, economic, or cultural features of interest that could be impacted by the Proposed Action or alternatives. When preparing this EIS, the best available information was used to describe existing environments and the proposed facilities and activities. The information serves as a baseline from which to identify and evaluate environmental changes resulting from construction and operation of the proposed Project. The baseline conditions, for the purposes of analysis, are the conditions that currently exist.

In the following sections, the term “Project area” refers to the area that encompasses the proposed right-of-way and associated project components, such as the access road and project wells as well as the area immediately adjacent to the proposed facilities. The study area, or ROI, varies depending on the resource being analyzed and the predicted locations of direct and indirect impacts from the Proposed Action or alternatives. The APE, as used in the Cultural and Historic Resources section, is synonymous with the Project area.

The following resources are considered in the evaluation of the Proposed Action and alternatives in the Final EIS:

- Section 3.1 - Air Quality
- Section 3.2 - Geological Hazards and Mineral Resources
- Section 3.3 - Soil Resources
- Section 3.4 - Water Resources
- Section 3.5 - Noise
- Section 3.6 – Biological Resources include Vegetation and Wildlife Resources
- Section 3.7 - Paleontological Resources
- Section 3.8 - Cultural and Historic Resources
- Section 3.9 - Socioeconomic Resources
- Section 3.10 - Environmental Justice
- Section 3.11 - Land Use, Recreation, Transportation, and Access
- Section 3.12 - Visual Resources
- Section 3.13 - Health and Safety/Hazardous Materials

3.1 AIR QUALITY AND CLIMATE

This section describes the existing meteorological and air quality conditions in and around the proposed Project and existing emission sources. Air quality data were obtained from existing literature, agency files, and meteorological data from local monitoring stations.

In Nevada, air quality management areas typically comprise a valley, a portion of a valley, or a terminal basin. The air quality ROI for the proposed Project incorporates portions of Nye County in Nevada and portions of the Death Valley National Park in Inyo County, California, within the Amargosa Desert Hydrographic Basin #230.

3.1.1 Regulatory Framework

The EPA implements and enforces the requirements of most federal environmental laws. The EPA Region 9 administers federal air programs in Nevada, including oversight of the State of Nevada, Department of Environmental Protection and Clark County, Department of Air Quality and Environmental Management which are responsible for implementing those programs within their jurisdiction. The Clean Air Act most recently amended in 1990, provides the EPA with the legal authority to regulate air pollution from stationary, area, and mobile sources.

Pursuant to the federal Clean Air Act of 1970, 42 USC § 7401 et seq. as amended in 1990, the EPA has established primary and secondary National Ambient Air Quality Standards (NAAQS) for criteria pollutants. The criteria pollutants under the NAAQS include ozone (O₃), NO₂, lead (Pb), CO, SO₂, and PM. The Nevada air quality standards are the same as the NAAQS, with the exception of a more restrictive CO standard in locations with a ground elevation above 5,000 feet. Table 3-1 lists the national and State of Nevada standards.

Two subsets of PM are inhalable PM₁₀ and PM_{2.5}. The PM₁₀ regulation was established by the Clean Air Act. Sources of PM₁₀ within the Project vicinity include:

- stationary point sources, such as fuel combustion and industrial processes
- fugitive sources, such as roadway dust from paved and unpaved roads
- wind erosion from open land
- transportation sources, such as automobiles

Recently, the EPA implemented revised standards for PM. Specifically EPA revised prior standards for PM₁₀ and added a new standard for PM_{2.5}. The requirement that agencies demonstrate attainment of the new standards has affected the current emission standards for combustion and fugitive dust sources.

O₃ is not emitted directly into the atmosphere from emission sources; it is produced through photochemical (light catalyzed) reactions in the atmosphere involving hydrocarbons and NO_x, known generically as O₃ precursors. Because O₃ formation results from large-scale atmospheric processes, O₃ formation and transport is a regional concern, and not directly associated with individual, localized sources of pollution. In 2008, the EPA promulgated a new O₃ standard, and as of January 2010, is considering changes to making the standard more stringent.

CO is an odorless, invisible gas usually formed as the result of incomplete combustion of organic substances. The primary sources of CO are motor vehicles and stationary combustion sources. Secondary sources include aircraft emissions and agricultural and/or forest burning. CO is more of a localized pollution issue, due to its ability to react in the atmosphere under normal

conditions. However, during those periods when the air is stagnant, such as with a ground-based inversion, local levels of CO can increase. Such inversions are caused when a layer of colder air at higher elevations traps relatively warmer air near the ground, preventing normal air circulation.

SO₂ is formed during the combustion of sulfur-bearing materials, such as the sulfur in metal ores or fossil fuels.

NO_x, consisting primarily of nitric oxide and NO₂, as well as VOCs emissions, readily react in the atmosphere as precursors to O₃ and, to a lesser extent, PM, and are major contributors of acid rain. The NAAQS is specific to NO₂, although total NO_x is usually quantified for emission sources.

Historically, the main sources of Pb emissions are vehicles fueled with leaded gasoline and Pb smelters.

3.1.2 General Conformity Rules

These regulations ensure that federal agencies will not engage, support, or provide financial assistance for licensing or permitting, or approve any activity which does not conform to an approved Clean Air Act implementation plan. Specifically within nonattainment and maintenance areas, potential federal actions (directly or through use authorizations) should not: (1) cause or contribute to new violations; (2) increase the frequency or severity of existing violations; or (3) delay timely attainment or interim emission reductions.

As federal lead agency, the BLM must complete a conformity analysis and possibly a formal determination for the proposed action before it can be approved. The General Conformity Rule excludes activities which are accounted for in the approved SIP, as well as certain specific actions which are assumed to conform. In addition, based on an assessment of reasonably foreseeable potential emissions of the specific air pollutant(s) for which the nonattainment and/or maintenance area was established, activities whose emissions would be below regulatory threshold levels are also assumed to conform. Potential emissions may incorporate BLM enforceable controls or mitigation measures.

Activities which cannot be presumed to conform will require the BLM to prepare a formal General Conformity Determination for public comment, including preparation of a draft Determination, presentation to the public for formal comments, incorporation of changes based on public review, and presentation of the final Determination. If the final Determination cannot demonstrate the activity will comply with applicable requirements of the Clean Air Act, the proposed activity will not be allowed to occur.

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Table 3-1 National and State of Nevada Ambient Air Quality Standards

		Nevada Standards ^A		National Standards ^B		
Pollutant	Averaging Time	Concentration ^C	Method ^D	Primary ^{C, E}	Secondary ^{C, F}	Method ^G
O ₃	1 hour	0.12 ppm (235 µg/m ³)	Ultraviolet absorption	1 hour equals 0.12 ppm (235 µg/m ³) 8 hours equal 0.08 ppm	Same as primary	Chemiluminescence
Ozone Lake Tahoe Basin, #90	1 hour	0.10 ppm (195 µg/m ³)				
CO less than 5,000' above mean sea level (amsl)	8 hours	9 ppm (10,500 µg/m ³)	Nondispersive infrared photometry	9 ppm (10 mg/m ³)	None	Nondispersive infrared photometry
At or greater than 5,000' amsl		6 ppm (7,000 µg/m ³)				
CO at any elevation	1 hour	35 ppm (40,500 µg/m ³)		35 ppm (40 mg/m ³)		
NO ₂	Annual arithmetic mean	0.053 ppm (100 µg/m ³)	Gas phase chemiluminescence	0.053 ppm (100 µg/m ³)	Same as primary	Gas phase chemiluminescence
SO ₂	Annual arithmetic mean	0.030 ppm (80 µg/m ³)	Ultraviolet fluorescence	0.030 ppm	None	Spectrophotometry (Pararosaniline method)
	24 hours	0.14 ppm (365 µg/m ³)		0.14 ppm		
	3 hours	0.5 ppm (1,300 µg/m ³)		None	0.5 ppm	

Table 3-1 National and State of Nevada Ambient Air Quality Standards

		Nevada Standards ^A		National Standards ^B		
Pollutant	Averaging Time	Concentration ^C	Method ^D	Primary ^{C, E}	Secondary ^{C, F}	Method ^G
Particulate 50 µg/m ³ matter as PM ₁₀	Annual arithmetic mean	50 µg/m ³	High-volume PM10 sampling	50 µg/m ³	Same as primary	High-volume PM ₁₀ sampling
	24 hours	150 µg/m ³		150 µg/m ³		
Pb	Quarterly arithmetic mean	1.5 µg/m ³	High-volume sampling, acid extraction, and atomic absorption spectrometry	1.5 µg/m ³	Same as primary	High-volume sampling, acid extraction, and atomic absorption spectrometry
Hydrogen sulfide	1 hour	0.08 ppm (112 µg/m ³) ^G	Ultraviolet fluorescence	—	—	—

Notes:

- ^A – The director shall use the Nevada standards in considering whether to issue a permit for a stationary source and shall ensure that the stationary source will not cause the Nevada standards to be exceeded in areas where the public has access.
- ^B – These standards, other than for O₃, PM, and those based on annual averages, must not be exceeded more than once per year. The 1-hour O₃ standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one. The PM₁₀ 24-hour standard is attained when there are one or fewer days per calendar year with a 24-hour average concentration above the standard, rounded to the nearest 10 µg/m³. The expected number of days per calendar year is generally based on an average of the number of times the standard has been exceeded per year for the last 3 years. The national standards are to be used in determinations of attainment or nonattainment.
- ^C – Where applicable, concentration is expressed first in units in which it was adopted. All measurements of air quality that are expressed as mass per unit volume, such as micrograms per cubic meter, must be corrected to a reference temperature of 25 degrees Centigrade and a reference pressure of 760 millimeters of Hg (1,013.2 millibars); *ppm* in this table refers to parts per million by volume, or micromoles of regulated air pollutant per mole of gas; µg/m³ refers to micrograms per cubic meter.
- ^D – Any reference method specified in accordance with 40 CFR Part 50 or any reference method or equivalent method designated in accordance with 40 CFR Part 53 may be substituted.
- ^E – National primary standards are the levels of air quality necessary, with an adequate margin of safety, to protect the public health.
- ^F – National secondary standards are the levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a regulated air pollutant.
- ^G – The ambient air quality standard for hydrogen sulfide does not include naturally occurring background concentrations.

Source: NDEP 2009

3.1.3 Climate and Meteorology

The region around the Project area has a semiarid climate, with total annual precipitation range of approximately 4 to 10 inches. Mean nighttime and daytime air temperatures typically range from 72°F to 93°F in the summer, and from 34°F to 51°F in the winter. On average, the daily range in temperature change is approximately 18°F. The closest weather-monitoring station to the Project site is located at the Amargosa Valley Library, approximately 0.5 mile from the eastern edge of the Project site. Table 3-2 summarizes daily maximum and minimum temperatures, as well as extreme high and low temperatures by month.

Month	Air Temperature (°F)			Extremes (°F)		Average Number of Days			
	Average Max	Average Min	Average	High	Low	Maximum Temperature		Minimum Temperature	
						≥90°F	≥75°F	≤32°F	≤20°F
Jan	60.1	33.1	45.6	81	12	0.0	0.7	14.7	1.1
Feb	62.8	36.5	49.2	80	20	0.0	1.9	7.1	0.2
Mar	71.0	42.2	56.8	92	25	0.3	12.4	2.1	0.0
Apr	77.4	47.9	63.4	98	31	2.9	19.0	0.2	0.0
May	89.3	58.2	75.2	108	40	16.6	28.3	0.0	0.0
Jun	98.4	66.5	84.2	110	49	26.8	29.9	0.0	0.0
Jul	104.3	74.1	90.4	114	61	30.9	31.0	0.0	0.0
Aug	101.4	71.7	87.4	112	56	30.3	31.0	0.0	0.0
Sep	93.8	62.3	78.4	107	47	22.4	29.6	0.0	0.0
Oct	81.5	51.4	66.1	99	36	6.4	24.5	0.0	0.0
Nov	69.0	40.2	53.7	87	21	0.0	8.0	4.1	0.0
Dec	59.0	32.2	44.5	75	18	0.0	0.3	16.8	0.5

(Period of Record October 1999 to December 2008)
Source: Community Environmental Monitoring Program 2009

Precipitation in the region is influenced by two distinct storm patterns, one occurring in the winter and the other in the summer. Winter precipitation (dominantly snow in the mountains and rain in the valleys) tends to be low intensity and long duration and covers a great area. In contrast, most summer rains, resulting from local convective thunderstorms, are of high intensity and short duration. These storms can generate an abundance of lightning, strong winds, and

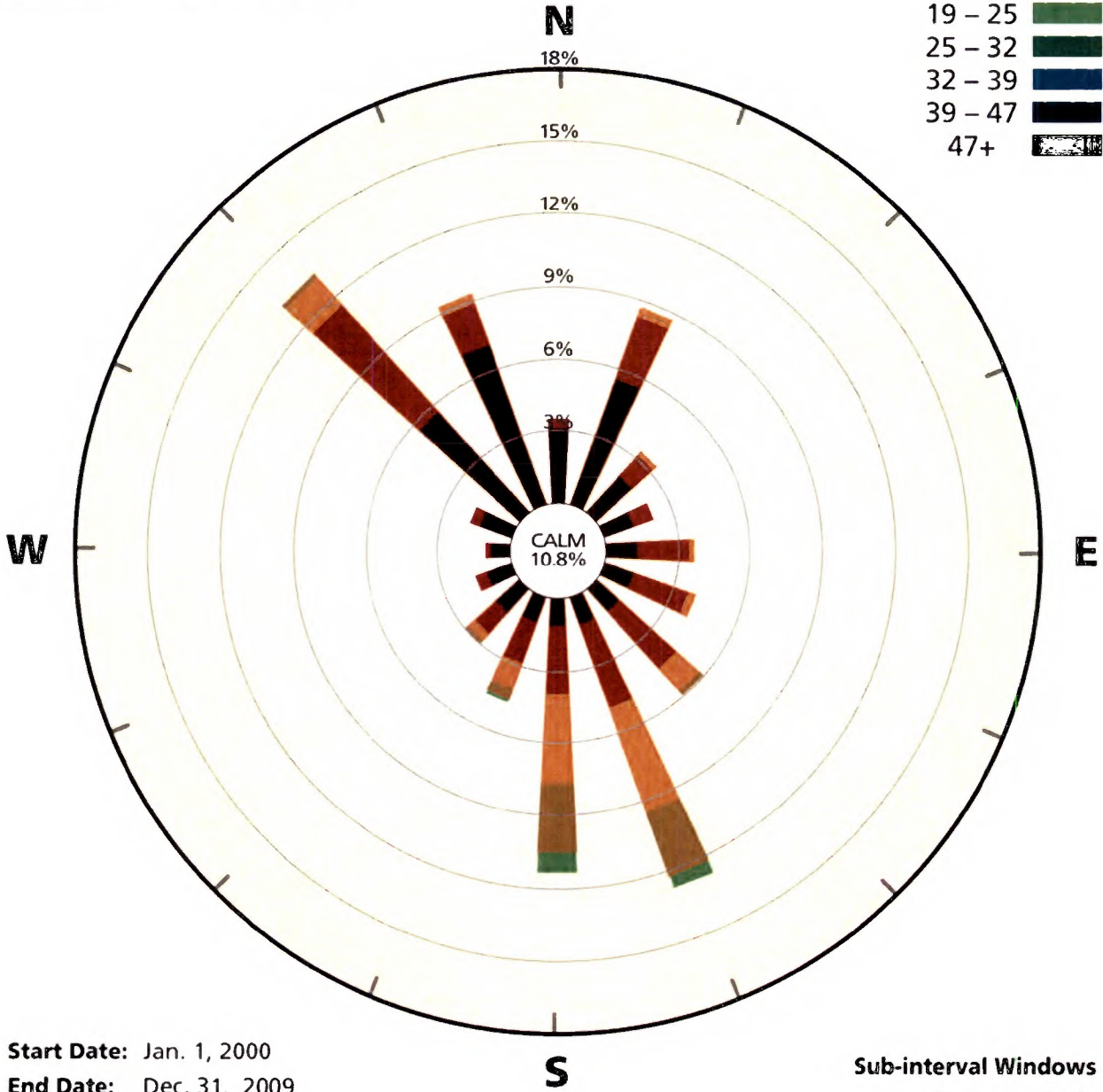
heavy and rapid precipitation. Table 3-3 summarizes precipitation data (rainfall) for the Amargosa area for the period from October 1999 through December 2008.

Local wind patterns have a strong daily cycle of daytime winds from the south and nighttime winds from the north. Figure 3-1 shows the wind patterns near the proposed Project, and illustrates the fluctuations in data from different heights and times of day.

Table 3-3 Precipitation Data for Amargosa Valley, Nevada								
Month	Monthly Average	Extremes		Average Number of Days of Precipitation				
		Max 10-minute Precipitation	Max Daily Precipitation	≥ .01 Inch	≥ 0.1 Inch	≥ 0.25 Inch	≥ 0.5 Inch	≥ 1 Inch
Jan	0.48	0.08	0.70	3.1	1.4	0.7	0.2	0.0
Feb	0.97	0.14	1.74	4.9	2.3	1.4	0.3	0.2
Mar	0.29	0.06	0.57	1.8	0.9	0.4	0.2	0.0
Apr	0.19	0.06	0.75	2.1	0.3	0.1	0.1	0.0
May	0.04	0.11	0.32	0.3	0.1	0.1	0.0	0.0
Jun	0.02	0.03	0.05	0.6	0.0	0.1	0.0	0.0
Jul	0.27	0.26	0.85	1.2	0.6	0.3	0.2	0.0
Aug	0.20	0.37	0.64	1.2	0.3	0.3	0.2	0.0
Sep	0.52	0.12	2.37	1.3	0.8	0.4	0.3	0.1
Oct	0.20	0.09	0.40	2.1	0.5	0.3	0.0	0.0
Nov	0.32	0.07	0.89	1.4	0.7	0.4	0.1	0.0
Dec	0.24	0.05	0.63	2.3	0.5	0.3	0.1	0.0
Total	3.74	0.37	2.37	22.4	8.5	4.9	1.9	0.3

Source: Community Environmental Monitoring Program 2009

Station: Amargosa Valley, Nevada
Latitude: 36° 34' 09" N
Longitude: 116° 27' 32" W
Elevation: 2424 ft.
Element: Mean Wind Speed



Start Date: Jan. 1, 2000
End Date: Dec. 31, 2009
of Days: 3653 of 3653
Obs: Poss: 522493 of 526032

Sub-interval Windows

Start	End
Jan. 1	Dec. 31
Hour: 00	23

Figure 3-1 Wind Patterns in the Vicinity of the Proposed Project

Table 3-4 summarizes wind speed data for the period from October 1999 through December 2008.

Month	Average	Max Daily Average	Average Daily Peak Gust	Peak Gust	Average Number of Days Peak Gust		
					≥ 30	≥ 40	≥ 50
Jan	4.4	18.8	17.5	43	3.1	0.1	0.0
Feb	5.1	16.6	19.5	42	3.3	0.6	0.0
Mar	5.4	18.1	20.8	42	3.6	0.3	0.0
Apr	7.2	20.4	25.1	58	9.1	1.0	0.1
May	6.5	19.1	23.8	52	5.4	0.7	0.1
Jun	6.9	22.3	24.3	50	5.8	0.8	0.1
Jul	7.1	14.8	25.7	46	7.9	0.3	0.0
Aug	6.8	15.4	24.2	38	5.7	0.0	0.0
Sep	5.6	19.2	21.9	47	4.6	0.4	0.0
Oct	4.8	17.9	18.6	42	2.5	0.2	0.0
Nov	4.0	19.7	16.6	45	1.3	0.2	0.0
Dec	4.0	16.9	16.5	42	2.5	0.2	0.0

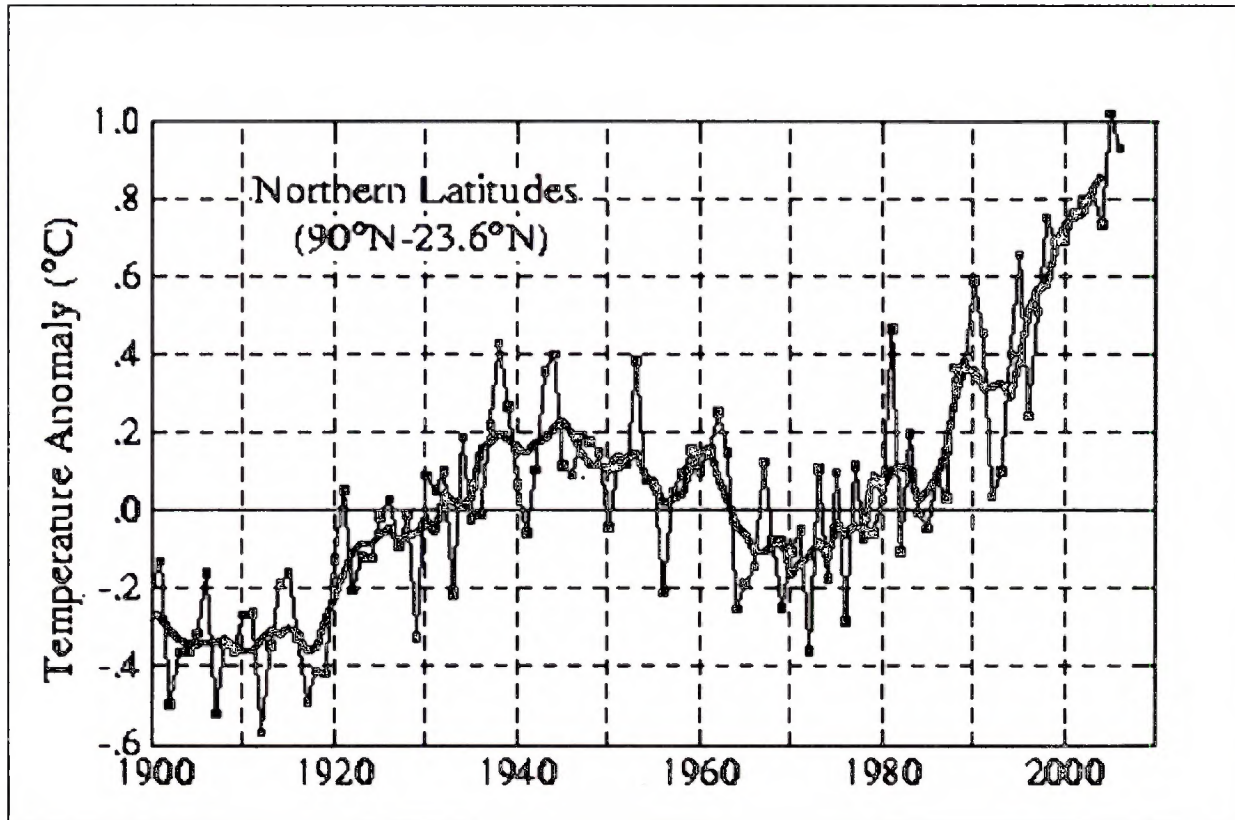
Source: Community Environmental Monitoring Program 2009

3.1.4 Climate Change

Ongoing scientific research into global climate change correlates increasing atmospheric concentrations of greenhouse gases (including carbon dioxide [CO₂], methane, nitrous oxide, water vapor, and several trace compounds) with observed trends of increasing temperatures and changes in the amount and seasonal variability of precipitation. The assessment of greenhouse gas emissions and climate change is in its formative phase, and the net impact to climate cannot yet be determined with an absolute certainty. Predicting regional changes in precipitation due to climate change remains challenging, particularly because of uncertainty in regional projections of how precipitation changes (Intergovernmental Panel on Climate Change [IPCC] 2007). Currently, the BLM does not have operational tools to predict climate change impacts from potential GHG emissions.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Figure 3-2 demonstrates that northern latitudes (above 24° N) have exhibited temperature

increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change.



Source: Goddard Institute for Space Studies (2007)

Figure 3-2 Annual Mean Temperature Change for Northern Latitudes (24 - 90° N)

3.1.5 Existing Ambient Air Quality

The primary factors that determine air quality of a region are the locations of the air pollution emission sources, amounts and types of pollutants emitted, and local meteorological conditions over a period of time.

An area is considered to be in nonattainment for a pollutant if it has violated the NAAQS (generally, more than one exceedance of the NAAQS annually) for that pollutant. Areas in violation of one or more of these standards are called nonattainment areas. If an area has not been designated as nonattainment, and if there are no representative air quality data, the area is listed as unclassifiable. For regulatory purposes, the EPA considers unclassifiable areas to be in attainment. The Project area is located in an unclassifiable area.

Section 176(c)(1) of the Clean Air Act requires federal agencies to ensure that their actions conform to applicable implementation plans for the achievement and maintenance of the

NAAQS for criteria pollutants. To achieve conformity, a federal action must not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of standards in the area of concern (e.g., a state or a smaller air quality region). The EPA general conformity regulations (40 CFR 93, Subpart B) contain guidance for determination of whether a proposed federal action would cause emissions to be above certain levels in locations designated as nonattainment or maintenance areas. By definition, a *maintenance area* is a region that was previously in nonattainment, but the EPA or state has re-designated it as an attainment area, with a requirement to develop a maintenance plan.

The Prevention of Significant Deterioration (PSD) program of the Clean Air Act controls air quality in attainment areas; its goal is to prevent significant deterioration of existing air quality. This program is applicable only to point sources and does not apply to transportation sources. Under the PSD provisions, Congress established a land classification scheme for areas of the country with air quality better than the NAAQS. Under this scheme, Class I allows very little deterioration of air quality, Class II allows moderate deterioration, and Class III allows more deterioration; but within each classification, the pollution concentrations must not violate any NAAQS.

On August 7, 1977, Congress designated 158 areas in existence as Class I, including national parks larger than 6,000 acres and wilderness areas larger than 5,000 acres. Class II areas are essentially all areas that are not designated Class I by Congress. Class II areas could include rural and urban areas, lands managed by cities or state agencies, and land managed by the federal government that have not been designated as Class I. Death Valley National Park is a Class II designation area. The nearest boundary of Death Valley National Park is approximately 4 miles southwest of the Project area.

Due to the remoteness of the Project area, there are limited air quality data specific to Amargosa Valley. However, air quality data are available for the Yucca Mountain area north of the Project site, and for the Pahrump Regional Planning District approximately 30 miles southeast of the Project site. The dominant air pollutant in the regional area is PM. Although construction and excavation activities tend to aggravate dust production in the area; however, natural sources of particulate matter, especially dust accumulating in dry playas, tend to be the dominant source.

While the air quality in most of Nye County is unclassifiable, a portion of the Pahrump Valley is in nonattainment for PM₁₀. Nye County and Pahrump, in cooperation with NDEP, successfully negotiated with the EPA to enter into a Memorandum of Understanding to address the nonattainment classification in Pahrump Valley. The Memorandum requires the parties to prepare a Clean Air Action Plan for the nonattainment portion where rapid growth and development have affected air quality with increased fugitive dust levels for Pahrump Valley. As required by the Memorandum, Nye County has enacted an ordinance to regulate construction and other ground-disturbing activities, and has implemented a mandatory program of Best Practicable Methods for use on all ground disturbances of 0.5 acre or greater (NDEP 2009). This Memorandum of Understanding refers to Pahrump Valley only it does not include Amargosa Valley where the proposed Project site is located.

3.1.6 Existing Emission Sources

There are three primary emission sectors in Nevada: (1) electrical generation; (2) transportation; and (3) residential, commercial, and industrial fuel use. The smaller emission sectors are industrial processes, agriculture, waste management, fossil fuel industry, and forestry. The NDEP – BAPC has jurisdiction over air quality programs in all counties in the state, with the exception of Clark and Washoe counties. The BAPC has jurisdiction only over fossil-fuel-fired units that generate steam for electrical production in these counties.

NRS 445B.380 requires that a statewide greenhouse gas emissions inventory be prepared and issued by the NDEP, at least every four years beginning in 2008. The emissions inventory must include the origins, types and amounts of greenhouse gases released throughout the State, as well as all supporting analyses and documentation.

On October 30, 2009, the EPA promulgated Title 40 part 98 – Final Mandatory Reporting of Greenhouse Gases Rule (Federal Register: Volume 74, Number 209; Page 56259-56519). In general, the rule covers sources emitting any of the major greenhouse gases (CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers) in an amount equal to or greater than 25,000 metric tons of greenhouse gas emissions or its equivalent per year. This rule requires that facilities classified as general stationary fuel combustion sources, including electricity generating services (North American Industry Classification System [NAICS] Code 221) report emissions if annual rates equal or exceed 25,000 ton of greenhouse gas. However, the rule does not set specific reporting requirements for electric power generation from solar resources (NAICS code 221110).

The BAPC issues four types of operating permits – Class I, Class II, Class III, and Surface Area Disturbance (SAD). Class I sources are sources that have a potential to emit more than 100 tons of PM₁₀, SO₂, NO_x, CO, or VOCs; Class II sources are sources that have the potential to emit less than 100 tons of PM₁₀, SO₂, NO_x, CO, or VOCs. Class III sources are sources that cannot emit more than 5 tons/year of combined PM₁₀, SO₂, NO_x, and VOCs and may not be subject to federal standards (40 CFR 60, 61, 63), excluding 40 CFR 60 Subpart IIII and JJJJ (Phillip, personal communication, 2009).

SAD sources are Class II sources that only have a surface-area disturbance associated with the site/facility. Surface-area disturbance permits are required if the Project will disturb 5 or more acres of land (Phillip, personal communication, 2009).

There are no PSD sources or Class I sources in the ROI (Amargosa Desert Hydrographic Basin #230). There are several Class II and III sources in Basin 230. These are listed in Table 3-5.

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Table 3-5 Class II and Class III Sources in the Amargosa Valley

Facility ID	Permit ID	Class	Company Name	Facility Name
A0519	AP32712457	II	Cind-R-Lite Cinder Cone Mine	Class II – Cinder Cone Mine
A0447	AP14592231	II	Mud Camp Mining Company, LLC	Class II – dba Industrial Mineral Ventures (IMV) Nevada
A0786	AP48122278	II	Alltel Communications, Inc.	Class II – Mt. Schader Cell Site
A0966	AP10412492	II	CR Reward Corporation	Class II – Reward Mine
A0448	AP14592455	II	R.T. Vanderbilt Co., Inc.	Class II – Vanderbilt Minerals
A0467	AP14990924.02	II	Ash Meadows, LLC	Class II – Ash Meadows Project
A0557	AP49530184.02	II	U.S. Ecology Nevada, Inc	Class II – Hazardous Waste Stabilization Unit
A0106	AP14421368	III	Have Welder Will Travel	Class III
A0483	AP16112479	III	Funeral Mountain Ranch	Class III
A1025	AP48122565	III	Alltel Communications, LLC	Class III – Amargosa Valley Cell Site
A0936	AP16292454	II	Death Valley Raceway	SAD – Death Valley Raceway
A0641	AP16292090	II	Tri-state Contracting	SAD – E Street Apartments, LLC
A0771	AP14592261	II	Mud Camp Mining Co., LLC – IMV Nevada	SAD – Ewing Bentonite Mining Area
A0191	AP10412304	II	Barrick Bullfrog, Inc.	SAD – Final Closure of Tailings Pond 3/4
A0229	AP14421142.01	II	Nye County Road Department	SAD – Free Use Gravel Pit
A0801	AP16292295	II	TSS Investments, LLC	SAD – Kozal Subdivision
A0449	AP16292435	II	Galtar, LLC	SAD – Lathrop Mill
A1005	AP14422540	II	Frehner Construction Company	SAD – Mercury Highway Project
A0772	AP14592262	II	Mud Camp Mining Co., LLC – dba IMV Nevada	SAD – Moretti Mining Area
A0773	AP10412263	II	Sterling Gold Mining Corporation	SAD – Sterling Mine
A0674	AP16292123	II	Clay Management Trust	SAD – T&T Parcels Project
A0770	AP14592260	II	Mud Camp Mining Co., LLC – dba IMV Nevada	SAD – West Dry Lake Mining Area
A0816	AP16292311	II	William Hernstadt	SAD – Zoc Village Estates

Source: Phillip, personal communication, 2009

3.2 GEOLOGICAL HAZARDS AND MINERAL RESOURCES

This section presents an overview of the regional and local geology, geological hazards, and mineral resources that occur within the Project area and ROI. The main purpose of this analysis is to identify geological hazards that could result in potential risks to Project construction or operation, and any locatable, leasable, and salable mineral deposits that may be impacted by the Project. Geological hazards include active faulting, seismicity, and ground subsidence. The Project area is located in the Amargosa Valley, Nye County, Nevada, within the Leeland, and South of Amargosa Valley, U.S. Geological Survey (USGS) 7.5-minute quadrangle topographic maps.

3.2.1 Regulatory Framework

3.2.1.1 Federal

NEPA and FLPMA serve as the primary federal legislation requiring assessment and mitigation of potential impacts to geological resources on federally administered land. The General Mining Law of 1872, Mineral Leasing Act of 1920, and Mineral Materials Act of 1947 specifically govern the discovery, disposition, and extraction of mineral resources throughout the western United States.

The General Mining Law of 1872 (30 USC §§ 22, 28, 28b) was the first formal, large-scale demarcation of mining claim law in the United States. In general, the law allows United States citizens to locate lode or placer mining claims on federal land that has been opened to mineral entry. Lode claims are located within rock formations or veins of ore, whereas placer deposits are deposits of minerals that have been washed by water into alluvial deposits. The Mineral Leasing Act of 1920 (30 USC §§ 181-187, 187a-b, 188-195, among others.) separated the governance of coal, petroleum, natural gas, and other hydrocarbons away from the jurisdiction of the General Mining Law, and provided regulation and guidance for their leasing on public lands. The Mineral Materials Act of 1947 (30 USC §§ 601-604) regulates the sale and disposal of mineral material resources from public land, including common varieties of sand, gravel, stone, pumice, pumicite, cinders, clay, other minerals, and petrified wood. Many of the mineral resources governed by this law are most often used for construction or industrial purposes.

The majority of the Project area is located on BLM-administered land. As such, an approved right-of-way is required for the Project and all of the previously listed federal laws regarding geological resources must be adhered to throughout the construction and operation of the proposed Project.

3.2.1.2 State

The establishment of claims on locatable mineral resources, such as lode and placer mines, is governed by the NRS §§ 517.003-517.460. Leasable mineral resources such as oil and gas deposits on state land in Nevada are governed by NRS §§ 522.010-522.190.

3.2.1.3 Local

No local regulations governing geological resources are known to apply to the construction and operation of the proposed Project.

3.2.2 Data Collection Methods

The geological inventory for the proposed Project presents an overview of the regional geology and the specific geological features that occur within the Project area and ROI. The Project area refers to the area that encompasses the proposed right-of-way and associated components. The ROI includes the Project area, as well as the Amargosa Valley Planning Area. Information for the inventory was obtained from the scientific literature (publications and maps) and discussions with agency specialists at the USGS, BLM, and Nevada Bureau of Mines and Geology (NBMG).

Locality information pertaining to geological formations, local seismicity, recent earthquakes, and known areas of Quaternary faulting was compiled into a geographic information system (GIS). The geological formations within the Project area were identified from a geological map of the Nevada Test Site region (Slate et al. 1999). Landslide and fault data were compiled from the USGS Atlas (USGS 2009). Earthquake data between 1973 and the present were acquired from the National Earthquake Information Center (USGS 2009). Seismicity data were obtained from the Geological Hazards Team at the USGS Earthquake Hazard Program (Peterson et al. 2008; USGS 2009).

The mineral resource inventory presents an overview of the locatable, leasable, and salable resources present in the Project area and ROI. Locatable resources are typically metallic mineral deposits such as copper and gold. Leasable resources include energy resources such as petroleum, natural gas, and coal. Salable resources include sand and gravel. Information for the inventory was obtained primarily from the Geocommunicator online database that is operated by the BLM and U.S. Forest Service (USFS [2009]). Additional information was obtained from publications and maps of the USGS, BLM, and NBMG. Mineral resource data were compiled into the GIS.

3.2.3 Regional Geological Setting

The Project area is located within the Amargosa Valley in southern Nevada, which is located in the southwestern part of the Basin and Range physiographic province (Fenneman 1931). The Basin and Range physiographic province is characterized by north-south trending mountain ranges that are separated by alluvium-filled, nearly flat to gently sloping valleys. The mountain ranges consist mostly of Paleozoic quartzite, limestone, dolomite, sandstone, siltstone, shale, and chert. Also present in the mountain ranges are Mesozoic limestone, siltstone, conglomerate, granodiorite, and monzonite. The valleys contain Cenozoic, tuffaceous, sedimentary rocks, as well as alluvial, fluvial, playa, lacustrine, and spring deposits (Stewart 1980). The Basin and Range Province formed through regional, crustal extension of the western part of the North American continental plate, with fault blocks sliding downward, forming basins that are separated by ranges (Eaton 1982).

The southeastern portion of Amargosa Valley is bounded by the Amargosa and Funeral Mountain ranges to the southwest; the Ash Meadows area, Specter Range, and Little Skull Mountain to the east; and Yucca Mountain and the Calico Hills to the north. The Amargosa River flows mostly north to south and is underground through the western side of Amargosa Valley. Fortymile Wash is a tributary of the Amargosa River that originates on the Nevada Test Site to the north of the Project area as Fortymile Canyon, before flowing toward the south and becoming Fortymile Wash (Stonstrom et al. 2003). Fortymile Canyon lies between Yucca Mountain and the Calico Hills. Fortymile Wash flows in a southwesterly direction through the Project area before joining the Amargosa River. Fortymile Canyon and Fortymile Wash drain highland areas that are mostly comprised of igneous rocks of Tertiary age. For instance, Yucca Mountain is largely composed of Tiva Canyon Tuff that erupted from the Claim Canyon caldera; whereas, the Calico Hills are composed of the Calico Hills Rhyolite (Slate et al. 1999). Elevation near the Project area is from 2,600 feet above sea level at the floor of Amargosa Valley to over 6,500 feet above sea level at Yucca Mountain.

3.2.4 Geological Units in the Project Area

The Project area contains mostly alluvial-fan deposits, which are the most common geological units within the Amargosa Valley (Figure 3-3). Two Quaternary alluvial deposits and one Quaternary-Tertiary spring deposit are mapped within the Project area (Slate et al. 1999). These mapped geological units are named, respectively: (1) Young alluvial deposits (Qay); (2) intermediate alluvial deposits (Qai); and (3) Quaternary-Tertiary marl deposits (QTm). The alluvial units share a likely source in the mountains and hills to the north of US 95. The Quaternary-Tertiary marl deposits were emplaced by ancient springs and seeps that were present in the Amargosa Valley.

The hydrogeologic units described by Sweetkind et al. (2004) can be correlated with these geological units. Younger and Older Alluvial Aquifers described by Sweetland et al. (2004) are correlated with the Young alluvial deposits and intermediate alluvial deposits, respectively; and the Limestone Aquifer is correlated with the marl deposits. The hydrogeologic units described by Winograd and Thordarson (1975) are not correlated with these geological units. The Valley-fill aquifer that they described is present, on average, between 650 and 960 feet deep. The Lower Carbonate aquifer as described by Winograd and Thordarson (1975) is present, on average, between 1,370 and 1,800 feet deep. Devils Hole in the Ash Meadows area is a water-filled cave system in the Paleozoic carbonates of the Bonanza King Formation. This suggests that the surface water in the Ash Meadows area is linked to the Lower Carbonate Aquifer as described by Winograd and Thordarson (1975).

3.2.4.1 Young Alluvial Deposits

Quaternary to recent alluvium is mapped as a long, southwestern-oriented lobe overlying another broader and older alluvial fan composed of older Quaternary alluvial material (see Figure 3-3). Young alluvial deposits comprises poorly sorted silt, sand, gravel, and cobbles, with a typical total thickness of less than 2 meters (Slate et al. 1999).

Amargosa Farm Road Solar Energy Project (NVN-84359)

Geologic Resources Figure 3-3

LEGEND

 Project Area

Geology

-  Intermediate Alluvial Deposit (Qai)
-  Marl Deposit (QTm)
-  Young Alluvial Deposit (Qay)
-  Young Eolian Sand Deposit (Qey)
-  Pre-Basin-Range Sedimentary Rock (Tgp)
-  Geologic Structure
-  Fault


General Reference Features

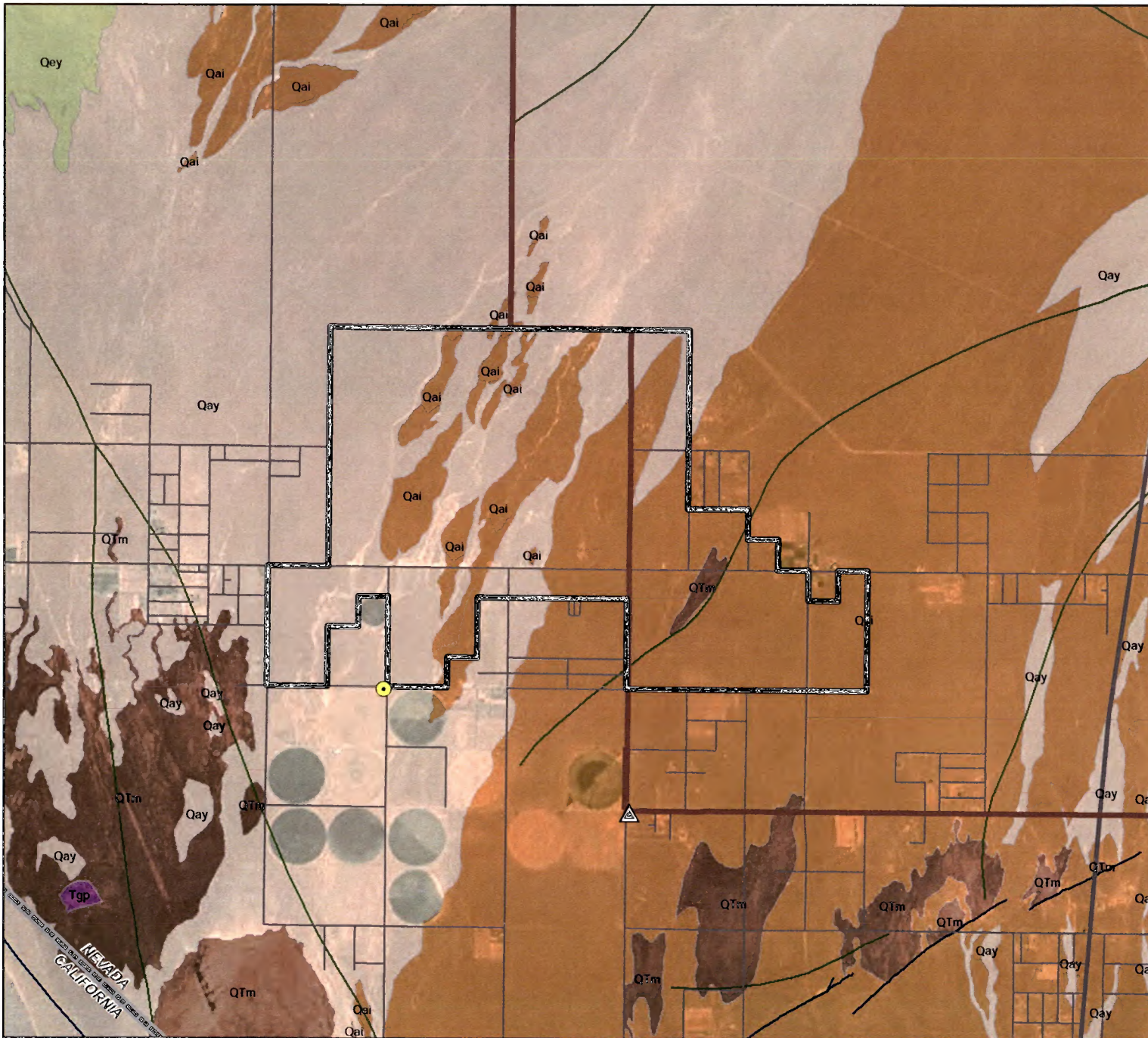
-  Existing Transmission Line (<230kV)
-  Highway
-  Existing Substation
-  Local Road
-  Proposed Project Well
-  State Boundary



Source: Geology - USGS, 1999;
 Transmission Lines, Substations - Platts, 2009;
 Wells - Nevada State Engineer, 2008;
 Roads - TerraSpectra Geomatics 2009;
 Imagery - ESRI, 2009

September 2010

0 0.75 1.5
 Miles



These deposits are Holocene to Recent in age (10,000 years old to present) and exhibit little to no development of desert pavement. Surface clasts are unvarnished. Young alluvial deposits are present in the western half of the Project area.

3.2.4.2 Intermediate Alluvial Deposits

Intermediate alluvial deposits are mapped alongside the Young alluvial deposits as the principal component of a large alluvial fan that covers most of the eastern end of Amargosa Valley (Slate et al. 1999). Intermediate alluvial deposits consist of silt, sand, gravel, and cobbles. Surface clasts are old enough (Holocene to late Pleistocene in age) to have acquired some desert varnish.

3.2.4.3 Quaternary-Tertiary Marl Deposits

Marl deposits of Quaternary-Tertiary age are the only non-alluvial geological units mapped within the Project area (see Figure 3-3). These spring deposits consist of massive to well-bedded mudstone and marlstone that commonly contain fossil root casts of plants (Slate et al. 1999).

3.2.5 Unique Geological Resources

Unique geological resources that may have recreational interest to the general public include dunes, natural bridges, caves, waterfalls, and rock or mineral collecting areas. Based on a search of recreation-related websites (e.g., Nevada Division of State Parks), there are no known recreational or unique geological resources associated with the Project area.

The nearest geological resource of recreational interest is the Big Dune complex located in Amargosa Valley, approximately 4 miles northwest of the Project area. The Big Dune complex is protected as a BLM-designated ACEC. The dune is composed of Quaternary eolian dune sand derived from Precambrian source rocks, likely the Funeral Mountains southwest of the dune field (Castor et al. 2006; Slate et al. 1999). The Big Dune exhibits the characteristic multi-lobed morphology of a large, pyramidal star dune. Star dunes are frequently stable, only shifting within a localized area, often remaining fixed in place for centuries (Bates and Jackson 1987).

3.2.6 Geological Hazards

Geological hazards include earthquakes, faults, seismicity, and ground subsidence. Earthquake data have been compiled by the USGS National Earthquake Information Center since 1973 (USGS 2009). The USGS maintains archives of all earthquakes of detectable magnitude and have made this earthquake catalog available to the public. No earthquakes have been recorded within the Project area, although nine earthquakes have been recorded within 10 miles of the Project area, ranging from 2.9 to 4.1 magnitudes on the Richter scale (Figure 3-4). The most recent earthquake occurred in 2004, in the Funeral Mountains southwest of the Project area.

Faults have been mapped in the eastern portion of the Project area, as well as outside the Project area to the west (Figure 3-4). These faults were inferred from gravity anomalies in the Amargosa

Valley. Quaternary to Recent faults have also been mapped southeast of the Project area, and are the likely source of spring deposits and Quaternary marls, as the faults provide a path for groundwater to reach the surface (dePolo 2008; Slate et al. 1999).

Seismicity is a measure of the susceptibility of an area to damaging earthquakes and is measured in terms of acceleration due to gravity (Peterson et al. 2008). Seismicity data and maps are available from the Geological Hazards Team, a unit of the USGS Earthquake Hazard Program (USGS 2009). The region around the Project area is mapped as having 10 to 15 percent gravity (Figure 3-4). According to the USGS, 10 percent gravity is the lower threshold at which damage to structures is likely to occur, dependent upon measures taken in design and construction to mitigate structural damage as a result of ground shaking.

Ground subsidence is the relative downward motion of the local land surface that is often the result of subsurface mining, drawdown of groundwater for irrigation, or settling of soils resulting from local usage of high explosives for mining or construction. Within the Project area, groundwater drawdown is the most likely cause for ground subsidence. A minor amount of subsidence has been mapped using satellite interferometry within Amargosa Valley, which is attributed to groundwater usage (Katzenstein and Bell 2005).

3.2.7 Mineral Resources

An inventory of mineral resources was conducted in and around the Project area to determine if known mineral resources are present, or if there is a possibility of discovering mineral resources in the future. The inventory included locatable, leasable, and salable mineral resources and was conducted using information from the USGS, BLM, and NBMG.

Active mining claims and mineral-materials areas are mapped by the Geocommunicator online mapping system maintained by the BLM and USFS. There are four active mineral-resource-extraction areas in Amargosa Valley within 5 miles of the Project area (see Figure 3-4). The first area has active mining claims staked by Mud Camp Mining, LLC, which are present to the southeast of the Project area in sections 20, 21, and 29 of T16S R50E. The Mud Camp Mining claims provide specialty clays (sepiolite and saponite) to a processing facility operated by IMV Nevada, located in section 29 of T17S R49E to the south of the Project area. The second area, in section 10 of T15S R49E, is a sand and gravel site used by Nye County under a Free Use Permit. The third area contains an active sand and gravel operation at the western end of Amargosa Farm Road, approximately 5 miles from the Project area. The fourth area has a series of public and private claims for volcanic-mineral materials, such as pumice and cinder, which are located north of the Project area at the junction points of T14S R48E, T14S R49E, T15S R48E, and T15S R49E.

This final group of claims includes the Cinder Cone Mine operated by the Cind-R-Lite Block Company, located in section 36 of T14S R48E. None of these four active mineral-resource-extraction areas is located in the Project area. Potential mineral resources located within the Project area are described in the following section.

Amargosa Farm Road Solar Energy Project (NVN-84359)

Geologic Hazards and Mineral Resources Figure 3-4

LEGEND

Project Area

Geologic Hazards

Peak Horizontal Acceleration (%g)
(g = acceleration due to gravity)

10-15

15-20

Earthquakes (magnitude, year)

Mining Claims

Active Mining Claim / Processing Facility

Closed Placer Claim

General Reference Features

Existing Transmission Line (<230kV)

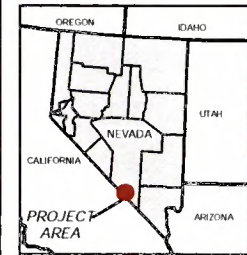
Existing Substation

Proposed Project Well

Highway

Local Road

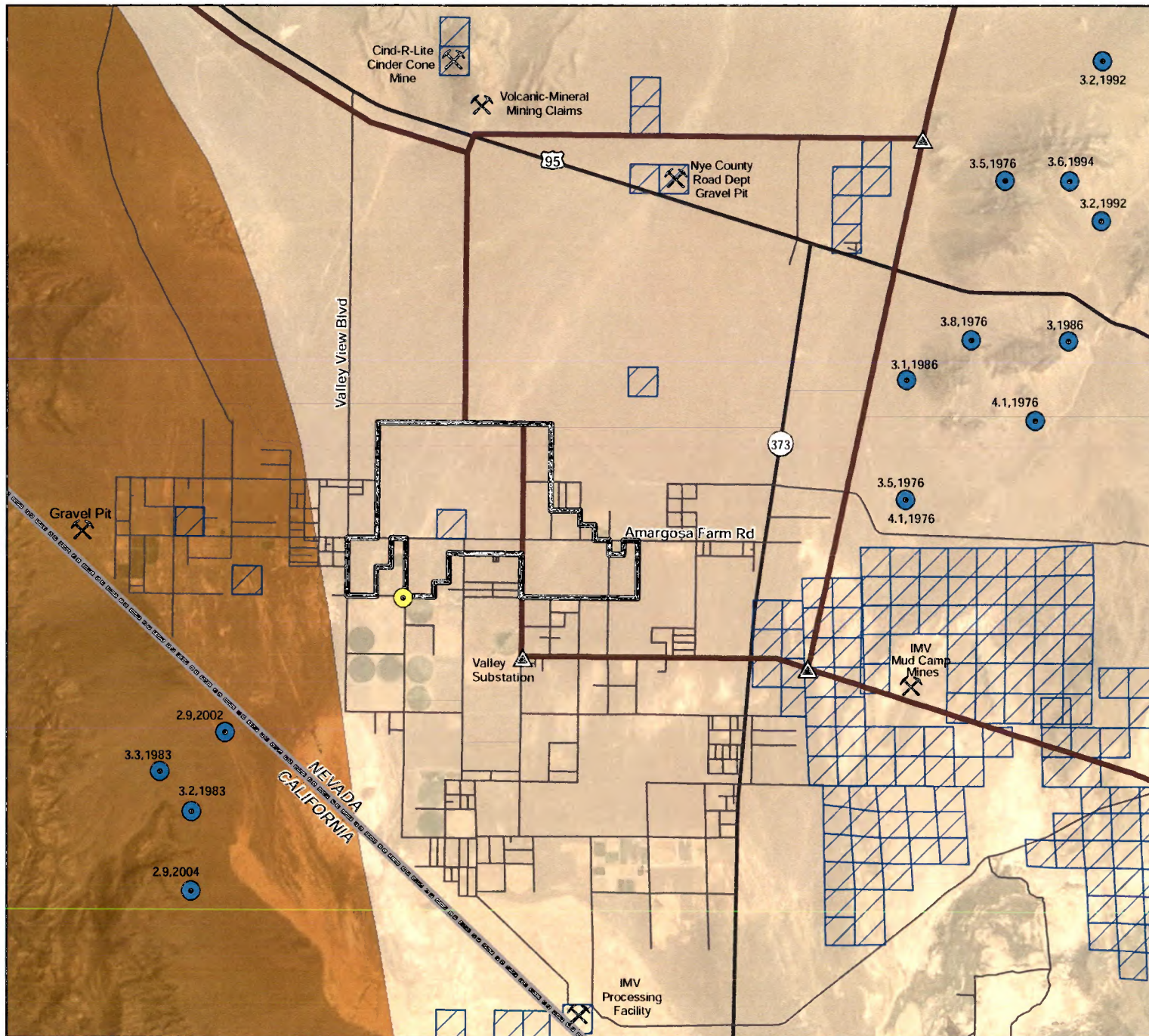
State Boundary



Source: Earthquakes, Seismicity - USGS, 2009;
Mining Claims - BLM, 2009; Imagery - ESRI, 2009;
Transmission Lines, Substations - Platts, 2009;
Roads - TerraSpectra Geomatics 2009;
Wells - Nevada State Engineer, 2008

September 2010

0 1 2
 Miles



3.2.7.1 Locatable Mineral Resources

There are no active claims in the Project area (BLM and USFS 2009).

3.2.7.2 Leasable Mineral Resources

No leases for leasable mineral resources (oil, gas, and coal resources) are recorded within the Project area (Garside and Hess 2007; Hess et al. 2004; BLM and USFS 2009).

3.2.7.3 Salable Mineral Resources

No mineral-material contracts for salable mineral resources (sand, gravel, topsoil, and clay) are recorded within the Project area (BLM and USFS 2009).

3.3 SOILS

3.3.1 Data Collection Methods

The soil inventory presents an overview of soil types and characteristics, including areas of potential wind and/or water erosion in the Project area. Information for the inventory was obtained primarily from publications, unpublished reports, data of the Soil Conservation Service and the BLM, and from discussions with specialists. The soils inventory was compiled from data maintained online as part of the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey, namely the USDA soil survey report that includes the Project area and ROI.

3.3.2 Soils in the Project Area

Four soil map units (three associations and one series) have been mapped within the Project area (Figure 3-5): (1) the Yermo, hot-Yermo-Arizo association; (2) Lewdlac-Yermo association; (3) Sanwell-Sanwell, warm-Yermo association; and (4) Shamock series (Borup 2004).

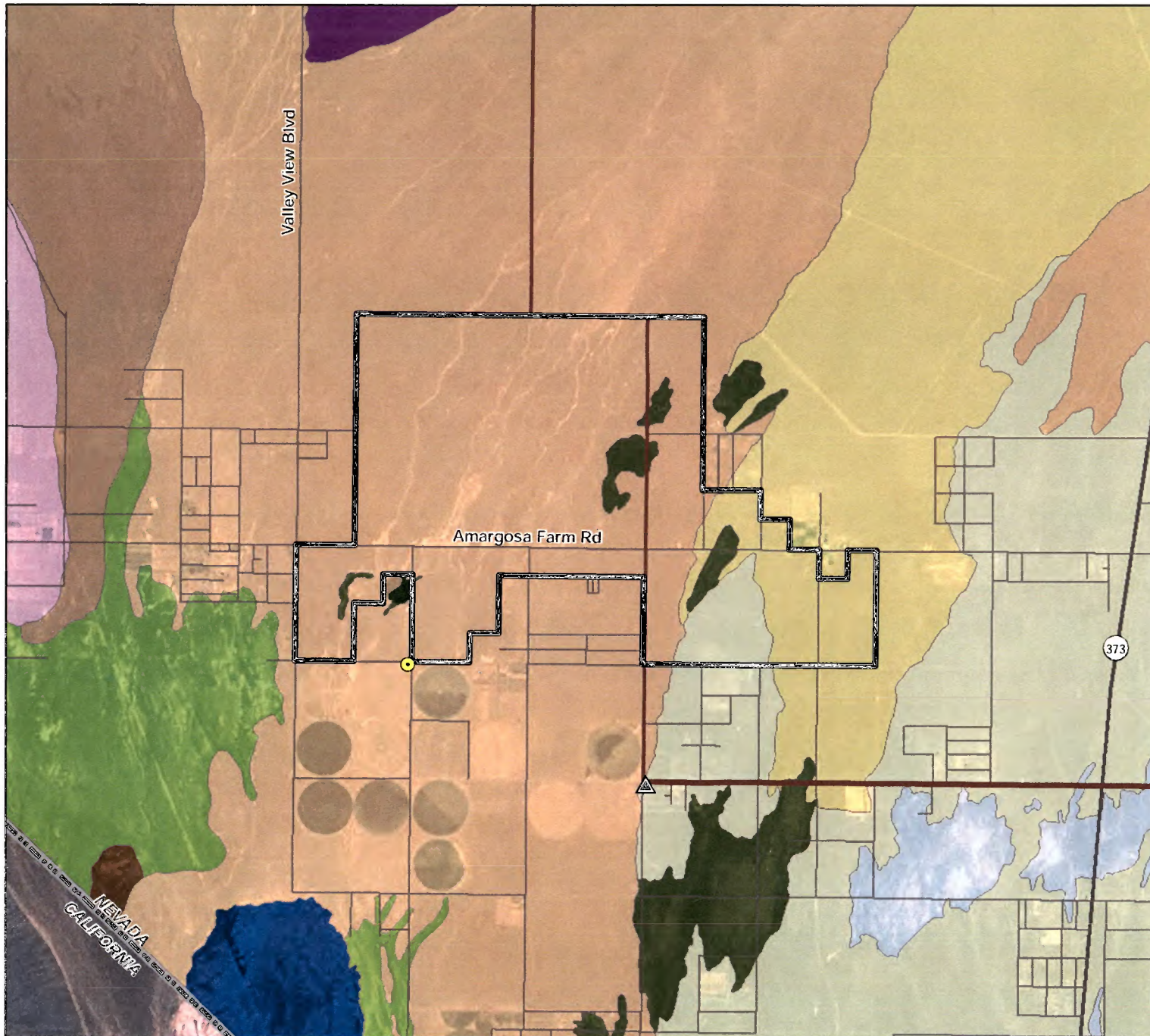
A soil association is a map unit used in soil surveys to represent areas that contain two or more distinct soil series in such a pattern that it is easy to illustrate them as a single map unit for mapping purposes. A soils series is an individual map unit, much like a geological formation that represents an area that has unique characteristics. The four soil map units mapped within the Project area are listed in Table 3-6.

3.3.2.1 Yermo, hot-Yermo-Arizo Association

The Yermo, hot-Yermo-Arizo association mostly comprises 40 percent hot-Yermo soil, 30 percent Yermo soil, and 15 percent Arizo soil on slopes of 2 to 4 percent. This soil association is the most common, covering more than two-thirds of the Project area.

Table 3-6 Soil Map Units and Properties within Project Area

Table 3-6 Soil Map Units and Properties within Project Area					
Map Unit		Yermo, hot-Yermo-Arizo association	Shamock series	Sanwell-Sanwell, warm-Yermo association	Lewdlac-Yermo association
Texture		Skeletal, mixed, thermic, Typic Torriorthents	Coarse-loamy, mixed, thermic, Typic Haplodurids	Skeletal, mixed, thermic Duric Torriorthents	Loamy, mixed, thermic, Cambidic Haplodurids
Permeability		Moderately rapid to very rapid	Moderate	Moderate to moderately rapid	Moderately rapid
pH		8.5	8.5	8.2	8.2
Water Capacity		Low	Low	Low	Very low
Hydrologic Group		B	C	B	D
Water Erosion	Kw	0.1	0.2	0.2	0.2
	Kf	0.2	0.3	0.4	0.3
	T	5	2	5	2
Wind Erosion	WEG	5	4	4	3
	WEI	56	86	86	86
Landscape Position (percentage slope)		2 to 4	2 to 4	0 to 4	2 to 4
Depth to Bedrock/ Restrictive Feature (inches)		>80	25 to 40 to duripan	>80	10 to 20 to duripan
Land Capability (Irrigated, Nonirrigated)		4	4	-	7
Topsoil Reclamation		Poor	Poor	Poor	Fair
<p>Key:</p> <p>Kw = susceptibility of the whole soil to sheet and rill water erosion</p> <p>Kf = susceptibility of only the soil's fine portion (<2 millimeters in diameter) to these same forms of water erosion (Generally, soils that are more susceptible to water erosion will exhibit greater Kw and Kf factors.)</p> <p>WEG = wind erodibility group; soils assigned lower ratings are more susceptible to erosion</p> <p>WEI = wind erodibility index</p>					



Amargosa Farm Road Solar Energy Project (NVN-84359)

Soils Figure 3-5

LEGEND

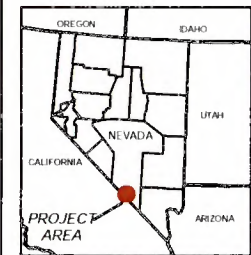
Project Area

SSURGO Soils

- Rock outcrop-Upspring-Rubble land
- Corbitt gravelly fine sandy loam, warm
- Yermo, hot-Yermo-Arizo association
- Vace gravelly sandy loam
- Shamock gravelly fine sandy loam
- Arizo-Bluepoint-Dune land complex
- Arizo very gravelly sandy loam, moist
- Arizo-Corbitt-Commski association
- Sanwell-Sanwell, warm-Yermo association
- Nowoy-Skelon association
- Lewdlac-Yermo association

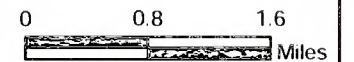
General Reference Features

- Existing Transmission Line (<230kV)
- Highway
- Existing Substation
- Local Road
- Proposed Project Well
- State Boundary



Source: Soils - NRCS, 2006; Imagery - ESRI, 2009;
Transmission Lines, Substations - Platts, 2009;
Wells - Nevada State Engineer, 2008;
Roads - TerraSpectra Geomatics 2009

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The Yermo, hot-Yermo-Arizo association has a low water capacity, with moderately rapid to very rapid permeability, and is assigned to hydrologic group B, which corresponds to a moderate water-infiltration route in soils with fine to moderately coarse texture. The soil association has a measured pH of 8.5. Bedrock is not encountered at 80 inches of depth and is likely much deeper. This map unit has been rated as a poor candidate to provide suitable topsoil for reclamation efforts (Borup 2004).

The soils of the Yermo series are typically deep and well drained, occurring on alluvial fans with alluvium derived from mixed rocks. Typically, Yermo series soils are characterized as loamy-skeletal, mixed, superactive, calcareous, thermic, Typic Torriorthents (Borup 2004). The taxonomic classification, Typic Torriorthents, is given to those soil units that exemplify the torriorthents, a soil order that is defined by little to no development of any true soil horizons and that are formed in warm, arid environments (USDA – NRCS 1993). This soil order and its variations are some of the most common soils throughout the Southwest (Birkeland 1999). Within this soil association, the Yermo series is divided into two separate soil units, the Yermo and the hot-Yermo. This division reflects varying average temperatures recorded within the Yermo series, possibly due to greater gravel content or slope facing.

The soils of the Arizo series are typically deep and excessively drained, occurring on inset fans with slopes between 0 and 15 percent. Arizo series soils form in alluvium that is derived from mixed rocks (e.g., igneous, carbonate). Taxonomically, Arizo series soils are characterized as sandy-skeletal, mixed, thermic, Typic Torriorthents (Borup 2004).

3.3.2.2 Lewdlac-Yermo Association

The Lewdlac-Yermo association is intermittently present in the Project area, specifically in the southwestern, southeastern, and northeastern corners of the Project area. The Lewdlac-Yermo association consists of 70 percent Lewdlac series soils and 15 percent Yermo series soils on slopes of 2 to 4 percent. The Lewdlac-Yermo association exhibits very low water capacity with moderately rapid permeability and is assigned to hydrologic group D, which corresponds to a very slow water-infiltration rate. This is likely because of a duripan layer between 10 and 20 inches below the surface that impedes the transmission of water. This soil association has a measured pH of 8.2. Bedrock is not encountered at 80 inches and is likely much deeper. The Lewdlac-Yermo association has been given a fair rating regarding its suitability to provide topsoil for reclamation efforts (Borup 2004).

The soils of the Lewdlac series are typically shallow, over a strongly cemented duripan. These well-drained soils occur on alluvial flats with slopes ranging from 2 to 8 percent. Lewdlac series soils form in alluvium mostly derived from quartzite over reworked lacustrine sediments. Typically, Lewdlac series soils are characterized as loamy, mixed, superactive, thermic, shallow, Cambidic Haplodurids. The soil taxonomic classification, Cambidic Haplodurids, includes aridisols that contain a duripan within the upper 40 inches of the soil unit that is strongly cemented (Borup 2004).

Yermo series soils mapped within this soil association exhibit the same characteristics as those mapped as part of the Yermo, hot-Yermo-Arizo association.

3.3.2.3 Sanwell-Sanwell, warm-Yermo Association

The Sanwell-Sanwell, warm-Yermo association is restricted to the southeastern portion of the Project area. It consists of 65 percent Sanwell series soils and 20 percent Yermo series soils on slopes of 0 to 4 percent. This soil association exhibits low water capacity with moderately rapid permeability and is assigned to hydrologic group B, which corresponds to a moderate water-infiltration route in soils with fine to moderately coarse texture. The Sanwell-Sanwell, warm-Yermo association has a measured pH of 8.2. This soil association has been assigned a poor rating regarding its suitability for use as topsoil for reclamation efforts (Borup 2004).

The soils of the Sanwell series are typically very deep and well drained, occurring on alluvial flats with slopes ranging from 0 to 8 percent. Sanwell series soils form in coarse lacustrine sediments. This lacustrine source is likely associated with the marl deposits that are mapped just upslope from the location of this soil unit. Typically, Sanwell series soils are characterized as loamy-skeletal, mixed, superactive, calcareous, thermic, Duric Torriorthents. The taxonomic soil classification, Duric Torriorthents, applies to soil units formed in hot and arid environments that do not exhibit well-developed soil horizons, but may include a notably harder and competent soil horizon within 40 inches of the soil surface (Borup 2004).

Yermo series soils mapped within this soil association exhibit the same characteristics as Yermo soils mapped as part of the Yermo, hot-Yermo-Arizo association.

3.3.2.4 Shamock Series

The Shamock series is restricted to the easternmost portion of the Project area and has the second greatest areal extent within the Project area. It is present within the Project area on slopes of 2 to 4 percent. This soil series exhibits a low water capacity with moderate permeability. It is assigned to hydrologic group C, which corresponds to a slow rate of water infiltration in soils with moderately fine to moderately coarse texture. The Shamock series has a pH level of 8.5. A well-indurated duripan is present between 25 and 40 inches from the surface of the soil unit. This soil unit has been given a poor rating for suitability for topsoil reclamation, because of difficulty of recovery (Borup 2004).

The soils of the Shamock series are typically moderately deep over a duripan. The well-drained soils occur on alluvial flats with slopes ranging from 0 to 4 percent. Shamock series soils form in alluvium derived from mixed rocks. Typically, Shamock series soils are characterized as coarse-loamy, mixed, superactive, thermic, Typic Haplodurids. The taxonomic classification Typic Haplodurids refers to aridisols, soils formed in arid environments with well-developed soil horizons that contain a duripan within the upper 40 inches of the soil unit (Borup 2004).

3.3.3 Erosion Potential

Water erosion of soils are typically indicated in soil surveys by two factors, Kw and Kf, where Kw represents the general susceptibility of the whole soil to sheet and rill water erosion, and Kf represents the susceptibility of only the soil's fine portion (<2 millimeters diameter) to these same forms of water erosion (USDA – NRCS 1993). Generally, soils that are more susceptible to

water erosion will exhibit greater Kw and Kf factors. The Yermo, hot-Yermo-Arizo association, located in the western two-thirds of the Project area, is the least susceptible to water erosion (lower Kw and Kf factors), whereas the other soil associations that are located in the eastern one-third of the Project area are more susceptible to water erosion (higher Kw and Kf factors).

Wind erosion may have adverse impacts on soils, particularly those that lack vegetation cover (USDA – NRCS 1993). The NRCS assesses a soil series' susceptibility to wind erosion by assigning each soil series to a WEG. This includes a rating on the WEI that is measured in tons of soil lost per acre per year. These determinations are made based upon the composition and texture of a given soil. For example, soils with well-established desert pavement are far less susceptible to wind erosion than unvegetated soils that are composed of fine sand soils assigned lower ratings of the WEG scale are more susceptible to erosion than soils assigned higher ratings. WEG ratings of 3 or 4 (on a scale of 1-8) are assigned to the Lewdlae-Yermo association; Sanwell-Sanwell, warm-Yermo association; and Shamock series. The Yermo, hot-Yermo-Arizo association is less susceptible to wind erosion and is assigned to a WEG of 5 (Borup 2004). Therefore, soils in the western two-thirds of the Project area are less susceptible to wind erosion than soils in the eastern one-third of the Project area.

3.3.4 Prime and Unique Farmland

The USDA uses the designation *prime farmland* to describe soils that have the correct combination of physical and chemical characteristics that allow the soil to produce significant amounts of food, feed, fiber, or oilseed crops. These characteristics include soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when properly managed with farming methods such as an adequate and dependable water supply (USDA – NRCS 1993). No soil within the Project area has been designated as prime farmland. However, irrigated farmlands are present south of the Project area. These agricultural areas are serviced by rotary irrigation systems that create the circular patterns easily visible in aerial photographs. Without the irrigation systems, it is unlikely that Amargosa Valley could support extensive agriculture.

3.4 WATER RESOURCES

This section presents an overview of the surface and groundwater resources in the ROI which could be affected by construction, operation, and maintenance of the proposed Project. The ROI for surface water is different from the groundwater ROI based on potential effects of the proposed Project on water resources. Surface water features in the ROI are described in Section 3.4.3, followed by a discussion of groundwater resources in Section 3.4.4. Because springs are a function of groundwater expression and influence, regional springs are discussed in the groundwater resources section.

3.4.1 Regulatory Framework

3.4.1.1 Federal

Federal laws and policies establish standards for clean water, controlling development in flood plains, and protecting the environment. The CWA 33 USC §§ 1251-1387, regulates both direct and indirect discharges, including stormwater discharges from construction and industrial activities.

Activities resulting in the dredging or filling of jurisdictional waters of the United States, which can include drainages and ephemeral washes, require authorization under a Section 404 permit issued by the USACE. In addition, an applicant for a federally permitted activity that may result in a discharge to jurisdictional waters must obtain from the State a Section 401 certification that the action will not violate state or federal water quality standards. In Nevada, the 401 Certificate is issued by the NDEP BWQP.

Quality of jurisdictional waters of the U.S. is protected through Sections 301 and 402 of the CWA, which regulates discharges of pollutants and stormwater discharges through the NPDES. In Nevada, authority to implement the NPDES permit program has been delegated to the NDEP BWPC.

The Safe Drinking Water Act (SDWA) is the main federal law that ensures the quality of Americans' drinking water. The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996 and requires many actions to protect drinking water and its sources, including: rivers, lakes, reservoirs, springs, and groundwater wells. Under SDWA, the EPA sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards (EPA 2010). The SDWA does not regulate private wells that serve fewer than 25 individuals (EPA 2010). The SDWA also mandates that a Groundwater Wellhead Protection Program be developed by each state in order to protect groundwater resources that serve as sources for public drinking water.

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA), a component of the U.S. Department of Homeland Security. The NFIP enables property owners in participating communities to purchase insurance protection against losses from flooding. This flood insurance is designed to provide an alternative to federal disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

In support of the NFIP, FEMA identifies flood hazard areas throughout the United States by identifying and mapping Flood Hazard Boundary Maps, Flood Insurance Rate Maps, and Flood Boundary and Floodway Maps. Several areas of flood hazards are commonly identified on these maps. One of these areas is the Special Flood Hazard Area, which is defined as an area of land that would be inundated by a flood having a 1 percent chance of occurring in any given year (previously referred to as the base flood or 100-year flood). Development may take place within the Special Flood Hazard Area, provided that development complies with local floodplain management ordinances, which must meet the minimum Federal requirements.

Based on review of the Flood Insurance Rate Map for Nye County, Nevada, and Incorporated Areas (32023C8400E), there are no Special Flood Hazard Areas in or near the Project area.

3.4.1.2 State

The state serves in several relevant functions with regard to water regulation. First, Nevada law governing water rights is set forth in NRS Chapters 533 and 534. The NDWR, headed by the State Engineer, is responsible for the administration of these laws. Applications for new appropriations or to change water already appropriated under an existing right must be reviewed and approved by the State Engineer, prior to any water diversion. The State Engineer determines the limit and extent of water rights and establishes any appropriate conditions regarding these rights. In ruling on a water right application, the State Engineer must consider four criteria:

- 1) Is there unappropriated water available for the proposed use?
- 2) Will the proposed water use impair senior water rights?
- 3) Is the proposed water use in the public interest?
- 4) Is the proposed Project feasible, and if so is it filed for speculative purposes?

When a water rights permittee has “perfected” a water right; i.e., shown that the water has been put to beneficial use as defined by NRS 533.030 and NRS 533.035, the Nevada State Engineer's Office issues a Certificate of Appropriation. Once granted, water rights in Nevada have the standing of both real and personal property; this means that they are conveyed as an appurtenance to real property unless they are specifically excluded in the deed of conveyance. When water rights are purchased or sold as personal property or treated as a separate appurtenance in a real-estate transaction, the water rights are conveyed specifically by a deed of conveyance. It is possible to buy, sell, or lease water rights and change the water's point of diversion, manner of use, and/or place of use by filing an application with the State Engineer (NDWR 2009b).

The NDEP administers the Nevada Water Pollution Law (NRS 445A.300-730), which implements the state water quality standards and protection programs mandated by the CWA. The regulatory requirements governing these programs (Water Quality Standards Regulation) are published in 40 CFR § 131 and applicable sections of the NAC. States are responsible for reviewing, establishing, and revising water quality standards. Section 303(d) of the CWA requires states to provide a list of impaired waters only, identifying possible pollutants and prioritizing those waters for further pollution control. The Nevada Water Pollution Control Law applies the NPDES system to all water of the state, regardless of whether they are federal jurisdictional waters.

The State of Nevada Stormwater Program, administered by NDEP, requires operators of large and small construction sites to obtain an NPDES construction stormwater permit in order to discharge stormwater. The submittal of a NOI for inclusion under the State of Nevada's General Stormwater Permit and a SWPPP is required for all soil disturbing activities (including grading, trenching, and demolition), where one or more acres will be disturbed, and have a discharge of stormwater to a receiving water (e.g., wetlands, creeks, unnamed creeks, rivers, marine waters, ditches, and estuaries), and/or storm drains that discharge to a receiving water (NDEP 2009).

The NDEP administers the Wellhead Protection Program, which is developed and implemented at the local level. The NDEP offers guidance and enforces regulatory setbacks to protected groundwater and wellhead areas and tracks specific areas delineated as wellhead and source water protection areas.

The state also administers the federal SDWA, through the NDEP Bureau of Safe Drinking Water.

3.4.1.3 Local

The Nye County Water Resources Plan (Buco 2002) outlines the county plan for ensuring adequate supplies of water remain available in Nye County to maintain and enhance the quality of the environment; to improve the quality of life for residents and visitors to the County; and to expand and diversify the economy of the County. In 2007 the Nevada Legislature established the Nye County Water District pursuant to NRS Chapter 542. The Nye County Water District Board was created to oversee the qualitative and quantitative status of water resources available for use within Nye County.

3.4.2 Data Collection Methods

Since the early 1950s, extensive investigations have been conducted to characterize water resources that have been, or may be, affected by activities at the Nevada Test Site and the proposed Yucca Mountain repository. In addition, because of the presence of environmentally sensitive areas at Devils Hole, Ash Meadows, and Death Valley, extensive hydrological monitoring infrastructure has been installed and has resulted in the accumulation of over 40 years of water level monitoring and water chemistry analysis in the Death Valley Hydrographic Region.

The DOE, in cooperation with the USGS and other federal, state, and local agencies, has conducted studies to evaluate water-resources potential of the region, evaluate the impacts of groundwater pumping, estimate groundwater recharge from wash infiltration, and evaluate regional groundwater flow. Between 1951 and 1996, more than 1,700 publications and abstracts have been written about the geology, hydrogeology, and hydrology of the Nevada Test Site area (Seaber et al. 1997). Since 1996, additional studies have been conducted as new technology has emerged, and the body of knowledge has increased. Hydrologic investigations relevant to the Amargosa Desert include measurements of evapotranspiration within the Central sub-region; construction of a dataset for pumping in the Amargosa Desert (and other areas); and measurement of groundwater recharge underneath the Amargosa River and irrigated fields in the Amargosa Farms area.

The references that were selected for use in this analysis are listed in Chapter 6 – References, with full bibliographic citations. The information compiled from these sources is assumed to be factual and sufficiently accurate for use in this analysis.

Additional data sources reviewed for this EIS include USGS topographic and aerial maps, reports and studies prepared by the DOE for the proposed Yucca Mountain Geologic Repository,

as well as additional water resource reports by various organizations. Basin water rights abstracts and pumpage inventories were obtained from the USGS and NDWR and were used as the basis for the values of perennial yield, committed water resources, and estimated water use in the ROI.

3.4.3 Surface Water Resources

For water planning and management purposes, the USGS and the NDWR, Department of Conservation and Natural Resources, have divided the state into 256 discrete hydrologic basins and sub-areas, within 14 major hydrologic units called Hydrographic Regions (NDWR 2009b). Hydrographic basins and sub-areas generally consist of valleys that are separated by surface-water drainage divides (Rush 1968).

All Project components would be located within the Nevada portion of the Amargosa Desert Hydrographic Basin (#230), which is a part of the Death Valley Hydrographic Region (#14). The Amargosa Desert Hydrographic Basin covers 896 square miles (573,440 acres). Approximately 65 percent of the Amargosa Desert Hydrographic Basin is located in Nye County, with the remainder in Inyo County, California, primarily within Death Valley National Park.

3.4.3.1 Surface Water Features

The Project is situated within the Amargosa River drainage system (Figure 3-6). The Amargosa River begins in Oasis Valley, north of Beatty, and drains an area approximately 3,100 square miles by the time it reaches Tecopa, California. Its course extends approximately 60 miles farther, before terminating in the Badwater Basin in Death Valley National Park (DOE 2008). Basin relief is approximately 8,000 feet, ranging from approximately 7,700 feet above sea level at Pahute Mesa, Nevada, to approximately 300 feet below sea level at Badwater Basin in Death Valley, California (Tanko and Glancy 2001).
















Major tributaries of the Amargosa River in Nevada include Thirsty Canyon and Beatty Wash in the northern reach, Fortymile Wash, Tonopah Wash, and Carson Slough along its central reach and China Ranch Wash and Salt Creek in the lower reach in California.

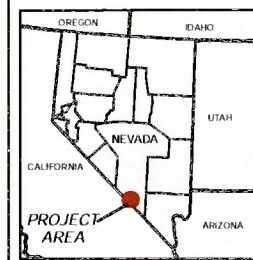
Despite the large drainage area, most of the Amargosa River and its tributaries are ephemeral, except in a few relatively short reaches of the River where discharging springs maintain small, perennial base flows. The Amargosa Desert portion of the river is dry more than 98 percent of the time (Stonestrom et al. 2007). Within the lower reach of the Amargosa River, small thermal springs near Shoshone and Tecopa, California contribute flow to the river. These springs also add to river flow in the reach between Tecopa and Dumont Sand Dunes. A 4-mile segment of the Amargosa River in this area was designated “wild and scenic” under the Omnibus Public Land Management Act of 2009. This Act, signed by President Barack Obama on March 30, 2009, provides protection of riverside land along both sides of a river in order to preserve the river's free-flowing nature.

Amargosa Farm Road Solar Energy Project (NVN-84359)

Water Resources Figure 3-6

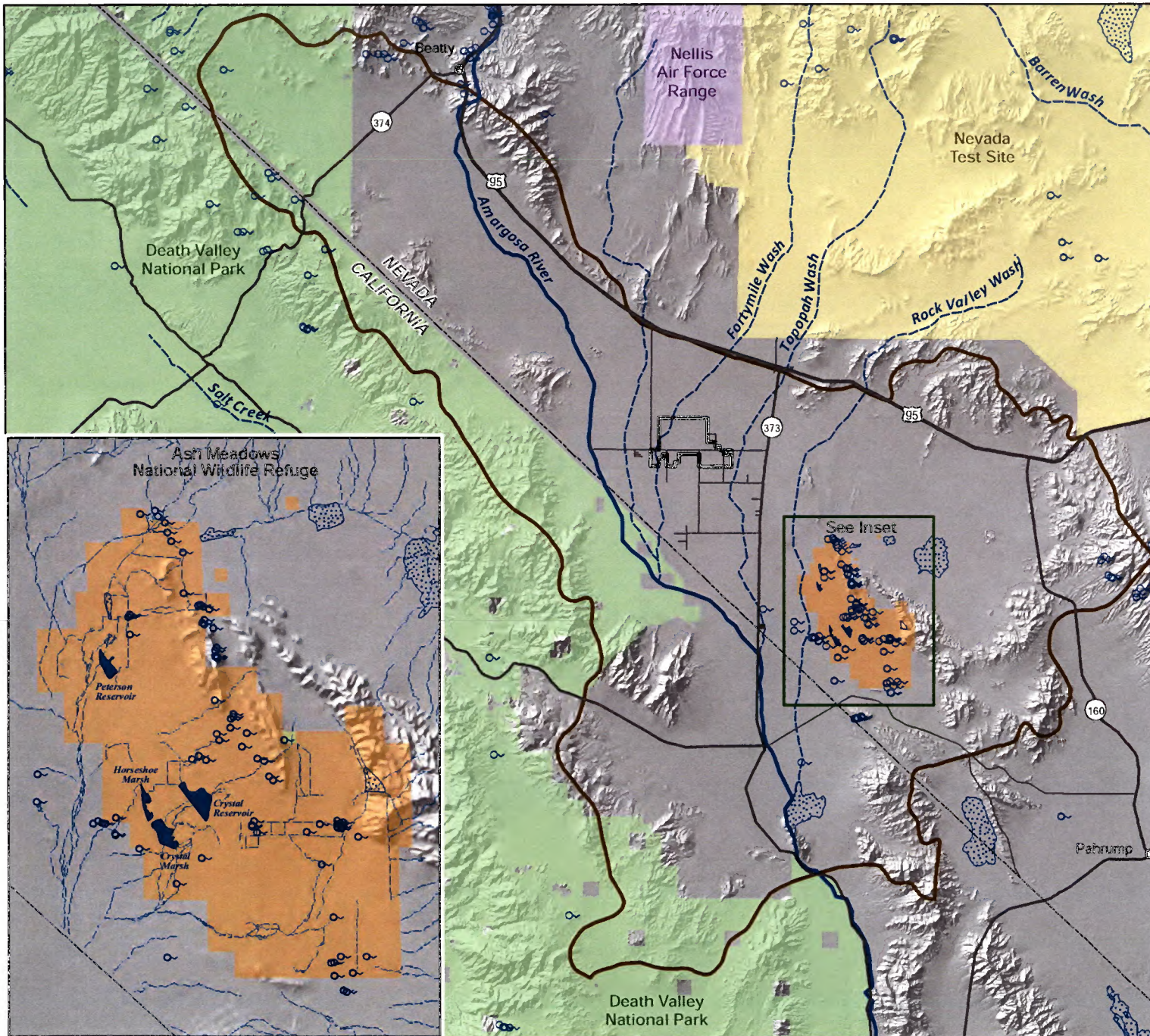
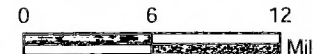
LEGEND

-  Project Area
- Water Resources**
-  Amargosa Desert Hydrographic Basin (230)
-  Reservoir
-  Playa
-  River
-  Wash
-  Spring/Seep
- General Reference Features**
-  Ash Meadows National Wildlife Refuge
-  Death Valley National Park
-  Nevada Test Site
-  Nellis Air Force Range
-  US Highway
-  State Highway
-  Local Road
-  State Boundary



Source: Water Resources - USGS, 2005, 2006;
 Ash Meadows - USFWS, 2005;
 Land Ownership - BLM, 2007;
 Local Roads - Terra Spectra, 2009;
 Highways - ESRI, 2005

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The Project site is traversed by Fortymile Wash, which is tributary to the Amargosa River and originates in the mountains of the Nevada Test Site directly to the north. Along its 93-mile length, the Fortymile Wash drains the western slopes of Shoshone Mountain, the eastern slopes of Yucca Mountain, and the western part of Jackass Flats all on the Nevada Test Site. Fortymile Wash has a sizeable canyon associated with its upper reaches between the mountains and remains a moderately confined channel to approximately one mile upstream of US 95 where the wash widens into several distributary channels. These numerous channels form a less defined drainage pattern that persists downstream to the confluence with the Amargosa River floodplain. The nearest surface water impoundments are Peterson Reservoir, Crystal Reservoir, Lower Crystal Marsh, and Horseshoe Reservoir in the Ash Meadows NWR, approximately 7 miles southeast of the Project area. The largest of these is Crystal Reservoir, a manmade impoundment at Ash Meadows, which captures the discharge from several springs in the area and has a capacity of 1,500 acre-feet (1.8 million cubic meters). Crystal Reservoir and other smaller pools in Ash Meadows drain to the Amargosa River through Carson Slough (DOE 2008).

3.4.3.2 Flood Occurrence

Streamflow characteristics of the Amargosa River have been studied for at least 45 years, with USGS stream gage data being recorded since 1964 near Beatty (USGS streamflow gauging station 10251220). Other stream gages and thermal detection gages have been installed along the Amargosa River; though they have not been continuously monitored.

Streamflow characteristics of Fortymile Wash have been similarly studied for the past 26 years; primarily within the Nevada Test Site, directly north of the Project area and US 95, and to a lesser extent in Amargosa Valley. USGS stream gage data is available at the Nevada Test Site southwestern boundary, upstream of US 95 (USGS streamflow gauging station 10251258).

As part of the DOE site characterization, investigations for Yucca Mountain (studies pertaining to surface-water runoff, including the potential for flooding in Fortymile Wash and Amargosa River) have been conducted (Beck and Glancy 1995; Tanko and Glancy 2001). Although flow in the Fortymile Wash is rare, the area is subject to flash flooding from intense summer thunderstorms or sustained winter precipitation. When these events occur, intense flooding can include mud and debris flows, in addition to water runoff in both the Fortymile Wash and Amargosa River (Blanton 1992).

At least three major flood events have occurred for which it is well documented that flows from Fortymile Wash and Amargosa River completely traversed the Amargosa Desert from the Nevada Test Site to Death Valley. These were in 1969, 1995, and 1998 (USGS 2008). The 1969 flood was the largest, producing a peak flow that exceeded the median annual peak flow by more than two orders of magnitude (Stonestrom et al. 2007). Beck and Glancy (1995) documented conditions during March 1995 and February 1998, when Fortymile Wash and the Amargosa River flowed simultaneously through their primary channels to Death Valley. During both floods, surface water from the Nevada Test Site flowed to the Amargosa River mainly via the Fortymile Wash, and road overflows were observed at similar locations (Tanko and Glancy

2001). In Fortymile Wash, a peak streamflow of approximately 3,000 eubie feet per second in 1995 severely scoured and eroded the channel, causing extensive road damage on the Nevada Test Site as well as to US 95 (Beck and Glancy 1995).

3.4.3.3 Surface Water Quality

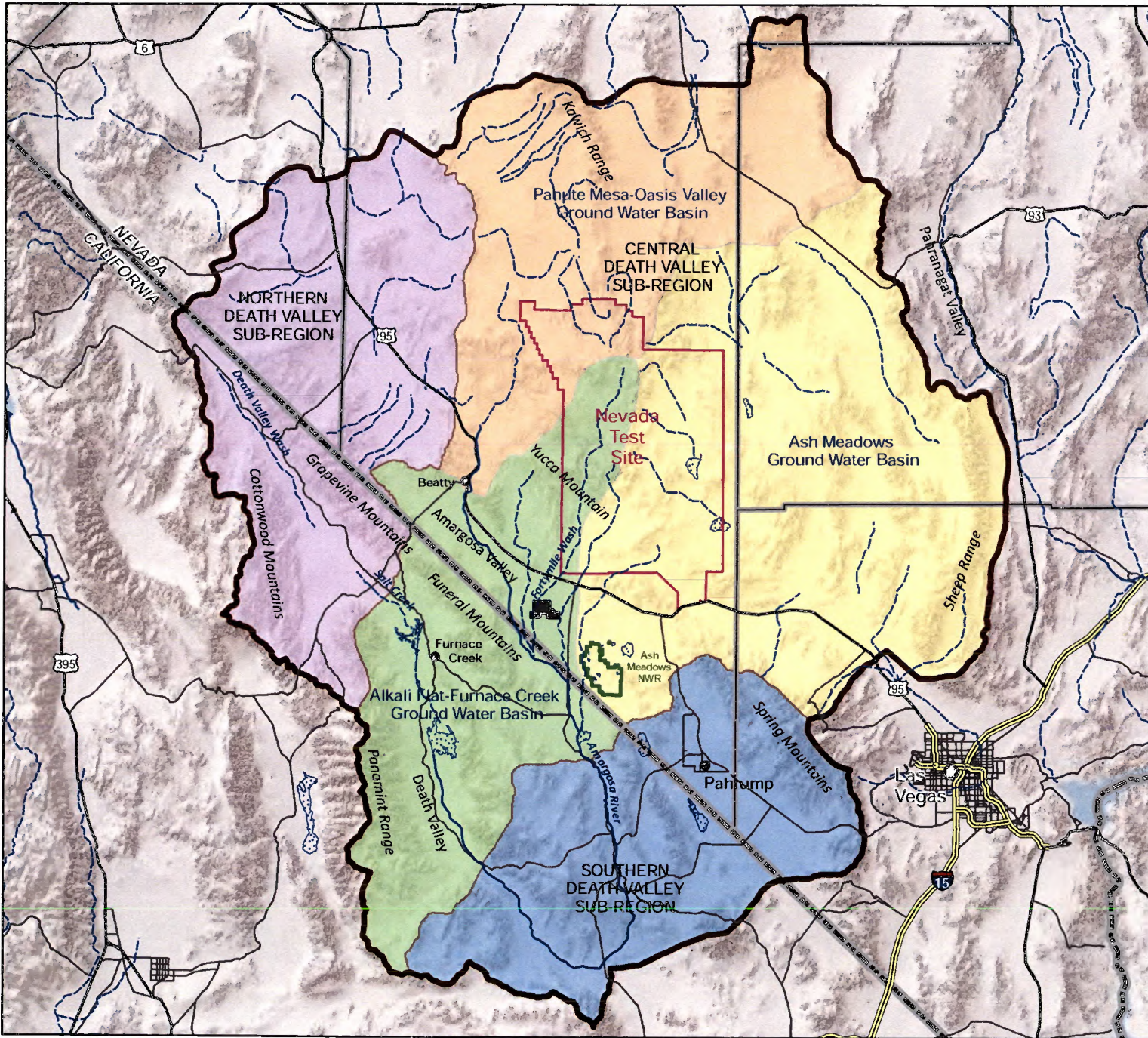
Section 305(b) of the CWA requires states to make water quality assessments and provide water quality reports to the EPA; CWA Section 303(d) requires states to identify waters, through their Section 305(b) water quality assessments, that do not or are not expected to meet applicable water quality standards with federal technology-based standards alone. Under CWA Section 303(d), States also are required to develop a priority ranking for these waters that takes into account the severity of the pollution and the designated uses of the waters. Once this listing and ranking of impaired waters is completed, States are required to develop Total Maximum Daily Loads for these waters in order to achieve compliance with the water quality standards. Nevada's 2006 Section 303(d) list of impaired waters shows no CWA Section 303(d) impaired waters in the Project area.

3.4.4 Groundwater Resources

The ROI for groundwater resources is the Death Valley Regional Flow System (DVRFS). The DVRFS (used as the basis for modeling groundwater flow for the Project) covers an area of 15,800 square miles and includes much of southern Nevada and the Death Valley region of eastern California (Harrill et al. 1998). As shown in Figure 3-7, this groundwater flow system is west of Las Vegas, Nevada, and includes parts of Clark, Esmeralda, Lincoln, and Nye counties, Nevada, and Inyo and San Bernardino counties, California. Death Valley, the largest valley within the flow system, forms the southwestern boundary of the flow system.

As shown in Figure 3-8, a total of 30 hydrographic areas are recognized within the DVRFS. Hydrographic areas are delineated primarily from topography and geologic structures, and generally correspond to major surface drainages. These areas serve as the basic units used by State and local agencies for water-resources planning, and in combination, form the regional flow systems delineated throughout the area (Harrill et al. 1998).

Groundwater flow within the DVRFS is divided into subregions that are further divided into sections, and the sections are grouped into groundwater basins. These divisions are based on locations of recharge areas; regional hydraulic gradients; distribution of aquifers, structures, and confining units that affect flow; and location of major discharge areas (Belcher 2004). The Project area is located within the Central Death Valley subregion. In this subregion, the dominant flow paths are associated with major regional or intermediate discharge areas and have been grouped into three groundwater basins: (1) Pahute Mesa-Oasis Valley basin, (2) Ash Meadows basin, and (3) Alkali Flat-Furnace Creek basin. The Project is situated within the Alkali Flat-Furnace Creek basin. Groundwater is derived from recharge on Pahute Mesa, Timber and Shoshone Mountains, and the Grapevine and Funeral Mountains. Additional recharge may occur as throughflow from Sarcobatus Flat, Oasis Valley, and Ash Meadows. Recharged groundwater then moves through volcanic rock aquifers in the north and carbonate rock aquifers in the south towards discharge areas in the southern and southwestern portions of the basin (Belcher 2004).



**Amargosa Farm Road
Solar Energy Project
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**Death Valley
Regional Flow System
Figure 3-7**

LEGEND

- Project Area
- Death Valley Regional Flow System
- Northern Death Valley Sub-region
- Southern Death Valley Sub-region

Central Sub-region Ground Water Basin

- Alkali Flat-Furnace Creek
- Ash Meadows
- Pahute Mesa-Oasis Valley

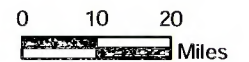
General Reference Features

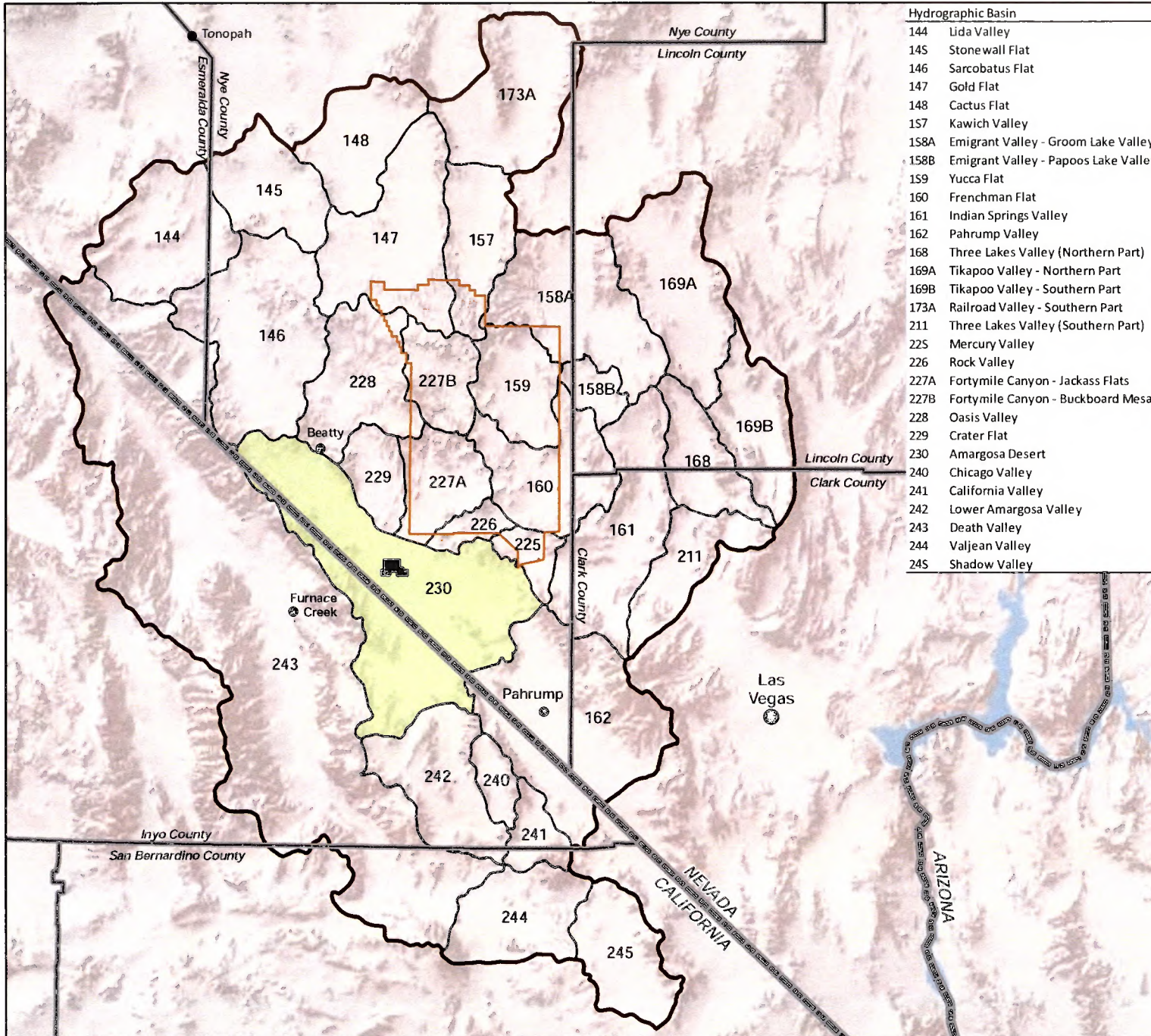
- Interstate
- US Highway
- Major Road
- River
- Wash
- State Boundary
- County Boundary
- City / Town
- Playa



Source: DVRFS - USGS, 2004,
Ash Meadows - USFWS, 2005
Hydrology, Roads, Boundaries, Hillshade - ESRI, 2009

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Hydrographic Basin	
144	Lida Valley
145	Stonewall Flat
146	Sarcobatus Flat
147	Gold Flat
148	Cactus Flat
157	Kawich Valley
158A	Emigrant Valley - Groom Lake Valley
158B	Emigrant Valley - Pappos Lake Valley
159	Yucca Flat
160	Frenchman Flat
161	Indian Springs Valley
162	Pahrump Valley
168	Three Lakes Valley (Northern Part)
169A	Tikapoo Valley - Northern Part
169B	Tikapoo Valley - Southern Part
173A	Railroad Valley - Southern Part
211	Three Lakes Valley (Southern Part)
225	Mercury Valley
226	Rock Valley
227A	Fortymile Canyon - Jackass Flats
227B	Fortymile Canyon - Buckboard Mesa
228	Oasis Valley
229	Crater Flat
230	Amargosa Desert
240	Chicago Valley
241	California Valley
242	Lower Amargosa Valley
243	Death Valley
244	Valjean Valley
245	Shadow Valley

Amargosa Farm Road Solar Energy Project (NVN-84359)

Hydrographic Basins Figure 3-8

LEGEND

- Project Area
- Death Valley Regional Flow System
- Amargosa Desert Hydrographic Basin (230)
- Nevada Test Site

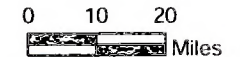
General Reference Features

- State Boundary
- County Boundary
- City / Town



Source: DVRFS, Basins - USGS 2009
 Nevada Test Site - USGS GAP 2005
 Boundaries, Hillshade - ESRI, 2009

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Within the Alkali Flat-Furnace Creek basin, the Project is further divided into the Amargosa River Section. Recharge to this section is predominantly by throughflow in the basin-fill sediments from Oasis Valley, Crater Flat, Fortymile Canyon and Wash, and Specter Range sections (Belcher 2004).

Three types of aquifers are recognized in the region: the volcanic aquifer, alluvial aquifer, and carbonate aquifer. The most developed and utilized water-bearing source in the basin is the valley fill alluvial aquifer. The Valley-fill aquifer as described by Winograd and Thordarson (1975) is present, on average, between 650 and 960 feet deep. The Lower Carbonate aquifer as described by Winograd and Thordarson (1975) is present, on average, between 1,370 and 1,800 feet deep. As described in Chapter 3.3, Devils Hole in the Ash Meadows area is a water-filled cave system in the Paleozoic carbonates of the Bonanza King Formation. This suggests that the surface water in the Ash Meadows area is linked to the Lower Carbonate Aquifer as described by Winograd and Thordarson (1975).

Under the Amargosa Farms area, where the proposed Project would be located, the depth to groundwater ranges from approximately 135 feet below land surface in the northwest to approximately 90 feet below land surface near the Longstreet Inn at the California/Nevada state line (Buqo 2002).

Due to concerns regarding the use of groundwater for Project construction and operations, a numerical groundwater flow model of the DVRFS was used to evaluate the regional effects to water resources associated with current use and the potential regional effects to water resources associated with the proposed Project. The reader is referred to Section 4.4 (Water Resources) for a summary of the groundwater flow modeling and Appendix B for the complete groundwater flow modeling report.

3.4.4.1 Groundwater Recharge and Discharge

Most groundwater recharge in southern Nevada is derived from winter and spring precipitation, which represents approximately 40 to 60 percent of the total annual precipitation. Precipitation reaches the groundwater reservoirs through streams, originating in uplands and eventually discharging onto alluvial aprons or by infiltrating directly into consolidated rock and percolating vertically and laterally to the valley fill aquifer (BLM Las Vegas District RMP 1998). Recharge may also occur from infiltration during ephemeral flows of the Amargosa River and Fortymile Wash (Savard 1998; Beck and Glancy 1995; Stonestrom et al. 2007). Groundwater recharge was found to be narrowly focused beneath the Amargosa River channel, flanked by large tracts of recharge-free basin floor, in a study conducted in 1998-2001 (Stonestrom et al. 2007).

Stonestrom et al. (2007) noted differences in recharge beneath agricultural areas versus native vegetation. Recharge was found to be negligible beneath undisturbed native vegetation covering most of the Amargosa Desert floor, where water-potential profiles indicate upward flow and atmospherically deposited salts have been accumulating more or less continuously since the end of the Pleistocene Epoch. Accumulation of salts has formed pronounced bulges just below the root zone. In contrast, beneath both irrigated fields and the Amargosa River channel, extreme water potentials and low salt concentrations indicate active deep percolation and groundwater

recharge. Transit times of recharge beneath the channel are on the order of centuries. Transit times of irrigation-return flow are on the order of decades (Stonestrom et al. 2007)

Groundwater discharges from the Amargosa Valley Hydrographic Basin include: (1) evapotranspiration, (2) discharge from springs, (3) flows across a groundwater flow system boundary to an adjacent system, and (4) groundwater pumping from underground sources. These functions are described in the following section. Activities such as groundwater pumping for agricultural uses and human consumption remove water from storage in a groundwater system, thereby reducing hydraulic heads which are measured as groundwater levels in open wells. Groundwater pumping also can affect streams or springs in direct hydraulic connection with the groundwater system, because declining groundwater levels can lead to increased recharge from streams and decreased spring flow.

3.4.4.2 Evapotranspiration

Evapotranspiration is the combined process of evaporation and the transpiration of water through plant tissue into the atmosphere. Evapotranspiration is a critical component of the water cycle, and thus an important component of many hydrological and climate models. However, evapotranspiration is difficult to measure directly. It is calculated from climate data, factors representing vegetation characteristics, and water supply.

Historically, estimates of evapotranspiration in the DVRFS were computed as part of regional groundwater assessments (Malmberg and Eakin 1962; Eakin 1963; Pistrang and Kunkel 1964; Malmberg 1967; Rush 1968). These regional assessments estimated annual evapotranspiration losses as the product of the acreage of phreatophytes within a discharge area and an annual evapotranspiration rate representative of the vegetation and soil conditions of the discharge area (Laczniak et al. 1999).

Estimates of the total amount of evapotranspiration in the Amargosa Desert Hydrographic area vary. Walker and Eakin (1963) estimated 24,000 acre-feet of annual evapotranspiration in the Amargosa Desert. Of this total, approximately 10,500 acre-feet were determined to be from Ash Meadows (Winograd and Thordarson 1975); and the remainder from other smaller areas of groundwater discharge found throughout the Amargosa Desert.

Recent studies of evapotranspiration rates for vegetation and soil conditions in the regional area (Johnson 1987; Czarnecki 1997; Laczniak et al. 1999; Nichols 2000) indicate rates somewhat different than those presented in earlier studies. Based on the updated data, Laczniak et al. (1999) estimated 22,000 acre-feet of annual evapotranspiration in the Ash Meadows area.

3.4.4.3 Regional Springs

Several springs of regional importance lie outside of the immediate Project area. These include more than 30 seeps and springs in the Ash Meadows NWR, including Devils Hole, a 40-acre detached unit of Death Valley National Park. Devils Hole provides habitat for the only naturally occurring population of the endangered Devils Hole Pupfish (*Cyprinodon diabolis*).

Springs in the Ash Meadows NWR are created by groundwater discharge along the Ash Meadows fault system (Denny and Drewes 1965). The Ash Meadow fault system trends southeast to northwest through the eastern portion of the Ash Meadows NWR. Groundwater discharging at Ash Meadows originates from areas to the north and east and is transported into the area through the regional carbonate rock aquifer. Winograd and Friedman (1972) suggested that 65 percent of the spring-fed waters originate from the Spring Mountains and Sheep Range, 30 to 60 miles to the east; and 35 percent comes from underflow from the Pahrangat Valley, approximately 90 miles northeast of Ash Meadows.

Other springs in the Ash Meadows area discharge from the valley-fill aquifer, which is derived from and connected to the carbonate aquifer, but is overlain by valley-fill sediments. The total annual discharge of these springs is estimated at approximately 17,000 afy (Walker and Eakin 1963; Laczniaik et al. 1999).

3.4.4.4 Groundwater Pumping and Use

Many reports have been published that estimate groundwater pumping and use in Nevada. Every 5 years since 1950, the USGS has compiled and published water use data in circulars entitled "Estimated use of water in the United States." The circulars include water use for several categories including public and domestic use, agricultural use, and industrial use. These reports also include population and irrigated acreage data. The Nevada State Engineers Office also has reported water use and pumping, in which water usage is estimated by county and hydrographic area.

The USGS data reflects different groundwater withdrawal amounts than the State Engineer's groundwater pumping inventory. The reason for this difference is that the USGS uses satellite imagery and consumptive use estimates to create their groundwater use inventory while the State Engineer's inventory bases its inventory upon metered amounts or estimates provided by a pumpage inventory field report for water rights owners with unmetered wells. Pumping estimates for unmetered wells are generally approximate and are based on rudimentary records, or consumptive use estimates made by the State Engineer Office, based on a standard consumptive use amount of 5 afy per acre. For example, 160 acres of irrigation at 5 afy per acre would require 800 afy. In 2003, 12 percent of reported irrigated acreage for Amargosa Desert was metered (Moreo et al. 2003). Table 3-7 lists pumpage history in the Amargosa Desert from 1983 through 2009. No data was available for 1984.

The primary use of groundwater in the Amargosa Desert Hydrographic Basin is for agricultural irrigation. Irrigation in the Amargosa Farms area began on a limited basis around 1917 and continued on a modest scale until roughly 1954. Intensive agriculture in Amargosa Desert began in 1954 as land was patented under the Desert Land Act (Moreo et al. 2003), and irrigated acreage exceeded 2,000 acres by 1965. Between 1954 and 1965, the number of wells grew by roughly 150 to support agricultural production (Laczniaik et al. 1999; Stonestrom et al. 2003). As of 2009, more than 1,000 water supply wells have been drilled in the Amargosa Desert hydrographic basin (NDWR 2010a).

Table 3-7 Pumpage Inventories for the Amargosa Desert Hydrographic Basin 1983 through 2009

Year	Irrigation	Irrigation*	Industrial	Commercial ¹	Quasi-Municipal / Domestic ¹	Quasi-Municipal / Commercial ¹	Domestic ¹	Total
1983	5,893.0	3,212.0	850.0	20.0	450.0			10,425.0
1984	-	-	-	-	-	-	-	-
1985	5,807.0	2,665.0	950.0	20.0	230.0			9,672.0
1986	5,552.9	1,000.0	584.0	10.0	125.0			6,971.9
1987	4,500.0	1,200.0	298.0	10.0	125.0			6,133.0
1988	2,666.0	312.0	569.0	10.0	125.0			3,682.0
1989	1,266.0	300.0	525.0	10.0	125.0			2,226.0
1990	4,603.1	350.0	383.6	10.0	125.0			5,471.7
1991	4,716.5	225.0	335.0	10.0	100.0			5,386.5
1992	5,711.0	50.0	347.5	10.0	100.0			6,218.5
1993	8,558.8	150.0	495.0	10.0	100.0			9,313.8
1994	8,892.0	1,085.0	340.0	10.0	100.0			10,427.0
1995	10,839.0	1,515.0	349.0	10.0	100.0			12,813.0
1996	9,263.0	1,780.0	272.0			205.0	50.0	11,570.0
1997	9,349.0	1,105.0	251.0			576.0	366.0	11,647.0
1998	9,667.0	2,373.0	237.0			537.0	382.0	13,196.0
1999	9,069.0	1,766.0	253.0			593.0	364.0	12,045.0
2000	9,086.0	625.0	243.0			1,057.0	378.0	11,389.0
2001	8,782.0	625.0	237.0			1,067.0	396.0	11,107.0
2002	8,951.0	625.0	386.0			1,128.0	415.0	11,505.0
2003	9,846.0	625.0	333.0			1,324.0	437.0	12,565.0
2004	9,979.0	625.0	309.0			1,319.0	453.0	12,685.0
2005	10,139.0	625.0	247.0			1,332.0	466.0	12,809.0
2006	11,511.0	1,613.0	308.0			1,844.0	491.0	15,767.0
2007	11,909.0	2,150.0	306.0			1,793.0	55.0	16,663.0
2008	11,419.0	937.0	933.0			3,984.0	517.0	17,790.0
2009	10,493.0	984.0	510.0			3,905.0	487.0	16,380.0

* No Permits or Certificates

¹ Prior to 1996, Quasi-Municipal/Domestic and Commercial inventories were calculated under different classifications. Beginning in 1996 commercial water use, which includes local dairies, were included with quasi-municipal. Domestic water use is inventoried separately and includes water rights for domestic use over 2.02 afy.

Source: NDWR 2010a

As shown in Table 3-7, total groundwater withdrawal from Amargosa Desert fluctuates annually, but has steadily increased over the past 5 years. The annual variation in total groundwater withdrawal is attributed primarily to crop and irrigation cycles, and the amount of precipitation in a given year. Alfalfa fields typically are allowed to fallow 2 years during a 7-year period. Other fields are irrigated once every 5 years to demonstrate beneficial use and maintain water rights (Moreo et al. 2003).

Non-irrigation groundwater use in the Amargosa Desert includes industrial, quasi-municipal/commercial, and domestic. Industrial water use is primarily related to mineral exploration activities at the American Borate, IMV, and Barrick Bullfrog Mine. Groundwater use for mining has fluctuated over the years, based on the rise and fall of ore prices.

Quasi-municipal and commercial water use in the Amargosa Valley is primarily related to large-scale farming operations, such as dairies, and to a lesser degree, municipal water uses by local water providers and businesses. There are only three water supply systems in the Amargosa Valley that are publically owned. They include the Amargosa Elementary School, Amargosa Town Complex, and the Amargosa Water Company.

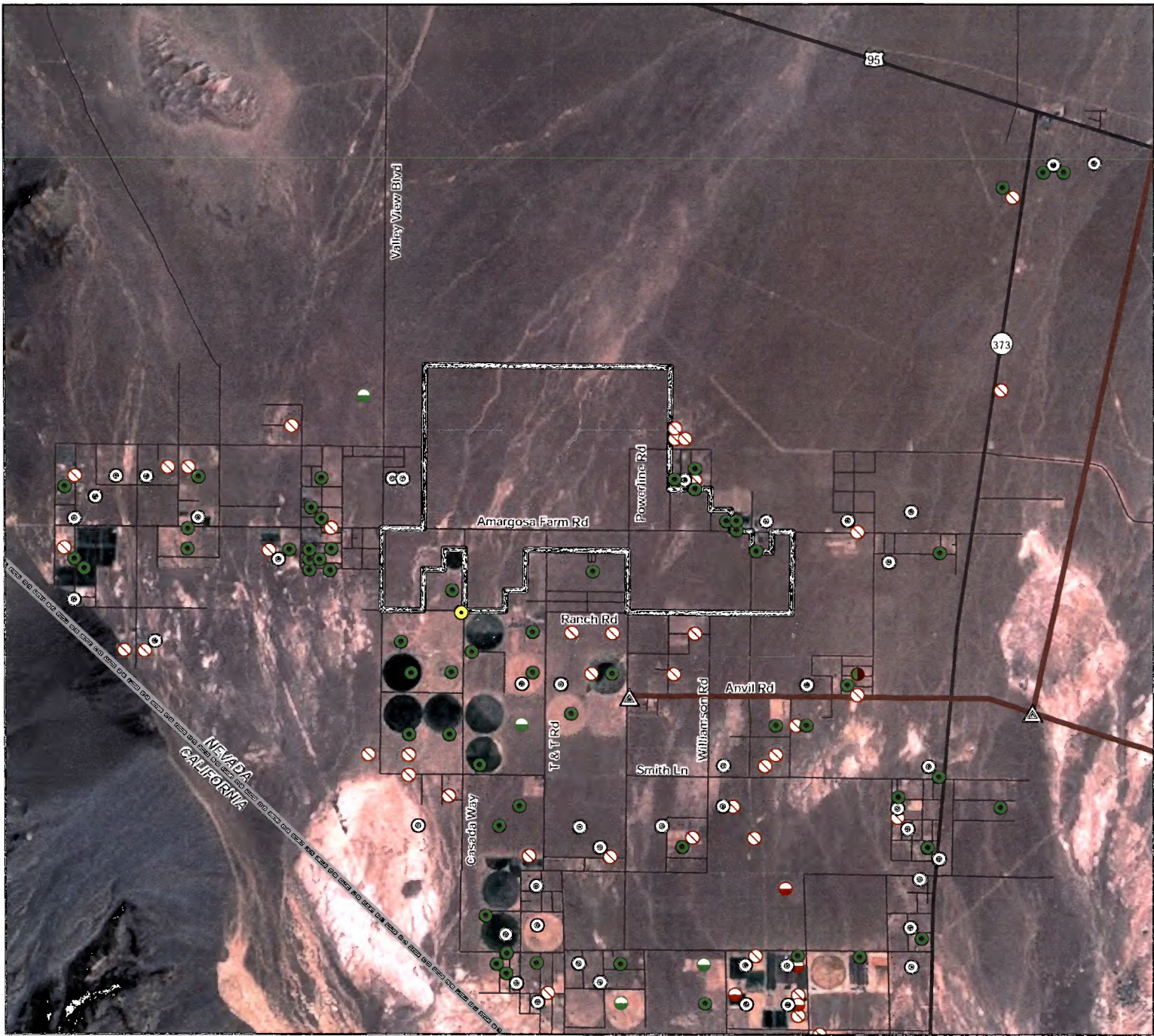
Most residents in the Amargosa Valley area rely on individual wells for their water supply. In 2000, there were 378 domestic wells listed in the NDWR database. By the end of 2008, a total of 517 domestic wells had been drilled in the Amargosa Desert Hydrographic Basin. It is unknown how many of these wells are currently being pumped. Under Nevada water law, a domestic well may use up to 1,800 gallons per day (2.02 acre-feet annually) for domestic purposes without the benefit of a water right permit (NRS § 534.180). In 2009, this equates to a potential of 1,046.36 afy being pumped from existing domestic wells.

Wells within 3 miles of the Project area are shown on Figure 3-9. During the biological surveys conducted in the Spring 2009, several water wells were found scattered throughout the site. Most of these wells have either been plugged or have welded covers on the casing; at least one well was uncapped. It is assumed these wells are associated with past agricultural fields and desert land entrees that have been filed with BLM. Prior to the enactment of FLPMA, trespass agricultural fields were established throughout the Amargosa Valley. Over the years, these fallow agricultural fields have reverted back to desert scrub communities.

3.4.4.5 Water Rights

Water rights in the Amargosa Desert Hydrographic Basin are associated with commercial and industrial use, domestic wells, mining, agriculture (farming, livestock, and dairies), and federal use. Water rights are issued for pumping from an underground source, either from the valley-fill deposit or from fractured or faulted carbonate and volcanic rock; and diversion of surface or spring flows. The withdrawal of groundwater from much of the area is limited by federal mandates instituted to protect rare and endangered species dependent for their survival on regional springflow in Ash Meadows, Devils Hole, and Death Valley.

The perennial yield of the Amargosa Desert Hydrographic Basin was estimated by Walker and Eakin (1963) to be 24,000 afy. Perennial yield of a groundwater reservoir may be defined as the maximum amount of groundwater that can be withdrawn each year over the long term without depleting the groundwater reservoir. Withdrawals of groundwater in excess of the perennial yield contributes to adverse conditions such as water quality degradation, storage depletion, diminishing yield of wells, increased cost due to increased pumping lifts, land subsidence, and possible reversal of groundwater gradients.



**Amargosa Farm Road
Solar Energy Project
(NVN-84359)**

**Wells Within
3-Miles of Project
Figure 3-9**

LEGEND

Project Area

Wells

- Abrogated
- Certificated
- Permitted
- Ready for Action
- Ready for Action (Protested)
- Relinquished a Portion

General Reference Features

- Existing Transmission Line (<math>< 230\text{kV}</math>)
- Existing Substation
- Proposed Project Well
- Highway
- Local Road
- State Boundary



Source: Transmission Lines, Substations - Platts, 2009;
Wells - Nevada State Engineer, 2008;
Local Roads - TerraSpectra Geomatics 2009;
Highways, Imagery - ESRI, 2009

September 2010



Although numerous studies have been conducted to revise the current perennial yield estimate, the Office of the State Engineer maintains that none of the new studies offer new and convincing arguments that the perennial estimates should be revised (Nevada State Engineer 2007).

According to the State Engineer, the estimated perennial yield of 24,000 acre feet includes 17,000 acre-feet discharged by springs in Ash Meadows and 7,000 acre-feet from underground water in the Amargosa Desert Hydrographic Basin. At the time of publication, there are over 25,000 acre-feet of permitted underground water rights. The 17,000 acre-feet discharged by springs in Ash Meadows, not included in the underground rights total, are used to satisfy the certificated rights of the USFWS for wildlife conservation purposes.

Table 3-8 lists the current (2010) annual duty for the various types of water use in the Amargosa Desert Hydrographic Basin. The annual duty is the total volume of water per year that may be diverted under a vested, permitted, or certificated water right authorized by the State Engineer. As shown in Table 3-8, committed groundwater resources of the Amargosa Desert Hydrographic Basin currently exceed the groundwater basin's estimated perennial yield.

Manner of Use	Active Annual Duty* (Acre-Feet)	Pending Annual Duty* (Acre-Feet)
Commercial	1,447.59	452.30
Domestic	3.22	0.00
Irrigation - Domestic	1,942.16	0.00
Irrigation	18,886.43	160.10
Industrial	0.00	400.00
Mining and Milling	1,923.49	0.00
Municipal	431.79	0.00
Quasi-Municipal	588.61	5.00
Wildlife	9.42	0.0
Total	25,232.73	1,017.40
* May include supplemental duties as well as duties associated with applications to change Source: NDWR 2010b		

Water rights in the Amargosa Desert Hydrographic Basin have been scrutinized for many years due to the proximity of environmentally sensitive areas at Devils Hole, Ash Meadows, and Death Valley. In the late 1960s and early 1970s, ranching and farming operations in the Ash Meadows area resulted in a decline in water levels in Devils Hole, which threatened the survival of the Devils Hole Pupfish. As a result, the NPS filed a lawsuit against the land owner, Cappaert Ranch, to restrict groundwater pumping.

In 1973 the U.S. District Court granted a preliminary injunction preventing pumping that would lower the pool level more than 2.98 feet below the datum. The injunction was made permanent by the District Court's decision, and upon appeal, the Supreme Court affirmed the lower court decision. In 1978 the District Court issued a revised permanent injunction to limit pumping to maintain a daily mean water level of 2.69 feet below the datum, based on scientific studies (Bedinger and Harrill 2006).

By 1988 the pool level had recovered to roughly 0.98 feet below the pre-pumping level when it began to decline. Concerns were raised that in the intermediate to long-term future the pool level would fall below the court-mandated minimum level. Since 1989, to protect the springs and seeps in the Ash Meadows NWR area, the USFWS has acquired 57 permitted or certificated water rights, totaling over 16,908 afy in the Amargosa Desert Hydrographic Basin, making the USFWS the largest water rights holder in the basin. These water rights, formerly used primarily for irrigation, were changed to modify the place and manner of use for wildlife purposes.

To further protect federally reserved water rights at Devils Hole, the Nevada State Engineer issued Order 1197 on November 4, 2008. Information provided during the administrative hearing for Order 1197 showed the water level in Devils Hole to be only 0.6 to 0.7 feet above the threshold level mandated by the U.S. District Court. The State Engineer ruled that the conditions warranted the curtailment of future appropriations of underground water and additional regulations of change applications within portions of the Amargosa Desert Hydrographic Basin. The State Engineer ordered, with exceptions, that "any applications to appropriate additional underground water and any application to change the point of diversion of an existing groundwater right to a point of diversion closer to Devils Hole, described as being within a 25-mile radius from Devils Hole within the Amargosa Desert Basin, will be denied."

Certain applications are excepted from this restriction:

- Any application within the described area that seeks to change an existing point of diversion closer to Devils Hole but remains: (1) within its existing place of use and (2) is no more than 1/2 mile from its original point of diversion.
- Those applications filed which seek to appropriate 2.0 afy or less may be considered and shall be processed subject to NRS 533 and 534.
- Projects that require changes of multiple existing rights; the State Engineer may compare the net impact of the proposed changes to Devils Hole to the impacts of the base rights to Devils Hole. If the net impact of the proposed changes is the same or less than the base rights impacts, as determined by the State Engineer, such change applications may be considered and shall be processed subject to NRS 533 and 534. In no such case shall new points of diversion be allowed within 10 miles of Devils Hole.
- Those applications for environmental permits filed pursuant to NRS 533.437 to 533.4377, inclusive.
- Those applications filed pursuant to NRS 533.371.

The proposed Project is located within the 25-mile radius of Devils Hole. However, since the Proponent would use existing water rights for the Project, and would not move the point of diversion closer to Devils Hole, the Project would comply with Order 1197.

3.4.4.6 Groundwater Quality

With the exception of radionuclide contamination at the Nevada Test Site, the water quality of the surface and groundwater resources in the ROI is generally good. Elevated concentrations of fluoride, sulfate, arsenic, and TDS are present in some areas, and traces of naturally occurring uranium are also present (DOE 2008). Preliminary water quality tests of the well to be used for the proposed Project indicate the well water meets EPA drinking water standards.

3.4.4.7 Jurisdictional Waters, Drainage, and Riparian Areas

The USACE regulates “discharge of dredged or fill material” into “waters of the U.S., which includes tidal waters, interstate waters, and all other waters that are part of a tributary system to interstate waters or to navigable “waters of the U.S.” (33 CFR 328.3(a)). Once waters have been determined to be jurisdictional “waters of the U.S.” the USACE generally takes jurisdiction within the plane of ordinary high water determined by erosion, the deposition of vegetation or debris, and changes in vegetation. The law requires authorization from the Secretary of the Army, acting through the USACE, for the construction of any structure in or over any navigable water of the United States, or any other water of the United States.

Before the USACE will issue a Section 404 permit, applicants must receive a Section 401 Water Quality Certification from the NDEP BWQP. By federal law every applicant for a federal permit or license for an activity which may result in a discharge into a water body must request State certification that the proposed activity will not violate state and federal water quality standards. The state may respond to the application in three ways:

- **Waiver** – Under federal law the state may waive its certification authority if it takes no action on an application within a "reasonable time" not to exceed one year. For Section 404 permit projects, the USACE has defined "reasonable time" to be 60 calendar days, starting with receipt of a complete application by the state, but may extend this period up to one year on a case-by-case basis. Waivers carry no conditions, and are, in some ways, equivalent to certification without conditions.
- **Certification** – Certification is based on a finding that the proposed Section 404 discharge will comply with all pertinent water quality standards. In order to allow certification, special conditions may be required by the the state in order to remove or mitigate potential impacts to water quality standards. Such conditions must ultimately be included in the federal Section 404 permit.
- **Denial** – The state has the option to deny certification if it is unable to find that the project will comply with water quality standards or other applicable requirements. If a project is denied certification, a Section 404 permit for it cannot be issued by the federal government. In some instances denial is necessary due to failure by the applicant to meet

a procedural requirement or the ability to meet water quality standards. Once the deficiency is addressed, the application for water quality certification may be reconsidered.

Representatives from the USACE, EPA, BLM, USFWS, and the Project Proponent and consultants met on May 13, 2010 to discuss the geographic extent of jurisdictional waters on the Project site and the direct and indirect impacts that could occur as a result of Project construction. The criteria that may be considered when determining impacts include habitat for plants and animals, recharge to the groundwater system, and sediment transport.

Preliminary discussions with the USACE indicate that jurisdictional washes are present in the Project area. However, the extent to which construction and operation of the proposed Project will affect those washes has not been determined, but some level of mitigation will be required by the USACE. A complete assessment of the potential effects to jurisdictional waters that would be caused directly or indirectly by the proposed Project will be completed when the USACE issues a Jurisdictional Determination for the proposed Project.

3.5 NOISE

This section discusses noise regulations and standards and the existing ambient noise conditions within and adjacent to the Project site.

3.5.1 Regulatory Framework

There are no federal, state, or local laws or regulations directly regulating off-site (community) noise. The Project area is subject to the management guidance included in the Las Vegas RMP/EIS, which does not contain noise regulations or standards. Also, Nye County currently does not have noise regulations or standards.

For such circumstances, the EPA (1974) has developed and published criteria for environmental noise levels with a directive to protect public health and welfare with an adequate margin of safety. That is, EPA developed this criterion (*Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*) for use as an acceptable guideline when no other local, county, or state standard has been established. However, the EPA criterion is not meant to substitute agency regulations or standards where states and localities should use the developed criteria accordingly to their individual needs and situations.

The EPA established its criteria using the day-night average sound exposure (Ldn) metric. This metric is a 24-hour average noise level calculated by obtaining the daytime noise level from the hours of 0700 to 2200 and applies a 10 decibel (dB) penalty for the more restrictive quietest nighttime noise levels between the hours of midnight to 7:00 a.m, and 10:00 p.m. to midnight.

According to the EPA guidelines, an Ldn of 45 A-weighted decibel (dBA) indoors and 55 dBA outdoors for residential areas is identified as the maximum allowable noise level that has no effects on public health and welfare occur due to interference with speech or other activity.

These levels also would protect the vast majority of the population under most conditions against annoyance, in the absence of intrusive noises with particularly aversive content. Table 3-9 was published by the EPA and summarizes the maximum allowable noise level for specified areas.

Table 3-9 Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety		
Effect	Level	Area
Hearing Loss	$L_{eq}(24) \leq 70$ dB	All areas
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas and farms and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{dn} \leq 45$ dB	Indoor residential areas
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.
L_{eq} - Equivalent Sound Level; L_{dn} - Day/night sound level		

The proposed Project also is governed by federal OSHA hearing conservation noise exposure regulations. These regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which a worker is exposed. The Federal OSHA Occupational Noise Exposure standard states:

1910.95(b)(1)

When employees are subjected to sound exceeding those listed in Table 3-10, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table 3-10, PPE shall be provided and used to reduce sound levels within the levels of the table.

1910.95(b)(2)

If the variations in noise level involve maxima at intervals of 1 second or less, it is to be considered continuous.

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

¹ When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions: $C(1)/T(1) + C(2)/T(2) + \dots + C(n)/T(n)$ exceeds unity, then the mixed exposure should be considered to exceed the limit value. C(n) indicates the total time of exposure at a specified noise level, and T(n) indicates the total time of exposure permitted at that level. Exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level.

3.5.2 Data Collection Methods

Noise is generally defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance; interference with speech communication; sleep disturbance; and, in the extreme, hearing impairment. An assessment of the potential for a project to result in adverse noise effects requires an evaluation of several factors. These factors include an inspection of the site's general setting (such as isolated, rural, suburban, or urban); nature of the existing ambient noise sources or activities occurring in those settings; proximity of the receptor to the existing ambient noise source or activity; time of day; and various sound-attenuating factors such as vegetation, ground absorption, topographic features, buildings, and atmospheric conditions.

Noise standards and sound measurement equipment have been designed to account for the sensitivity of human hearing to different frequencies. This is accomplished by applying "A-weighted" correction factors. This correction factor is widely applied in the industry and is known to de-emphasize the very low and very high frequencies of sound in a manner similar to the response of the human ear. The primary assumption is that the dBA is a good correlation to a human's subjective reaction to noise.

Noise is measured in units of dB on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies are given more "weight." The dBA scale corresponds to the sensitivity range for human hearing. Noise levels capable of being heard by humans are measured in dBA. A noise level change of 3-dBA is barely perceptible to average human hearing. A 5-dBA change in noise level, however, is clearly noticeable. A 10-dBA

change in noise level is perceived as a doubling or halving of noise loudness, while a 20-dBA change is considered a dramatic change in loudness. Table 3-11 provides typical instantaneous noise levels of common activities in dBA.

Table 3-11 Typical Noise Levels		
Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet Fly-over at 1,000 feet	100	
Gas Lawn Mower at 3 feet	90	
Diesel Truck at 50 feet, at 50 miles per hour (mph)	80	Food Blender at 3 feet Garbage Disposal at 3 feet
Noisy Urban Area, Daytime Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area Heavy Traffic at 300 feet	60	Normal Speech at 3 feet
Quiet Urban Daytime	50	Large Business Office, Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	30	Library
Quiet Rural Nighttime	20	Bedroom at Night, Concert Hall (Background)
	10	Broadcast/Recording Studio
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

3.5.3 Existing Conditions

The Project area is located within a rural, sparsely populated area. The existing ambient noise environment in the vicinity of the Project site is mainly made up of natural sounds, vehicle noise associated with the small roadway segments, and community activity in the vicinity of the Project site, as well as noise associated with the Amargosa Valley Elementary School and over flight aircraft traffic. There are no other identified noise sources located within the vicinity of the Project site.

To confirm and document the current community ambient noise conditions at the site, two environmental noise monitors were placed on the Project site to capture the rise and fall of ambient noise conditions in the area. One noise meter was located along the eastern edge of the property and the second noise meter was placed in the center of the proposed eastern powerblock area. The noise monitors were programmed to record simultaneously in the appropriate data acquisition format for depicting the significant daily background noise levels prevalent within the area of the proposed Project site. The two 24-hour noise monitors were programmed to record continuously throughout a typical business day on Thursday, December 3, 2009; the results are shown in Table 3-12.

Position	Date	Location	24 Hour L_{EQ} (dBA)	L_{dn} (dBA)
1	12-3-2009	Eastern Property Line	34.5	39.7
2	12-3-2009	Eastern Power Block Area	33.0	41.4

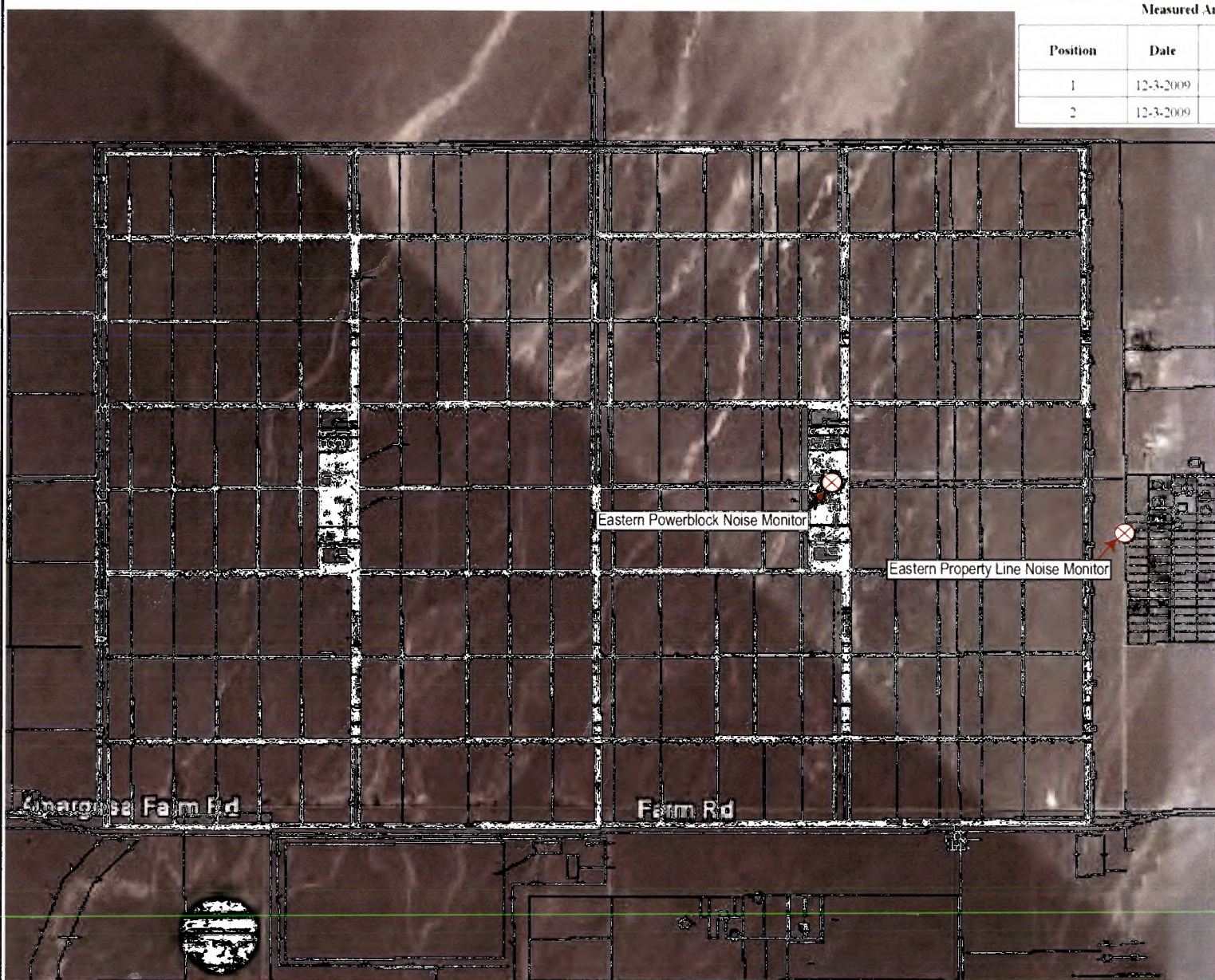
The two continuous 24-hour sound level measurements (L_{dn}, A-Weighted) range from a worst-case noise impact of 41.4 dBA L_{dn} at the center of the proposed eastern powerblock area, down to the quietest noise level of 39.7 dBA L_{dn} at the eastern property line. During the on-site noise measurements, start and end times were recorded as well as any significant and background noise sources in the area. The 24-hour sound level measurements ran from midnight to midnight, integrating and logging data every 30 minutes. For a graphical representation showing the two 24-hour ambient noise monitoring locations and resultant measurement values see Figure 3-10.

Other field data gathered at the site includes measuring or estimating distances, angles-of-view, slopes, and site elevations. This information is subsequently verified using available maps and records. The sound level meters were field-calibrated prior to and following the noise measurements to ensure accuracy. All sound level measurements conducted and presented in this report are in accordance with and were made using a sound level meter that conforms to the American National Standards Institute (ANSI S1.4-1983 - R2001) specifications for sound level meters. All instruments are maintained with the National Bureau of Standards traceable calibrations.

Results of any investigations or field measurements and any findings presented in this report apply solely to conditions existing at the time when the investigative work was performed. It must be recognized that any such investigative or measuring activities are inherently limited and do not represent a conclusive or complete characterization. Conditions in other parts of the Project site may vary from those at the locations where data were collected. The ability to interpret investigation results is related to the availability of the data and the extent of the investigation activities.

Measured Ambient Noise Levels over a 24 Hour Period

Position	Date	Location	24 Hour L ₁₀ (dBA)	L _{dN} (dBA)
1	12-3-2009	Eastern Property Line	34.5	39.7
2	12-3-2009	Eastern Powerblock Area	33.0	41.4



Amargosa Farm Road Solar Energy Project
Amargosa Valley, Nevada

Global Image Showing Ambient Noise Measurement Locations and Data Results


 **ARCADIS**

FIGURE 3-10

3.6 BIOLOGICAL RESOURCES

3.6.1 Regulatory Framework

Numerous federal and state environmental regulations and legislative acts are applicable to biological resources. Following are those which are applicable to the Proposed Action within the Project area.

3.6.1.1 Endangered Species Act of 1973

The ESA of 1973 (16 USC 1531 et seq.), as amended, provides for the conservation of federally listed plant and animal species and their habitats. The ESA directs federal agencies to conserve listed species, and imposes an affirmative duty on these agencies to ensure that their actions are not likely to jeopardize the existence of a listed species or adversely modify their habitat. Each species listed is required to have designated critical habitat. Critical habitat is the specific geographic areas that are most essential for the conservation and protection of a listed species.

3.6.1.2 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668) applies primarily to taking, hunting, and trading activities that involve Bald Eagles (*Haliaeetus leucocephalus*) or Golden Eagles (*Aquila chrysaetos*). The act prohibits the “taking” of any individuals of these two species, as well as any part, nest, or egg. The term “take” as used in the Act includes “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.”

On July 13, 2010, the BLM issued Instructional Memorandum No. 2010-156 regarding the Bald and Golden Eagle Protection Act – Golden Eagle NEPA and Avian Protection Plan Guidance for Renewable Energy Projects. The purpose of the Instructional Memo is to provide direction for complying with the Bald and Golden Eagle Protection Act—including its implementing regulations—and to identify steps that may be necessary within the habitat of golden eagles to ensure environmentally responsible authorization and development of renewable energy resources.

For this Project, there is no anticipated take of Bald or Golden Eagles as no suitable nesting/roosting habitat is present within the Project area nor is any present within likely foraging distance.

3.6.1.3 Migratory Bird Treaty Act of 1986

The MBTA (16 USC 703) makes it unlawful to pursue, hunt, take, capture, kill, or possess any migratory bird or part, nest, or egg of such bird listed in wildlife protection treaties among the United States, Great Britain (on behalf of Canada), Mexico, Japan, and the former Soviet Republic. In addition, this act also contains a clause that prohibits baiting or poisoning of these bird species. The current list of species covered by the MBTA can be found in Title 50, CFR

Section 10.13. Because many migratory bird species occur within the Project area, the MBTA applies to those bird species that may be affected during the construction and operation of the proposed Project.

3.6.1.4 Nevada State Protection of Christmas Trees, Cacti, and Yucca

The State of Nevada has a statute for the protection of Christmas Trees, Cacti, and Yucca (NRS 527.060-527.120). Under this statute it is illegal for any individual or company to cut, destroy, mutilate, remove, or possess any Christmas tree, cactus, yucca, or portions of these plants. Additionally, it is illegal to sell any of these plants from any lands owned by or under the jurisdiction of the United States. This statute applies to any cacti or yucca on BLM-managed lands that may be affected during construction of the proposed Project.

3.6.1.5 Nevada State Protection and Propagation of Native Fauna

The State of Nevada has a statute for the protection and propagation of native fauna (NRS 503.584-503.589). The purpose of this statute is to provide for the conservation, protection, restoration, and propagation of selected species and the perpetuation of the habitats of such species. The Board of Wildlife Commissioners, under consultation with authorities, will determine which species' existence is endangered or habitat is threatened with destruction, thereby warranting protection under this statute. This statute applies to species listed by the State of Nevada that may be affected during the implementation of the proposed Project.

3.6.2 Environmental Setting

The Project area lies in the Amargosa Valley in Nye County, Nevada, between the Yucca Mountains to the north and the Funeral Mountains to the southwest. The proposed Project is located in the Northern Mojave Desert Ecoregion which encompasses the southern tip of Nevada and extends into Arizona, California, and Utah. This ecoregion is a transitional region between the higher and cooler Great Basin Desert to the north and the warmer Sonoran Desert to the south (Webb et al. 2009), featuring basin and range topography, with broad valleys separated by rugged mountain ranges. This ecoregion is dominated by Mojave Desert scrub, which is intermediate between the Great Basin Desert scrub and the Sonoran Desert scrub habitats. Elevation in the region ranges from approximately 450 to more than 8,000 feet, averaging 2,770 feet. Precipitation in this ecoregion ranges from approximately 5 to 11 inches per year, with slightly more winter than summer precipitation.

The Amargosa Valley averages 4.2 inches of rain annually, with annual extremes of anywhere from less than half an inch (0.45 inch in 2002) to more than 10 inches (10.4 inches in 1983) (Western Regional Climate Center, Amargosa Farms Garey, Nevada [Station 260150]). The Project area is characterized as creosote desert scrub, dominated by creosote bush (*Larrea tridentata*). It is a typical dry region of Mojave Desert, with relatively sparse shrub canopy and very little annual herbaceous growth except during wet years. The topography of the Project area is uniform with a few small, shallow washes that cross the site from north to south. The largest of these washes is Fortymile Wash that connects to the Amargosa River.

3.6.3 Data Collection Methods

A biological inventory of the Project area was conducted utilizing scientific literature, satellite imagery, agency contacts, and biological resource field surveys. Data were collected by Tierra Data, Inc. in the Project area in the spring and summer of 2009. Agency personnel were asked to provide information on potential or known occurrences of sensitive species of wildlife and plants and on habitats of special concern within the Project area and ROI. The following agencies were contacted for information: BLM, USFWS, and NDOW.

Data were collected and digitized into GIS format for:

- vegetation communities
- species listed as federally threatened, endangered, or as candidates under review for listing
- species classified as rare, sensitive, or otherwise protected by the State of Nevada
- areas of special biological value or interest, including riparian and wetland habitats

The report entitled “*Biological Resources Surveys for Amargosa Farm Road Solar Project*” (Tierra Data 2009) contains detailed information on the vegetation and wildlife resources inventoried. The results of the biological resources inventory are summarized below.

3.6.4 Vegetation

3.6.4.1 Vegetation Communities within the Region of Influence and Project Area

The ROI for botanical resources, including threatened, endangered, proposed, and candidate plant species, consists of areas that may be affected by permanent and temporary features of the Proposed Action and areas that may be impacted groundwater withdrawal. The extent of the ROI for botanical resources is based on the effects on surface and groundwater hydrology discussed in the analysis provided in Water Resources-Section 3.4 of this document. Based on these criteria, the ROI for direct impacts on botanical resources includes those areas in the immediate vicinity of the Proposed Action construction, operation, and maintenance activities. The ROI for indirect effects is the Amargosa Desert Hydrographic Basin #230.

The majority of the Project area is characterized as desert flats with Mojave creosote scrub (Holland code 34100; Hartman 2002) as the sole dominant community type. This community type is dominated by creosote bush, either as the sole dominant or co-dominant, with one or more other shrub species. Burrobush is the most typical co-dominant, followed by saltbush (*Atriplex* spp.) in more alkaline soils. The shrubs range from 1.5 to 9 feet tall, are widely spaced, and generally the ground between shrubs is essentially barren or contains very sparse forbs and grasses (Hartman et al. 2002). Growth occurs during spring (rarely in summer or fall) if rainfall is sufficient. Cold winters and droughts in other seasons can limit plant growth. Many herbaceous ephemeral species may flower in late March and April if winter rains are sufficient. Summer thundershowers can also trigger growth in these ephemeral species.

The soils where creosote scrub occurs are characterized as well-drained soils with very low available water holding capacity (Hartman 2002). They occur on slopes, alluvial fans, and valleys. Winter nighttime temperatures are often below freezing in these areas.

Creosote scrub is extensive and characteristic of the Mojave Desert, extending from the Death Valley region southward and across the Mojave Desert to the San Bernardino Mountains, and eastward to northwestern Arizona and southern Nevada (Hartman 2002).

A number of shallow ephemeral washes cross the western half of the Project area flowing from north to south; however, none have desert riparian trees typical of desert washes in more mesic regions, such as desert willow (*Chilopsis linearis*) or catclaw acacia (*Acacia greggii*). The washes in the Project are mainly unvegetated, or have a sparse shrub assemblage composed primarily of the surrounding desert flats. A few individuals of cheesebush (*Hymenoclea salsola*), a shrub species typical of desert washes elsewhere, do occur, but are sparse and widely scattered. In some places, the washes have well-developed banks, especially Fortymile Wash. Along the banks it is more common to see desert saltbush (*Atriplex polycarpa*) than in the uplands away from the banks.

3.6.4.2 General Vegetation Conditions within Project Area

The vegetation within the Project area is generally very sparse and dominated by creosote bush and burrobrush (*Ambrosia dumosa*), with very little herbaceous growth; most of which is confined to the shrub canopies or just a short distance beyond (Figure 3-11). Between shrubs the surface is mostly barren, desert pavement with a widely scattered growth of a few forb and grass species, primarily cryptantha (*Cryptantha* spp.), goldfields (*Lasthenia californica*), and devils spineflower (*Chorizanthe rigida*).

The relative proportions of these annuals tended to shift from mostly *Cryptantha* and *Schismus* in areas of creosote bush-burrobrush, to more *Chorizanthe* in areas dominated solely by creosote bush. Other forb species common on-site were various annual buckwheat species (e.g., flat-topped buckwheat [*Eriogonum deflexum*], Thomas' buckwheat [*Eriogonum thomasi*]), several species of the primrose (Onagraceae) family (e.g., devils lantern [*Oenothera deltoides*], Booth's evening primrose [*Camissonia boothii*]), and annual mustard species (none could be identified in 2009 since the only evidence observed was the remnants of previous years' growth, which lacked the identifiable structures necessary to identify the species). Other annual species documented in the species list compiled for this Project were scarce, occurring mostly as widely scattered individual plants.

Cacti found within the Project area are represented by just two species; golden cholla (*Cylindropuntia echinocarpa*) and beavertail pricklypear (*Opuntia basilaris* var. *basilaris*). Only seven cholla and two beavertail were found. All cacti, with the exception of two, were located in a small area in the northwestern quadrant of the Project site (Figure 3-11).

The washes located within the Project area are little more than shallow swales, with no riparian vegetation.






Amargosa Farm Road Solar Energy Project (NVN-84359)

Vegetation
Figure 3-11



LEGEND

 Project Area





Vegetation Association

-  Creosote Bush
-  Creosote Bush - Allysum
-  Creosote Bush - Bursage
-  Creosote Bush - Bursage - Saltbush
-  Creosote Bush - Saltbush
-  Sparse, wash

Cactus Species Detected

-  Golden Cholla (*Cylindropuntia echinocarpa*)
-  Beavertail Prickly Pear (*Opuntia basilaris*)

General Reference Features

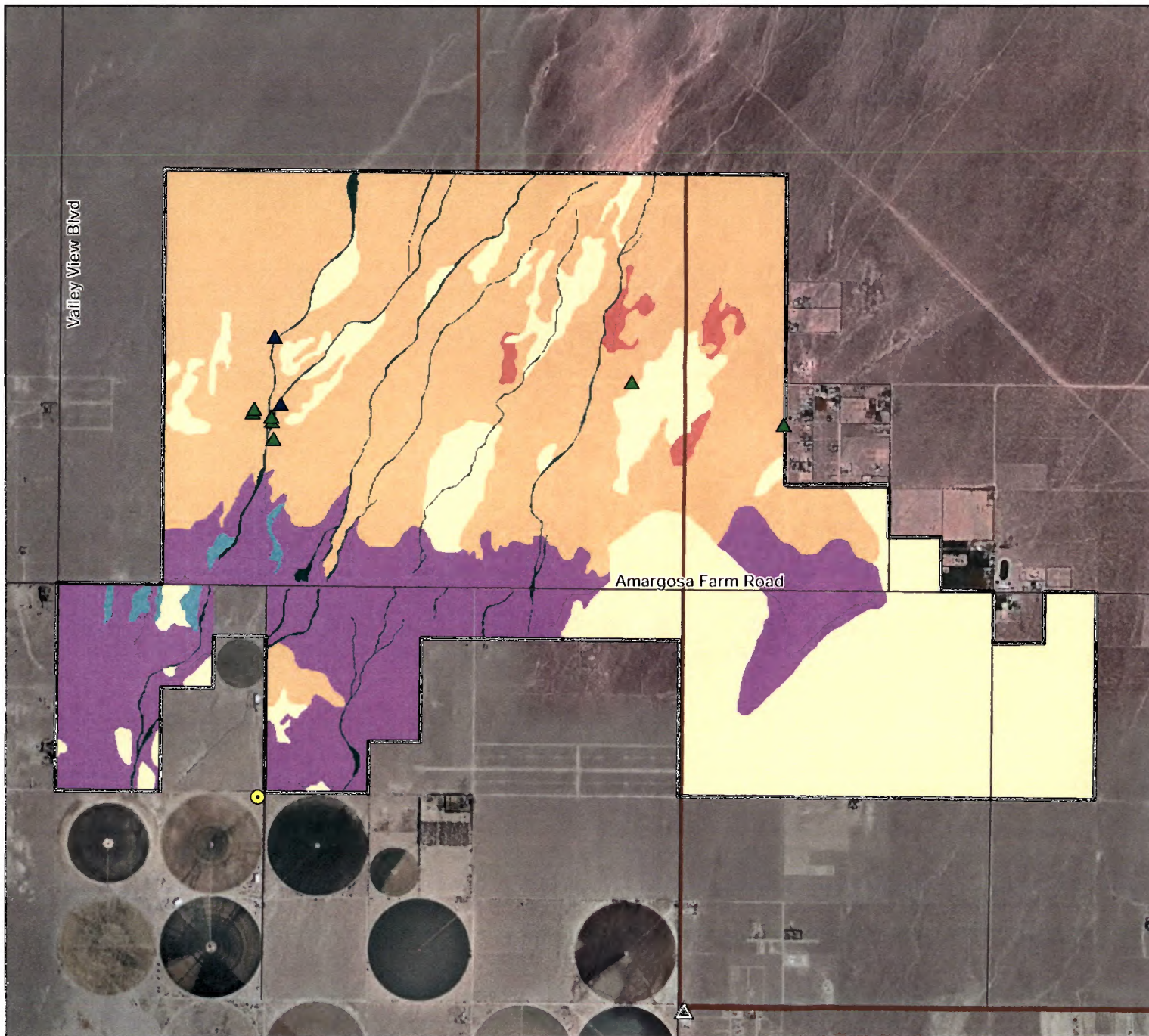
-  Proposed Project Well
-  Existing Substation
-  Local Road
-  Existing Transmission Line (<230kV)



Source: Vegetation, Species - TerraData, 2009;
Wells - Nevada State Engineer, 2008;
Local Roads - TerraSpectra, 2009;
Imagery - ESRI, 2009

September 2010

0 0.4 0.8
Miles



3.6.4.3 Non-native and Invasive Plants

Plant surveys conducted in spring 2009 found 8 species that are not native and may be invasive to the area (Table 3-13) (Tierra Data 2009).

Scientific Name	Common Name
<i>Bromus madritensis</i> ssp. <i>rubens</i>	red brome
<i>Datura stramonium</i>	jimson weed
<i>Erodium cicutarium</i>	redstem stork's bill
<i>Salsola</i> sp.	Russian thistle
<i>Salsola tragus</i>	spiny Russian thistle
<i>Schismus barbatus</i>	Mediterranean grass
<i>Sisymbrium irio</i>	London rocket
<i>Tamarix aphylla</i>	athel tamarisk

Red brome

Red brome (*Bromus madritensis* ssp. *rubens*) is the most widely scattered non-native grass species in the area, and is one of the most invasive because, once established, it becomes competitive with other grasses. The tolerance of this subspecies to high salt and high pH conditions partially explains its success in desert soils, but control may be possible by reducing seed production and increasing competition from native herbaceous plants.

Jimson weed

Jimson weed (*Datura stramonium*) is commonly found on dry rangelands and waste places, and was found scarcely scattered in the Project area. The seeds of this plant can lie dormant underground and germinate when the soil is disturbed.

Redstem stork's bill

Redstem stork's bill (*Erodium cicutarium*), also known as filaree, is a widespread annual species common in disturbed habitats. It has the capacity to form dense, transient populations when conditions are suitable.

Russian thistle

Russian thistle (*Salsola* sp.) is especially troublesome because it is very difficult to control once it becomes established. It is a common invader on disturbed sites and is extremely drought

tolerant, the taproot extends several feet into the soil to reach subsurface moisture. The numerous seeds are spread when mature plants are blown along by the wind. A few patches of spiny Russian thistle (*S. tragus*) were present, some of which consisted of numerous individuals and seedlings. The populations ranged from a few plants to greater than 20 plants. All individuals were located near roads, generally no more than 60 feet from the road edges. Control of Russian thistle is difficult. Biological agents were introduced in the 1970s, with little success.

Mediterranean grass

Mediterranean grass (*Schismus barbatus*) is common in agricultural and urban areas, occurring along roadsides, in cultivated fields, and other disturbed areas, although it can occur in undisturbed habitats as well, especially along river bottoms, plains, and hillsides in desertscrub. Activities that disturb the soil and reduce groundcover contribute to its spread. Mediterranean grass is commonly found in the spaces between shrubs, often producing a carpet of green that turns purplish at maturity and fades to a light straw color soon after death.

London rocket

London rocket (*Sisymbrium irio*) is abundant and widespread throughout North America, and appears to thrive along roadsides, waste places, and irrigated lands. It is one of the first weeds to appear in the winter, and because it is a prolific seeder, can be a troublesome invader.

Athel tamarisk

Various Tamarix species are listed as noxious weeds in Nevada; however, athel tamarisk (*Tamarix aphylla*), which was found in the Project area, is not regarded as weedy, nor is it considered an aggressive invader. All individuals were found near roads where they were planted in several locations around residential structures in adjacent neighborhoods; however, some of the individuals growing along roadsides were located within the Project boundary.

3.6.4.4 Federally Threatened, Endangered, Proposed, and Candidate Plant Species

No federally threatened, endangered, proposed, or candidate plant species were located during surveys of the Project area. However, the USFWS identified several threatened and endangered plant species with the potential of occurring within the ROI. Table 3-14 lists these species and identifies corresponding protection status for the BLM and the State of Nevada.

Table 3-14 Endangered and Threatened Plant Species that May Occur within the Region of Influence

Scientific Name	Common Name	Habitat	Endangered Species Act	State of Nevada	BLM
<i>Nitrophila mohavensis</i>	Amargosa Niterwort	Carson Slough – highly alkaline, moist, salt-encrusted soils	Endangered	Endangered	Sensitive
<i>Astragalus phoenix</i>	Ash Meadows Milkvetch	Ash Meadows – hard, white, alkaline clay soils	Threatened	Endangered	Sensitive
<i>Centaureum namophihum</i>	Spring-loving Centaury	Ash Meadows – seasonally flooded wetlands, moist alkali meadows, and edges of some scrub-shrub communities	Threatened	Endangered	Sensitive
<i>Enceliopsis naudicaulis var. corrugata</i>	Ash Meadows Sunray	Ash Meadows – dry washes and weathered saline soils	Threatened	Endangered	Sensitive
<i>Grindelia fraxinopratisensis</i>	Ash Meadows Gumplant	Ash Meadows – ash-screwbean mesquite woodlands and desert shadscale scrub vegetation	Threatened	Endangered	Sensitive
<i>Ivesia eremica</i>	Ash Meadows Ivesia	Ash Meadows – highly alkaline, clay lowlands or depressions where soil moisture remains high	Threatened	Endangered	Sensitive
<i>Mentzelia leucophylla</i>	Ash Meadows Blazing Star	Ash Meadows – upland alkaline soils found in arroyos and on knolls	Threatened	Endangered	Sensitive

All federally endangered and threatened plant species assessed in this document are endemic to the Ash Meadows NWR area. Ash Meadows NWR is home to 25 species of plants and animals found nowhere else in the world and are highly dependent upon available water (USFWS 1990). The Project area is located approximately 7 miles northwest of the edge of the Ash Meadows NWR, which is located within the ROI.

Amargosa Niterwort

Regulatory Status

The Amargosa niterwort (*Nitrophila mohavensis*) was first proposed endangered under the ESA on October 13, 1983 with six other rare plants and one insect species in Ash Meadows, Nevada and California (48 FR 46590-46598). It was finally listed as Endangered with designated critical habitat on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal

protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered endangered by the Nevada Native Plant Society (NNHP 2001). Designated critical habitat is located in Inyo County, California, approximately two miles northeast of the Amargosa River along Ash Meadows Road, approximately 0.75 miles south of the California-Nevada state line (USFWS 1990).

Species Description

The Amargosa niterwort was first collected by J.C. and A.R. Roos in 1955 (50 FR 20777-20794) and described by Munz and J.C. Roos in 1955 (48 FR 46590-46598; 50 FR 20777-20794). This small, 4-inch tall perennial herbaceous plant is a member of the goosefoot family, that comprises a group of herbs or shrubs that are often succulent or seurfy, and often weedy and frequently of saline or subsaline places (Munz 1974). The characteristic which identifies *Nitrophila* from other genera is the presence of sepals, that are strongly imbricate, scarcely united, and strongly chartaceous. The leaves are opposite and united at the base (Munz 1974). The Amargosa niterwort is one of two species included in the *Nitrophila* genus, and is identified by its 5-8 centimeter stems that are erect from extensive heavy underground root-stocks, round-ovate leaves, small, inconspicuous pink flowers and shiny black seeds (Munz 1974). *N. mohavensis* appears to be restricted to heavy alkaline mud in habitats at approximately 2,050 feet in elevation.

Status and Distribution

The Amargosa niterwort occurs in colonies of individuals linked by their large, rhizomatous roots in highly alkaline, moist, salt-encrusted clay soils within the southern portion of Carson Slough in Nevada and California. Carson Slough is a large and extensive marsh into which the waters from Fairbanks Spring drain, but has been obliterated due to the present large-scale exploitation of water resources for agricultural purposes. Only a few remnants of the marshland and its vegetation are known to exist today. The Carson Slough was not botanically surveyed prior to its destruction and there is no basis upon which to judge how many rare or possibly endemic species may have been lost (Conservation Management Institute [CMI] 1996).

When the species was listed in 1985, it was known from one location, the type locality, in the southern end of Carson Slough, approximately three miles northeast of Death Valley Junction, California (Beatley 1977; USFWS 2007a). Since the listing in 1985, five additional populations have been documented, totaling six populations; two in California and four in Nevada. In Nevada, populations were found at Crystal Reservoir, Central Carson Slough 1 on the NWR boundary line, Central Carson Slough 2 outside of the NWR, and the NWR West Entrance, north and south side of Spring Meadows Road. During surveys conducted by USFWS and USGS in 2005 and 2006, the species was found at five of the six known locations. During surveys conducted at the NWR West Entrance in 2006 resulted in no plants found. Currently, this population is likely extirpated from the location (USFWS 2007a). The most important *Nitrophila mohavensis* population is located in the Lower Carson Slough in California, but the Crystal Reservoir population in Nevada represents the second most important population for the species. According to the USFWS (2007a), the size and extent of the Crystal Reservoir population is not well characterized, but it appears to be the second most important population with respect to the

number of ramets observed. Ramets are the above-ground stems, that are the most visible to the naked eye, but they may not represent true numbers of plants because they reproduce underground as rhizomes, along which multiple ramets emerge.

The population at Crystal Reservoir occupies larger acreage than at Lower Carson Slough, but the population is smaller and less dense. In a 2005 survey conducted by Caicco (2005), the niterwort occupied approximately 25-30 acres. The remaining populations of niterwort in Nevada and California represent approximately two percent of the known distribution of ramets (USFWS 2007a). Based on available data, according to USFWS, the Lower Carson Slough population may be declining due to the species' inability to recover from impacts resulting from development activities (e.g., peat mining, water diversions, and groundwater pumping associated with large-scale farming in the NWR and Upper Carson Slough during the 1950s and 1960s). It also appears the extent of the Lower Carson Slough and Tecopa populations are also decreasing. According to the USFWS (2007a), little or no data are available to suggest trends for the populations at Tecopa and the NWR West Entrance.

Life History

There is little known about the life history of Amargosa niterwort, but it is known to be a long-lived perennial, reproducing underground. Its presence appears to be limited to areas that are highly alkaline in moist salt-encrusted clay soils. Observations indicate it is an extremely hardy plant that is tolerant of high soil salinity and alkalinity, and because of this, few other plant species occupy the habitat where it grows (USFWS 1990). Large rhizomatous roots connect many seemingly individual plants within a colony. Flowering occurs in late spring (NNHP 2001).

The niterwort is confined to specific habitat that is restricted to extremely local areas within or near the Carson Slough, where saline and alkaline sinks occur near the terminuses of seepage from springs that lie many miles to the north and east in Ash Meadows (50 FR 20777-20794).

Ash Meadows is a fragile ecosystem dependent on water, which enters a vast underground aquifer system. The water is known as fossil water because it takes thousands of years to move through the ground. The fault system blocks the flow of water, forcing it to the surface into 30 seeps and springs (Desert Gazette 2009). The hydrological and soil conditions at these sites make them uniquely suitable for Amargosa niterwort. Little is known regarding the subsurface flows in the Central and Lower Carson Slough that currently support the majority of the niterwort. A groundwater study conducted by Rowley in 2003, determined that groundwater entering Lower Carson Slough comes from three or four flow paths within the Death Valley Flow system that includes Ash Meadows subbasin and/or Alkali Flat Furnace Creek Ranch subbasin (Rowley 2003).

Threats to the Species

A significant portion of plant habitat in Ash Meadows was eliminated in the 1960s when Carson Slough was drained to facilitate peat mining, then large scale farming shortly thereafter. Even though Amargosa niterwort habitat was not plowed, free-flowing water to its habitat was halted by upstream plowing and reduction of spring flows resulting from groundwater pumping (48 FR

46590-46598). According to Reveal (1978), Amargosa niterwort is sensitive to disturbance and does not reestablish itself at sites where salt crust overlying the soil has been disturbed. The Nevada population lies in a remote area where the disturbance has been limited to trampling by wild horses and soil compaction by OHVs (USFWS 1990).

Throughout the species' range, three major threats have been identified by USFWS (2007a): (1) Ecosystem-based alteration, particularly habitat loss by changes in groundwater availability, (2) direct and indirect impacts resulting from surface mining, and (3) direct and indirect impacts resulting from raised construction of Ash Meadows Road. Currently, three of the four Nevada population sites face the threat of interruption of water supply to habitat. The fourth site at Crystal Reservoir, appears to be secure from the threat. Impacts to the niterwort due to groundwater pumping may not be immediately evident. Slow population declines can take years and trends may be masked by other factors such as annual variations in precipitation (USFWS 2007a). The Project area is located approximately 7 miles northwest of the Ash Meadows NWR within the adjacent Alkali Flat/Furnace Creek hydrologic subbasin; however, none of the Nevada population sites are within this subbasin (USFWS 2007a). Given the proximity and predicted flow paths, the Central and Lower Carson Slough populations of Amargosa niterwort likely receive water from both the Ash Meadows and Alkali Flat hydrologic subbasins (USGS 2002). The hydrology that supports the Crystal Reservoir population is poorly understood because at the time the Reservoir was constructed in 1970s, it was unknown whether the niterwort already existed there (USFWS 2007a).

The second major threat to all Ash Meadows species, including Amargosa niterwort, is habitat loss or degradation from surface mining. Mining directly and indirectly threatened the Lower Carson Slough population in California, and the four niterwort populations on the Ash Meadows NWR, which are on BLM and USFWS lands with public minerals. The third threat is from habitat degradation from construction of Ash Meadows Road. In late 1999 and early 2000, the California Department of Transportation improved Ash Meadows Road where it crossed the Lower Carson Slough and Amargosa niterwort habitat. California Department of Transportation raised the roadbed, which altered sedimentation patterns in the Carson Slough during thunderstorms or rare high flow events (USFWS 2007a). Other threats to the niterwort include trampling by wild horses and OHV activity, invasive species and fire, and damage to Crystal Spring Dam.

Species in the Project Area

The Project area is located approximately 12 miles northwest of the nearest known locations of the species in near Crystal Reservoir at Ash Meadows NWR. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFs.

Ash Meadows Blazing Star

Regulatory Status

The Ash Meadows blazing star (*Mentzelia leucophylla*) was listed as threatened with designated critical habitat on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered threatened by the Nevada Native Plant Society (NNHP 2001). Critical habitat consists of 1,240 acres in Ash Meadows at four locations; two along and just east of Carson Slough and two east of Carson Slough in close proximity to Devils Hole (50 FR 20777-20794).

Species Description

The Ash Meadows blazing star (*Mentzelia leucophylla*) was first collected in 1898 by Carl Purpus, and described by Brandegree in 1899 (USFWS 1990). Initially, the plant collected by Purpus was included with *M. oreophila* as a single species by Darlington in 1934 and Abrams in 1951. The reverse synonymy was published by Jepson in 1936 and Munz and Keck in 1959. Taxonomy of the species was in question until the issue was resolved in a status report completed by Reveal in 1977.

This small biennial or short-lived perennial is a member of the stick-leaf (blazing star) family that is comprised of a group of herbs that are pubescent with barbed or sometimes stinging hairs. The characteristics which most readily identifies *Mentzelia* from other genera is the presence of three placenta, seeds that are 1-4 millimeters, white to golden yellow flowers, and never with stinging hairs (Munz 1974). *M. leucophylla* has leaves that are densely covered with white hairs (NNHP 2001). Flowers are few, small, opening only briefly from May to September. In addition, the stems are covered with an epidermis that peels in long segments. Leaves are mainly basal, linear-oblong, 6-8 centimeters long, 1 centimeter wide, rigid, densely tomentose with strongly revolute margins. The seeds are flat and narrowly margined (Knight and Clemmer 1987).

Status and Distribution

The Ash Meadows blazing star occurs exclusively in Nye County, and is endemic to Ash Meadows. The local distribution of small populations suggests the species is extremely vulnerable to any land disturbance (USFWS 1990). It has been suggested that past development for agriculture is believed to have eliminated some populations within their range (Reveal 1978). Few individuals occur at any one site, with fewer than 200 individuals estimated on the refuge; however, because the species blends in well with the landscape, plants may be missed during surveys. Currently, four populations occur in Nevada, all of which are within designated critical habitat. They include (1) Purgatory Spring, (2) Old Rooker Ranch-Cold Spring, (3) North County Road, and (4) Marsh to Bradford springs (Knight and Clemmer 1987).

Life History

Mentzelia leucophylla is a small biennial or short-lived plant that occurs only in Ash Meadows, in clay soils of spring areas, especially along canyon washes where *Atriplex* is common, at

elevations ranging from 2,200-2,300 feet amsl (Beatley 1976). Mozingo and Williams (1980) suggests, in addition to clay soils, it also occurs in sandy or saline clay soils in plant communities dominated by, *Atriplex confertifolia*, *Haplopappus acradenius*, *Cryptantha confertiflora*, *Enceliopsis nudicaulis* var. *corrugata*, and *Astragalus phoenix*, at elevations 2,200-6,500 feet amsl. The USFWS suggests that the species is associated with upland alkaline soils found in arroyos and on knolls only within the more xeric portions of Ash Meadows (50 FR 20777-20794). However, this uncommon plant is often found with Ash Meadows milkvetch and Ash Meadows sunray. According to the USFWS (1990), the Ash Meadows blazing star is probably the rarest of all plant species endemic to Ash Meadows. Although little is known about its life history or habitat requirements, it is known to occupy alkaline soils in dry washes and on barren bluffs distributed along the eastern edge of Ash Meadows. Bright yellow flowers bloom from late May into September and are open only for brief periods in late afternoon (NNHP 2001).

Threats to the Species

According to USFWS (50 FR 20777-20794):

“Existing populations have been greatly reduced from those known to have occurred 15 years ago by habitat disturbance during road construction, cropland development, and peat mining in Carson Slough. Threats to its existence include alteration of storm drainage patterns through arroyos by road construction, habitat destruction in locations where road construction activities are proposed, and the trampling by wild and free-roaming horses.”

The blazing star is narrowly confined to a spring-fed desert wetland area with extreme saline soils. Eight sites are known in Nevada, which are threatened by development. Agricultural development and the associated large-scale exploitation of the region’s water resources have destroyed large portions of the local native flora (NatureServe 2009).

The local distribution of small populations suggests the species is vulnerable to any level of disturbance. In addition to trampling by wild and free-roaming horses and agricultural development, USFWS (1990) also suggests trampling by other livestock and disturbance caused by OHV travel as major threats to these small, fragile populations.

Species in the Project Area

The Project area is located approximately 9 miles northwest of the nearest known locations of the species in Nevada at Ash Meadows and Carson Slough. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFs.

Ash Meadows Gumplant

Regulatory Status

The Ash Meadows gumplant (*Grindelia fraxino-pratensis*) was listed as threatened with designated 1,968 acres of designated critical habitat for the species under the ESA on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered endangered by the Nevada Native Plant Society (NNHP 2001). Designated critical habitat is located in Inyo County, California and Nye County, Nevada, at 11 locations east of Carson Slough, and one site on the west side of the Slough (USFWS 1990).

Species Description

The Ash Meadows gumplant was first collected in 1965 by Beatley, and described by Reveal and Beatley in 1971 (50 FR 20777-20794). This tall (70-100 centimeters) biennial (or short-lived perennial) herbaceous plant is a member of the sunflower family, the largest family of vascular plants, with possible 950 genera and 20,000 species, chiefly herbaceous, and world-wide in distribution (Munz 1974). There are one to three stems arising from a woody root-stock. The stems are glabrous, leafy, and openly branched in their upper halves. The leaves are leathery, dark green, and dotted with resinous glands. Basal leaves are oblanceolate and 4 to 7 centimeters long while the stem leaves are oblanceolate to oblong and 1.5 to 5.0 centimeters long. The leaf edge is entirely to somewhat toothed at the apex (Mozingo and Williams 1980).

Status and Distribution

The Ash Meadows gumplant is endemic to the Ash Meadows area in Nye County, Nevada and Inyo County, California, and is concentrated in three main populations and several smaller ones, covering approximately 2,260 acres (BLM and USFWS 2000a), mostly within the boundaries of the Ash Meadows NWR, but one population occurs outside the wildlife refuge, but within the Ash Meadows ACEC managed by the BLM. This large population extends approximately one mile into Inyo County, California. Most of the populations were surveyed in 1998, and plants were confirmed at all sites identified in 1985; however a few small populations on private lands were not surveyed and six new sites were discovered during the 1998 surveys (Glennie 1998; Alexander 1998). Based on survey history, it appears the gumplant has increased its distribution since the species was listed in 1985, probably due to the conversion of some agricultural lands back to a natural state, and the species ability to recover in disturbed habitats (USFWS 2007b; Mozingo and Williams 1980).

According to USFWS (2007b), there is little quantitative or demographic data to describe trends for the Ash Meadows gumplant. In 2000, the entire population, based on visual estimates of 81,000 plants, was likely a serious underestimate of the total number of plants actually present. A 2002 survey conducted in California found approximately 241,514 (+ or - 69,660) plants on 88 acres.

Life History

The Ash Meadows gumplant is a biennial or short-lived perennial that occurs generally in moist saltgrass flats and near stringer washes and pools with high water table, at elevations ranging from 2,070 to 2,320 feet amsl (Center for Biological Diversity 2009). It has been associated with ash-screwbean mesquite woodlands and desert shadscale scrub vegetation. It occasionally occurs on open alkali clay soils in drier shadscale habitats (BLM 2009a). According to the NNHP (2001), the gumplant occurs in open, flat, whitish, strongly alkaline, moist and hard to sometimes dry and powdery clay soils in or bordering meadows and shallow drainages near springs and seeps. It sometimes occurs in disturbed and somewhat weedy areas in ereosote bush-bursage and shadscale zones in ash-mesquite woodlands, shadscale scrub, or saltgrass meadows with *Prosopis* spp., *Fraxinus* spp., *Atriplex confertifolia*, *Centaurium namophilum*, *Distichlis spicata*, *Sporobolus airoides*, *Baccharis emoryi*, *Iva acerosa*, *Tamarix ramosissima*, and *Cirsium mohavense*. Best population development is on moist intact soils (Knight and Clemmer 1987). The meadow ecosystem occupied by Ash Meadows gumplant is also commonly associated with spring-loving centaury (*Centaurium namophilum*), yerba mansa (*Anemopsis californica*), western niterwort (*Nitrophila occidentalis*), and California loosestrife (*Lythrum californicum*). Additional species associated with the gumplant in shadscale scrub include desert isocoma (*Isocoma acradenius*), alkali rabbitbrush (*Chrysothamnus albidus*), and sealight (*Saueda* spp.) (Cochrane 1981).

New leaves of the gumplant start growing in June or July, and budding occurs from July through August. Beginning in June, the plant produces daisy-like bright yellow flowers, with fruit produced in early October. The seeds are very light and can be blown by the wind for a long distance. Seeds that fall near the parent plant may also be transported by water during winter rains or summer flash floods. Mammals, birds, and ants may also aid in seed dispersal. The germination date of seeds is unknown (Center for Biological Diversity 2009).

Threats to the Species

Throughout the species' range, three major threats have been identified by USFWS (2007b): (1) Loss of habitat from groundwater pumping; (2) invasive non-native species; and (3) surface mining. During the 1985 final rule to list the Ash Meadows gumplant, interruption of water supply was identified as a major threat to the species. This threat continues today as groundwater pumping occurs on a regional scale, particularly from the Alkali Flat/Furnace Creek Ranch hydrologic basin in Amargosa Valley, at approximately two times the rate predicted to be sustainable (USGS 2005). The NPS has indicated that the number of water rights issued by the State of Nevada for Amargosa Valley has grossly exceeded sustainable levels and the resource is over-allocated (Baldino 2006).

The second largest threat to the Ash Meadows gumplant, and all native flora, is the infestation and establishment of non-native species. According to Pimental et al. (2005), approximately 42 percent of all threatened and endangered species in the U.S. are at risk because of non-native species. Because agricultural land is common throughout the area, noxious weeds commonly associated with agriculture include Russian knapweed (*Acroptilon repens*), five hook bassia (*Bassia hyssopifolia*), Malta star thistle (*Centaurea melitensis*), yellow star thistle (*Centaurea solstitialis*), and hoary cress (*Cardaria draba*) (USFWS 2006a). The weeds directly compete

with native species for water, nutrients, and sunlight, and alter ecosystem processes such as nutrient cycling and fire regime. The adaptations of noxious weeds present on the Ash Meadows NWR allow them to out-complete native flora and colonize undisturbed habitat (USFWS 2007b). The wet meadows are particularly vulnerable to invasion by noxious weeds because it provides favorable conditions to invade sites that are occupied by the gumplant. The agricultural fields adjacent to large populations of Ash Meadows gumplant are infested with Russian knapweed, bassia, and Malta star thistle (USFWS 2007b).

Fire facilitated by non-native species is a threat that was not identified in the 1985 listing document. Where weeds are present, anecdotal observations suggest fire appears to provide an opportunity for non-native plants to expand on the wildlife refuge where most of the gumplant exists. Because weeds alter fire regimes by increasing the ease with which fires spread through riparian corridors and along spring channels, they destroy native plants and their habitats. The hardier non-natives typically prevent regrowth and colonization of native plants after fires, causing reduction in native plant cover and diversity (USFWS 2007b).

Surface mining has remained a threat to the Ash Meadows gumplant since it was listed in 1985. Direct impacts to the plant as result of mining include loss of habitat. Indirect impacts are caused by diverting or draining water away from its habitat during mining operations (USFWS 2007b). However, there are plans to withdraw BLM and USFWS lands with public minerals, so the threat caused by surface mining is looking more optimistic for the species. Other threats to the gumplant include trampling by cattle and wild horses, OHV activity, and potential stochastic and natural catastrophic events (USFWS 2007b).

Species in the Project Area

The Project area is located approximately 11 miles northwest of nearest known locations of the species within or adjacent to the Ash Meadows NWR. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFS.

Ash Meadows Ivesia

Regulatory Status

The Ash Meadows ivesia (*Ivesia eremica*[=*I. kingii* var. *eremica*]) was listed as threatened with designated critical habitat under the ESA on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered threatened by the Nevada Native Plant Society (NNHP 2001). Designated critical habitat is located at five general locations east of Carson Slough (large and extensive marsh) in Nye County, Nevada (50 FR 20777-20794).

Species Description

The Ash Meadows ivesia (*Ivesia eremica*[=*I. kingii* var. *eremica*]) was first discovered by Coville and Funston on March 2, 1891 near Watkins Ranch, south of Devils Hole in north Ash Meadows, Nye County, Nevada (Beatley 1976; Knight and Clemmer 1987). It was originally described as *Potentilla eremica* in 1892, because remains of spent flowers were collected in mid-winter and was thought to be *P. santolinoides*, but was later changed to *Ivesia eremica*. Coville and Funston found *Ivesia* only in one location east of Watkins/Collins Ranch in an alkaline limestone marsh with *Spartina gracilis*, *Anemopsis californica*, and *Schoenus nigricans* (Beatley 1977). As of 1987, the taxonomy of the species and genus has been controversial. The *Horckelia-Ivesia-Potentilla* complex went through revision, and *Ivesia eremica* became the accepted name of the plant, although some botanists question whether this taxon is distinctive enough to be maintained as a discrete variety of the species *I. kingii*. The species as a whole is extremely variable and somewhat rare (NNHP 2001).

This tall, prostrate perennial herb is a member of the rose family. It grows from an erect thick woody root that bears a basal tuft of grayish pubescent leaves. The leaves are pinnately compound with 60 pairs of overlapping leaflets covered with fine hairs (Knight and Clemmer 1987). Flowering stems are about 9 centimeters long and bear white flowers from August to October (NNHP 2001). Plants occur as solitary clumps not exceeding 4.8 centimeters high and 25 centimeters in diameter (USFWS 1990).

Status and Distribution

As of 1987, seven populations were located in Ash Meadows. They included: (1) Old Rooker Ranch; (2) Shaft-Chalk springs; (3) Mary Scott-Indian-School-Crystal Pool springs; (4) Crystal Pool/Amargosa Reservoir; (5) Collins Ranch; (6) Bluffs west of County Road; and (7) Tubbs-Love ranches (Knight and Clemmer 1987). According to USFWS (1985), existing populations were smaller and less numerous than those known historically because of habitat eliminations during agricultural development. From 1987 through 2001, eight occurrences were mapped totaling 3,862 plants covering approximately 9.1+ acres (NNHP 2001), but are now more widely distributed.

Life History

There is little known about the life history of Ash Meadows ivesia, but it is known as a matted perennial herb that flowers from August to October. All other stages including germination, leafing, budding, fruiting and fruit dispersal and dissemination agents are unknown (CMI 1996).

Ash Meadows ivesia is associated with highly alkaline, clay lowlands or depressions where soil moisture remains high from perched groundwater maintained by springs and seeps (50 FR 20777-20794). It occurs only in the mesic, meadow areas of just north and east of Ash Meadows at elevations ranging from 2,200- 2,300 feet amsl (CMI 1996). The flat, mesic, meadow areas with white, alkaline clay soils are remnants of Pleistocene age lakes. The ivesia is associated with *Distichlis spicata* var. *stricta*, *Centaurium namophilum*, *Haplopappus acradenius*, *Spartina gracilis*, *Juncus balticus*, and *Cordylanthus tecopensis* (Knight and Clemmer 1987). According to NNHP (2001), Ash Meadows ivesia occurs in open, moist to saturated, whitish, heavy, to

chalky soils on flats, drainages, and bluffs near springs and seeps, in saltgrass meadow, shadscale, and ash-mesquite vegetation with *Atriplex confertifolia*, *Prosopis* spp, *Cirsium mohavense*, *Fraxinus velutina*, *Anemopsis californica*, and *Iva acerosa*.

Threats to the Species

Threats to the Ash Meadows ivesia include trampling by cattle, wild horses, and sheep, and spring diversions and groundwater pumping resulting in the drying of soils and elimination of its habitat (USFWS 1990). The existing populations are smaller and less numerous than those known historically because of habitat eliminations during agricultural development, including cropland development, spring alteration, and stream channelization and diversion, and during road construction occurring with municipal development (50 FR 20777-20794).

Groundwater depletion, drying ivesia habitat, poses the greatest threat to the existence of the species. Its dependence on perched groundwater issuing from seeps and springs or their outflows makes it extremely vulnerable to decreases in spring discharge that result in less water seeping to areas distantly removed from water sources (50 FR 20777-20794). In addition, road construction could eliminate populations by passing through habitat or interrupting drainage patterns and drying areas that were previously moist. Approximately 45 percent of the known populations occur on the Ash Meadows NWR.

Species in the Project Area

The Project area is located approximately 9 miles northwest of the nearest known locations of the species in Nevada at Ash Meadows and Carson Slough. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFS.

Ash Meadows Milkvetch

Regulatory Status

The Ash Meadows milkvetch (*Astragalus phoenix*) was proposed threatened under the ESA on October 13, 1983 with six other rare plants and one insect species in Ash Meadows, Nevada and California (48 FR 46590-46598), and finally listed as threatened with designated critical habitat on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered threatened by the Nevada Native Plant Society (NNHP 2001). Designated Critical habitat includes nine small areas east of Carson Slough at Ash meadows in Nye County, Nevada. This designation includes 1,200 acres of dry, hard, white, barren saline, clay flats, knolls, and slopes, which is the only suitable habitat for the plant (USFWS 2009a).

Species Description

The Ash Meadows milkvetch was first collected in Ash Meadows by Carl Anton Purpus in 1898. His original specimen was left unnamed until botanist Art Cronquist (1972) collected and named a second better specimen in 1966. It was finally described by Rupert Barneby in 1970 (Barneby 1970). This low, mat-forming perennial herb is a member of the legume or pea family, which is comprised of 450-500 genera and many thousands of species, many of great economic importance for food, forage, dyes, and wood (Munz 1974).

The plant forms mounds that are up to 40-50 centimeters across. The older stems characteristically have a flaking bark. The leaves, which are densely covered with coarse, white hairs, are 1.5 to 3.5 centimeters long and bear 2 to 3 ovate to obovate leaflets which are 3 to 7 millimeters long. The stipules are 2 to 3 millimeters long, pubescent on the outer surface and glabrous on the inner surface. The pinkish to purple flowers are borne on short, erect stems in a mat and commonly number only one or two per inflorescence. No other species occurs within the known range of *Astragalus phoenix* with which it could easily be confused. The flowers are very similar to those of *A. newberryi* Gray, but the latter is vegetatively very different in that it does not form the dense mound of foliage typical of *A. phoenix* (Mozingo and Williams 1980).

Status and Distribution

The Ash Meadows milkvetch is endemic to the Ash Meadows area in Nye County. Its range includes the Ash Meadows NWR, a small portion of the BLM Ash Meadows ACEC adjacent to the northeastern refuge boundary, and private lands within the refuge boundary. The plant was originally known from six sites in spring areas of north and east Ash Meadows (Beatley 1976). Two years later, Reveal (1978) estimated the population to contain 1,000 individuals. Cochrane (1981) identified 19 localities at which the milkvetch had been reported. Knight and Clemmer (1987) reported the species at six sites, which represented subpopulations of one historically larger, biological unit growing as adaphic endemics. In 1998, survey efforts concentrated on the six sites identified by Knight and Clemmer in 1987, and the total population was estimated to be about 1,800 plants on 847 acres (BLM and USFWS 2000b.).

Refuge-wide surveys of listed and rare plants, including, Ash Meadows milkvetch, were begun in 2008. As a result of these surveys, the total population on the wildlife refuge is estimated at 11,643 individuals on about 800 acres (Bio-West 2008a). According to Bio-West (2008a), a large area on public land occupied by the milkvetch was newly discovered adjacent to a previously known population on private land in 2008. The occupied area at most other previously reported sites was also extended.

Life History

The life history and habitat requirements of Ash Meadows milkvetch are largely unknown (USFWS 1990), but appear to be consistent with a stress-tolerant life history as described by Grime (1977). It is known to be a long-lived perennial composed of spreading branches that eventually form large, pulvinate mounds. Both foliage and fruit are matted with dense, grayish hairs. The plants accumulate air-borne particles, becoming partially buried by maturity (Knight and Clemmer 1987).

Stress-tolerant plants are typically long-lived with low annual production, except during favorable conditions (Grime 1977). According to Reveal (1978), winter and early spring rains are required to produce large numbers of flowers, but some flowering occurs each year regardless of climatic conditions. Flowering occurs in early spring from March to late May with fruit forming in April and lasting to June-July. It appears that population growth is constrained by low seed output per plant when precipitation is low. The opposite is generally true when there is above average precipitation. However, in a study conducted by Pavlik et al. (2006), seedlings were not observed at four of the six known sites during a year with above average precipitation. It was suggested that either the seed bank was depleted or the species was dependent on the most extreme and infrequent precipitation events. Wind and water appear to be the primary vectors for dispersal of seeds, and these seeds typically remain within the leaves and branches of the parent plant (USFWS 2009b).

Stress-tolerant species, like Ash Meadows milkvetch are generally slow to recover from disturbance, and given the little known life history of the plant and its naturally low rate of reproduction, it is unlikely that severely disturbed habitat has recovered. However, the slow population increases are probably the result of new protections implemented at Ash Meadows since it was established as a wildlife refuge (USFWS 2009c).

The Ash Meadows milkvetch grows between 2,200 and 2,300 feet elevation amsl, and appears to be restricted to flats and knolls of hard, white, alkaline clay soils in the Ash Meadows area (Knight and Clemmer 1987). The specific hydrological requirements for the species are largely unknown, but surface and subsurface groundwater that reaches the surface through capillary action may be an important habitat determinant for at least some of the populations of the species. The primary constituent elements of designated critical habitat consist of the biological and physical attributes essential to the species' conservation within those areas (USFWS 2009c). Those elements include hard, white, barren, saline, clay flats, knolls, and slopes (USFWS 2009c). Plant species associated with the Ash Meadows milkvetch include, saltgrass, shadscale, Ash Meadows blazing star, Alkali golden bush (*Isocoma acradenius*), and Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*) (Knight and Clemmer 1987).

Threats to the Species

The threats to Ash Meadows milkvetch are consistent with those of other Ash Meadows plants and ecosystem including: (1) Present and threatened destruction, modification, or curtailment of habitat or range (e.g., groundwater withdrawal, surface mining, proposed road construction); (2) inadequacy of existing regulatory mechanisms; (3) other natural or manmade factors affecting continued existence (e.g., trampling by wild horses) ; (4) non-native species; (5) rabbit herbivory of flowers and fruits; (6) OHVs; (7) stochastic events affecting species with restricted ranges or small population sizes; and (8) climate change (USFWS 2009c).

At the time of listing, groundwater development was a major threat to the milkvetch and the entire Ash Meadows ecosystem. The milkvetch depends, in part, on near-surface water for its survival. Water levels in Devils Hole stabilized after groundwater pumping on the refuge stopped in 1975; however, the water level in Devils Hole declined 7 centimeters between 1988 and 2004, and increased again after a wet year. As groundwater pumping at Ash Meadows decreased, it

increased in the Amargosa Valley, and is currently occurring in some areas of the basin at about twice the rate predicted to be sustainable (USGS 2005).

Habitat loss or degradation from surface mining occurs in the Ash Meadows area. New mineral claims and subsequent mining could cause direct loss of Ash Meadows milkvetch habitat, as well as indirect impacts by diverting or draining water away from occupied habitat. Surface mining of a valid existing mining claim on private land within the wildlife refuge, therefore, poses a significant threat to one of the six known populations of Ash Meadows milkvetch. Alteration of the local groundwater table from mining could negatively affect this population and adversely modify its critical habitat on adjacent public land (USFWS 2009c).

New proposed road construction is not a threat to the milkvetch; however, some populations along the Ash Meadows Road may have been affected by the disruption of surface flows due to prior road construction. The species is found on the floor of washes and water has been identified as one of the vectors by which its seed may be distributed (Reveal 1978).

Non-native species impact approximately 42 percent of all federally listed and rare plants in the United States. (Pimental et al. 2005). They compete directly with native species for water, nutrients, and sunlight, and indirectly by altering ecosystem processes such as nutrient cycling and fire regimes (Brooks et al. 2004). The flats and knolls of hard, dry, alkaline clay that support the Ash Meadows milkvetch is a harsh environment, so weeds have not been identified as a major threat to the species. However, salt cedar (*Tamarix ramosissima*), Russian knapweed, five hook bassia (*Bassia hyssopifolia*), Malta star thistle, yellow star thistle, and hoary cress are noxious weeds that could potentially threaten Ash Meadows milkvetch (USFWS 2006b).

Species in the Project Area

The Project area is located approximately 9 miles northwest of the nearest known locations of the species in Nevada at Ash Meadows and Carson Slough. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFS.

Ash Meadows Sunray

Regulatory Status

The Ash Meadows sunray (*Enceliopsis nudicaulis* var. *corrugata*) was first proposed as threatened under the ESA on October 13, 1983 with six other rare plants and one insect species in Ash Meadows, Nevada and California (48 FR 46590-46598), and was listed as threatened with designated critical habitat on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered threatened by the Nevada Native Plant Society (NNHP 2001).

Approximately 1,760 acres of designated critical habitat are located in the Ash Meadows area in Nye County, Nevada, approximately 7 miles southeast of the Project (USFWS 1990). It includes nine locations, comprised of three main subpopulations, along and east of Carson Slough and in the vicinity of Devils Hole. Some of this area overlaps with critical habitats for the Ash Meadows milkvetch and Ash Meadows blazing star (USFWS 1990).

Species Description

Ash Meadows sunray was described in 1972 from specimens collected by Cronquist in 1966 in north Ash Meadows (Cronquist 1972; Beatley 1976). This medium-sized perennial shrub is a member of the sunflower family, the largest family of vascular plants, with a possible 950 genera and 20,000 species, chiefly herbaceous, and world-wide in distribution (Munz 1974). It forms clumps 10–40 centimeters high from a stout, woody root-stock. The leaves, which are densely tomentose with fine grayish-white hairs, are relatively small, with a blade about 1 to 3.6 centimeters long. They are ovate to subcircular in shape. The leafless flower stalks bear individual heads with disks 0.8 to 1.4 inches across. The ray flowers number 11 to 23 and possess yellow corollas 2 to 2.5 centimeters long. The disk flowers are strongly compressed. The silky-pubescent achenes bear 2 short awl-shaped awns connected by a whorl of short, fused scales, but sometimes the pappus are absent on the achenes. This variety appears as a geographically peripheral phase of the species *E. nudicaulis*, and is distinctive in habitat and morphological features (CMI 1996). The varietal name, *corrugata*, refers to its strongly ruffled-corrugate leaves (Mozingo and Williams 1980).

Status and Distribution

This variety of sunray is found in local populations in or near limestone mountain ranges or limestone outcrops. Historically, the plant occupied the southern end of Monitor Range, northern Belted Range, and the foothills of Quinn Canyon Range at elevations ranging from 3,300 to 6,400 feet amsl. (Beatley 1976). The elevational range was also reported from 2,300 to 2,410 feet in Mozingo and Williams (1980). The Ash Meadows sunray is endemic to Ash Meadows where it occupies dry washes and weathered saline soils. According to USFWS (50 FR 20777-20794):

“It is one of the more common species of plants endemic to Ash Meadows but its populations have been reduced during the past 15 years by habitat elimination for agricultural production, the initial phases of PEC’s development, and road construction.”

PEC (Preferred Equities Corporation) is a real estate developer that purchased land in Ash Meadows during the 1980s.

In the late 1980s, the sunray was found throughout the Ash Meadows NWR, and was the most widespread of the rare species, but populations were destroyed during road construction, land leveling for crops, and alterations for municipal development between 1970 and 1985 (USFWS 1990, 2009b).

At Rogers-Purgatory-Longstreet Springs along Carson Slough, the habitat is variably disturbed from clay mining and OHV use. There are two distinct populations in this area. In central Ash

Meadows, the populations are very large but are somewhat fragmented occurring from the terrace overlooking Old Rooker Ranch to Collins Ranch and southwest to Amargosa Reservoir. This area is riddled with roads, OHV tracks, agricultural fields, and other human-caused disturbances (Knight and Clemmer 1987). Within the southeast portion of Ash Meadows, sunray populations and habitat run from west of the county dirt road to Jack rabbit Spring and south nearly to Big Spring. The area is disturbed by county and private roads, private ranches, and natural and altered drainage patterns from the springs (Knight and Clemmer 1987).

Life History

There is little known about the life history and habitat requirements of the Ash Meadows sunray, particularly the reproductive phenology except that flowering occurs between April and May. It flowers coincidentally with the Ash Meadows milkvetch. A single plant usually produces a number of flowering stalks, each supporting an individual yellow flower (USFWS 1990).

It typically occurs in whitish, poorly drained, alkaline soils along dry washes or on pale, hard limestone outcrops. The region within which this plant grows is relatively dry; rainfall in Ash Meadows averages three to five inches per year, falling mainly in the autumn and winter with some sporadic summer rains (CMI 1996). *Enceliopsis* is generally a common component of the perennial flora. Much of the lower elevation alkali clay soils have underlying water table making the habitat inappropriate for *Enceliopsis* distribution. This is particularly true along the western and southern borders of the wildlife refuge (Knight and Clemmer 1987). It occupies habitats of the Ash Meadows milkvetch and Ash Meadows blazing star in addition to areas that are more densely vegetated with *Ambrosia dumosa*. According to Mozingo and Williams (1980), individuals are restricted to dry, upland areas outside the influence of water from seeps and springs. However, recent soil surveys have revealed that approximately 14 percent of the populations occur on landtypes that are saturated to the surface or to within 50 cm in the winter months (Novosak 2010, personal communication). In CMI (1996) and Knight and Clemmer (1987), Ash Meadows sunray is associated with *Atriplex confertifolia*, *Haplopappas acradenius*, *Arctomecon merriami*, and *Cryptantha confertifolia*.

Threats to the Species

Recent losses of habitat due to agricultural and municipal/residential development activities, land clearing for road construction, groundwater removal and surface spring diversion and local mining activities, all have threatened the species habitat and ultimately their survival. Ash Meadows remained largely intact until 1967 when PEC purchased large tracts (approximately 20 square miles) in the northern and eastern regions. In their attempt to farm the land, they plowed large areas of land and installed pumps at the springs. These alterations virtually obliterated the natural features of the area including Carson Slough and its surrounding vegetation. Corporate farming failed in the area and it was abandoned in 1975 (CMI 1996).

Currently, the plant is threatened primarily by large-scale destruction of the native flora over large portions of the Ash Meadows area caused by continued agricultural development, road construction, and OHV activity (CMI 1996). Habitat destruction and mineral development has broken the hard, xeric alkali clay slopes of the upland topography into sporadic patterns (Knight

and Clemmer 1987). The sunray's distribution appears to be limited to a particular edaphic condition in washes weathered saline soils. Any further loss of its habitat would probably be detrimental to the species survival (CMI 1996).

Species in the Project Area

The Project area is located approximately 9 miles northwest of the nearest known locations of the species in Nevada at Ash Meadows and Carson Slough. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFS.

Spring-Loving Centaury

Regulatory Status

The variety of spring-loving centaury (*Centaureum namophilum* var. *namophilum*) was proposed endangered under the ESA on October 13, 1983 with six other rare plants and one insect species in Ash Meadows, Nevada and California (48 FR 46590-46598). However, USFWS later did not accept the validity varietal designations for *C. namophilum*, so the entire species was listed as threatened with designated critical habitat on May 20, 1985 (50 FR 20777-20794). The plant was included in a recovery plan at Ash Meadows with 11 other federally listed species in 1990 (USFWS 1990). In addition to federal protection, it is fully protected in Nevada, is a BLM Special Status Species in Nevada, and is considered threatened by the Nevada Native Plant Society (NNHP 2001). Approximately 1,840 acres of designated Critical habitat are scattered in or adjacent to Ash Meadows in Nye County, Nevada, approximately 7 miles southeast of the Project (USFWS 1990).

Species Description

The taxonomy of the spring-loving centaury has been a contentious issue since the 1970s. The spring-loving centaury was first collected in 1891 by Coville and Funston, while on the Death Valley expedition (Knight and Clemmer 1987), but was not described until 1973 by Reveal, Broome, and Beatley (Reveal et al. 1973; 50 FR 20777-20794). According to Broome (1981), the plants collected from the Furnace Creek area in Death Valley closely resembled specimens of *C. namophilum* var. *namophilum* found in Shoshone and Tecopa in Inyo County, but due to certain morphological characteristics, the specimens were likely to be a second variety; *C. n.* var. *nevadense*. During Broome's survey in 1981, she also found *C. n. namophilum* near Beatty, Nevada, although Morefield (1991) did not relocate it, but found several populations of *C. exaltatum* and *C. calycosum* instead. Intermountain flora and Jepson Manual treatments combined *C. n. nevadense* with *C. exaltatum*, and *C. n. namophilum* became a valid taxon without varietal distinctions. It is now officially identified as *Centaureum namophilum*, and is currently restricted to Ash Meadows (USFWS 2009d; Knight and Clemmer 1987; 50 FR 20777-20794; USFWS 1990).

This annual herb is a member of the pea family, comprised of over 65 genera and 600 species, is widely distributed, but most abundant in temperate regions. A colorless bitter juice is a distinguishing characteristic of the family (Munz 1974). The spring-loving centaury is an erect, annual herb, up to 45 centimeters tall with flowering stems borne from the base and flowering lateral branches. Stems and herbage are glaucous and the leaves are opposite, not forming basal rosettes. Stems are yellowish to tannish with internodes up to 4 centimeters long. Inflorescences extend more than half the length of the plant, and are paniculate-cymose (Knight and Clemmer 1987). Flowers are deep rose-pink above and below. The throat is yellowish with five dark purple spots below the juncture of adjacent petals (Reveal et al. 1973).

Status and Distribution

Historically, the plant probably occupied all the springs and seeps in the northern and eastern sections of Ash Meadows until development in the 1960s through 1980 reduced its distribution to small isolated patches. Cochrane (1981) identified 17 localities at which the plant had been previously observed, and Knight and Clemmer (1987) reviewed data and identified seven general areas from which the species had been reported. In 1998, surveys targeted those seven locations, and as a result, the population was estimated to be approximately 175,000 plants on 522 acres (BLM and USFWS 2000c).

The centaury is endemic to the Ash Meadows area of Nye County, Nevada. Its range includes the Ash Meadows NWR and adjacent public and private land. On public land managed by the BLM, the plant is found entirely within the Ash Meadows ACEC. Beginning in 2008, rangewide surveys were conducted for all rare plants throughout the Ash Meadows NWR. As a result of the survey effort for spring-loving centaury, the total population is estimated to be 4,468,571 individuals on about 800 acres (Bio-West 2008b). The likely reasons for the increase from 1998 to 2008 is most likely due to better, more comprehensive survey effort, natural fluctuations in the population size of an annual species, and differences in estimation protocols (USFWS 2009d).

According to Bio-West (2008b), the plants confirmed in the 2008 surveys were found at most of the previously recorded sites. In addition, distribution range of the plants in 1998 was extended in most locations to connect populations that were once believed to be separate. They found the plant to be widespread throughout the wildlife refuge in habitats that included seasonally flooded wetlands to seasonally moist alkali meadows, and the edges of some alkali scrub-shrub communities. In addition, they concluded that any habitat with surface or subsurface water was potential habitat for the species. The species has apparently extended beyond the wildlife refuge as well, but it is important to note, while the numbers have increased at most locations, other smaller populations reported in 1998 have apparently disappeared.

Based on the 2008 survey effort conducted by Bio-West (2008b), the current distribution includes six major subpopulations with additional minor subpopulations. They include: (1) Purgatory-Rogers-Longstreet-Five springs-North Carson Slough- T17S, R50E, Sections 10, 14-16, 20-23; (2) Scruggs-Mary-Scott-Indian School-Crystal-marsh springs- T17S, R50E, Sections 7-10, and 15-18; (3) Unmapped seep west of South Springs Meadow road- T18S, R50E, Sections 14 and 23; (4) Point of Rocks Springs- T18S, R51E, Sections 7 and 12; (5) Jackrabbit-Big springs- T18S, R51E, Sections 18-19 and west from Big Spring extending into T18S, R50E,

Sections 14, 22-24; and (6) last Chance-Bole-Brahma springs- T18S, R51E, Sections 20, 29, and 30 (USFWS 2009d).

The land and management of spring-loving centaury within the wildlife refuge is 50 percent USFWS land, 45 percent BLM land, and 5 percent private land. No data are available for populations outside the wildlife refuge within the BLM Ash Meadows ACEC (USFWS 2009d).

Life History

The life history and habitat requirements of spring-loving centaury are largely unknown, but general observations indicate it is an annual species that flowers during the late summer and autumn (USFWS 1990). According to Reveal et al. (1973), each flower develops into a narrow, linear seed capsule containing about 50 seeds, of which one plant can produce thousands. Like other plants, it likely has certain controls that delay germination, allowing it to persist in the soil seed bank for long periods (USFWS 2009d). The seeds are small (0.07–0.09 centimeter) and are easily dispersed by wind, water, and animals. Similar to other plants, most seed probably remains near the parent plant.

According to USFWS (2009b), it is unknown whether the centaury is self compatible or requires pollination, but based on the present distribution and population numbers, pollination probably does not limit reproduction. Even though little is known or understood about the centaury's life history, it is probably consistent with other species that have adapted to disturbed habitats (ruderal), like agriculture and other human-caused activities that impact habitats. Grime (1977) described ruderal plants with similar life histories as being adapted to disturbance, where the relative proportion of energy devoted to seed production is high, and capable of recovering from disturbance more quickly than other species.

The spring-loving centaury grows at elevations between 2,070 to 2,320 feet amsl in alkaline clay soils where water availability is a limiting factor (Pavlik and Manning 1986). It prefers moist to wet clay soils along the banks of streams or in seepage areas, habitat similar to that of Ash Meadows gumplant (USFWS 2009b). Where found, it occurs in abundance and is associated with *Cordylanthus tecopensis*, *Distichlis spicata*, var. *stricta*, *Baccharis emoryi*, *Fraxinus velutina*, and *Prosopis* (Knight and Clemmer 1987), and *Pyrrocoma* spp., *Juncus balticus*, *Anemopsis californica*, *Nitrophila occidentalis*, *Atriplex* spp, *Tamarix* spp., *Typha* spp., and *Iva* spp. (NNHP 2001). According to Reveal et al. (1973) in USFWS (2009b), the plant typically grows in wet saltgrass meadows near springs and streams and occasionally in low uplands at seeps.

Threats to the Species

The threats to spring-loving centaury are consistent with those of other Ash Meadows plants and ecosystem. They include: (1) Present destruction, modification, or curtailment of habitat or range (e.g. groundwater withdrawal, surface mining, non-native species); (2) overutilization for commercial, recreational, scientific, or educational purposes (e.g. disease or predation); (3) inadequacy of existing regulatory mechanisms; (4) other natural or manmade factors affecting continued existence (e.g., vulnerability to environmental uncertainty, and climate change) (USFWS 2009d).

The spring-loving centaury depends on the outflow of springs and near-surface water for its survival, so local groundwater pumping negatively affects populations of the species (USFWS 2009d). At the time of listing, groundwater development was a major threat to the entire Ash Meadows ecosystem. Water levels in Devils Hole stabilized after groundwater pumping on the Ash Meadows NWR stopped in 1975; however, the water level at Devils Hole declined 7 centimeters between 1988 and 2004, and increased again after a wet year. As groundwater pumping at Ash Meadows decreased, it increased in the Amargosa Valley, and is currently occurring in some areas of the basin at about twice the rate predicted to be sustainable (USGS 2005).

Habitat loss or degradation from surface mining occurs in the Ash Meadows area. New mineral claims and subsequent mining could cause direct loss of spring-loving centaury, as well as indirect impacts by diverting or draining water away from occupied habitat. Surface mining of a valid existing mining claim on private land within the wildlife refuge, therefore, poses a significant threat to about 50 percent of the known occurrences of the centaury within the wildlife refuge that are open to public minerals. The existing claims do not occur near any of the large populations of the plant, so mining doesn't pose a significant threat to those populations (USFWS 2009d).

Non-native species impact approximately 42 percent of all federally listed and rare plants in the United States. (Pimental et al. 2005). They compete directly with native species for water, nutrients, and sunlight, and indirectly by altering ecosystem processes such as nutrient cycling and fire regimes (Brooks et al. 2004). Over 100 non-native species, approximately 16 percent of the total flora, occur on Ash Meadows NWR. Of the total, six species could potentially threaten the centaury including salt cedar, Russian knapweed, five hook bassia, Malta star thistle, yellow star thistle, and hoary eress (USFWS 2006c). The wet meadows and old agricultural fields that support the species are also favorable conditions for non-native, noxious weeds. There are about 4,460 acres of old agricultural fields on Ash Meadows NWR, and some of these fields are nearly monocultures of non-native noxious weeds; however, approximately 315 acres or roughly 10 percent of spring-loving centaury habitat is threatened by non-native noxious weeds (USFWS 2009d).

Since the final listing rule was published for spring-loving centaury, laws and regulations were interpreted as simply providing recognition of the species' status, but no legal protection was afforded to the individual plants or their habitats. Weak interpretation and enforcement of these laws and regulations in Nevada, where the plant occurs, has further threatened the species' survival. Since the final listing rule was published, regulations have been strengthened and new regulatory mechanisms have been developed to protect and conserve the spring-loving centaury (USFWS 2009d).

Other natural or manmade factors affecting the species' continued existence include vulnerability to environmental uncertainty and climate change. Environmental uncertainty includes extreme flash flooding, which could affect the species, but because its distribution creates population redundancy, flash flooding does not appear to be a serious threat to the centaury. The same holds true for climate change. Based on current climatic modeling, the southwestern United States is likely to experience increased frequency of regional drought in response to elevated levels of atmospheric CO₂. The aquifer that supports the centaury is recharged from precipitation in the

same area. If precipitation decreases significantly in the area, it could affect the plant, but to what level climate change will have on the local aquifer that supports the ecosystem and the plant is unknown. Monitoring groundwater change would be important to identifying climate change as a potential threat (USFWS 2009d).

Species in the Project Area

The Project area is located approximately 8 miles northwest of the nearest known locations of the species in Nevada at Ash Meadows and Carson Slough. The plant has never been found within the Project area, although the plant populations at Ash Meadows share some groundwater-related commonalities with the Project area. The Ash Meadows Basin (includes most of Ash Meadows NWR) and Alkali Flat-Furnace Creek Basin (includes the Project area and a small portion of Ash Meadows NWR) are connected by the Central Death Valley subregion of the DVRFS.

3.6.4.5 Sensitive Plant Species

No special status plant species were located within the Project area during field surveys. However, two cactus species were located. Two individual beavertail prickly pear and seven golden cholla were found in the Project area (see Figure 3-11). Neither species is considered rare; however, both are protected by the State of Nevada's statute for the protection of Christmas trees, cacti, and yucca (NRS 527.060-.120).

Tecopa bird's-beak (*Cordylanthus tecopensis*) has been identified by the BLM as a species of concern in Nevada. This annual herb occupies moist alkaline meadows and flats, saltbush scrub within Mohave desert scrub. It is found in salt encrusted clay soils at 2,000 to 2,700 feet elevation along bottomlands of the Amargosa River drainage, east of Death Valley in California and Nevada and in Fish Lake Valley, Nevada. Locally, several populations occur in Ash Meadows, each following major drainage patterns of the springs. (NDOW 2003; Knight and Clemmer 1987; Mozingo and Williams 1980). Main threats to this species include water diversion, development, intensive recreation/OHV, non-native species, vandalism, vegetation encroachment (undesirable species), groundwater pumping, wild burros and livestock, rights-of-way, and mining (NDOW 2003; Mozingo and Williams 1980).

3.6.5 Wildlife Resources

The ROI for wildlife resources, including threatened, endangered, proposed, and candidate wildlife species, consists of areas that may be affected by permanent and temporary features of the Proposed Action and areas where groundwater withdrawal may impact surface and groundwater hydrology. The extent of the ROI for wildlife resources is based on the effects of the proposed Project on water resources as described in Section 3.4. Based on these criteria, the ROI for direct impacts on wildlife resources includes those areas in the immediate vicinity of the Proposed Action construction, operation, and maintenance activities. The ROI for indirect effects is the Amargosa Desert Hydrographic Basin.

3.6.5.1 Wildlife Observed within the Project Area

Fifty-eight vertebrate species were detected or seen over the course of the field surveys in the Project area during the spring and summer of 2009. Of these, 13 species were reptiles, 27 species were birds, and 18 species were mammals (Tierra Data 2009).

Thirteen species of reptiles were found or detected in the Project area during 2009 surveys (Table 3-15). The only protected reptile species detected was the Desert Tortoise which is listed as threatened under the ESA and discussed further in section 3.6.5.2.

Common Name	Scientific Name	Common Name	Scientific Name
Desert Tortoise	<i>Gopherus agassizii</i>	Desert Iguana	<i>Dipsosaurus dorsalis</i>
Long-nosed Leopard Lizard	<i>Gambelia wislizenii</i>	Zebra-tailed Lizard	<i>Callisaurus draconoides</i>
Side-blotched Lizard	<i>Uta stansburiana</i>	Desert Horned Lizard	<i>Phrynosoma platyrhinos</i>
Great Basin Whiptail	<i>Aspidocelis tigris</i>	Spotted Leaf-nosed Snake	<i>Phyllorhynchus decutatus</i>
Red Racer	<i>Masticophis flagellum</i>	Glossy Snake	<i>Arizona elegans eburnata</i>
Long-nosed Snake	<i>Rhinocheilus lecontei</i>	Nevada Shovel-nosed Snake	<i>Chionactis occipitalis talpina</i>
Mojave sidewinder	<i>Crotalus cerastes</i>		
Source: Tierra Data 2009			

Twenty-seven bird species were seen or detected within the Project area during 2009 surveys, although no nests were found (Table 3-16). Surveys revealed that avian nesting potential is low to moderate owing to the sparse nature of the vegetation. No active nests for any species were located during 2009 surveys. Of the 27 total identified species five are classified as sensitive: Swainson's Hawk, Prairie Falcon, Phainopepla, LeConte's Thrasher, and Burrowing Owl. These species are discussed further in section 3.6.5.3.

Table 3-16 Bird Species Observed in the Project Area

Common Name	Scientific Name	Common Name	Scientific Name
Great Egret	<i>Ardea alba</i>	White-faced Ibis	<i>Plegadis chihi</i>
Turkey Vulture	<i>Cathartes aura</i>	Cooper's Hawk	<i>Accipiter cooperii</i>
Swainson's Hawk	<i>Buteo swainsoni</i>	Red-tailed Hawk	<i>Buteo jamaicensis</i>
American Kestrel	<i>Falco sparverius</i>	Prairie Falcon	<i>Falco mexicanus</i>
Eurasian Collared Dove	<i>Streptopelia decaocto</i>	Mourning Dove	<i>Zenaida macroura</i>
Greater Roadrunner	<i>Geococcyx californianus</i>	Burrowing Owl	<i>Athene cunicularia</i>
Lesser Nighthawk	<i>Chordeiles acutipennis</i>	Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>
Western Kingbird	<i>Tyrannus verticalis</i>	Common Raven	<i>Corvus corax</i>
Horned Lark	<i>Eremophila alpestris</i>	LeConte's Thrasher	<i>Toxostoma lecontei</i>
Phainopepla	<i>Phainopepla nitens</i>	Wilson's Warbler	<i>Wilsonia pusilla</i>
Chipping Sparrow	<i>Spizella passerina</i>	Black-throated Sparrow	<i>Amphispiza bilineata</i>
Lincoln's Sparrow	<i>Melospiza lincolni</i>	Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Great-tailed Grackle	<i>Quiscalus mexicanus</i>	House Finch	<i>Carpodacus mexicanus</i>
House Sparrow	<i>Passer domesticus</i>		

Source: Tierra Data 2009

Twelve terrestrial mammal species were detected or observed in the Project area during the 2009 surveys (Table 3-17). No special status mammals were detected.

Large mammals are not thought to be common to this area, however, burro tracks were encountered frequently throughout the Project area and two burros were observed traversing the Project area during the spring surveys. Wild burros are managed by the BLM. The closest actively managed herd management area (HMA) is the Johnnie HMA. This HMA boundary lies approximately 15 miles east of the Project area. The current estimated population for the Johnnie HMA is 77 wild horse and 158 wild burros. In addition to burro presence, during the spring 2009 survey, a Bighorn Sheep skull was found in Fortymile Wash. No other big game species were detected within the Project area.

In addition to the 12 terrestrial mammals species, 6 species of bats were detected during acoustic surveys in 2009 (Table 3-17). All of these species are considered sensitive species and are discussed further in section 3.6.5.3. No bat roosting habitat was identified in the Project area.

Table 3-17 Mammal Species Observed in the Project Area

Common Name	Scientific Name	Common Name	Scientific Name
Deer Mouse	<i>Peromyscus maniculatus</i>	Little Pocket Mouse	<i>Perognathus longimembris</i>
Long-tailed Pocket Mouse	<i>Perognathus formosus</i>	Merriam's Kangaroo Rat	<i>Dipodomys merriami</i>
White-tailed Antelope Squirrel	<i>Ammospermophilus leucurus</i>	Desert Cottontail	<i>Sylvilagus audubonii</i>
Black-tailed Jackrabbit	<i>Lepus californicus</i>	California Myotis	<i>Myotis californicus</i>
Yuma Myotis	<i>Myotis yumanensis</i>	Western Paratrelle	<i>Parastrellus Hesperus</i>
Townsend's Big-eared Bat	<i>Corynorhinus townsendii townsendii</i>	Pallid Bat	<i>Antrozonus pallidus</i>
Brazilian Free-tailed Bat	<i>Tadarida brasiliensis</i>	Domestic Dog	<i>Canis familiaris</i>
Coyote	<i>Canis latrans</i>	Kit Fox	<i>Vulpes velox</i>
Burro	<i>Equus asinus</i>	Bighorn Sheep	<i>Ovis canadensis</i>

Source: Tierra Data 2009

3.6.5.2 Federally Threatened, Endangered, Proposed, and Candidate Wildlife Species

The USFWS identified several threatened and endangered wildlife species with the potential of occurring in the proposed Project area or in the ROI. No proposed or candidate species were identified. Table 3-18 lists these species and identifies corresponding protection status under the ESA, BLM, and NDOW.

Table 3-18 Endangered and Threatened Wildlife Species that May Occur within the Region of Influence

Scientific Name	Common Name	Habitat	Endangered Species Act	State of Nevada	BLM
<i>Gopherus agassizii</i>	Desert Tortoise (Mojave population)	Mojave desertscrub	Threatened	Protected	Sensitive
<i>Cyprinodon diabolis</i>	Devils Hole Pupfish	Devils Hole	Endangered	Protected	Sensitive
<i>Cyprinodon nevadensis mionectes</i>	Ash Meadows Amargosa Pupfish	Ash Meadows – large, warm waters	Endangered	Protected	Sensitive
<i>Cyprinodon nevadensis pectoralis</i>	Warm Springs Pupfish	Ash Meadows – Warm Springs Complex	Endangered	Protected	Sensitive

Table 3-18 Endangered and Threatened Wildlife Species that May Occur within the Region of Influence					
Scientific Name	Common Name	Habitat	Endangered Species Act	State of Nevada	BLM
<i>Rhinichthys osculus nevadensis</i>	Ash Meadows Speckled Dace	Ash Meadows – large, warm waters	Endangered	Protected	Sensitive
<i>Ambrysus amargosus</i>	Ash Meadows Naucorid	Ash Meadows – Point of Rocks Spring	Threatened	–	Sensitive

Source: USFWS 2009

Desert Tortoise (Mojave population)

Regulatory Status

The Desert Tortoise (*Gopherus agassizii*) consists of two geographically dissimilar populations: the Mojave and Sonoran. The Mojave population is defined as those tortoises north and west of the Colorado River and west of Beaver Dam Slope, Utah, and is distributed throughout southern Nevada, southeastern California, the Beaver Dam Mountains and Virgin River area of southwestern Utah, and northwestern Arizona. The Sonoran population is found in most of Arizona, western New Mexico, and south through Sonora to northern Sinaloa, Mexico. The Sonoran population of Desert Tortoises also occurs on Isla Tiburon, in the Sea of Cortez (Germano et al. 1994).

Major declines and die-offs of Desert Tortoises were observed in the Mojave Desert in the 1980s, leading to the emergency listing of the Mojave population of Desert Tortoise as endangered on August 4, 1989 (54 FR 32326-32331). On October 13, 1989, the USFWS published a proposed rule to list the Mojave population as endangered (54 FR 42270-42278), but because the emergency rule expired on April 2, 1990, it was necessary to publish the final rule on that day, to prevent a lapse in protection for the tortoise. On April 2, 1990, the USFWS published a determination of threatened status for the Mojave population of Desert Tortoise with no critical habitat determination at that time (55 FR 12178-12191).

The Mojave population has been divided into six distinct population segments or recovery units, based on presumed evolutionary history (those population segments are sometimes deemed evolutionarily significant units. Each recovery unit has been delineated based on variations in genetic, morphological, ecological, physiological, and behavioral traits (USFWS 2008), and the USFWS adopted recovery plan in 1994 (USFWS 1994). The USFWS is currently developing a revised recovery plan which is in draft form (USFWS 2008). Also, in 1994, the USFWS designated a total of 6.4 million acres of critical habitat (59 FR 5820-5866). Within those six management units, the USFWS identified Desert Wildlife Management Areas or areas, where populations of tortoises facing similar threats would be managed with the same strategies (59 FR 5820-5866).

The California and Nevada State Natural Heritage Programs have listed Desert Tortoises as imperiled, and in Utah they are considered critically imperiled (NatureServe 2009). The Desert Tortoise is protected by the State of Nevada (NNHP 2009). The Mojave population is on the watch list of species in Clark County, Nevada, and it is considered sensitive by the BLM and USFS (NNHP 2009).

Species Description

The Desert Tortoise was first described by Cooper in 1863 as *Xerobates agassizii*, named after the iconoclastic Harvard professor Louis Agassiz. Over the years, scientists assigned it to different genera including, *Scaptochelys* (Bramble 1971), *Xerobates* (Lamb et al. 1989), and *Gopherus* (Crumley 1994), the genus under which it is now recognized.

The Desert Tortoise has a domed shell (carapace) and a relatively flat, unhinged plastron (abdominal portion of the shell). The exterior of the carapace is comprised of horny plates made up of keratin called scutes. Adults will reach a carapace length of 8 to 15 inches and shell height of 4 to 6 inches. Adults typically weigh 8 to 15 pounds. When hatchlings emerge from their eggs, they are approximately 2 inches long (Ernst et al. 1994).

The Desert Tortoise is greenish-gray to dark brown with tan scute centers. Their forelimbs have heavy, conical scales and are flattened for digging and burrowing. Hindlimbs are more elephantine. When limbs pull in, they block the openings of the shell (Ernst et al. 1994).

Status and Distribution

Population densities of the Desert Tortoise are decreasing in many areas, particularly in the western Mojave Desert (Corn 1994). According to a USGS report by Berry and Medica (1995), density estimates in 1990 ranged from approximately 13 to 168 adult tortoises per square mile depending on location. A study in southeastern Nevada found a density of approximately 17 tortoises per square kilometer (44 per square mile), and most populations discussed in that report showed a downward trend (Berry and Medica 1995).

Although population density studies have been conducted for many years in several areas throughout the Desert Tortoise's range, inconsistencies in sampling techniques, study scale, and study goals make long-term population trend determinations impracticable. Those data may however provide a general overview of the species' range-wide status and demonstrate considerable declines at the local level (USFWS 2008). Beginning in 2001 (1999 in the Upper Virgin River Recovery Unit) annual range-wide monitoring was initiated (USFWS 2006d). Results from the first 5 years of this program estimated a population density low of 2 to 8 tortoises per square mile for the NE Mojave Recovery Unit and a high of 44 to 78 tortoises per square mile for the Upper Virgin River Recovery Unit (USFWS 2006d). The Project area is located within the NE Mojave Recovery Unit. Because this monitoring program is designed to measure long-term population trends, the first 5 years of the program are essentially to establish baseline densities and variability between years and between recovery units (USFWS 2006d).

Life History

Tortoises of the Mojave population are found primarily in Mojave desert scrub. They are generally associated with communities dominated by creosote bush and other sclerophyll shrubs and small cacti (Germano et al. 1994). Some parts of their range may contain abundant Joshua trees (*Yucca brevifolia*). In the Mojave Desert, the terrain is generally gently rolling alluvial fans with sandy or gravelly soils (Ernst et al. 1994).

Adequate burrowing substrate and thermal cover plant species are a crucial habitat component for Desert Tortoises. In the Mojave population, Desert Tortoises will construct their own burrows to avoid extreme hot or cold temperatures. They often excavate burrows under vegetation, up to 33 feet deep. Elevations at which tortoises occur in the Mojave population range from below sea level in Death Valley, California, up to about 5,000 feet at Yucca Mountain, Nevada (Arizona Game and Fish Department 2001).

The annual reproductive cycle of the Mojave Desert Tortoise begins in February or March when they emerge from hibernation. Mating generally takes place in the spring and may last into fall (Ernst et al. 1994). Between 1 and 14 eggs are laid in an excavated nest near a shrub or burrow entrance between May and July (Ernst et al. 1994). Incubation generally lasts for 90 to 120 days. Egg hatch rates vary, but hatchling and juvenile mortalities are assumed to be very high, and it has been estimated that only one hatchling for every 15 to 20 nests will survive to reach sexual maturity (Lawler, no date). Average age of reproductive viability of females is primarily a function of animal size, but is usually between the ages of 12 and 25 years (USFWS 1994). Females produce from one to three clutches of eggs per year (Turner 1986).

Desert Tortoises are herbivores, consuming a wide variety of plant materials including dicot annuals, grasses, herbaceous perennials, trees, shrubs, sub-shrubs/woody vines, and succulents (Arizona Game and Fish Department 2001). A study of their food habits in the Mojave Desert found that they used 43 plant species, including 37 annuals and 6 perennials. The diet showed a very strong preference for native plants (95.3 percent), and some of their preferred food plants were uncommon to rare (Jennings 1997). A study of juvenile tortoises found differences in diet between wet and dry summers. During a very dry summer, tortoises were observed foraging on only three species, but they used 15 species during a wet summer (Spangenberg 1995). Tortoises may forage selectively, sampling several possibilities before consumption (Oftedal 2002; Van Devender et al. 2002). Selective food preferences for individual tortoises within a population make plant diversity an important constituent of tortoise habitat (Tracy 2001). Desert Tortoises also ingest rocks, bones, and soil, possibly to maintain intestinal bacteria, to provide additional minerals, or as gastroliths to aid digestion (Esque and Peters 1994; Stitt and Davis 2003).

Threats to the Species

Desert Tortoises are facing numerous threats to their survival. Livestock grazing, recreational OHV use, military training activities, urban development, disease, and increases in predation are some of the factors that affect tortoise survival by reducing or fragmenting available habitat, causing population declines (Lovich 1999). Additional threats include illegal collection of tortoises as pets, vandalism (shooting, crushing or mutilation), road-kill mortality, and use as human food (USFWS 1994; Stitt and Davis 2003).

The presence of livestock may affect tortoise habitat in several ways. Tortoises, their eggs, and hatchlings can be killed directly by trampling and collapsing burrows. Livestock also trample vegetation (e.g., creosote bush) that is utilized by tortoises to shade burrows, pallets, and for thermoregulation. Impacts from grazing include damage to soils crusts and cryptogamic soils leading to increased erosion, decreased water infiltration due to soil compaction, and an increase in exotic annual vegetation, which compromises plant diversity and density, and increases fire fuel (USFWS 1994). Removal of native vegetation by livestock grazing allows the infiltration and proliferation of exotic plants on disturbed soils. Some of these invading exotic species include filaree (*Erodium cicutarium*), tumbleweed (*Salsola iberica*), split grass (*Schismus barbatus*), Arab grass (*S. arabicus*), cheat grass (*Bromus tectorum*), and red brome (*Bromus rubens*) (USFWS 1994), and are of decreased nutritional quality relative to native species (Ofstedal 2002).

Invasion by exotic plants can have a negative impact on tortoises due to the changes that are effected in the native plant community. Red brome, for example, a European import, competes with native perennial grasses, shrubs, and annuals. Recurrent fires due to the presence of exotic ephemerals, such as red brome, can reduce the abundance and diversity of native forbs on which the tortoises depend (NPS 2009). Increased fires also aggravate habitat fragmentation, which is a major contributor to tortoise population declines (USFWS 1994).

Effects to tortoises and tortoise habitat by OHV use include mortality by crushing on the surface or in burrows, collapsing of burrows, destruction of soil crusts and compaction of soils, soil erosion, proliferation of weeds, increase in wild fires, and damage or destruction of plants used for food, water, and thermoregulation (USFWS 1994). A study of food preferences found that the preferred plant species were often found in washes and on hills. These areas also are heavily used by recreational OHVs (Jennings 1997). Since tortoises are very particular in their food plant selection, reduction of available food sources due to damage from recreational OHVs can force tortoises to change their diets. This may result in additional energy expenditures searching for acceptable food sources. When tortoises are forced to switch foods, they accrue a long-term digestive deficit due to the lag time in adjustment of their gut microflora to the new food source. Their effective feeding season is thus shortened (Tracy 2001).

Urban development has affected tortoises and tortoise habitat through habitat fragmentation and destruction. The construction of roads leads to habitat destruction, habitat fragmentation, road kills, and increased human access into formerly remote areas. The proliferation of landfills and illegal dumping subsidizes increased population densities of predators, including Common Ravens (*Corvus corax*), Coyotes (*Canis latrans*), and feral domestic dogs (*Canis familiaris*). These effects are greatest nearer to human settlements (USFWS 1994). Gila Monsters (*Heloderma suspectum*), snakes, skunks, and foxes are also tortoise egg predators (Ernst et al. 1994).

While predators are not normally a concern for tortoise populations in an undisturbed ecosystem, the perturbation of an ecosystem can cause predators to become a management issue. Increasing populations of generalist native predators have resulted in an increased rate of mortality of hatchling and juvenile tortoises. The USFWS's Breeding Bird Survey Program showed a 15-fold increase in raven populations in the Mojave Desert for the 20-year period from 1968 to 1988 (BLM et al. 1989). This surge in the raven population was attributed to increases in perching and

nesting structures. The food supplies listed were road-kills, landfills, trash, garbage dumps, and agricultural developments. The perching structures listed were fence posts, power poles and towers, signs, buildings, bridges, and freeway access ramps. Elevated perches were historically scarce in the Mojave Desert, and such man-made substitutes provide perching sites for predatory birds. Farrell (1989) documented ravens utilizing power line towers for perches while consuming juvenile tortoises (USFWS 1994). Human predation in the form of highway mortality and the illegal removal of adult tortoises for pets are also factors in the decreasing numbers of Desert Tortoises (Lovich 1999; 59 FR 5820-5866). Tortoises will urinate in response to harassments and this jeopardizes their survival through the summer due to water loss (Averill-Murray et al. 2002).

The manipulation of populations and/or individual tortoises during earlier conservation efforts was mostly unsuccessful. This may have been due to a lack of information regarding tortoise ecology, or poor planning. The translocation of in-situ tortoises and reintroduction of captive tortoises to the wild by the public are ongoing management problems. The historic lack of success of reintroductions can be attributed to several factors. Relocated tortoises often attempt to return to their home ranges (Blythe et al. 2004) and they face increased vulnerability to predators and potential antagonistic responses from resident tortoises. Perhaps the largest problem facing potential relocation efforts is the potential for the spread of diseases, especially upper respiratory tract disease, and genetic pollution.

Recently, upper respiratory tract disease has been found to be a significant contributor to tortoise mortality, and this disease is widespread in the Mojave population. Upper respiratory tract disease is caused by a bacterium (*Mycoplasma agassizii*), and it may be aggravated by simultaneous infections from other bacteria. Upper respiratory tract disease has been reported in a variety of tortoise species from around the world. It is likely that it has been spread through the wild populations by the release of infected, captive tortoises (Jacobson 1993). One of the main reasons for the emergency listing of Mojave Desert Tortoises in 1999 was the observed die-offs of populations due to upper respiratory tract disease.

Groundwater withdrawal may cause the development of large fissures (Koehn Dry Lake, Saltdale, California) which act as pit-fall traps that can capture tortoises. Tortoises can also be trapped in utility trenches. Railroad tracks fragment tortoise habitat and their movements may be constrained by train rails (Edwards et al. 2004; 59 FR 5820-5866).

Species in the Project Area

A small Desert Tortoise population is known to exist approximately 25 miles to the northwest of the Project area near Beatty, NV. Desert Tortoise surveys conducted in 2006 (Knight and Leavitt 2006) and in 2007 (Converse Consultants 2008) for proposed mining operations, indicate population densities of 0-10 tortoise per square mile. The DOE, Nevada Test Site is located northeast of the Project, and has been extensively surveyed for Desert Tortoise over many years (Rautenstrauch and O'Farrell 1994). These surveys have indicated low to very low densities of Desert Tortoise.

To the south and east of the Project site, in the Pahrump Valley and an area known as Johnny, surveys were conducted over years that also indicated low densities of Desert Tortoise (Tierra Data 2009).

Desert Tortoise surveys were conducted within the footprint of the proposed Project from late March through May, 2009. Four Class 4 burrows were observed on the 7,670 acres surveyed during a time when tortoises would have been most active (Figure 3-12). Class 4 burrows are burrows with deteriorated condition that may have been used by Desert Tortoise. No dead or live tortoises were observed nor were any shells, scutes or bone segments of dead tortoise detected in washes or ponding areas during high water events. Generally, even if no other tortoise sign is detected during survey activities, tortoise remains can be found in washes (Tierra Data 2009).

Devils Hole Pupfish

Regulatory Status

The Devils Hole Pupfish (*Cyprinodon diabolis*) was listed by the USFWS as an endangered species on March 11, 1967 (32 FR 4001). The species was listed as critically endangered by the State of Nevada on January 1, 1969 (USFWS 1980). The species is currently listed as a protected species by the State of Nevada (NNHP 2009).

Maintaining the water level of Devils Hole is critical to the survival of the species. In 1976, the U.S. Supreme Court upheld the rights of the NPS to maintain the water levels at Devils Hole at no more than 2.7 feet below the copper marker (a copper washer in the wall of Devils Hole) over the water right holders in the vicinity of Devils Hole (Cappaert vs. U.S., 426 U.S. 128 [1976]; USFWS 1980; USFWS 1990).

Species Description

The Devils Hole Pupfish is among the smallest of the pupfish species reaching a maximum length of 0.98 inches. The body shape is similar to that of other pupfish as it possesses a large head and eyes and a long anal fin. However, this species lacks pelvic fins and vertical bars that are typical in other *Cyprinodon* species. The male Devils Hole Pupfish is typically a pale blue color with breeding males becoming a solid dark blue with a black terminal band on the caudal fin, violet gill covers, and a brownish to silver colored back. The females lack ocellus on their dorsal fin and are colored yellowish-brown along the back (Baugh and Deacon 1983; USFWS 1990, 2009b, 2009e).

Status and Distribution

This species is endemic to a single limestone cave called Devils Hole, which is located at the east-central boundary of the Ash Meadows NWR. The species has been isolated from other pupfish for an estimated 10,000 – 20,000 years (Soltz and Naiman 1978), and has always been small in numbers fluctuating from a maximum of 553 fish in the summer to a minimum of 127 fish in the winter (USFWS 1990). The population reached a low of 38 individuals in 2006 for reasons that are not clear (Hillyard and Van Breukelen 2009), but it appears the decline is not correlated with declining water levels. However, studies are on-going to determine what may be impacting the species (Wilson et al. 2009).






Amargosa Farm Road Solar Energy Project (NVN-84359)

Sensitive Wildlife Species Figure 3-12





LEGEND

 Project Area

Species Detected

-  Desert Tortoise burrow (unoccupied)
-  Burrowing Owl
-  Burrowing Owl burrow (unoccupied)
-  Prairie Falcon
-  LeConte's Thrasher

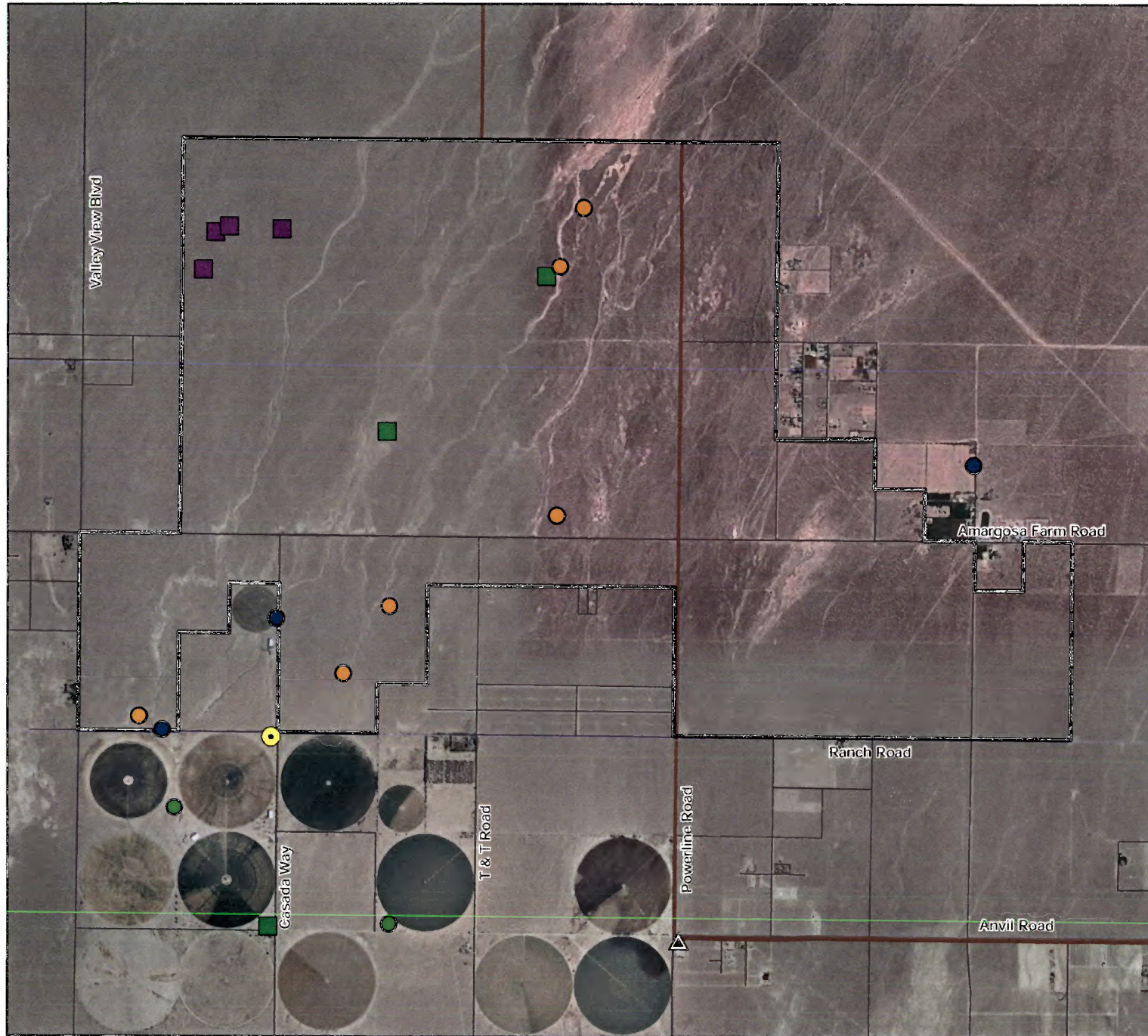
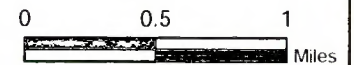
General Reference Features

-  Proposed Project Well
-  Substation
-  Existing Transmission Line (<230kV)
-  Local Road



Source: Species Data - TierraData, 2009;
Wells - Nevada State Engineer, 2006;
Transmission Line, Substation - Platts, 2009;
Local Roads - TerraSpectra Geomatics, 2009;
Imagery - ESRI, 2009

September 2010



Small refugium populations have been established in the Amargosa Pupfish Station in Ash Meadows NWR and in facilities constructed by the Bureau of Reclamation located near the base of Hoover Dam along the Colorado River (USFWS 1990). Despite these efforts, none of the refugia were able to sustain a viable population of Devils Hole pupfish and no longer remain active (Mapula et al. 2009).

Life History

The species inhabits the limestone cave known as Devils Hole. Essential habitat for this species encompasses 21,760 acres of the area where groundwater removal most influences the water level in Devils Hole. This extends northwest of Devils Hole to within approximately 8 miles of the Project area. This species is highly dependent upon a limestone shelf where feeding and spawning are focused. This shelf can become unusable to the pupfish should the water level drop too low (Soltz and Naiman 1978). The Devils Hole Pupfish is an opportunistic feeder. During the fall and summer months, the pupfish primarily feeds on diatoms, but also feeds on algae (*Spirogyra*) and invertebrates such as amphipods, ostracods, and protozoa. Less frequent food items include beetles (*Stenelmis* sp.), a turbellarians (*Dugesia* sp.), and snails (*Tryonia* sp.) (Baugh and Deacon 1983; USFWS 1990).

Spawning occurs year-round due to the relatively constant water temperature of 32°C maintained in Devils Hole (Baugh and Deacon 1983). Spawning peaks in the spring during the maximum photoperiod (USFWS 1990), and eggs are fertilized when deposited onto a limestone substrate ledge where they incubate (Baugh and Deacon 1983; USFWS 1990).

Threats to the Species

The primary threat to the Devils Hole Pupfish is decreased water levels in Devils Hole due to pumping of surface and groundwaters for agriculture and other activities in the Amargosa Valley (USFWS 1980). By the late 1960s, ranching in the area altered most springs with heavy machinery, cleared extensive areas of riparian and marsh vegetation, decreased spring discharge by pumping surface and groundwaters, diverting water into earthen and concrete-lined ditches, and impounding waters. The population of the Devils Hole Pupfish declined to fewer than 150 individuals following these activities (USFWS 1980).

Much of the spawning and foraging activities of the pupfish occurs within 6.5 by 13 foot ledge. If water levels drop below that ledge, the Devils Hole Pupfish could suffer extreme population declines.

Species in the Project Area

The Devils Hole Pupfish does not occur within the Project area. The entire population is known only from Devils Hole which is located approximately 12.5 miles southeast from the edge of the Project area. Devils Hole and the Project area are located within the Nevada portion of the Amargosa Desert Hydrographic Basin (#230), which is a part of the Death Valley Hydrographic Region (#14).

Ash Meadows Amargosa Pupfish

Regulatory Status

The Ash Meadows Amargosa Pupfish (*Cyprinodon nevadensis mionectes*) was emergency listed as endangered on May 10, 1982 (47 FR 19995-19999). This listing was in effect until January 5, 1983 at which time a second emergency listing and a proposal of endangered status with critical habitat were published concurrently (48 FR 608-625). A determination of endangered status and critical habitat was published on September 2, 1983 (48 FR 40178-40186). Critical habitat was designated at Fairbanks, Rogers, and Longstreet Springs and three unnamed springs in the northwest corner of Section 23, T17S, R50E; Bradford, Jackrabbit, Big, and Point of Rocks Springs; Crystal Pool; and their outflows areas. All critical habitat for this subspecies is located within the Ash Meadows NWR (48 FR 40178-40186). The species is listed as a protected species by the State of Nevada (NNHP 2009).

Species Description

The Ash Meadows Amargosa Pupfish is a short, deep, slab-sided fish with a long head and strongly arched nape. This subspecies has low fin-ray and scale counts relative to other *Cyprinodon* species. The breeding males are iridescent silver-blue with a yellowish-olive color along the back anterior to the dorsal fin (Soltz and Naiman 1978).

Status and Distribution

The Ash Meadows Amargosa Pupfish tends to occupy relatively large habitats that are 14.5 to 79 feet in diameter and are relatively warm with constant temperatures of 24 to 30°C (Soltz and Naiman 1978). The subspecies is known to have been extirpated from Bole, Deep, and Forest Springs (48 FR 40178-40186). In 1990, this subspecies was known to occupy 10 spring areas and was established in clay ponds within Ash Meadows NWR. Population estimates from June 1982 reported 568 individuals from Jackrabbit Spring and 1,189 individuals from Big Spring. Estimates from July 1983 reported 1,189 individuals from Jackrabbit Spring and 1,822 from Big Spring (USFWS 1990).

Surveys were conducted between fall 2007 and summer 2008. These surveys resulted in a minimum population of 5,635 individuals captured in the winter of 2008. The highest number of individuals was detected in the summer of 2008 resulting in 8,346 individuals within the Ash Meadows NWR. The largest populations were consistently located in the Crystal and Fairbanks Springs systems in addition to the outflow from Peterson Reservoir. Additional large populations were located in the Kings, Jackrabbit, Big, and Longstreet Springs (USGS 2008).

Life History

Like other pupfish, the Ash Meadows Amargosa Pupfish is omnivorous, a subspecies thought to be similar to that of the Amargosa Pupfish (*C. n. amargosae*) which also feeds primarily on a mixture of algae and detritus throughout the year. Small invertebrates are consumed opportunistically (Naiman 1979).

Spawning typically occurs from February to September, but can occur year-round when conditions are suitable. Spawning peaks in the spring with females depositing one or two eggs at a time in a substrate of silt, sand, detritus, and/or algae (Soltz and Naiman 1978).

Threats to the Species

The subspecies is endemic to a very small area that is dependent upon the integrity of the Ash Meadows ecosystem including undisturbed flows from the Ash Meadows basin aquifer. Alteration of surface and groundwater flows could greatly impact the pupfish's population survival or growth (48 FR 40178-40186).

Introduction of non-native predatory organisms such as Largemouth Bass (*Micropterus salmoides*), Red Swamp Crayfish (*Procambarus clarkii*), and Bullfrog (*Rana catesbeiana*) are an additional threat because these exotics are known predators of the Ash Meadows Amargosa Pupfish. Other introduced species such as the Sailfin Mollie (*Poecilia latipinna*), Convict Cichlid (*Archocentrus nigrofasciatus*), and Mosquitofish (*Gambusia affinis*) are known to outcompete and replace the pupfish (48 FR 40178-40186; USGS 2008). Intensive efforts to remove Sailfin Mollies and Convict Cichlids were undertaken in 2008, and based on the most recent surveys, have failed to capture either of these species indicating removal efforts may have been successful (USGS 2008; McKelvey and Taylor 2009).

Species in the Project Area

The Ash Meadows Amargosa Pupfish does not occur within the Project area. Its known range is located within the Amargosa Desert Hydrographic Basin (#230). The Project area is also located within the Nevada portion of this Basin, which is a part of the Death Valley Hydrographic Region (#14). Fairbanks Spring is the closest known population of Ash Meadows Amargosa pupfish to the Project area. It is located approximately 8 miles southeast from the edge of the Project area.

Warm Springs Pupfish

Regulatory Status

The Warm Springs Pupfish (*Cyprinodon nevadensis pectoralis*) was listed as endangered without critical habitat on October 13, 1970 (35 FR 16047-16048). The species is listed as a protected species by the State of Nevada (NNHP 2009). Essential habitat includes all known populations and is located entirely within the Ash Meadows NWR (USFWS 2009b). Essential habitat includes the area in which groundwater pumping is most likely to have an adverse affect to the discharge of Warm Springs (USFWS 1990).

Species Description

The Warm Springs Pupfish is the smallest of the subspecies of pupfish, with a shorter, deeper body and more numerous pectoral fin rays and displays the strongest tendency towards reduction

and loss of pelvic fins. Breeding males appear similar to the Ash Meadows Amargosa Pupfish with readily seen yellow on the nape (Soltz and Naiman 1978).

Status and Distribution

Warm Springs Pupfish habitat is relatively small, the water is less than 6.5 feet in diameter and 4 feet deep and is relatively warm with constant temperatures of 30 to 33°C (Soltz and Naiman 1978). This pupfish is isolated from other subspecies; found only in the Warm Springs Complex of Ash Meadows NWR. These springs have been isolated from other water bodies for several hundred years. This pupfish historically occupied seven springs within the complex, but one such spring (Mexican Spring) dried up in 1973 and is no longer inhabited (Soltz and Naiman 1978). Currently, the Warm Springs Pupfish occupies North Scruggs, South Scruggs, Marsh, North Indian, South Indian and School Springs (Sada and Mozejko 1984).

Surveys were conducted between fall 2007 and summer 2008. These surveys revealed a minimum population of 322 individuals captured in the spring of 2008. The highest number of individuals was detected in the fall of 2007 revealing 765 individuals within the Ash Meadows NWR. The School Springs underwent restoration during the survey period and was not surveyed completely, which may account for the low numbers found during the two seasons, as this spring complex showed the largest numbers prior to initiation of restoration work. Also, during restoration, exotic species such as Red Swamp Crayfish and Mosquitofish (*Gambusia affinis*) were eradicated, after which pupfish numbers increased at Warm Springs (USGS 2008).

Life History

Like other pupfish, the Warm Springs Pupfish is omnivorous, and is thought to be similar to that of the Amargosa Pupfish (*C. n. amargosae*) which feeds primarily on a mixture of algae and detritus throughout the year. Small invertebrates are consumed opportunistically (Naiman 1979).

Spawning typically occurs from February to September, but can occur year-round when conditions are suitable. Spawning peaks in the spring with females depositing one or two eggs at a time in a substrate of silt, sand, detritus, and/or algae (Soltz and Naiman 1978).

Threats to the Species

This pupfish is endemic to a very small area that is dependent upon the integrity of the Ash Meadows ecosystem including undisturbed flows from the Ash Meadows basin aquifer into the Warm Spring Complex. Alteration of surface and groundwater flows could greatly impact the Warm Springs Pupfish population survival or growth (USFWS 1990).

Introduction of nonnative predatory organisms to pupfish habitat such as Mosquitofish, Red Swamp Crayfish, and Bullfrog are an additional threat. These species, in particular, are known to prey upon and/or out-compete the Warm Springs pupfish (USFWS 1990). Intensive efforts to remove Mosquitofish and Red Swamp Crayfish from the School Springs system were undertaken in January 2008. Surveys following eradication of these species indicate an increase in Warm Springs Pupfish populations in addition to confirming complete eradication of Red Swamp

Crayfish and Mosquitofish (USGS 2008). A major goal of Ash Meadows NWR is the continued eradication of Red Swamp Crayfish and Mosquitofish from the Warm Springs Complex in 2009-2010 including from the North and South Indian Springs. If these goals are achieved, only one spring system within the Warm Springs Complex (the South Scruggs Spring system) will contain these non-native invasive species (Weissenfluh et al. 2009).

Species in the Project Area

The Warm Springs Pupfish does not occur within the Project area. Its known range is located within the Amargosa Desert Hydrographic Basin (#230). The Project area is also located within the Nevada portion of this Basin, which is a part of the Death Valley Hydrographic Region (#14). The entire population is only known from the Warm Springs Complex located approximately 11 miles southeast from the edge of the Project area.

Ash Meadows Speckled Dace

Regulatory Status

The Ash Meadows Speckled Dace (*Rhinichthys osculus nevadensis*) was emergency listed as endangered on May 10, 1982 (47 FR 19995-19999). This emergency listing was in effect until January 5, 1983 at which time a second emergency listing and proposal of endangered status with critical habitat were published concurrently (48 FR 608-625). A determination of endangered status with designated critical habitat was published on September 2, 1983 (48 FR 40178-40186), which included Bradford Springs, Jackrabbit Spring, Big Spring, and their outflows, all of which are located within the Ash Meadows NWR (48 FR 40178-40186). The species is currently listed as a protected species by the State of Nevada (NNHP 2009).

Species Description

The Ash Meadows Speckled Dace is a small fish with a maximum length of 3.9 inches and varies widely in their coloration. Typically the dorsum is olive-gray that blends ventrally to a golden color (USFWS 1990). The subspecies has black speckles and splotches covering the body with one or two distinct lateral stripes (Soltz and Naiman 1978; USFWS 1990). The degree of speckling and completeness of the lateral stripes varies between the isolated populations. It has a slightly overhung snout and small fins (Soltz and Naiman 1978).

Status and Distribution

The Ash Meadows Speckled Dace is thought to have historically occupied the same springs and outflows as Ash Meadows Amargosa Pupfish, which tends to occupy relatively large habitats that are 14.5 to 79 feet in diameter and are relatively warm with constant temperatures of 24 to 30°C (Soltz and Naiman 1978; USFWS 1990). In 1990, this fish was known to occupy four springs within Ash Meadows NWR, including Bradford, Big, Tubbs, and Jackrabbit Springs. Population surveys were conducted in June 1982 and July 1983 that resulted in an estimated total population of 500 individuals within Ash Meadows NWR (USFWS 1990).

Surveys were conducted between fall 2007 and summer 2008. These surveys revealed a minimum population of 1,009 individuals captured in the summer of 2008. The highest number of individuals was detected in the winter of 2008 revealing 1,552 individuals within the Ash Meadows NWR. Ash Meadows Speckled Dace were located in five spring complexes including, Bradford 1 Spring, Bradford 2 Spring, Forest Spring, Jackrabbit Spring, and Point of Rocks Spring. Point of Rocks and Forest Springs each resulted in fewer than 10 individuals during each survey period. The two systems with the highest population sizes were Bradford 1 Spring and Jackrabbit Spring. Surveys in Big and Tubbs Springs, which historically maintained populations of Ash Meadows Speckled Dace, failed to locate any individuals (USGS 2008).

Life History

Like other speckled dace, the Ash Meadows Speckled Dace is omnivorous, feeding on bottom surfaces for insect larvae, crustaceans, diatoms, snails, and algae as would be expected from its downward-shaped mouth (Soltz and Naiman 1978). Occasionally mid-water or surface food or insects will be consumed (USFWS 1990).

Spawning primarily occurs during the spring but a second spawning can occur in the summer. Spawning occurs over stream riffles where eggs are fertilized as they drift into the substrate (Soltz and Naiman 1978; USFWS 1990).

Threats to the Species

The subspecies is endemic to a very small area that is dependent upon the integrity of the Ash Meadows ecosystem including undisturbed flows from the Ash Meadows basin aquifer. Alteration of surface and groundwater flows could greatly impact the Ash Meadows Speckled Dace population survival or growth (USFWS 1990).

Introduction of nonnative invasive organisms to the habitat such as Largemouth Bass, Mosquitofish, Red Swamp Crayfish, and Bullfrogs is an additional threat. These species, in particular, are known to prey upon and/or outcompete the Ash Meadows Speckled Dace (USFWS 1990; USGS 2008). Intensive efforts to remove Largemouth Bass, Mosquitofish and Red Swamp Crayfish from the southern springs have been ongoing since the 1990s and more intensive during 2007 and 2008 (USGS 2008). Current restoration efforts at Fairbanks and Soda Springs are expected to provide reintroduction opportunities for expanding the current range of the Ash Meadows Speckled Dace into the northern springs of the Ash Meadows NWR from where the speckled dace was historically known (Andress et al. 2009; Bio-West 2009).

Species in the Project Area

The Ash Meadows Speckled Dace does not occur within the Project area. Its known range is located within the Amargosa Desert Hydrographic Basin (#230). The Project area is also located within the Nevada portion of this Basin, which is a part of the Death Valley Hydrographic Region (#14). Bradford Springs is the closest known population of Ash Meadows Amargosa Pupfish to the Project area. It is located approximately 13 miles southeast from the edge of the Project area.

Ash Meadows Naucorid

Regulatory Status

The Ash Meadows naucorid (*Ambrysus amargosus*) was listed as threatened with designated critical habitat on May 20, 1985 (50 FR 20777-20794). Critical habitat includes Point of Rocks Springs and their immediate outflows (50 FR 20787).

Species Description

The Ash Meadows naucorid is a member of the family *Naucoridae* which are commonly called creeping water bugs. The species has an average adult length of 0.24 inches (Parker et al. 2000). The species is a dull brown color with scattered dark yellow markings on the head, thorax, and legs. It is a flightless insect with hind legs modified for swimming and raptorial forelegs for capturing prey (Dominguez 2006).

Status and Distribution

Originally, the Ash Meadows naucorid was only known from an area at Point of Rocks Springs where flowing water passes over rock and pebble substrates (USFWS 1990). Water diverted from Point of Rocks Springs to aid recovery efforts for the Devils Hole Pupfish resulted in a reduction of suitable habitat for the Ash Meadows naucorid. In 1997, Ash Meadows naucorids were introduced into the Kings Pool outflow and later into the channel 16-33 feet below Kings Pool. Additional individuals were added in 1998 to supplement the fledgling population. By 2002, the population of naucorids in Kings Pool was extinct. In February 2009, water which had previously been diverted to the Devils Hole Pupfish refuge was returned to its original flow in the main stream channel at Point of Rocks. This nearly doubled the discharge and expanded the suitable habitat for naucorids. Reintroductions are being proposed to reestablish naucorids throughout their historic range (Parker et al. 2009).

Life History

Naucorids feed by piercing the exoskeleton of invertebrates and sucking out the body fluids. Feeding trials showed that *Hyalella* (amphipods), *Elmidae* larvae, and baetid mayfly nymphs were selected for while elmid beetle adults, snails and flatworms were not consumed (Parker et al. 2000).

Population levels peak in the spring and summer in response to reproduction activities. Fecundity is low with females only producing approximately seven eggs at a time. Selection of oviposition substrate is not clear, however, researchers have noted that eggs have been found on gravel, pebble and cobble substrates as well as from submersed vegetation, but no eggs have been reported from coarse sand or boulder substrates. Ash Meadows naucorids have five nymphal instars. Individuals may overwinter as adults or late instar nymphs (Parker et al. 2000).

Threats to the Species

The Ash Meadows naucorid is endemic to a very small area that is dependent upon the integrity of the Ash Meadows ecosystem including undisturbed flows from the Ash Meadows basin aquifer. Its current range is greatly reduced from its known historic range due to channelization of the springs' outflow for agricultural diversion in addition to other flow-restricting alterations made at Point of Rocks Springs. Alteration of surface and groundwater flows could impact the Ash Meadows naucorid population survival or growth by decreasing spring discharge (50 FR 20782).

Species in the Project Area

The Ash Meadows naucorid does not occur within the Project area. Its known range is located within the Amargosa Desert Hydrographic Basin (#230). The Project area is also located within the Nevada portion of this Basin, which is a part of the Death Valley Hydrographic Region (#14). The entire population is only known from Point of Rocks Spring located approximately 15 miles southeast from the edge of the Project area.

3.6.5.3 Other Sensitive Species

Several wildlife species of concern were acknowledged by BLM and NDOW as warranting special consideration in this EIS. They are briefly discussed below.

Reptiles

There are two reptile species of concern. The Desert Iguana is on the NNHP Plant and Animal Watch List, which means it is vulnerable to decline by habitat loss. The Project area consists of potentially suitable habitat for the Desert Iguana such as creosote bush on sandy soils. The second reptile that has been identified as a conservation priority species is the Nevada Shovel-nosed Snake. The Project area consists of suitable habitat for this species such as dry desert washes and sparse vegetation.

Amphibians

Two sensitive species of amphibians naturally occur in Nye County. The Amargosa Toad (*Bufo nelsoni*) is largely restricted to the Amargosa River around the towns of Springdale and Beatty, Nevada (Stebbins 1985). Although it may be found in a few other subsidiary creeks, none of them flow through the Project area. The southern end of the Amargosa Toad's range is in the Oasis Valley near Beatty, approximately 25 miles north of the Project area. Additionally, due to the lack of any permanent water within the Project area this species is not expected nor was it found within the Project area (Tierra Data 2009).

The Columbia Spotted Frog (*Rana luteiventris*) is also known from Nye County. However, the southern end of the range of the Columbia Spotted Frog extends to Cloverdale Creek located over 100 miles north of the Project area (Toiyabe Spotted Frog Technical Team 2004).

Birds

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act. No suitable nesting or roosting habitat was located within the Project area. Eagles have been known to occur at the Ash Meadows NWR; however, these occurrences are occasional and irregular (Las Vegas Audubon Society 1997). When Bald Eagles are sighted in the NWR, they are only known to use the NWR as a stop-over during seasonal migrations (USFWS 2010). There are no other known areas of occurrence or suitable nesting/roosting habitat located within 10 miles of the Project area.

Swainson's Hawk is considered a sensitive species by the BLM Nevada office and is a protected species under Nevada state law. Five Swainson's Hawks were observed at the southwestern corner of the Project area, perched in and adjacent to the alfalfa field located immediately south of the Project area. These hawks were apparently feeding on large insects, such as grasshoppers, available in the field. This species is strongly migratory, and was not seen again on the Project area during the spring surveys.

Prairie Falcon is considered a sensitive species by the BLM Nevada office and is a protected species under Nevada state law. Prairie Falcons were observed three times during the 2009 surveys, always perched on telephone poles adjacent to agricultural fields (see Figure 3-12). It is likely that these agricultural fields regularly attract local Prairie Falcons, due to the increased number of prey available there. Desert habitats support relatively lower numbers of prey and would be utilized by raptors for hunting much less frequently than agricultural fields.

LeConte's Thrasher is considered a sensitive species by the BLM Nevada office and is a protected species under Nevada state law. LeConte's Thrashers were observed on three occasions during the surveys (see Figure 3-12). These observations included adults in addition to recently fledged young. LeConte's Thrasher naturally occurs at low densities, and since the entire site is potential habitat, it is possible that a small number of pairs are present throughout the site.

Phainopepla (*Phainopepla nitens*) is considered a sensitive species by the BLM Nevada office and is a protected species under Nevada state law. No suitable nesting habitat was observed within the Project area. During the spring 2009 survey, a single Phainopepla was observed perched on a tamarisk tree in a residential area along the eastern edge of the Project area.

Burrowing Owl is considered a sensitive species by the BLM Nevada office and is a protected species under Nevada state law. Two burrows previously occupied by owls were located during the 2009 surveys within the Project area (see Figure 3-12). Both of these burrow complexes had not been occupied in some time, as there were spider webs and debris in the entrances, very old whitewash, and bleached rodent bones and old pellets. No fresh pellets or feathers or prey remains were found, which suggests occupancy by wintering owls. It would be expected that the majority of owls using this area would be wintering owls, and a minority would remain to breed. Given the low productivity of the desert at this site, in terms of the very sparse vegetation and low insect and rodent populations, the only areas that are suitable for supporting breeding owls are those adjacent to the irrigated alfalfa fields.

A local resident identified an occupied Burrowing Owl burrow 1 mile south of the Project area along Casada Road in a residential lot adjacent to an alfalfa field (see Figure 3-12). One owl was observed during the visit, though the resident said that a pair of owls had fledged several young earlier in the year. In general, a low density of wintering owls could potentially occur throughout the Project area where there are suitable burrows. Breeding Burrowing Owls are most likely to be located adjacent to the alfalfa fields, where the prey base is significantly more abundant than the surrounding desert.

Focused surveys failed to observe or detect Bendire's Thrasher (*Toxostoma bendirei*) or Loggerhead Shrike (*Lanius ludovicianus*) in the Project area.

Bats

Six bat species were detected within the Project area. All six species are special status species. These are listed in Table 3-17. The majority of these bat species are found throughout Nevada, the exception being Yuma Myotis which is known from the southern and western half of Nevada. Except for the Brazilian Free-tailed Bat, these species are year-round residents that hibernate in the winter, rousing periodically to actively forage or drink. The Brazilian Free-tailed Bat is a summer resident that migrates to South America during the winter. These species utilize many different types of roosts, including mines, caves, buildings, rocks, hollow trees, bridges, vegetation, and exfoliating bark, although no roosting habitat was found in the Project area. All six species are insectivores, consuming moths, arthropods, flies, beetles, and aquatic insects (Bradley et al. 2006). Based on the positive results of the anabat survey, there is suitable foraging habitat for the bats in the Project and surrounding area.

3.7 HISTORIC AND CULTURAL RESOURCES

This section of the EIS addresses cultural resources, including the results of a cultural resource study that was completed in support of the proposed Project (Thompson et al. 2009).

3.7.1 Regulatory Framework

Section 106 of the NHPA, 16 USC § 470 requires federal agencies to take into account the effects of their undertakings on historic properties. For the purposes of Section 106, historic properties are defined as including prehistoric and historic sites, buildings, structures, districts, landscapes, and objects included in or eligible for inclusion in the NRHP, as well as artifacts, records, and remains related to such properties (National Register Bulletin 36). Historic properties can also include those cultural resources that are associated with the cultural practices or beliefs of a living community (National Register Bulletin 38).

3.7.2 Affected Environment

A cultural resource study consisting of a detailed records review and intensive pedestrian survey was conducted in support of the Proposed Action (Thompson et al. 2009). The study was

conducted to identify those cultural resources located within the Project's APE, and make recommendations on their eligibility for listing on the NRHP. These efforts were undertaken to support the preparation of the EIS and meet the BLM's Section 106 responsibilities, as well as to comply with other federal laws and EOs, such as EO Number 13007 (Indian Sacred Sites).

The APE originally encompassed 7,798.24 acres and included the proposed Project's power block, laydown area, office, maintenance building, switchyard, and detention basin. However, the Project size was formally reduced to 5,880 acres by the Proponent after the archaeological inventory was completed. Thirteen new prehistoric and/or historic cultural resource sites were documented within the current Project area. Of the 13 sites, only 1 prehistoric site has been determined eligible for listing on the NRHP under Criterion D. This criterion pertains to this site's potential to yield information important to local and regional prehistory. This site has the potential to be adversely affected by construction of this Project. A Memorandum of Agreement between the BLM and Nevada SHPO will be completed prior to the ROD. The Memorandum of Agreement ensures mitigation would occur prior to any Project implementation involving ground disturbance.

Through coordination with four of the Tribes that have ancestral ties to the Project area, there are no known sacred sites or cultural areas of concern within the Project area. Mitigation of NRHP-eligible site 26Ny13440 through use of the Memorandum of Agreement and the Historic Property Treatment Plan is considered appropriate by the Tribes to ensure that all of the National Register values of this site are retrieved prior to any possible project implementation.

3.8 PALEONTOLOGICAL RESOURCES

Paleontological resources are any fossilized remains, traces, or imprints of organisms that are preserved in the Earth's crust and are of paleontological interest and provide information about the history of life on Earth. Fossil remains may include bones, teeth, shells, leaves, and wood. They are found in geological deposits within which they were originally buried. Paleontological resources include not only the actual fossils, but also the collecting localities and the geological deposits that contain the fossils.

This section presents an overview of the paleontological resources, the location of any known paleontological localities, and the possibility of discovery of fossil resources within the Project area. This section also discusses the regulatory framework for paleontological resources, describes the methods used in the study, and presents a summary of the inventory results. The purpose of this inventory is to identify localities of known significant paleontological resources and to infer where potential significant paleontological resources may be present and potentially affected by construction-related activities.

3.8.1 Regulatory Framework

Federal, state, and local governments have enacted legislation providing for varying degrees of protection for fossil resources. The Society of Vertebrate Paleontology (SVP) regards paleontological resources as "nonrenewable scientific and educational resources that, along with their accompanying contextual data, constitute part of our natural heritage," (SVP 1995).

This paleontological resource inventory was conducted in accordance with the regulations that are applicable to the paleontological resources within the Project area.

3.8.1.1 Federal

The Federal Antiquities Act of 1906 and the PRPA, 16 USC § 470aaa serve as the primary, federal legislation that requires addressing potential impacts to paleontological resources on federally administered lands. The Federal Antiquities Act of 1906 (16 USC §§ 431-433) provides for protection of both historic and prehistoric items on federal land. NEPA (42 USC §§ 4321-4347) directs federal agencies, including the BLM, to fully assess and manage impacts (adverse or not) to the environment. FLPMA (PL 94-579; 43 USC §§ 1701-1782) provides for management and mitigation of adverse impacts on federal land by “protecting the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values.” Paleontological resources are viewed as having scientific value and requiring protection under the auspices of FLPMA. The PRPA was enacted as part of the 2009 Omnibus Public Land Management Act and codified specific protection for vertebrate fossil resources and scientifically significant plant and invertebrate fossil resources on federal land. The PRPA created criteria for the issuance of paleontological collection permits and directed the secretary of the interior to ensure that paleontological resources from federal land are properly placed into the collections of approved repository institutions.

3.8.1.2 State

NRS § 381.197 govern the protection of historic and prehistoric sites on state and federal land in Nevada. Per this statute:

“A person shall not investigate, explore, or excavate an historic or prehistoric site on federal or states lands or remove any object there from unless he is the holder of a valid and current permit issued pursuant to the provisions of NRS §381.195.”

NRS §§ 381.195 through 381.219 state that:

“An applicant is required to secure, from the Museum Director of the Nevada State Museum, or an agent designated by the Museum Director, a permit for the investigation, exploration, or excavation of any state or federal lands within the boundaries of the State of Nevada.”

These statutes also define the requirements for the permitting and disposition of any collected paleontological material found on Nevada land.

3.8.1.3 Local

No local protection of paleontological resources is known to pertain to the Project area.

3.8.2 Data Collection Methods

The Project area refers to the area that encompasses the proposed right-of-way and associated components. The ROI for paleontological resources includes a 1-mile buffer around the Project area. Information for the inventory was obtained from a review of the scientific literature and from record searches at paleontological institutions. A review was conducted of relevant published and unpublished geological and paleontological reports, and museum paleontological locality records. Paleontological locality record searches were requested from the Nevada State Museum in Carson City, Nevada, and the San Bernardino County Museum in Redlands, California. Following standard procedure, any known paleontological localities within 1 mile of the Project area were noted. A search for paleontological localities within the ROI was also conducted using records from the University of California, Santa Barbara, Paleobiology Database. The literature and record searches found no paleontological localities within the ROI.

A paleontological resources survey was conducted on February 2 and 3, 2010 in order to determine the nature of the Quaternary-Tertiary marl deposits mapped by Slate et al. (1999) and whether the mapped marl deposits contain paleontological resources.

3.8.2.1 Paleontological Potential

Information about the geological units and known fossil localities in the region was used to identify the paleontological potential of geological units within the Project area. Paleontological potential levels were assigned to each geological unit using the Potential Fossil Yield Classification (PFYC) system that was adopted by the BLM in 2007 for assessing paleontological potential on federal land (BLM Staff 2008). The PFYC system is a five-tiered system that the BLM uses to classify geological units based on the relative abundance of vertebrate fossils or scientifically significant invertebrate and plant fossils and their potential to be adversely impacted, with a higher class number indicating a higher potential. This classification system is applied to the geological formation, member, or other distinguishable map unit, preferably at the most detailed mappable level. This approach was followed in recognition of the direct relationship that exists between paleontological resources and the geological units within which fossils are entombed. By knowing the geology of a particular area and the fossil productivity of particular geological units that occur in the area, it is possible to predict where fossils will likely be found. Each class is defined below:

Class 1. Very Low Potential – geological units not likely to contain recognizable fossil remains. These units include igneous, metamorphic, and Precambrian rocks.

Class 2. Low Potential – sedimentary geological units not likely to contain vertebrate fossils or scientifically significant non-vertebrate fossils; these units include Aeolian, diagenetically altered, and Holocene sediments.

Class 3. Moderate or Unknown Potential – fossiliferous sedimentary geological units where fossil content varies in significance, abundance, and predictable occurrence; sedimentary units of unknown fossil potential. Class 3 is divided into two parts:

Class 3a. Moderate Potential – units are known to contain vertebrate fossils or scientifically significant non-vertebrate fossils, but these occurrences are widely scattered; common invertebrate or plant fossils may be found in the area.

Class 3b. Unknown Potential – units exhibit geological features and preservational conditions that suggest significant fossils could be present, but little information about the paleontological resources of the unit or area is known. This may indicate the unit or area is poorly studied and field surveys may uncover significant fossils.

Class 4. High Potential – geological units that contain a high occurrence of significant fossils. Vertebrate fossils or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability.

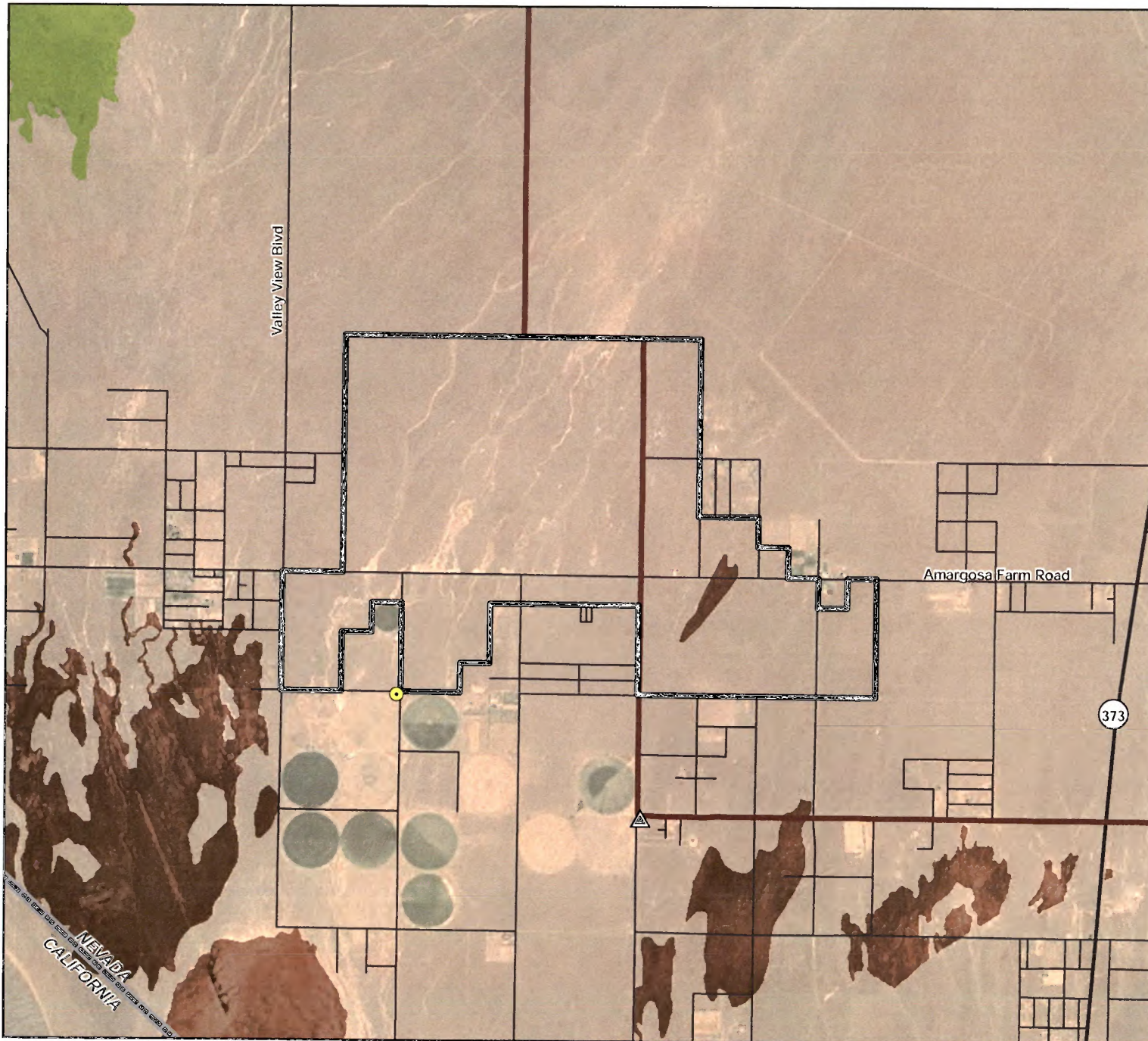
Class 5. Very High Potential – highly fossiliferous geological units that consistently and predictably produce vertebrate fossils or scientifically significant invertebrate or plant fossils.

3.8.2.2 Potential for Paleontological Resources in the Project Area

Three geological units have been mapped within the Project area: Young alluvial deposits (Qay), intermediate alluvial deposits (Qai), and Quaternary-Tertiary marl deposits (QTm) (Slate et al. 1999); as discussed previously in the section on geological hazards and mineral resources (see Figure 3-3). Results of the paleontological resources survey, however, determined that there are only two geological units present in the Project area.

Field evidence indicates that the marl deposits exposed in the Project area are not marl or ancient spring deposits as mapped by Slate et al. (1999), but are caliche deposits (another type of limestone deposit) that are part of a paleosol (an ancient soil). Field observations further indicate that these caliche deposits are part of the intermediate alluvial deposits (Qai). Therefore, the only geological units present in the Project area are the young alluvial deposits and the intermediate alluvial deposits. Each of these units has been assigned a PFYC value by the BLM based upon their physical nature, depositional history, probable fossil content, and age (Figure 3-13).

Young alluvial deposits of Holocene age are the youngest geological unit within the Project area. These alluvial deposits have a low potential for paleontological resources and have been assigned a PFYC of 2 as a result of their young age, which decreases the chances of preserving paleontological resources. Intermediate alluvial deposits range in age from the Pleistocene to the early Holocene. Field observations show that caliche deposits are common in the intermediate alluvial deposits. Exposures of caliche deposits in washes and in prospect pits commonly contain fossil root casts and root traces. The root casts and root traces are not considered to be scientifically significant by the BLM. No other fossils were found in the Project area during the paleontological resources survey. The intermediate alluvial deposits have a low potential for paleontological resources and have been assigned a PFYC of 2, because of the alluvial nature of these deposits and the low potential for scientifically significant fossils in the caliche deposits. The slightly older age of these deposits relative to the young alluvial deposits may result in a higher chance of discovering fossil material, but still warrants a PFYC of 2 based on the deposit's overall alluvial nature (Figure 3-13).



Amargosa Farm Road Solar Energy Project (NVN-84359)

Paleontological Resources Figure 3-13

LEGEND

Project Area

Potential Fossil Yield Classification

- 1 - Very Low Potential
- 2 - Low Potential
- 3 - Moderate or Unknown Potential

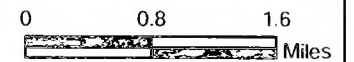
General Reference Features

- Existing Transmission Line (<230kV)
- Existing Substation
- Proposed Project Well
- Highway
- Local Road
- State Boundary



Source: Geology - USGS, 1999; PFYC - EPG, 2009;
Transmission Lines, Substations - Platts, 2009;
Wells - Nevada State Engineer, 2008;
Roads - TerraSpectra Geomatics 2009;
Imagery - ESRI, 2009

September 2010



3.9 SOCIOECONOMICS

This section characterizes the existing social and economic conditions within the ROI. The ROI for the socioeconomic analysis is Nye and Clark counties in Nevada, with an emphasis on the communities closest to the Project area, such as Amargosa and Beatty, as well as larger communities within 2 hours of the site, such as Pahrump and Las Vegas.

3.9.1 Data Collection Methods

The socioeconomic inventory describes the following current socioeconomic conditions:

- County and community descriptions
- Demographic and economic characteristics
- Housing, including housing occupancy and average value of homes
- Fiscal revenue and expenditures
- Public infrastructure and services
- Affected groups and their attitudes about the proposed Project

Demographic and economic data are provided for communities located closest to the Project area, as well as communities with a population of over 20,000 within a 2-hour commute of the Project site.

The nearest community with a population over 20,000 is Pahrump, followed by the Las Vegas metropolitan area. Corresponding data for the State of Nevada is included to set the Proposed Action in a regional context. Data were obtained from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, U.S. Bureau of Economic Analysis, Environmental Systems Research Institute (ESRI), and the Nevada State Demographer's Office.

3.9.2 Social Characteristics

3.9.2.1 Population

As shown in Table 3-19, 71.8 percent of Nevada's population is located in Clark County (71.9 percent). In 2000, the population of Clark County was 1,375,765. In 2010, the estimated population is 1,976,256, a 44 percent increase from 2000. Of this total, 96 percent live within the Las Vegas metropolitan area.

In comparison, Nye County's population in 2000 was 32,485. In 2010, the estimated population of Nye County was projected at 47,120, an increase of 45 percent. At 18,159 square miles, Nye County is the third largest county in the continental United States. Located over 100 miles north of the Project area, Tonopah, the county seat, had an estimated population in 2008 of 2,628 (Nevada State Demographers Office 2009). The majority of the county's population is concentrated in the unincorporated city of Pahrump with 34,335 people, approximately 73 percent of the county's population base (ESRI 2010).

Other unincorporated towns near the Project area include: Amargosa Valley with 2,706 people and Beatty with 1,390 people (ESRI 2010). The remaining population is located in isolated private residential areas throughout the county.

Nye County's sparse population can be attributed, in part, to the lack of available private land for development. In fact, 97 percent of the county's land area is administered by the federal government. Of the 11.6 million acres of land in Nye County, approximately 11.3 million acres are administered by the following federal agencies:

- BLM (6.5 million acres; 8,400 acres are jointly managed with the USFWS)
- USFWS (13,700 acres)
- USFS (1.9 million acres)
- U.S. DOD (1.8 million acres)
- DOE (863,000 acres)
- NPS (107,000 acres)
- Bureau of Indian Affairs (8,000 acres)

An additional 19,000 acres are under state jurisdiction, and a total of 249,000 acres in Nye County are privately owned (USFWS 2009f).

Table 3-19 through Table 3-22 summarize the population characteristics for the ROI. In summary the ROI has shown strong growth rates at the community, county, and state levels. Over the last several years Clark County, Nye County, and Nevada have been recognized as the fastest growing populations in the nation. Pahrump is also been one of the fastest growing communities in the nation. Although Amargosa Valley, Beatty, and Pahrump have historically been tied to industries that in recent years have shown some declines in activities (federal government, mining, agriculture), these communities are still projected to grow at modest rates.

- Although population bases in the individual ROI communities have historically been small, these communities have shown modest growth rates (Table 3-19).
- Number of households follows similar growth trends as total population (Table 3-20).
- Highest level of educational attainment for those 25+ years old was fairly consistent across all communities in the ROI and approximately 30 to 40 percent of this population has attained post high school education (Table 3-21).
- The common trend across all communities in the ROI is that a larger percentage of the overall populations are older than 19 years of age (Table 3-22).

	2000 Census	2010 ESRI Projection	2015 ESRI Projection	2010-2015 Annual Growth Rates
Towns				
Amargosa Valley	1,591	2,706	3,108	+2.81%
Beatty	863	1,390	1,571	+2.48%
Pahrump	24,631	34,335	37,591	+1.83%
Counties				
Nye County	32,485	47,120	52,074	+2.02%
Clark County	1,375,765	1,976,256	2,176,936	+1.95%
Nevada	1,998,257	2,748,294	2,999,160	+1.76%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.

	2000 Census	2010 ESRI Projection	2015 ESRI Projection	2010-2015 Annual Growth Rates
Towns				
Amargosa Valley	629	1,057	1,219	+2.89%
Beatty	399	643	730	+2.57%
Pahrump	10,153	14,256	15,708	+1.96%
Counties				
Nye County	13,309	19,463	21,652	+2.15%
Clark County	512,253	729,385	801,382	+1.9%
Nevada	751,165	1,025,511	1,116,629	+1.72%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.

	Amargosa Valley	Beatty	Pahrump	Nye County	Clark County	Nevada
Total Population 25+ Years	1,641	965	26,242	34,208	1,306,928	1,823,265
Less than 9 th Grade	8.4%	2.4%	4.1%	4.1%	7.0%	6.5%
9 th –12 th No Diploma	16.3%	13.6%	14.0%	13.5%	11.0%	10.5%
High School Graduate	35.3%	53.9%	44.2%	44.5%	32.2%	31.7%
Some College No Degree	19.3%	17.8%	20.5%	20.6%	24.5%	24.9%
Associates Degree	8.2%	4.4%	6.3%	6.2%	6.4%	6.7%
Bachelors Degree	8.2%	4.9%	7.4%	7.5%	12.4%	13.0%
Graduate/Professional Degree	4.3%	3.1%	3.4%	3.5%	6.5%	6.7%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2009.

	2000 Census	2009 ESRI Projections	2014 ESRI Projections	2009–2014 Avg. Annual Growth Rates
Amargosa Valley				
Total Population	1,553	2,529	3,183	+5.1%
Less than 19 years	31.0%	29.0%	27.9%	-0.76%
18+ years	71.7%	73.7%	74.4%	+0.19%
85+ years	0.9%	0.9%	0.9%	0.0%
Beatty				
Total Population	898	1,382	1,706	+4.69%
Less than 19 years	27.9%	25.5%	24.1%	-1.10%
18+ years	74.3%	77.1%	78.1%	+0.26%
85+ years	0.8%	1.6%	1.8%	+2.5%
Pahrump				
Total Population	24,630	35,261	42,216	+3.94%
Less than 19 years	23.9%	21.2%	19.7%	-1.42%
18+ years	77.8%	80.7%	82.0%	-0.17%

Table 3-22 Percent Population by Age for Communities and Counties in the ROI

	2000 Census	2009 ESRI Projections	2014 ESRI Projections	2009–2014 Avg. Annual Growth Rates
85+ years	0.9%	1.9%	2.3%	+4.21%
Nye County				
Total Population	32,485	47,4129	57,281	+4.15%
Less than 19 years	25.7%	23.0%	21.6%	-1.22%
18+ years	76.3%	79.1%	80.3%	+3.0%
85+ years	0.9%	1.7%	2.1%	+4.71%
Clark County				
Total Population	1,375,765	1,974,024	2,295,868	+3.26%
Less than 19 years	28.1%	27.4%	26.8%	-0.44%
18+ years	74.4%	75.2%	75.5%	+0.08%
85+ years	0.8%	1.2%	1.4%	+3.33%
Nevada				
Total Population	1,998,257	2,746,331	3,147,495	+2.92%
Less than 19 years	28.2%	27.2%	26.7%	-0.37%
18+ years	74.4%	75.4%	75.7%	+0.08%
85+ years	0.9%	1.3%	1.4%	1.54%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2009 and 2014.

Although Pahrump's population has grown at an average rate of 7.2 percent per year since the mid-1990s, the rest of the county has remained relatively stable, with some towns experiencing a slight decline in population (EDEN 2007). Nye County's historic dependency on the mining sector and activities at the Nevada Test Site has resulted in unstable population growth rates between 1970 and 2002, indicating the need for economic diversification in the county (EDEN 2007).

3.9.2.2 Housing

Table 3-23 and Table 3-24 summarize the housing characteristics of major population centers in the ROI. Housing data was obtained from the U.S. Census Bureau and ESRI. In 2009, the communities of Amargosa Valley and Beatty had relatively high projected rates of vacant houses, 22.7 percent and 26.0 percent, respectively. Overall, the communities and counties in the ROI are projected to expand housing between 3 to 5 percent per year (Table 3-23). The median and average home values in the communities and counties of the ROI are projected to be relatively flat at around 1 to 3 percent increases over the next few years (Table 3-24).

Table 3-23 Housing Units for Communities and Counties in the ROI				
	2000 Census	2009 ESRI Projections	2014 ESRI Projections	2009-2014 Avg. Annual Growth Rates
Amargosa Valley				
Occupied	614	995	1,252	+5.17%
Vacant	178	866	313	+3.53%
Total	792	1,261	1,565	+4.82%
Beatty				
Occupied	384	584	711	+4.35%
Vacant	153	277	339	+4.48%
Total	567	861	1,050	+4.39%
Pahrump				
Occupied	10,53	14,705	17,674	+4.04%
Vacant	1,502	2,141	2,475	+3.12%
Total	11,665	16,846	20,149	+3.92%
Nye County				
Occupied	13,309	19,694	23,305	+3.67%
Vacant	2,625	3,797	4,404	+3.22%
Total	15,934	23,491	28,305	+4.10%
Clark County				
Occupied	512,253	736,521	855,744	+3.24%
Vacant	47,546	94,166	108,699	+3.09%
Total	559,799	830,687	964,443	+3.22%
Nevada				
Occupied	751,165	1,033,339	1,183,165	+2.90%
Vacant	76,292,	136,330	153,930	+2.58%
Total	827,457	1,169,669	1,337,095	+2.86%
Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2009 and 2014.				

Table 3-24 Median Home Values for Communities and Counties in the ROI				
	2000 Census	2009 ESRI Projections	2014 ESRI Projections	2009-2014 Avg. Annual Growth Rates
Amargosa Valley				
Median	\$75,833	\$106,745	\$118,401	+2.18%
Average	\$102,212	\$143,657	\$151,953	+1.15%
Beatty				
Median	\$75,000	\$105,048	\$117,230	+2.32%
Average	\$94,788	\$120,854	\$127,566	+1.11%
Pahrump				
Median	\$106,588	\$147,182	\$168,217	+2.86%
Average	\$121,590	\$168,094	\$185,821	+2.11%
Nye County				
Median	\$96,272	\$134,415	\$151,874	+2.60%
Average	\$111,527	\$152,968	\$168,616	+2.05%
Clark County				
Median	\$132,186	\$152,591	\$156,949	+0.57%
Average	\$153,519	\$179,723	\$184,730	+0.56%
Nevada				
Median	\$132,514	\$157,802	\$164,516	+0.85%
Average	\$157,238	\$193,653	\$202,226	+0.89%
Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2009 and 2014.				

Short-term housing is available in the ROI in the form of hotels and motels. In 2009, there were three, one, and five hotels and motels in the communities of Pahrump, Amargosa, and Beatty, respectively. Based on information from the website TravelNevada.com, there are approximately 613 guest rooms among the 9 hotels and motels in these areas. Additional temporary housing is available in communities within 2 hours of the proposed Project site, with many more rooms available in the Las Vegas metropolitan area. Additional housing opportunities are available in the form of recreational vehicle facilities, mobile home sites, and campgrounds.

3.9.2.3 Affected Groups and Attitudes

This section discusses some potential impacts of the proposed Project on particular stakeholder groups. Note that any one person may fit into multiple stakeholder groups. “Stakeholder groups” are people with a shared social position or set of concerns (not necessarily people who interact with one another) who perceive themselves as likely being impacted by the proposed Project. The grouping used emerged from comments made during the scoping process, additional

comments on the Draft EIS, and general social impact assessment practice in relation to public lands. Scoping comments and comments on the Draft EIS provide clues about opinions of each potentially affected stakeholder group. However, they are anecdotal and should be read as such; as there are no available survey data on the groups attitudes toward this Project, or on the attitude of the larger community of which those groups are part.

Immediate Neighbors / Immediate Neighbors with Responsibility for the Health and Safety of Community Residents

Immediate neighbors are residents who dwell in the immediate vicinity of the proposed Project. Survey data show that the owners of the public lands – the United States general population of adults – believe that affected communities should have the most say in public land use (Brunson and Steel 1994). This group includes youth who may be eligible for apprenticeships, jobless adults in search of work, people who are employed, people who run local businesses or practice agriculture, homemakers, and retirees.

Scoping comments indicate that immediate neighbors have varying views towards the proposed Project. The comments also suggest substantial diversity in values and in goals for the community. In general the comments suggest a dominant opinion in favor of renewable energy in general and of solar in particular. There were concerns, though, that their community might disproportionately bear such burdens as: inconvenience, loss of amenities, impacts to visual resources, and a strain on public safety, social, medical, and fire services without receiving compensation through reductions in electricity costs, advantages in jobs, or contributions to community services, facilities, and infrastructure. In terms of jobs, a key concern is whether local people and then regional residents will receive preference in hiring. Finally, there is a generalized local value in favor of not wasting water, which was expressed more strongly with regard to the “wet cooled” alternative.

Volunteer firefighters, the Sheriff’s Office, Search and Rescue, and local medical services are included in this group. The key concern expressed by people in this group is that the quality and efficiency of local public services might be undermined by the additional demands likely to be generated during the construction period for the Project. Another concern is that the required construction force cannot be fulfilled locally, such that there is likely to be a substantial influx of construction workers who may be more rowdy after work and place extra demands on the Sheriff’s office personnel in contrast to Amargosa Valley’s existing, largely senior population.

Outdoor Recreationists

Many Nevada residents are outdoor recreation enthusiasts. OHV use is common, with about 56 percent of Nevada adults riding OHVs at least once a year (Rollins et al. 2007). About 23 percent of Nevada adults go horseback riding at least once a year (Rollins et al. 2007). Local OHV users and horseback riders are accustomed to having easy access to roads and trails on public lands in the Amargosa Valley and vicinity. Local residents who provided scoping comments and comments on the Draft EIS also specifically mentioned camping, photography, hiking, wildlife viewing, and rock hounding as outdoor recreation activities they undertake in the Amargosa Valley. Key concerns of this group have to do with terrain that will be withdrawn

from outdoor recreation use and that access will be reduced between town and public lands that remain in public use.

Environmental Groups and Stewards

This group is especially concerned about water use and its impact on wildlife, plants, and the physical structure of the land, with cumulative impacts being of particular concern. Carbon sequestration issues, the possibility of habitat loss, and loss of open space are also concerns. As with other groups discussed in this section the views articulated by the spokespersons for these groups represent the views of their members, not necessarily of a representative sampling of environmental organizations or of a wider public.

Federal, State, and Local Governmental Agencies

Because approximately 97 percent of Nye County is administered by the federal government, most land use activities within the County are subject to federal agency oversight. Federal agency responsibilities for the management and protection of resources within their jurisdiction are myriad within the proposed Project area and the proposed Project's ROI. For example, the development of renewable energy resources, including on lands administered by BLM, is mandated by the EPLA of 2005 and other Federal laws, policies, and programs. FLPMA requires the BLM to ensure the multiple use and sustained yield of the lands it administers, including energy development, conservation, recreation, and other uses.

The protection of water rights for sensitive species within Nye County is one of largest challenges facing development in the area. Within the ROI, the USFWS is tasked with enforcing the provisions of the ESA, including protected species within the Ash Meadows NWR and desert tortoise, throughout their critical habitat area(s), and water use and conservation are key to these efforts. The NPS, in cooperation with the USFWS, is required by the ESA and its own Organic Act to protect and maintain habitat for the endangered Devils Hole pupfish. To ensure protection of critical water levels within Devils Hole and spring flows at Ash Meadows NWR, the USFWS has acquired 57 permitted or certificated water rights totaling 16,908 afy in the Amargosa Desert Hydrographic Area.

Not all restrictions are federal. For instance, the Nevada State Engineer has the authority to approve and control the amount of groundwater pumped within the Amargosa Basin. Due to concerns about decreased water levels at Devils Hole, water use within a 15-mile radius of Devils Hole is subject to Nevada State Engineer Order 1197 (see Section 3.3), which restricts where and how much groundwater may be extracted.

These mandates, restrictions, and policies sometimes conflict, or are perceived to conflict, with local government and private development goals and objectives. For example, Nye County recently (July 28, 2010) updated its Comprehensive Plan to include the following language to address potential changes in the management of public lands:

Nye County needs to address public lands within the County and changes in public land management policies. Goals, objectives, and policies are needed to protect the health, welfare, and economic well-being of the County and those residents whose livelihoods and way of life are dependent on public land policies. Nye County citizens must be protected from federal rules and regulations which conflict with local customs, laws, and decisions of the court and which adversely impact the economy and tax base of Nye County.

A decision to grant a right-of-way for the proposed Project not only would be consistent with Nye County's desire to avoid "adversely impact[ing] the economy and tax base" of the County, but would affirmatively benefit the County's "economic well-being." Indeed, such a decision would serve to at least partly offset any adverse impacts to economic development caused by applicable federal and state legal restrictions and responsibilities. For example, to the extent the proposed Project would result in the retirement of existing water rights under federal and/or state law, the Project also would provide substantial benefits. Moreover, given the obligations of federal and state agencies in the County, particularly with regard to water use and sensitive species, the agencies would be required to evaluate any development requiring more than minimal water use in light of the same restrictions, such that any such development likely would face similar restrictions. Of course, federal agency decisions may not fully comply or synchronize with local goals and objectives. Providing for public review and comment periods and cooperating agency status to appropriate governmental entities enables BLM and other agencies to consider any such differences and, where possible and appropriate, seek to minimize them.

3.9.3 Economic Characteristics

The economy of Nye County has historically been supported by mining, agriculture, railroad operations, and federal defense research and development activities. Mining and agriculture have been the dominant economic activities in Nye County and continue as a source of income; however, the relative importance of agriculture and mining has decreased in recent decades. Both sectors are still important in the local economy but constitute a smaller share of employment and personal income sources. The historic economy has also been characterized by the "bust and boom" cycles of a mining economy, as shown by periods of high population growth, no population growth, and population declines.

Table 3-25 summarizes the labor force characteristics of the State of Nevada and Clark and Nye counties. The table includes state labor force data to provide a regional context for the county labor force data. Unemployment rates steadily declined between 1990 and 2008 for the State of Nevada and Clark and Nye counties, but recently rates have increased due to the economic slowdowns.

Table 3-25 Labor Force Characteristics of the State of Nevada, Clark County, and Nye County – 1990 Through 2008

	Nevada		Clark County		Nye County	
Year	1990	2008	1990	2008	1990	2008
Labor Force	655,896	1,373,462	407,763	987,998	8,945	17,764
Employment	622,516	1,282,012	387,881	922,878	8,616	16,036
Unemployment	33,380	91,450	19,882	65,120	329	1,728
Unemployment Rate	5.1%	6.7%	4.9%	6.6%	3.7%	9.7%

Source: NV Dept of Employment, Training and Rehabilitation – Research and Analysis Bureau 2009

While agriculture and mining activity have decreased in Nye County, these industries are still important basic industries in that they bring money into the county economy through sales to non-local businesses and individuals. The county's agricultural industry produced cash receipts of \$23.8 million in 2007 (most recent available data) (USDA National Agricultural Statistics Service 2009). The predominant industry employer for all ROI communities and counties is the service sector. The small rural communities of Amargosa Valley and Beatty also have a strong presence of Agriculture and Mining (Table 3-26). Nearly one-half of all jobs in each ROI community or county are classified as white collar or professional occupations (Table 3-27).

Table 3-26 2009 Employed Population 16+ Years of Age by Industry for Communities and Counties in the ROI

	Amargosa Valley	Beatty	Pahrump	Nye County	Clark County	Nevada
Total Employment	905	569	10,846	15,417	823,682	1,153,371
Agriculture/Mining	12.8%	7.4%	2.3%	7.2%	0.2%	1.0%
Construction	7.8%	7.6%	15.6%	13.5%	10.1%	9.7%
Manufacturing	1.4%	3.5%	3.0%	3.3%	2.9%	3.8%
Wholesale Trade	0.4%	1.1%	1.1%	1.2%	2.1%	2.4%
Retail Trade	7.8%	7.6%	10.1%	9.1%	9.9%	10.1%
Transportation/Utilities	7.7%	4.7%	4.8%	4.4%	4.0%	4.1%
Information	0.7%	0.4%	2.6%	2.1%	1.9%	1.8%
Finance/Insurance/Real Estate	2.8%	2.1%	7.6%	6.2%	7.4%	7.1%
Services	52.4%	58.7%	44.8%	44.7%	57.7%	55.4%
Public Administration	6.1%	7.0%	8.1%	8.3%	3.8%	4.6%

Source: ESRI 2010

	Amargosa Valley	Beatty	Pahrump	Nye County	Clark County	Nevada
Total Employment	905	569	10,846	15,417	823,682	1,153,371
White Collar	46.4%	45.2%	49.5%	47.2%	52.8%	53.9%
Management/ Business/ Financial	8.3%	4.4%	8.5%	8.0%	11.9%	12.2%
Professional	20.0%	19.5%	15.4%	16.4%	15.1%	16.1%
Sales	8.2%	8.8%	13.3%	11.1%	13.0%	12.7%
Administrative Support	9.9%	12.5%	12.2%	11.7%	12.8%	12.9%
Services	25.0%	35.3%	22.9%	22.8%	28.0%	26.0%
Blue Collar	28.6%	19.5%	27.6%	30.1%	19.2%	20.1%
Farming/Forestry/ Fishing	0.9%	0.2%	0.6%	0.5%	0.1%	0.2%
Construction/ Extraction	14.8%	8.3%	12.7%	13.0%	8.0%	7.9%
Installation/ Maintenance/ Repair	4.8%	5.6%	5.3%	6.3%	3.3%	3.6%
Production	3.2%	1.2%	3.0%	3.4%	2.6%	3.1%
Transportation/ Material Moving	5.0%	4.2%	6.1%	6.9%	5.2%	5.3%
Source: ESRI 2010						

Local government workers are employed by Nye County. State government workers in Nye County are employed at the Nevada Division of Parks and the NDOT, among others. Federal agencies operating in or near Nye County include the DOE, U.S. DOD, USFWS, and the BLM.

Many sub-sectors of the service economy in Nye County are proportionately small when compared with the service sub-sectors in the State of Nevada and Clark County; particularly accommodation and food services, real estate, professional and technical, and health care services. In contrast, employment numbers in the retail trade sectors and the arts, entertainment, and recreation services sub-sector indicate that tourism and recreation play a key role in the Nye County economy.

According to an economic development strategy analysis prepared by the University of Nevada, Reno, rural counties often lose population in age groups 20 to 34 years because the young people with the best education, health, and the most marketable skills and abilities leave the rural areas

to realize their potential in areas with greater economic opportunities (UNR 2005). In addition to the out-migration of young persons, increased rates of retiree in-migration in recent years has raised concerns that the growing elderly population would require greater levels of public services in a narrowing economy characterized by a shrinking revenue base.

Employers in the Amargosa Valley are dispersed throughout the valley from US 95 south to the Nevada/California state line. Table 3-28 lists the major employers in the area and the number of employees. It is unknown how many of these employees reside in the Amargosa Valley and how many commute from Pahrump or Las Vegas. Most of the other employers in the area employ fewer than 10 people.

Company	Number of Employees
Ponderosa Dairy	120
Horizon Academy	50
IMV	30
US Ecology	30
Amargosa Valley School	29
Longstreet Inn and Casino	17
Cind-R-Lite	17

Source: Amargosa Valley School 2009; Bagley 2009; Bowlin 2009; EDEN 2009; NBMG 2008; Powell 2009

3.9.3.1 Income

In 2007, total personal income for Nye County was \$1.35 billion and for Clark County was \$71.6 billion. The total personal income for Nevada was \$101.8 billion (U.S. Department of Commerce 2009). In 2000 the median household income for communities and counties in the ROI ranged from a low of \$34,913 in Pahrump to a high of \$44,650 in Clark County. However by 2010, Amargosa Valley had the lowest projected median household income of \$41,852 and Clark continued with the highest at \$57,807 (Table 3-29). Between 2010 and 2015 it is projected that median household income will grow between 2.85% and 3.28% in the ROI (ESRI 2010). In 2000, average household income is very similar between counties and communities in the ROI with the exception of Clark County at \$57,569 (Table 3-30). Between 2010 and 2015, average household income is projected to grow at an average annual rate between 2.4 percent and 3.1 percent in most ROI counties and communities. However, Amargosa Valley is projected to increase average household income annually +6.19 percent between 2010 and 2015 (Table 3-31). This projection is more than likely taking into account the real potential for the areas alternative energy development that provides above average wages. As expected, per capita incomes are projected to increase at similar growth rates as average household incomes in counties and communities in the ROI (Table 3-29).

One potential source of income in the ROI is personal current transfer receipts. Personal current transfer receipts include government payments to individuals for retirement and disability insurance benefits, medical payments (mainly Medicare and Medicaid), income maintenance benefits, and veteran’s benefits. In Nye County, personal current transfer receipts accounted for 22.7 percent of total personal income compared to 10.6 percent in Clark County and 10.7 percent in the State of Nevada or Clark County, which is an indicator of a larger proportion of retirement age population in Nye County (U.S. Department of Commerce 2009).

Table 3-29 Median Household Income for Communities and Counties in the ROI (2010 Dollars)

	2000 Census	2010 ESRI Projection	2015 ESRI Projection	2010-2015 Annual Growth Rates
Towns				
Amargosa Valley	\$35,672	\$41,852	\$48,053	+2.96%
Beatty	\$41,204	\$50,582	\$58,869	+3.28%
Pahrump	\$34,913	\$44,699	\$51,633	+3.10%
Counties				
Nye County	\$36,034	\$45,624	\$52,279	+2.92%
Clark County	\$44,650	\$57,807	\$66,515	+2.85%
Nevada	\$44,614	\$57,546	\$65,787	+2.86%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.

Table 3-30 Average Household Income for Communities and Counties in the ROI (2010 Dollars)

	2000 Census	2010 ESRI Projection	2015 ESRI Projection	2010-2015 Annual Growth Rates
Towns				
Amargosa Valley	\$47,099	\$56,134	\$73,515	+6.19%
Beatty	\$42,910	\$55,834	\$62,543	+2.40%
Pahrump	\$42,432	\$53,623	\$60,679	+2.63%
Counties				
Nye County	\$43,196	\$54,155	\$62,062	+2.92%
Clark County	\$57,569	\$71,748	\$82,836	+3.09%
Nevada	\$57,469	\$71,330	\$82,236	+3.06%

Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.

Table 3-31 Per Capita Income for Communities and Counties in the ROI (2010 Dollars)				
	2000 Census	2010 ESRI Projection	2015 ESRI Projection	2010-2015 Annual Growth Rates
Towns				
Amargosa Valley	\$19,219	\$21,936	\$28,843	+6.30%
Beatty	\$16,844	\$25,828	\$29,062	+2.50%
Pahrump	\$17,747	\$22,317	\$25,410	2.77%
Counties				
Nye County	\$17,962	\$22,513	\$25,953	3.06%
Clark County	\$21,785	\$26,761	\$30,784	3.01%
Nevada	\$21,898	\$26,969	\$30,985	2.98%
Source: U.S. Bureau of the Census, 2000 Census of Population and Housing. ESRI forecasts for 2010 and 2015.				

3.9.4 Public Services and Utilities

3.9.4.1 Law Enforcement and Emergency Services

Law enforcement in the Amargosa Valley is provided by the Nye County Sheriff's Department and the Nevada Highway Patrol. The Sheriff's Department has one substation in Amargosa Valley and three full time deputies. The area is also supported by a substation in Beatty which has one Lieutenant and three deputies. The Nevada Highway Patrol has three officers that patrol the highways in the area with a substation located in Pahrump (Amargosa Valley Area Plan Committee 2009).

Emergency services within Amargosa Valley are provided mainly by the Amargosa Valley Volunteer Fire Department managed by the Town of Amargosa Valley. There are two fire halls located in the area. The Nye County Emergency Services Department provides assistance to the local volunteers, including training. The BLM is responsible for fire protection for wildland fires on public land. Mercy Air Flight for Life helicopters provides emergency airlift services between Amargosa Valley and hospitals in Las Vegas. The Amargosa Valley Medical Clinic provides routine family medical care and is staffed by a visiting physician and physician's assistant (Amargosa Valley Area Plan Committee 2009).

3.9.4.2 Electricity and Natural Gas

The Project area is served by VEA. VEA is a nonprofit cooperative electric utility based in Pahrump, Nevada. VEA's service territory cover more than 6,800 square miles, mainly along the California-Nevada border. At present VEA provides electricity to approximately 16,000 customers (VEA 2009).

There are no natural gas services in the Amargosa Valley. However, there are several propane suppliers in Pahrump including: AmeriGas Propane, Proflame Gas of Pahrump, Shoshone Propane, and Suburban Propane.

3.9.4.3 Public Water Supply and Wastewater

There are very few public water supply systems in the Amargosa Valley Planning Area. The majority of water users rely on individual wells. There are only three public water supply systems near the Project area. These include wells supplying the Amargosa Elementary School, Amargosa Town Complex, and the Amargosa Water Company. As of 2008, over 500 domestic wells were listed in the NDWR database as being drilled in the Amargosa Valley Hydrographic Basin.

There are no wastewater treatment plants in the Amargosa Valley Planning Area. Domestic wastewater is disposed through septic tanks and leach fields.

3.9.4.4 Solid Waste

The NDEP, Bureau of Waste Management oversees the permitting of solid waste landfills and other waste management facilities within the state of Nevada. The nearest Class I landfill is the Pahrump Valley Landfill located north of Pahrump, east of Highway 160.

3.9.4.5 Schools

The proposed Project is located within the Nye County School District of Nye County. There are four schools that serve the Amargosa Valley; three public and one private. Horizon Academy is a special learning center for which students from other schools must apply independently. A summary of school information and enrollment for the schools is provided in Table 3-32.

District	Schools	Grades Provided	Number of Students for 2008-2009 School Year	Location of School
Nye	Beatty School	K-8	103	Beatty
	Amargosa School	K-8	194	Amargosa Valley
	Beatty High School	9-12	139	Beatty
Private	Horizon Academy	7-12	129	Amargosa Valley

Source: Nye County School District 2009; Nevada Department of Education 2009

3.9.5 Fiscal Resources

Clark County: There are 90 funds that Clark County uses for its operations. Table 3-33 shows the total revenues, by category, associated with the overall Clark County budget and the General Fund at the end of the 2007–2008 fiscal year. A blank cell with no financial information indicates that the revenue source did not contribute to the county fund. The significant revenue sources for these funds are intergovernmental resources (46 percent), property taxes (25 percent), and licenses and permits (10 percent).

Revenue	Overall	General Fund
Property Taxes	791,005,569	331,089,911
Other Taxes	66,010,096	14,341,093
Licenses and Permits	316,607,676	219,886,318
Intergovernmental Resources	1,422,232,908	330,571,827
Charges for Services	166,789,048	60,653,236
Fines and Forfeits	26,708,031	24,644,256
Special Assessments	37,236,673	-
Miscellaneous	291,483,804	136,016,587
Total Revenues	\$3,118,073,805	\$1,036,753,592
Source: Clark County 2009		

Table 3-34 shows the expenditures for the 2007–2008 fiscal year (July 1 through June 30). Public safety and public works comprise the largest expenditure items within Clark County.

Expense	
General Government	224,829,526
Judicial	187,097,471
Public Safety	1,048,734,667
Public Works	576,499,730
Health, Welfare, and Sanitation	326,872,672
Culture and Recreation	82,728,864
Community Support	13,127,241

Table 3-34 Clark County Expenditures for Fiscal Year 2007-2008	
Expense	
Intergovernmental Expenditures	114,566,225
Debt Service:	
Principal	110,892,600
Interest	122,112,389
Interest Cost\Fiscal Charges	78,169,949
Total Expenditures	2,885,631,334
Difference Between Revenue (Table 3-33) and Expenditures (Table 3-34)	232,442,471
Source: Clark County 2009.	

Nye County: The Nye County Finance Department describes county governmental revenues and expenditures within 5 major funds and approximately 67 non-major funds. The General Fund is the primary operating fund for Nye County (Nye County 2009). Table 3-35 and Table 3-36 summarize the Nye County revenues and expenditures, respectively. Blank cells indicate that the relevant revenue source did not contribute to the county fund, or that the fund did not pay for the relevant expense in Fiscal Year 2007-2008.

Table 3-35 Nye County Revenues: 2007-2008						
Revenue	General Fund	Education Endowment Fund	Special Project Fund	Endowment Capital Projects Fund	Repository Oversight Fund	Overall Total incl Non-major Funds
Taxes	14,944,493	-	-	-	-	20,545,682
Licenses	135,133	-	-	-	-	1,956,669
Intergovernmental	14,066,342	-	11,250,000	-	3,343,065	38,713,071
Charges for Services	2,646,579	-	-	-	-	4,690,031
Fines and Forfeits	403,155	-	-	-	-	678,477
Other	1,445,393	612,796	1,068,554	719,162	-	7,759,128
Total Revenues*	33,691,095	612,796	12,318,554	719,162	3,343,065	74,343,058
* Information taken directly from Nye County 2009; inconsistencies have been noted.						

Table 3-36 Nye County Expenditures for Fiscal Year 2007-2008

Expenditure	General Fund	Education Endowment Fund	Special Project Fund	Endowment Capital Projects Fund	Repository Oversight Fund	Overall Total incl Nonmajor Funds
General Government	12,342,734	-	540,064	-	3,343,065	20,853,997
Judicial	6,152,895	-	-	-	-	6,464,099
Public Safety	15,614,299	-	20,317	-	-	19,225,464
Public Works	114,738	-	355,310	-	-	9,146,041
Health and Sanitation	250,306	-	-	-	-	1,133,407
Welfare	-	-	-	-	-	1,616,136
Culture and Recreation	-	-	35,586	-	-	413,651
Community Support	392,940	-	476	-	-	890,075
Intergovernmental	298,900	1,119,264	841,088	-	-	3,526,569
Capital Projects	-	-	4,208,966	-	-	5,863,564
Debt Service:						
Principal	-	-	-	-	-	2,183,241
Interest	-	-	-	-	-	436,848
Total Expenditures	35,166,812	1,119,264	6,001,807	-	3,343,065	71,753,092
Difference Between Revenue (Table 3-35) and Expenditures (Table 3-36)	(1,475,717)	(506,468)	6,316,747	719,162	0	2,589,966
Source: Nye County 2009						

3.10 ENVIRONMENTAL JUSTICE

On February 11, 1997, EO 12898 (Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) was signed. This EO requires all federal agencies to assess whether their programs, policies, and activities have disproportionately high and adverse human health or environmental effects on minority and low-income populations in the United States.

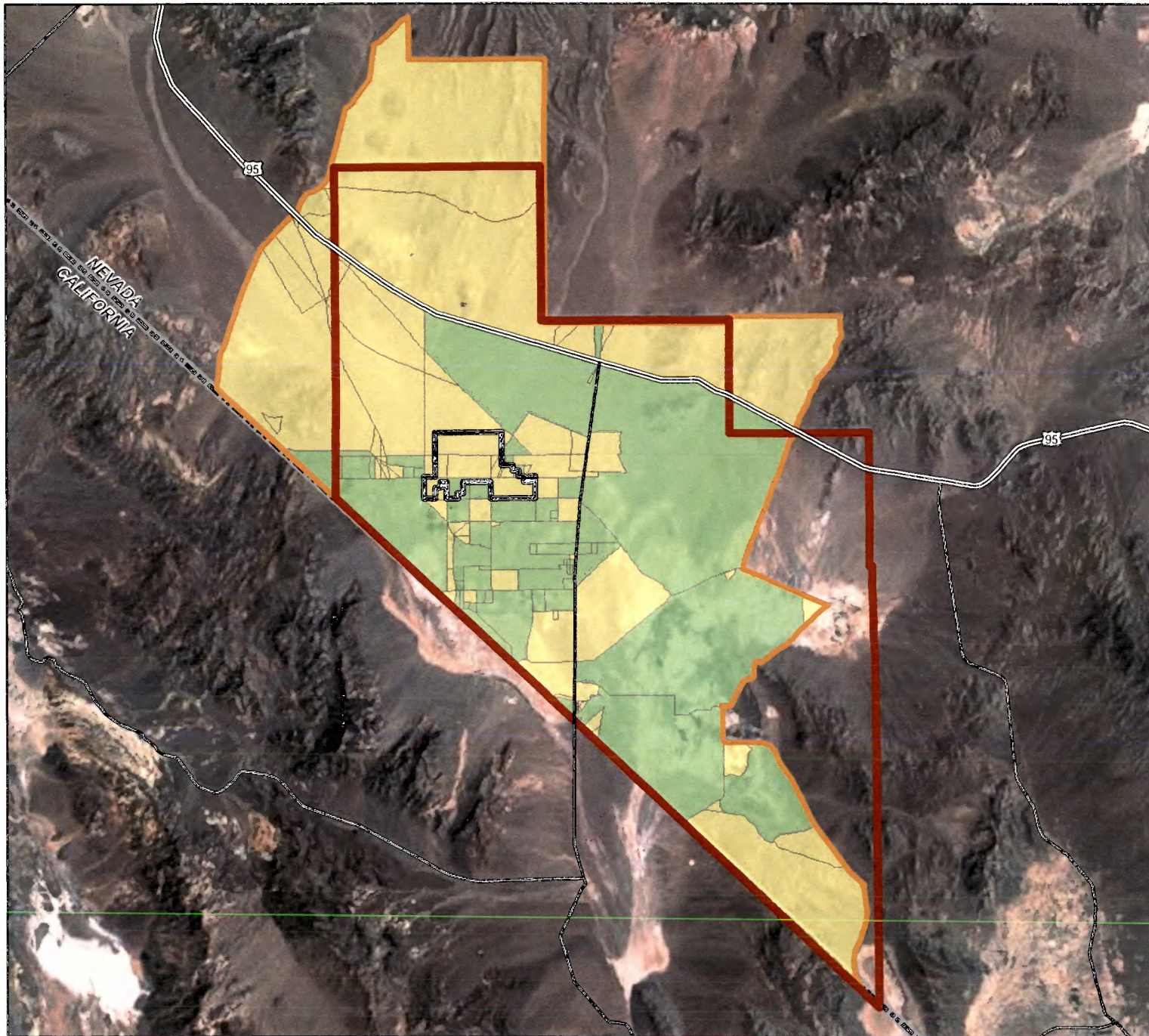
The EPA defines a community with potential Environmental Justice (EJ) populations as one that has a greater percentage of minority or low-income populations than does an identified reference community. Minority populations are those populations having (1) 50 percent minority population in the affected area or (2) a significantly greater minority population than the

reference area (EPA 1998). The EPA has not specified what percentage of the population can be characterized as “significant” in order to define EJ populations. Low-income populations were defined as those individuals that are considered living below poverty levels. The U.S. Census Bureau defines poverty level thresholds for individuals and a family of four as income levels below \$8,501 and \$17,029, respectively.

The U.S. Census Bureau has no specific designation for the Town of Amargosa Valley. Therefore, the EJ analysis is undertaken at the U.S. Census Block Group level, which allows an assessment of both poverty and minority populations. Within 5 miles of the Project area, there are two Block Groups which extend much farther than the 5-mile radius of the Project area; one in Nevada and one in California (Figure 3-14). The Block Group in California has no population within 5 miles of the Project area and thus was not used in the analysis. The Nevada Block Group encompasses 528 square miles and had a 2000 population of 1,176.

The reference areas are Nye County and the State of Nevada, which are larger geographic areas with which to compare the Census Block Group. Relevant ethnicity data and poverty level for the Census Block Group was used to determine whether populations residing within the affected area constitute a potential EJ population. This was done by comparing minority and poverty level statistics for the Block Group with those reported for Nye County and the State of Nevada. The data used for comparison was from the 2000 Census.






A potential EJ population is determined to exist in a Census Block Group if the minority population (e.g., a non-white population) is more than 10 percentage points higher than the minority population within one of the reference communities (Nye County or the State of Nevada). Table 3-37 summarizes these racial proportions for the referenced groups. As shown in Table 3-26, the minority population in the Amargosa Valley Block Group is 20.7 percentage points higher than that in Nye County and 1.2 percentage points higher than that in Nevada. The majority of the minority population in the Block Group is classified as Hispanic. The percentage of the population below poverty level in the Block Group is 4.1 and 4.3 percentage points higher than that in Nye County and Nevada, respectively.



Amargosa Farm Road Solar Energy Project (NVN-84359)

Environmental Justice
Figure 3-14

LEGEND

-  Project Area
-  Amargosa Valley Town Boundary
-  Census Block Group
-  Census Block (Population > 0)
-  Census Block (Population = 0)

General Reference Features

-  US Highway
-  State Highway
-  State Boundary



Source: Census Data - Tiger 2009, ESRI, 2005;
AV Town Boundary - TerraSpectra Geomatics, 2009;
Highways, Imagery - ESRI, 2005, 2009

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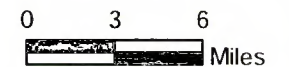


Table 3-37 Racial Proportions Summary

	Nevada	Nye County	Block Group
Total Population	1,998,257	32,485	1,181
White	1,303,001	27,511	753
Hispanic	393,970	2,713	360
African American	131,509	373	1
American Indian	21,397	587	58
Asian	88,593	242	8
Pacific Islander	7,769	100	1
Other	2,787	68	NA
Mixed	49,231	891	NA
Percentage Minority	34.8	15.3	36.0
Percentage Below Poverty Level	10.5	10.7	14.8

Source: U.S. Census Bureau 2009a

3.11 LAND USE, RECREATION, TRANSPORTATION AND ACCESS

This section of the EIS characterizes the existing and future land use, recreation, access, and transportation conditions within the ROI. The ROI area varies by resource area. The ROI for land use includes the Town of Amargosa Valley planning area, located in the south-central part of Nevada in Nye County, and covers approximately 505 square miles of rural, unincorporated desert land. The ROI for the transportation and access information encompasses a broader area, including Nye and Clark counties in Nevada, with an emphasis on the communities closest to the Project area, including Amargosa Valley and Beatty, as well as larger communities within 2 hours of the Project area, such as Las Vegas and Pahrump. For recreation resources, the ROI encompasses a radius of approximately 50 miles around the Project area, based on the visual resources ROI, which accounts for all areas within the viewshed of the Project area.

3.11.1 Regulatory Framework

The BLM may grant a right-of-way for use of the land it administers under the FLPMA, 43 USC §§ 1701-1782, specifically § 1732 and § 1761 et seq. Under FLPMA, the Secretary of the Interior is authorized to grant, issue, or renew rights-of-way over, upon, or through such land for utility corridors, roads, trails, highways, railroads, canals, etc. The FLPMA provides the BLM with authority to issue rights-of-way for the use, occupancy, and development of public land. The regulations establishing procedures for the processing of these rights-of-way are found in 43 CFR Part 2800.

FLPMA requires that BLM manage the lands it administers under the principle of “multiple use and sustained yield.” 43 USC §§ 1701, 1702, 1732, FLPMA defines “multiple use” to mean:

“... management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources...; the use of some land for less than all of the resources a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic scientific and historical values...” 43 USC § 1702(c).

This mandate does not require that every use be allowed on every acre, but rather that a proper balance of uses be struck in BLM’s RMPs and other land use decisions. In exercising this discretion, the BLM has defined the appropriate range of, and balance between, the multiple uses of land it administers in the Las Vegas RMP/Final EIS.

BLM Las Vegas RMP and Final EIS (1998) – This land use plan identifies existing and future management direction in the form of objectives and management for 3.3 million acres of public land in Clark and Nye counties, located in southern Nevada. All public land within the planning area, unless otherwise classified as ACEC or Wilderness Study Areas, is available for rights-of-way under FLPMA. Land use permit applications are addressed on a case-by-case basis, where consistent with other resource management objectives and local land uses.

Nye County Comprehensive Plan (Nye County Board of Commissioners 1994) – This plan was developed to protect the health, welfare, and economic well being of the County by creating management objectives for the effects of population growth and decline, and to serve as a framework for local land use plans. It is Nye County’s objective to establish long-term partnerships with the renewable energy sector, and has goals to:

- support and encourage the efficient use of energy
- promote the siting of renewable energy research or pilot technology and demonstration projects in Amargosa Valley
- become proactively involved in the federal and state efforts to route and approve renewable energy transmission corridors for distributing power from the Amargosa Valley to the national grid

Amargosa Valley Area Plan (Amargosa Valley Area Plan Committee 2009) – This plan was developed to manage the community’s natural resources and provide public services and facilities while protecting the public health, safety, and welfare.

3.11.2 Data Collection and Methods

Existing land use and recreation data were collected through analysis of aerial photography, field verification, review of existing studies and plans, and coordination with local and county

agencies. Individuals from the BLM were contacted and the BLM Legacy Rehost (LR2000) database was utilized to verify recreation and land use resources on BLM land within the ROI.

Planned land use and recreation information was collected through review of existing plans for the Amargosa Valley and the BLM. Local, county, and federal agencies were contacted to identify potential or approved developments near the proposed Project.

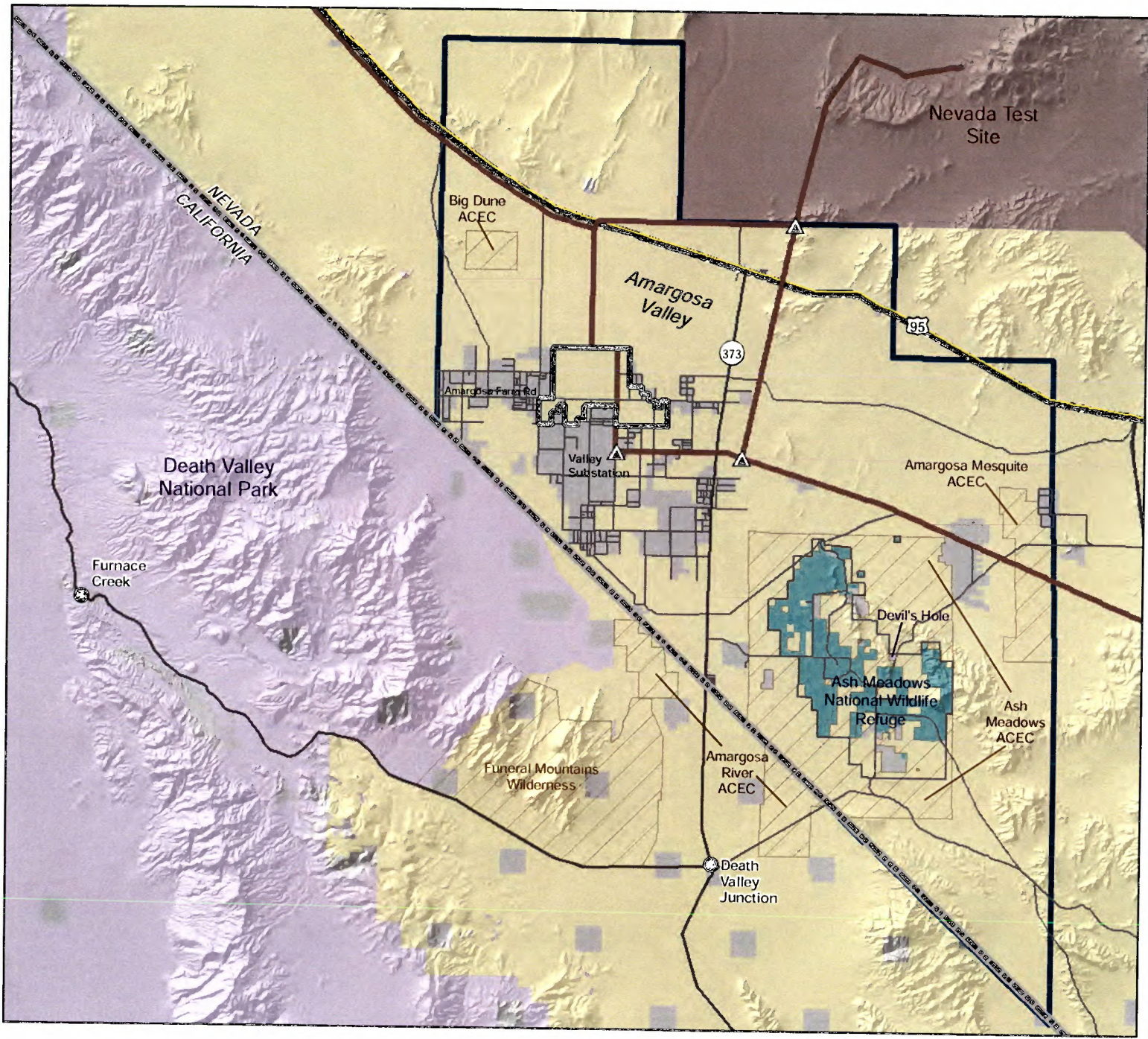
Land jurisdiction does not necessarily imply land ownership; however, in some cases the authority that has jurisdiction may also own the land. Three categories of land ownership were identified and mapped within the land use ROI: federal, local, and private. This information was obtained from available maps, planning documents, and discussions with agencies (Figure 3-15).

3.11.3 Existing Land Use

Existing land use conditions within the ROI are characterized primarily by open desert, utility corridors and facilities, limited industrial (mining and dairy) and commercial development, agriculture, and scattered low-density residences (Figure 3-16).

As described in Section 3.9 – Socioeconomic Resources, approximately 97 percent of Nye County’s land area is administered by the federal government.

The BLM is the largest landowner in the ROI. The Southern Nevada District, Pahrump Field Office manages 3.3 million acres of public land in southern Nevada and 700,000 acres in southern Nye County, including the land requested under the Proponent’s right-of-way application for the proposed Project. Per the 1998 Las Vegas RMP/EIS, these lands are available for multiple uses, including opportunities for recreation, utility development, mining, wildlife habitat, grazing, and wilderness preservation. The proposed Project conforms to the intent of the 1998 Las Vegas RMP/EIS (BLM 1998).



Amargosa Farm Road Solar Energy Project (NVN-84359)

Jurisdiction
Figure 3-15

LEGEND

- Project Area
- Amargosa Valley Town Boundary

Surface Management

- Bureau of Land Management
- Department of Energy
- National Park Service
- US Fish and Wildlife Service
- Private

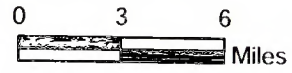
General Reference Features

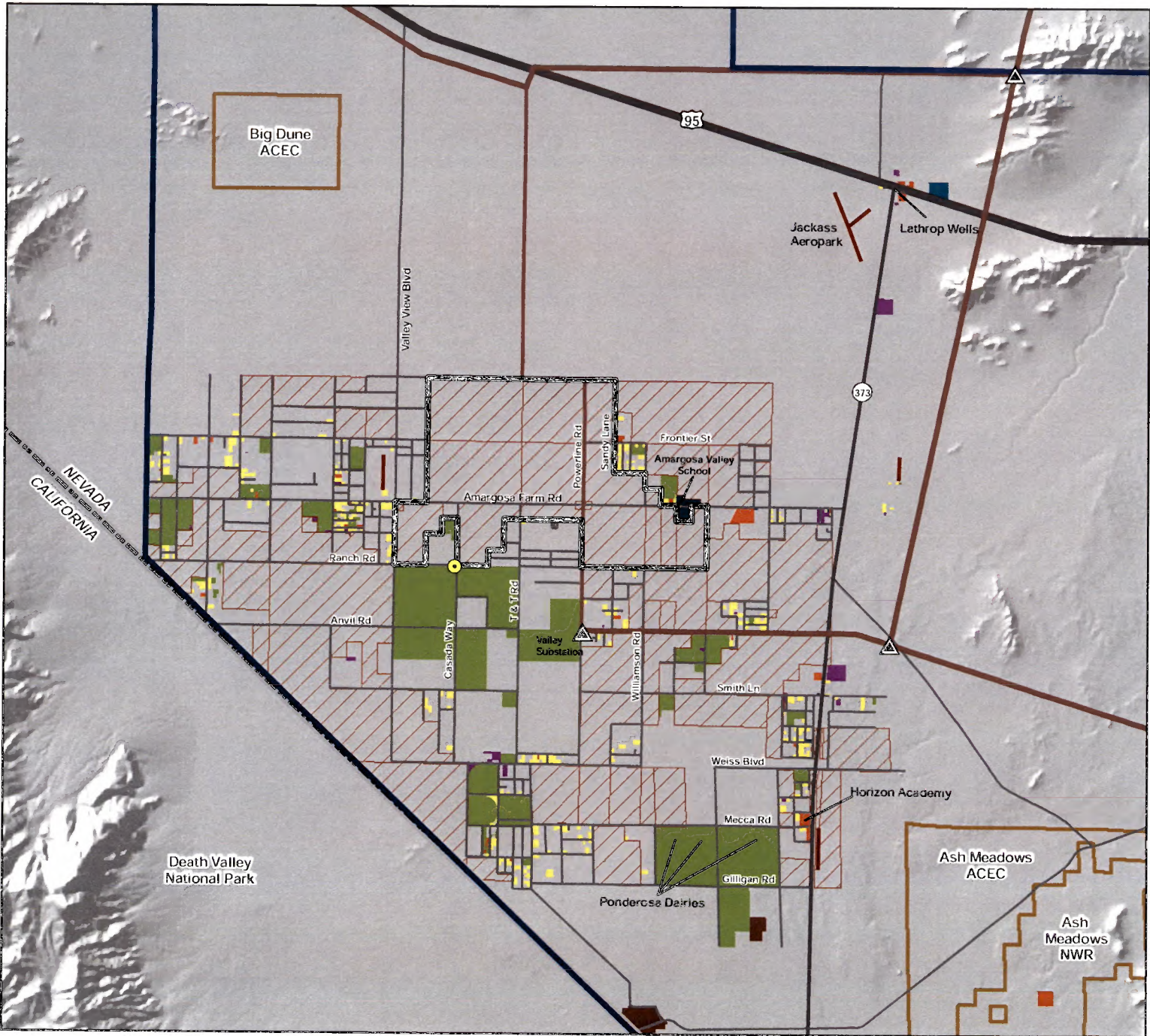
- Existing Transmission Line (<230kV)
- Existing Substation
- Special Management Area
- State Boundary
- US Highway
- State Highway
- Local Road



Source: Land Ownership, SMA - BLM, 2007;
 Ash Meadows - USFWS, 2005; Local Roads,
 AV Boundary - TerraSpectra Geomatics, 2009;
 Transmission Lines, Substations - Platts, 2009;
 Highways - ESRI, 2009

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Amargosa Farm Road Solar Energy Project (NVN-84359)

Existing Land Use Figure 3-16

LEGEND

- Project Area
 - Amargosa Valley Town Boundary
- Current Land Use**
- Residential
 - Agriculture
 - Commercial
 - Industrial
 - Mining
 - Public/Quasi-Public
 - Special Development Area

General Reference Features

- Existing Transmission Line (<230kV)
- Proposed Project Well
- BLM Land Designated for Disposal
- Special Management Area
- Highway
- Local Road
- Airstrip
- State Boundary



Source: Transmission Lines, Substations - Platts, 2009;
BLM Disposal Land - BLM, 2009; AV boundary, Airstrips,
Land Use, Local Roads - TerraSpectra Geomatics 2009;
Wells - Nevada State Engineer, 2008;
Highways - ESRI, 2009

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Varieties of leases, easements, and rights-of-way have been granted by the BLM on land they manage within the ROI. Table 3-38 lists those that have been authorized or are pending within a 2-mile buffer around the Project area.

Table 3-38 Authorized and Pending Rights-of-Way Granted		
Serial Number	Status	Description
NVN 52385	Authorized	Amargosa Community Pit – Sand and Gravel Facility
NVN 62888	Authorized	Right-of-way – FLPMA, Non-Energy Facilities
NVN 78483	Authorized	Free Use Permit – Government – Sand and Gravel Facility
NVN 83205	Authorized	Sand and Gravel Facility
NVN 83276	Pending	Mine/Reclamation Plan, Sand and Gravel Facility
NVN 84623	Authorized	Sand and Gravel Facility
NVN 85746	Pending	Desert Research Institute Wind Measurement Sites, Right-of-Way – Power Transmission – FLPMA Wind Energy Facilities
NVN 87822	Pending	Sand and Gravel Facility
NVN 35976	Authorized	Sale – Section 209, FLPMA
NVN 48876	Authorized	Access Road (2,640’ x 40’) Right-of-Way – Road, Non-Energy Facilities
NVN 53354	Authorized	Amargosa Valley Road, Right-of-Way – Road, Non-Energy Facilities
NVN 61968FD	Pending	Segregation Outside Las Vegas Valley, BLM Section 206, FLPMA
NVN 73706	Authorized	Nevada Bell, Right-of-Way
NVN 85654	Pending	Cogentrix Solar Transmission Line Right-of-Way Application; overlapping existing right-of-way (NVN-84359)
NVN 66289	Authorized	Ely to Cherry Creek Right-of-Way; Fiber Optic Facilities
NVN 84466	Pending	Pacific Solar Investments, 300 MW solar trough site called Amargosa South
NVN 85657	Pending	Cogentrix Solar Services, Solar thermal Energy Facility Amargosa Valley Big Dune overlapping existing right-of-way (NVN 84466)
NVN 83150	Pending	Cogentrix Solar Services Right-of-Way Application; 1,400 MW Concentrating Solar Trough Project
Source: BLM 2009b		

The 1998 Las Vegas RMP/EIS identified 28,257 acres of land in the ROI available for disposal, which means these lands are available for sale, exchange, or recreation and public expansion and development (BLM 1998). Currently, there are approximately 27,904 acres of disposal land

within the ROI. All BLM-managed land requested under the Proponent's right-of-way application is land that has been designated for disposal.

There is no state-owned land within the ROI. The nearest state-owned land is the Belmont Courthouse State Historic Park in northern Nye County, approximately 170 miles away. Within the ROI, a few state-owned facilities are present, including an NDOT-managed rest area at the intersection of US 95 and NV 373. Private land within the ROI includes isolated pockets of residential and commercial development within the Amargosa Valley.

There are no incorporated cities or towns within the ROI or Nye County. The Project area is located in the unincorporated Town of Amargosa Valley, which consists of a rural population of roughly 1,500 people, spread over a large geographic area of approximately 505 square miles. While the BLM has exclusive jurisdiction over land use activities on land that it manages, the Amargosa Valley Area Planning Commission provides guidance to ensure that proposed projects within the Town Planning boundary are constructed and operated in a manner that is consistent with the standards set forth in the Amargosa Valley Area Plan (Amargosa Valley Area Plan Committee 2009).

3.11.3.1 Residential

Residential development in the ROI includes isolated homesteads scattered throughout the Amargosa Valley. According to the Nye County Assessors database, there are approximately 600 parcels of residentially zoned private properties within 2 miles of the Project area, generally to the south and east. Concentrated population areas near the Project site include an area east of Sandy Lane, approximately 0.25 mile east of the Project area; and an area west of Valley View Boulevard along Amargosa Farm Road.

3.11.3.2 Commercial and Quasi-Public

There is limited commercial development within the Amargosa Valley. The closest commercial development is located approximately 6 miles northeast of the Project area at the intersection of NV 373 and US 95. It includes a business park, the Nevada Joe's commercial complex (containing a restaurant, brothel, and convenience store), a fireworks retailer, gas station, helicopter pad, and a materials-laydown yard leased by the Nye County Nuclear Waste Repository Project Office.

The Amargosa Valley Community Complex mixed-use area is located adjacent to Amargosa Farm Road immediately southeast of the Project area. It includes public facilities: an emergency services center (fire department, ambulance service, helipad, and sheriff's substation), library, medical clinic, senior center, park, cemetery, rodeo grounds, AVIA Community Center and Raceway, and the Amargosa Valley School.

A mixed-use commercial area is located adjacent to NV 373 and Mecca Road, approximately 3 miles southeast of the Project area. The area includes the Horizon School complex (boarding school with associated residences), a grocery store, First International Bank, and pizza restaurant.

Two commercial institutions, the Longstreet Hotel and Casino and the State Line Saloon complex (contains a restaurant, RV park, golf course, convenience store, and lounge with gambling) are located 8 miles southeast of the Project area on the Nevada/California border, east and west of NV 373.

Two churches are located in the ROI: the Church of Amargosa located on Amargosa Farm Road and an unknown church located off Maverick Road. Both are located approximately 0.5 mile west of the Project area.

3.11.3.3 Industrial and Agricultural

There is limited industrial development in the ROI. The Ponderosa Dairy, a large dairy operation employing approximately 120 employees, is located roughly 2 miles south of the Project area.

Within the Amargosa Valley, the principal crop grown is alfalfa, which supports the local dairy operations. Other crops include fruits and vegetables, and nut trees (primarily pistachios).

3.11.3.4 Communication Facilities

Three cellular towers are located within the Amargosa Valley Community Complex: one adjacent to the senior center and two located at the emergency services building. There are three Internet provider towers in the local area. The towers are located adjacent to the dairy, adjacent to the health clinic complex, and southwest of the Project area on T&T Road (per personal communication with Jan Cameron, December 16, 2009).

3.11.3.5 Air Facilities

Three private airstrips are located within the Amargosa Valley. One at the Mecca Road alignment and NV 373; one on the east side of NV 373 at the Amargosa Farm Road alignment, and off of Valley View Boulevard; and one the north side of Amargosa Farm Road. The nearest major airport to the Project area is McCarran International Airport, located approximately 3 hours east, in Las Vegas, Nevada.

An abandoned airstrip, formerly Jackass Aeropark, is located approximately 5 miles northeast of the Project area, west of the intersection of US 95 and NV 373.

3.11.3.6 Utilities

The Project area is located approximately 2 miles north of the VEA-owned Valley Substation. A 138kV transmission line, owned and operated by VEA, traverses north paralleling Powerline Road to US 95. Two other VEA transmission lines are located on the eastern edge of the Project area. Additionally, a telephone/telegraph right-of-way owned by Nevada Bell is adjacent to the western edge of the Project area. The right-of-way runs north from Anvil Road to US 95, and continues in the ROI east on Anvil Road and north on NV 373.

3.11.3.7 Mining/Extraction

There are no active mining claims within the Project area (LR2000). There are three active mineral-resource-extraction areas approximately 5 miles from the Project area. Two of these areas are industrial mineral mines with processing plants for cinder and specialty clay products. The location of these mining areas is shown on Figure 3-4.

IMV Nevada mines and processes a variety of specialty clays, approximately 5 miles south of the Project area, south of Anvil Road near School Lane. Currently, IMV maintains mining claims (the Mud Camp Mining claims in Sections 20, 21, and 29 of T16S R50E) on approximately 10,000 acres in the Amargosa Valley near the Nevada/California border. An exploration plan is maintained and extensive ore reserves are identified for future production. From the mine locations, specialty clays are processed at the plant in Section 29 of T17S R49E. A number of products are made using the clays for a wide variety of uses in industrial, construction, and agricultural applications.

Cinder Cone Mine, owned and operated by Cind-R-Lite Block, holds a series of public and private claims for volcanic-mineral materials, such as pumice and cinder. These claims are located in Section 36 of T14S, R48E, 9 miles north of the Project area and north of US 95.

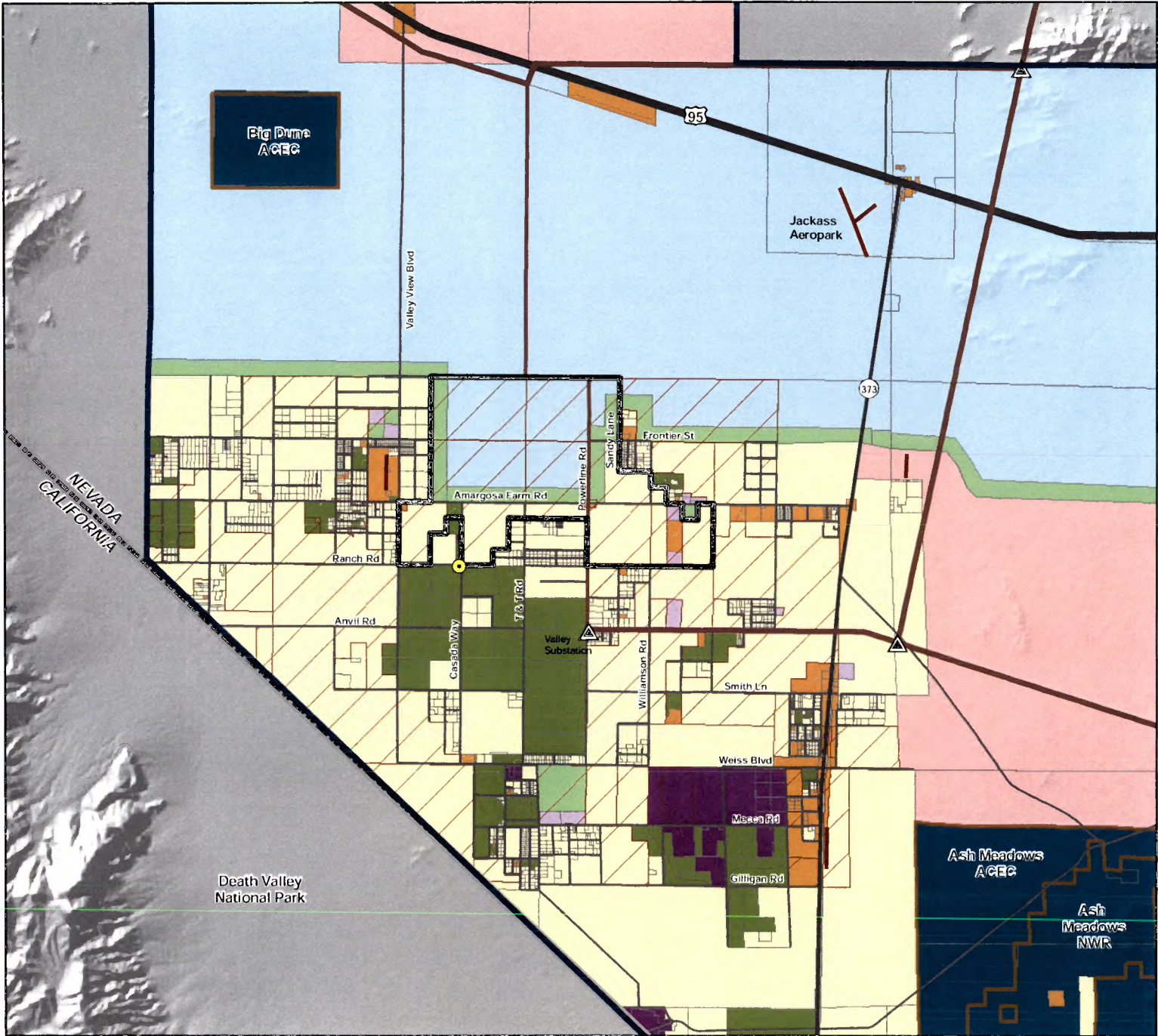
The third area contains claims filed by the Nye County Road Department, which operates a sand and gravel pit that occupies Section 10 of T15S R49E.

3.11.4 Planned Land Use

Planned or future land use refers to the future land uses designated within the ROI federal (BLM) and local (Amargosa Valley Area Plan) jurisdictional entities' plans. These land management plans reflect the goals and policies that guide the physical land development. Under the guidance of the 1998 Las Vegas RMP/EIS, a total of 27,904 acres of established land disposal areas on BLM land in the ROI and surrounding vicinity are currently available for transfer through sale or lease to other uses (BLM 1998). With the development of the proposed Project, approximately 7,000 fewer acres would be available for BLM disposal to other federal actions.

In the ROI, which is outside of the Pahrump Regional Planning District, the County does not provide official guidance for new developments. Based on relevant planning documents for the jurisdictions present in the ROI, the overall land uses, types, patterns, and densities therein are not expected to change substantially (Figure 3-17).

The Amargosa Valley Area Plan (Amargosa Valley Area Plan Committee 2009) limits parceling in the ROI to a minimum of 2 acres for the Low Density Residential land use designation; and to 5 acres for the Rural Density Residential land use designation outside specified higher density areas on the perimeter of the planning area boundary. It also shows a specification of a 0.25-mile Open Space, Parks & Trails land use designation between residential areas and the area where the proposed Project is located.



Amargosa Farm Road Solar Energy Project (NVN-84359)

Future Land Use Figure 3-17

LEGEND

- Project Area
- Amargosa Valley Town Boundary

Future Land Use

- Residential
- Agriculture
- Industrial
- Community/Utility Facility
- Mixed Use
- Open Space, Park, Trail
- Community Development Reserve
- Special Development Area
- Special Development Area (Federal)

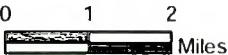
General Reference Features

- Existing Transmission Line (<230kV)
- Existing Substation
- Proposed Project Well
- BLM Land Designated for Disposal
- Special Management Area
- Highway
- Local Road
- Airstrip
- State Boundary



Source: Transmission Lines, Substations - Platts, 2009; BLM Disposal Land - BLM, 2009; AV boundary, Airstrips, Land Use, Local Roads - TerraSpectra Geomatics 2009; Wells - Nevada State Engineer, 2008; Highways - ESRI 2009

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Future land uses shown for the ROI include Special Development Areas, rural density residential, open space, parks & trails, a school, proposed museum and technology park, landfills and utility facilities. The term “Special Development Area” is a mixed-use designation to set aside public or private areas where a variety of land uses might be proposed for approval, including projects under review by the BLM, such as Solar Energy Facilities (Amargosa Valley Area Plan Committee 2009). Nye County’s resolution to adopt the plan:

“...is a guide toward future land use decisions over the next 20 years, without restricting private property rights or limiting the right to enter into any development agreements. The U.S. Bureau of Land Management would have to consider the plan when making decisions” (Jan Cameron, Pahrump Valley Times, November 2009).

The Development Agreement made between Nye County and the Proponent “found that the [Development] Agreement is consistent with the County’s plans, policies and regulations, including the Amargosa Valley Area Plan and the Master Plan, and that the execution of this Agreement on behalf of the County is in the public interest and is lawful in all respects.”

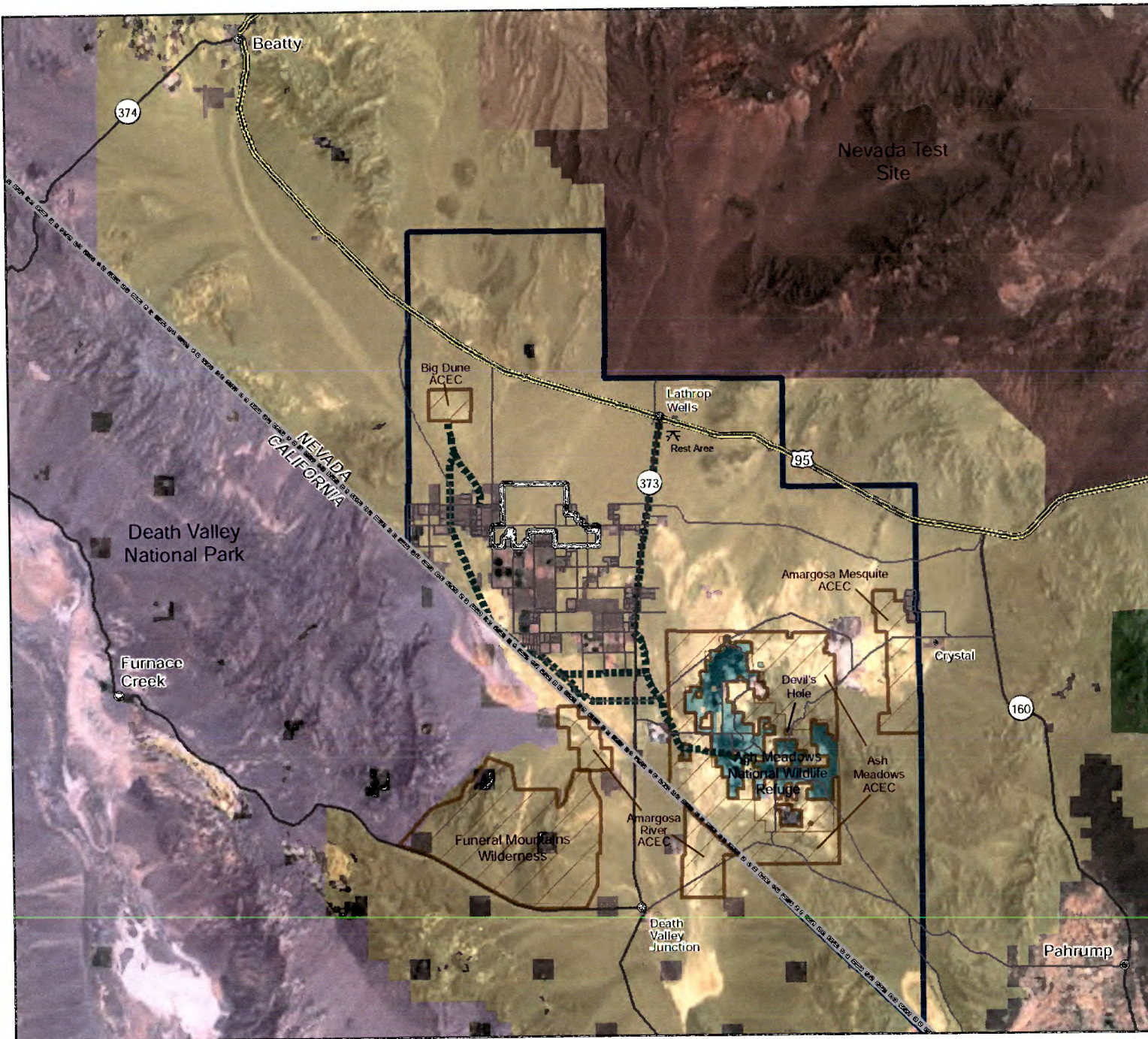
3.11.5 Recreation

For recreation resources, the ROI encompasses a radius of approximately 50 miles around the Project area. The 50-mile radius includes the mountains and valleys surrounding the Amargosa Valley, extending into the Death Valley National Park in California. The mountains and deserts surrounding the Project area offer a variety of dispersed recreation including OHV use in the Big Dune area and on existing roads and dry washes; big and small game hunting in the surrounding desert and mountains; and hiking, camping, and sightseeing in the Funeral Mountains and other accessible areas (Figure 3-18).

3.11.5.1 Special Management Areas

Big Dune, a unique sand dune area approximately 4 miles northwest of the Project area, is one of the more popular recreational areas in the ROI. The BLM manages this area primarily as an OHV recreation area, and as an ACEC for several sensitive beetle species. Other recreational opportunities include wildlife viewing, photography, and sandboarding and sandskiing on open dunes. The Big Dune recreational area is accessed primarily from Valley View Boulevard approximately 2 miles south of US 95. Developed facilities include a parking and vending area. Dispersed camping areas on the east and west sides of the dune is available as well. A Recreation Management Plan for the 1,920-acre area is being developed by the BLM.

The Ash Meadows NWR, managed by the USFWS, is located approximately 7 miles southeast of the Project area. Ash Meadows is a unit of the Desert Refuge Complex, which protects and manages valuable ecosystems in the Southwest. The Comprehensive Conservation Plan (2009) for the Desert NWR Complex provides guidance for the refuge and ensures public involvement in management decisions.



Amargosa Farm Road Solar Energy Project (NVN-84359)

Recreation and Transportation
Figure 3-18

LEGEND

- Project Area
- Amargosa Valley Town Boundary

Surface Management

- Bureau of Land Management
- Department of Energy
- National Park Service
- US Fish and Wildlife Service
- Private

General Reference Features

- US Highway
- State Highway
- Local Road
- Rest Area
- Future Trail / Recreation Corridor
- Special Management Area
- State Boundary



Source: Land Ownership, SMA - BLM, 2007; Trails, Local Roads, AV Boundary - TerraSpectra Geomatics, 2009; Transmission Lines, Substations - Platts, 2009; Ash Meadows - USFWS, 2005; Highways - ESRI, 2009

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The Ash Meadows unit includes a variety of recreational opportunities and facilities and includes Devils Hole, a detached unit of the NPS Death Valley National Park, which is managed as a wildlife refuge to an endangered species of pupfish. Encompassing over 23,000 acres of spring-fed wetlands, it contains a rare desert wetland ecosystem that provides habitat for 25 endangered or threatened species found only at Ash Meadows. Recreation opportunities include: hunting, boating, hiking, wildlife observation, environmental education, and photography. Facilities include a visitor center, boat launch, and picnic area, all of which are accessible by NV 373.

The Ash Meadows ACEC's 37,152 acres surround the Ash Meadows NWR. The ACEC is located approximately 5 miles southeast of the Project area and is managed for special status species habitat.

The Amargosa Mesquite ACEC is located approximately 12 miles east of the Project area and is managed for the neotropical bird habitat within its 6,891 acres.

South of the Nevada/California border, the Amargosa River ACEC encompasses 21,552 acres in three distinct geographic units, and are located in northeastern San Bernardino and southeastern Inyo counties, California, near the communities of Tecopa and Death Valley Junction. Eighty-nine percent of the ACEC is on private land, but the BLM has no jurisdiction on private land. Only one of the three separate units in this ACEC is in close proximity to the Project area: the Upper Amargosa Mesquite Bosque Unit, approximately 8 miles south of the Project area, is located west of CA 127 and immediately north of the Funeral Mountains Wilderness. It contains 2,720 acres of public land administered by the BLM. This ACEC contains significant historic and cultural, biological and scenic values centered on the river for which it is named. The Upper unit is considered semi-primitive, with no developed campgrounds or facilities and limited motorized vehicle access. Recreation opportunities include sightseeing, bird and wildlife viewing, and photography. The most common activity is casual use vehicle touring. The Amargosa River ACEC Implementation Plan/Environmental Assessment (2006) serves as the guidance document for this ACEC.

Also in California, approximately 4 miles southwest of the Project site, is the eastern boundary of the Death Valley National Park. Death Valley National Park covers approximately 5,262 square miles, 95 percent of which is designated as wilderness. Death Valley National Park's recreational opportunities include backcountry road sightseeing, biking, hiking, camping, wildlife observation, and stargazing. There are no developed recreational facilities present for approximately 7 miles into Death Valley National Park from Lee's Camp Road. This road is a common approach for recreational users going into the park from the Amargosa Valley, and is a continuation of Amargosa Farm Road (personal communication with Jan Cameron, December 16, 2009). Echo Canyon Road, a road that requires a 4-wheel-drive vehicle and that the NPS maintains and recommends for a backcountry drive, continues south from Lee's Camp Road into the park.

On the southeastern end of Death Valley National Park in Inyo County, within the ROI at approximately 7 miles south of the Project site, is the Funeral Mountain Wilderness Area. The area encompasses 25,708 acres managed by the BLM Barstow Field Office, and comprises portions of the Funeral Mountains ranging in elevations from 2,200 to 7,000 feet. Recreation opportunities include dispersed hunting, non-commercial trapping, hiking, horseback riding, and

camping within the wilderness area and non-vehicular access to Death Valley National Park. The Funeral Mountain Wilderness is closed to vehicular traffic, but is open to non-vehicular recreational traffic.

3.11.5.2 Future Recreation

All public land not included within a special management area is managed as an Extensive Recreation Management Area. The objective of these lands is to manage them, emphasizing dispersed and diverse recreation activities (BLM 2008).

The Amargosa Valley Area Plan has designated Open Space, Parks, and Trail corridors parallel to NV 373 east of the Project site, north from Frontier Road to Mojave Road and along Mojave Road west of the Project site (Amargosa Valley Area Plan Committee 2009).

3.11.6 Transportation and Access

The ROI for transportation and access includes Nye and Clark counties in Nevada, with an emphasis on the communities of Amargosa, Beatty, Pahrump, and Las Vegas. US 95 is located approximately 5 miles north of the Project area. Running east and west through the Amargosa Valley, US 95 is the major regional transportation route between Las Vegas and Reno. It serves local travelers between Las Vegas and Beatty and is a major connector route from Las Vegas to points north and west. This principal arterial route is part of the National Highway System, but is maintained by NDOT. The Lathrop Wells Rest Area, maintained by NDOT, is located at the intersection of US 95 and NV 373.

NV 373 (CA 127 in California) is a major rural collector route that runs north and south approximately 3 miles east of the Project area. It is a major travel route to Death Valley National Park from US 95 and a local travel route for residents and travelers within the local community. NV 373 is also a primary travel route to Ash Meadows NWR. Within the ROI, NDOT operates automatic traffic recording data sites along US 95 and NV 373. The 5-year Annual Average Daily Traffic for these sites is listed in Table 3-39.

At the eastern extent of the ROI, NV 160 is a regional travel route approximately 18 miles east of the Project area. It is used by residents and travelers to Pahrump and the small community of Crystal, Nevada. NV 160 is also an alternate travel route for recreational visitors to Death Valley National Park and Humboldt-Toiyabe National Forest for eastbound travelers along US 95.

At the western extent of the ROI, NV 374 is a travel route primarily for recreation travelers between Beatty and Death Valley National Park.

Station/Route/Location	2003	2004	2005	2006	2007
Station 0230019/US 95, Maine St., 1.5 mile south of NV 373/Death Valley Junction Road	2,800	3,200	2,850	2,900	2,800
Station 0230020/NV 373, Death Valley Junction Road, 0.5 mile south of US 95	570*	760	560	560*	560
Station 0230021/US 95, Maine St., 0.2 mile north of NV 373	2,500	2,500*	2,600	2,550	2,600
Station 0230078/Valley View Boulevard, 0.1 mile west of US 95	100	140	140	160	150
*Data adjusted or estimated					

Within the Amargosa Valley, local access routes provide direct access to local destinations such as commercial, agricultural, and residential areas. Primary transportation corridors (local two-lane roadways) in the ROI include:

- Amargosa Farm Road – An east-west connector road along the southern edge of the Project area. The Proponent is currently working with the Nye County Public Works Department to realign Amargosa Farm Road. The new alignment would be located 1,320 feet (0.25 mile) south of its current alignment to follow the southern perimeter of the solar fields.
- Valley View Boulevard – A north-south connector road that connects US 95 to the Amargosa Valley Community. The road is located along the western edge of the Project area. The road is used by residents and recreational users accessing the Big Dune area from the east.
- Powerline Road – A north-south connector road that connects the two main east-west connector roads within the Amargosa Valley. The northerly east-west connector road is the above described Amargosa Farm Road and the second is Mecca Road, which is 5 miles south of Amargosa Farm Road.

Other improved and unimproved local roads in the ROI include Sandy Lane, Frontier Road, Williamson Road, Atomic Road, Barnett Street, Senior Center Road, School Lane, Casada Way, and T&T Road. Numerous improved and unimproved roads follow the section lines and half section lines for access to dispersed agriculture and residential areas throughout the ROI.

3.11.6.1 Future Transportation

The Amargosa Valley Area Plan (Amargosa Valley Area Plan Committee 2009) identifies long-range plans for developing future roadway networks in the Amargosa Valley. The plan identified multiple extensions and improvements to secondary roads in the ROI, south of the Project area. The extensions would serve to connect the existing street grid south of the Project area, and north to create three additional connections to US 95. The plan also notes that a portion of the abandoned T&T railroad route has the potential to serve the proposed Yucca Mountain Nuclear Waste operation with rail access through a portion of the Amargosa Valley.

3.12 VISUAL RESOURCES

This section focuses on the inventory, identification, and description of existing visual resources that could be affected by the construction, operation, and maintenance of the proposed Project. Based on methods derived from the BLM VRM System (Manual H-8410-1) and consultation with Las Vegas Field Office VRM staff, the visual resource inventory for the Project focuses on scenic quality and landscape sensitivity (scenery), distance zones (sensitive viewers), and visual resource inventory and management classes.

3.12.1 Regional Setting

The proposed Project is located within the Mojave Desert section of the Basin and Range Province. The Basin and Range Province is distinguished by isolated, roughly parallel mountain ranges separated by closed desert basins (Fennemen 1931). Mountain ranges trend north to south with distinctive alluvial areas at their bases (known locally as *bajadas*). The Mojave Desert is characterized by dominant stands of low-growing creosote bush, burrobush, and saltbush, with varied occurrences of Joshua tree and yuccas.

The proposed Project is located in the Amargosa Valley, a basin loosely surrounded by the Yucca Mountains approximately 13 miles to the north, the Spring Mountains approximately 23 miles to the east, and the Funeral Mountains stretching approximately 12 miles from the south extending to within 8 miles to the west. The Amargosa Valley encompasses approximately 500 square miles. The valley generally drains to the south towards the Amargosa River and is traversed by several small washes. The topographic nature of the valley is generally flat with subtle elevation change.

There are approximately 80 residences and related community facilities within a 2-mile radius from the Project site. These populated areas contain denser vegetation that is not native to this portion of the Mojave Desert, including Cottonwoods and extensive amounts of Salt Cedar.

Modifications that have affected the landscape setting associated with the proposed Project include industrial/commercial and agricultural development associated with the Town of Amargosa Valley, industry related to farming (including center-pivot irrigated agricultural fields) and ranching, mining (gravel pits to the south and a large volcanic cinder mine to the north), and community/commercial facilities to the northeast, east, and southeast of the site.

Regional modifications (within 5 miles) include one double-circuit wooden pole transmission line, approximately 2 miles to the south; two substations (one 2 miles to the south, and one 5 miles southeast of the Project site); and a single-circuit transmission line running parallel to NV 373 on the east side. Other regional cultural modifications include major transportation corridors US 95, NV 373, and numerous local roads that border the Project site on three sides.

The local setting within, and immediately adjacent to the Project area, has been modified by several utility lines including single-pole, wooden distribution lines (one crossing the Project site east to west and one crossing north to south), two cell phone towers, and a radio transmission tower directly east of the site.

3.12.2 Regulatory Framework – VRM System

Pursuant to FLPMA, the BLM is required to consider scenic values of public lands as a resource that merits management and preservation, as determined through the land use planning process. As a response to the FLPMA, the BLM devised the VRM System, with the primary objective of managing public lands in a manner that will protect the quality of the scenic (visual) values of these lands (Information Bulletin No. 98-135). In this regard, the VRM system (BLM Handbook H-8410-1) provides guidance relating to the VRI methodology that the BLM implements to inventory scenic values, as well as assess potential effects to such resources based on the analysis of visual contrast. Following are descriptions of the VRI that were inventoried for the Project.

3.12.2.1 Visual Resource Inventory

Consistent with procedures and concepts as described above, VRI data were collected and/or developed when appropriate per Manual H-8410-1 (Visual Resource Inventory). The primary VRI includes Scenic Quality, Distance Zones, Visual Sensitivity all of which are combined to develop VRI Classes. In addition, public viewing locations (including their sensitivity to changes in the landscape) were identified and described (see section 3.12.2.3).

Scenic Quality – Scenic quality is defined by the BLM as the measure of the visual appeal of a tract of land. Scenic Quality Rating Units (SQRU) are established based on like physiographic characteristics including similar visual patterns, textures, colors, variety, etc. Once the SQRUs are delineated, an evaluation occurs and each SQRU is ranked A, B, or C based on; landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications (existing conditions). Scenic quality was provided by the BLM for inclusion in the VRI and subsequent impact analysis to scenery. Existing conditions based on the occurrences of cultural modifications within the landscape contribute to the overall visual character associated with a given area. Existing conditions can range from natural to completely modified based on the visual influence of transmission lines, transportation routes, and other structural features.

Distance Zones – Distance Zones represent the relative visibility of the landscape from viewing locations such as travel routes or observation points of sensitive views. KOPs are established to represent typical viewing distances and conditions associated with sensitive viewers. Three zones have been identified by the BLM which include foreground/middleground (0 to 5 miles), background (5 to 15 miles), and seldom-seen (areas that are not visible within the foreground-

middleground and background distance zones). A viewshed analysis is performed and combined with the distance zones information to finalize the inventory of distance zones.

Visual Sensitivity – Visual Sensitivity represents the relative sensitivity of a given tract of land and is based upon; type of user, amount of use, public interest, adjacent land uses, special areas, and other factors. Landscape sensitivity can range from high to moderate to low and largely is associated with SQRUs. It is important to note that although related, the sensitivity of the landscape does not equate to sensitivity of viewers or viewing locations within that landscape. Visual Sensitivity, mapped in the form of Sensitivity Rating Level Units (SLRUs) were provided by the BLM for the purposes of this analysis.

3.12.2.2 Visual Resource Management Classes

The VRIC classes are reviewed by the BLM in context with other resource plans and objective and updated accordingly to determine VRM classes (depicted on Figure 3-19) ranging from Class I to Class IV. Following are the management objectives associated with VRM Classes:

- **Class I** – To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention. Class I designation is reserved for special areas that requires maintaining a natural environment unaltered by man such as designated Wilderness Areas, Wilderness Study Areas, etc.
- **Class II** – To retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements found in the predominant natural features of the characteristic landscape.
- **Class III** – To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not be dominate the view of the casual observer. Changes must repeat the basic elements found in the predominant natural features of the characteristic landscape.
- **Class IV** – To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

The proposed Project site is located in a designated Class IV landscape. VRM data for the Project site and adjacent area was developed by the Las Vegas Field Office, the results of which can be found in Section 3.12.4. This data establishes the baseline for which Project impacts are measured against for resource management compliance.

3.12.3 Data Collection Methods

3.12.3.1 Methodology

Figure 3-19 illustrates the methodology associated with the VRI and subsequent impact assessment for the Project. The inventory methods discussed below are consistent with the concepts found within BLM Manual H-8410-1 – VRI.

The Area of Potential Visual Effect (APVE) was defined using the BLM's definition of background distance zone, which is 5 to 15 miles. The visual resources inventory was conducted on federal, state, and private land within the APVE that may be affected by construction and operation of the proposed Project. A viewshed analysis, based on BLM direction, was conducted using GIS mapping to assess where the Project could be visible within a 50-mile radius of the proposed right-of-way. This larger area defines the visual ROI that will be assessed for the Project. The results of the viewshed analysis were used to establish KOPs which were used for subsequent analysis in Chapter 4. Data collected within the APVE and ROI were based on reviews of aerial photographs, topographic maps, planning documents, consultation with the BLM and affected municipalities, and field investigations.

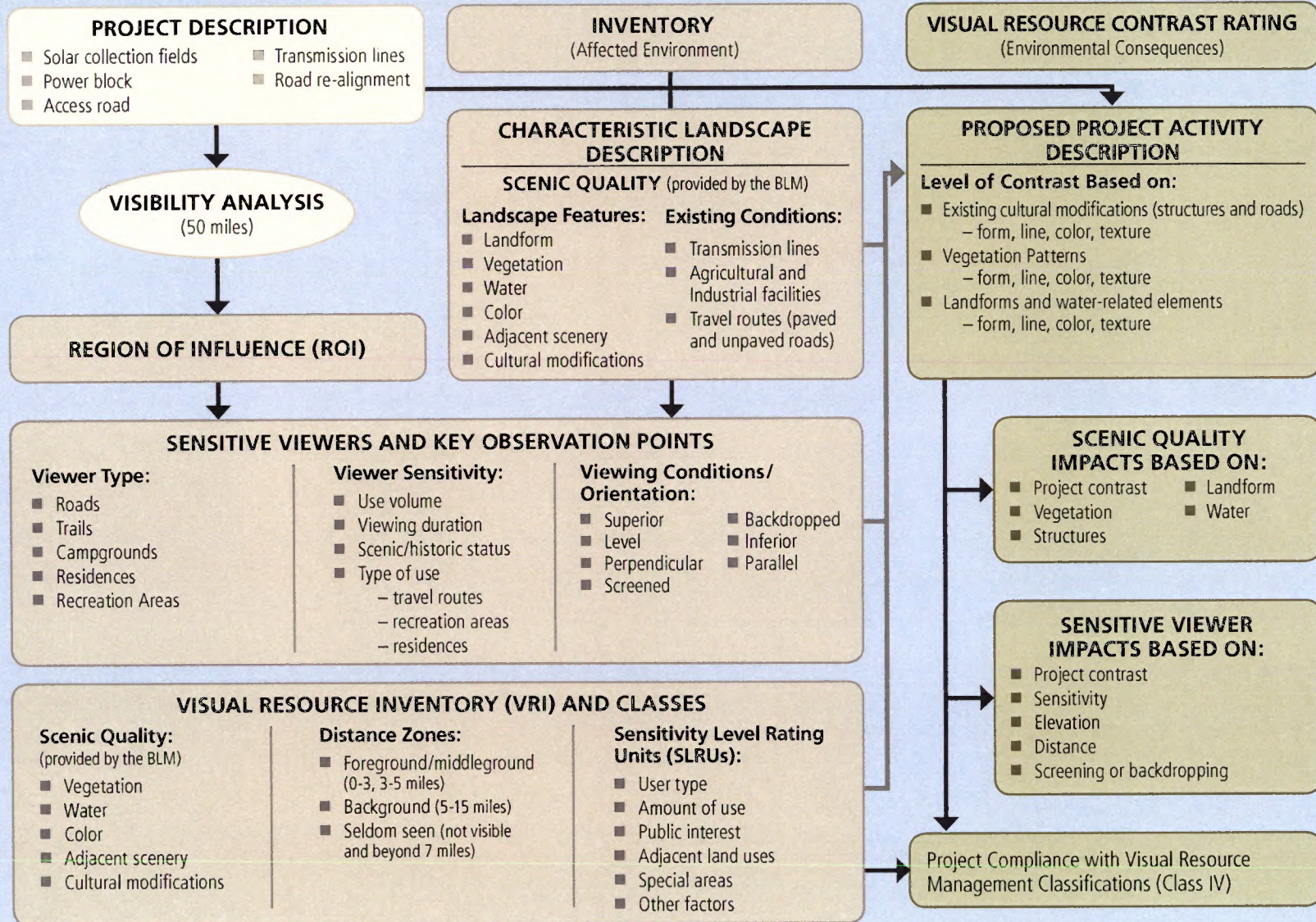
3.12.3.2 Sensitive Viewers

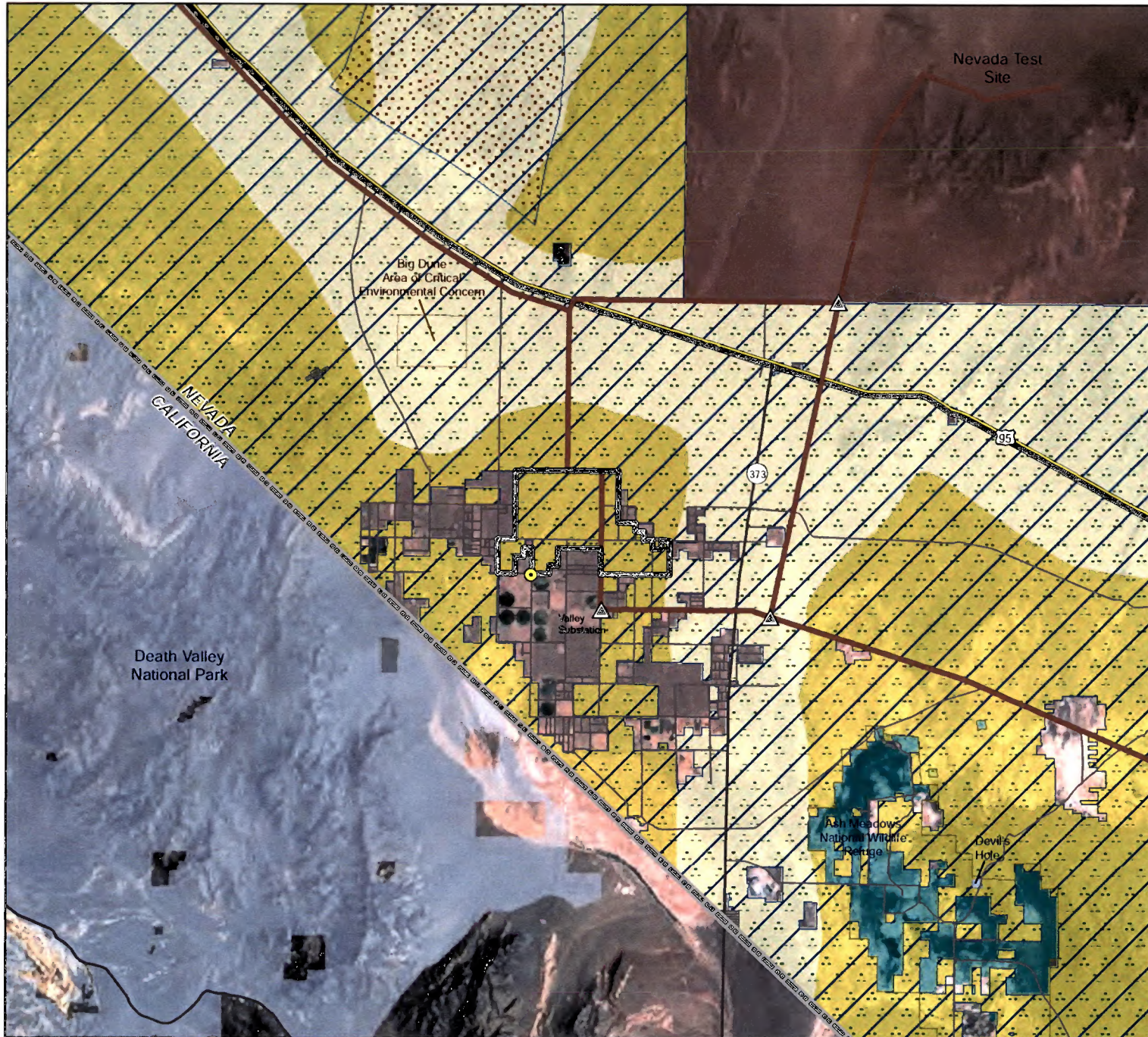
The term sensitive viewers refers to sensitive viewing locations and their associated viewers. Residences, travel routes, or trails are examples of locations where viewers typically are sensitive to visual modifications of the landscape. Key Observation Points (KOPs) represent critical viewpoints or typical viewing conditions associated with sensitive viewers in the context of the Project. Potential sensitive viewers that may have views of the proposed Project are typically identified and field verified within the defined APVE background distance zone of 15 miles (BLM Manual H-8410-1); however, based on the large scale of the Project and per BLM direction, sensitive viewers were also identified in the ROI. The identification of sensitive viewers was based on a review of aerial photography, a review of regional and local topographic maps, the results of the 50-mile radius viewshed analysis, agency and public input, and field investigations including photo documentation using high-resolution photography. Sensitive viewers are anticipated to include:

- Travel routes – highways and roads used by origin/destination travelers, designated scenic or historic byways, and recreation destination roads (i.e., roads that provide recreation access)
- Recreation areas – existing recreation sites used for picnicking, camping, hiking, scenic overlooks, rest areas, or other recreational activities
- Residences – single-family, detached structures, and permanent mobile homes or mobile home parks

Sensitive viewers and subsequent KOPs were approved by the BLM and illustrated in Figure 3-21.

Figure 3-19 | VISUAL RESOURCE AND CONTRAST RATING METHODOLOGY | Amargosa Solar Energy Project





Amargosa Farm Road
Solar Energy Project
(NVN-84359)
Visual Resource
Management Inventory
(VRI)
Figure 3-20

LEGEND

Project Area

Surface Management

Department of Energy
 National Park Service
 US Fish and Wildlife Service
 Private

Visual Resource Inventory Class

Class IV

Visual Resource Management Class

Class III
 Class IV

Scenic Quality

B
 C

General Reference Features

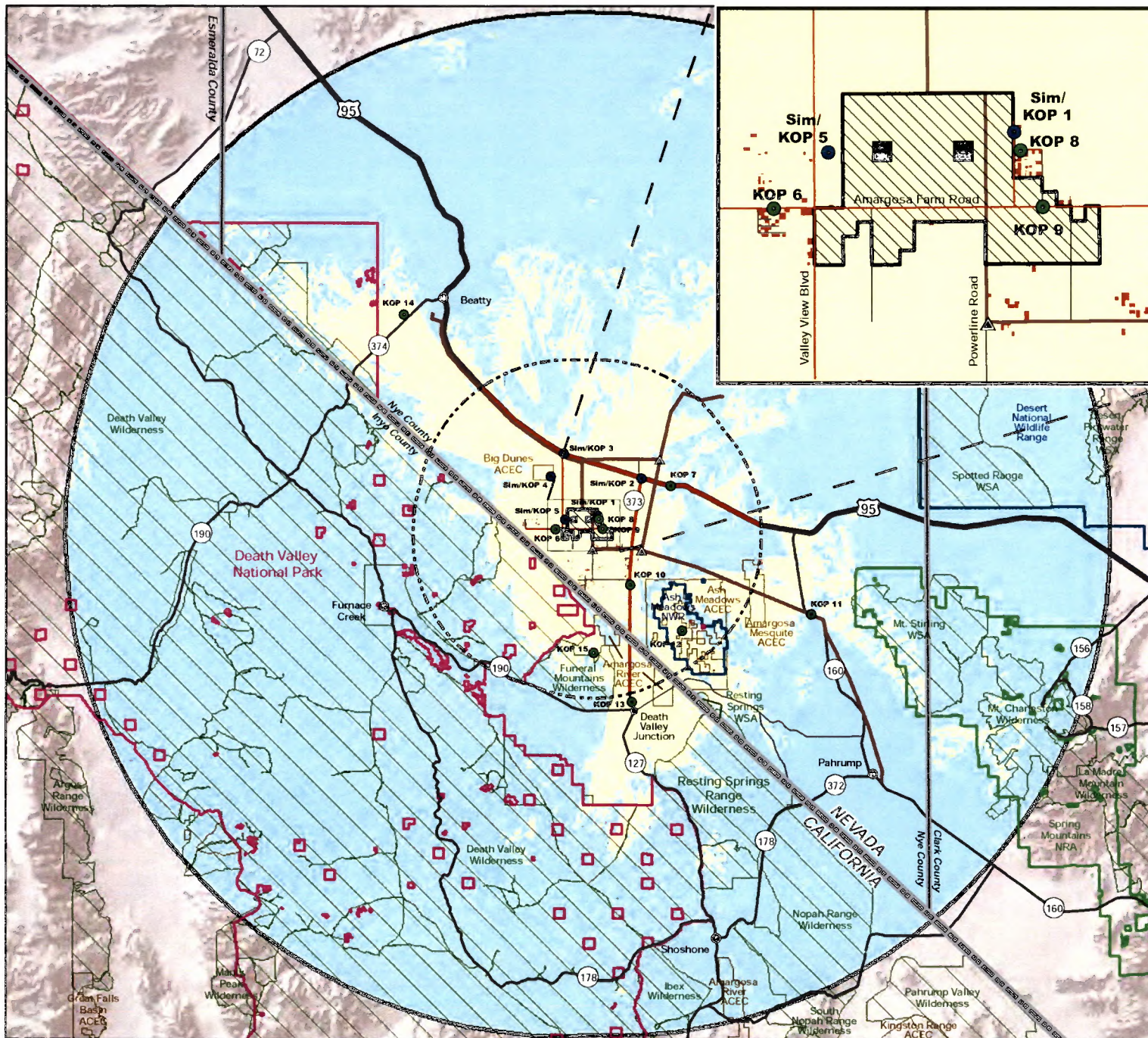
Existing Transmission Line (<230kV) US Highway
 Existing Substation State Highway
 Proposed Project Well Local Road
 State Boundary



Source: Land Ownership, VRM, Scenic Quality - BLM, 2007;
 Ash Meadows - USFWS, 2005;
 Local Roads - TerraSpectra Geomatics, 2009;
 Wells - Nevada State Engineer, 2008;
 Transmission Lines, Substations - Platts, 2009;
 Highways, Imagery - ESRI, 2009

September 2010





Amargosa Farm Road Solar Energy Project (NVN-84359)

Viewshed Analysis, Sensitive Viewers, and Key Observation Points Figure 3-21

Project Components

- Project Area
- Power Block

Project Features

- Background Zone (15-mile)
- Sensitive Viewer Inventory Boundary (50-mile)

Sensitive Viewers

- Residence
- Travel Route
- Key Observation Point (KOP)
- Simulation Key Observation Point (Sim/KOP)

Seen/Unseen

- Unseen
- Seen

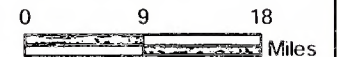
General Reference Features

- Substation
- Below 230kV Transmission Line
- National Park
- National Recreation Area (NRA)
- National Wildlife Refuge (NWR)
- Wilderness Area
- Area of Critical Environmental Concern (ACEC)
- US Highway/ Interstate
- State Highway
- Local Road
- State Boundary
- County Boundary



Source: BLM, 2009; USFWS, 2005; ESRI, 2009; EPG, 2009; Platts, 2008

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In the context of this visual study, viewer sensitivity is defined as the degree of concern for changes to the landscape that, in the context of the proposed Project, may range from high to moderate to low. The sensitivity rating is based on the following five criteria: (1) type of use, (2) volume of use, (3) viewing duration, (4) concern for aesthetics, and (5) scenic or historic status. Scenic or historic status may increase the amount of use and viewing duration for viewers. Note that viewer sensitivity is explicit to sensitive viewers and although related, differs from the sensitivity levels associated with BLM’s specific VRI (see Section 3.12.2.1). Table 3-41 provides a list of inventoried sensitive viewers. The described definition of sensitivity is associated with the sensitive viewers potentially affected by the Project and not associated with the sensitivity of the landscape.

3.12.3.3 Scenic Corridors

There are no designated scenic corridors in the Project area. US 95 is not a designated scenic highway; however, NDOT has determined that the highway is eligible as a scenic corridor called Mojave Desert Vista (from Clark County to the NV 266 junction, south of Goldfield, Nevada). The proposed scenic corridor concentrates on preserving the existing rural character of the region, including panoramic views and existing vegetation, improved recreation/travel information for Amargosa Valley at the rest area, and enhance the recreational opportunities afforded by the Big Dune recreation area and Ash Meadows NWR through signage improvements.

3.12.4 Visibility Analysis

Due to surrounding topography of Amargosa Valley, it was likely that sensitive viewers in the background distance zone (5 to 50 miles) would be screened from various Project components (e.g., solar fields, transmission lines within the Project area, and power blocks). Based on the results of the viewshed analysis and consultation with the BLM, 15 KOPs were selected to represent critical viewing conditions for each sensitive viewer group: travel routes, recreation areas, and residences. A summary of the KOPs by located is provided in Table 3-40. Detailed descriptions, including images and locations, are provided in the Contrast Rating Worksheets located in Appendix D.

Table 3-40 Key Observation Points	
KOP #	Description
KOP #1	View facing west from Sandy Lane
KOP #2	View facing southwest from Lathrop Wells Rest Area
KOP #3	View facing south from US 95
KOP #4	View facing southeast from Big Dune Recreation Area
KOP #5	View facing west from Valley View Estates
KOP #6	View facing east-northeast from Amargosa Farm Road

Table 3-40 Key Observation Points

KOP #	Description
KOP #7	View facing west-southwest from US 95
KOP #8	View facing west from Atomic Road
KOP #9	View facing northwest from Amargosa Farm Road
KOP #10	View facing north-northwest from NV 373
KOP #11	View facing west from SR 160
KOP #12	View facing northwest from Crystal Springs boardwalk at Ash Meadows NWR
KOP #13	View facing north-northwest from NV 373/CA 127 at Death Valley Junction, CA
KOP #14	View facing east-southeast from Rhyolite Cemetery near Beatty, NV
KOP #15	View facing south from Funeral Mountain Wilderness Area
KOP #16	View facing west from Sandy Lane (Scenic Quality Contrast Worksheet)

3.12.4.1 Project Specific Distance Zones and Visibility

Distance zones represent the relative visibility of a given landscape from sensitive viewing locations or KOPs. In the context of impact assessment, the BLM's established distance zones were used as the framework to establish Project specific distance zones appropriate for impact assessment which is further discussed in Section 4.12.

Visibility relates to the physical elements of the landscape and / or viewing locations that effect how the Project area is currently viewed. Visibility typically includes, but is not limited to; viewing position, screening (i.e., vegetation, topography, and existing municipal structures), and backdropping and/or skylining. Viewing position could range from superior, where the viewer is looking down at the Project area, to inferior, where the viewer is looking up at the Project area.

Screening is described as minimally, partially, and completely screened, and pertains to elements such as vegetation and topography that inhibit the visibility of the Project area. Landscape features can also be skylined or backdropped by adjacent terrain, vegetation, or structures. When a landscape feature is backdropped, the color, texture, and form of the feature are subdued, thus reducing visibility. When a landscape feature is skylined, portions of it will appear above the horizon line and would be seen in the context with typically blue sky.

Table 3-41 Sensitive Viewers and Viewer Sensitivity Analysis

		Sensitivity					Visibility		
		Use Volume	Viewing Duration	Aesthetic Concern	Scenic/Historic	Overall Sensitivity	Screening	Comments	KOP
Travel Routes									
U.S. Highway	US 95	High	Short	Moderate		Moderate	Partial (vegetation, topography)		Yes (2)
State Routes	State Route (NV) 374	Low	Moderate	Moderate		Moderate	Minimal to partial (topography, vegetation)		No
	NV 373	Moderate	Moderate	Moderate		Moderate	Yes (topography, vegetation)		Yes
	CA 127	Low	Moderate	Moderate		Moderate	Yes (topography, vegetation)		No
	State Route 160	Moderate	Short	Moderate		Moderate	Partial (topography, vegetation)		Yes
	Lathrop Wells Rest Area	Moderate	Moderate	Moderate		Moderate	Minimal to partial (topography, development)		Yes
Local Access Routes	Amargosa Farm Road	Moderate	Long	Moderate		Moderate	Minimal		Yes (2)
	Sandy Lane	Low	Long	Moderate		Moderate	Minimal		No
	Valley View Boulevard	Moderate	Long	Moderate		Moderate	Minimal		No
	Williamson Road	Moderate	Long	Moderate		Moderate	Partial (vegetation)		No
	Atomic Road	Moderate	Long	Moderate		Moderate	Partial (vegetation)		No

Table 3-41 Sensitive Viewers and Viewer Sensitivity Analysis

	Sensitivity					Visibility		
	Use Volume	Viewing Duration	Aesthetic Concern	Scenic/Historic	Overall Sensitivity	Screening	Comments	KOP
Barnett Street	Moderate	Long	Moderate		Moderate	Partial (vegetation)		No
Frontier Road	Moderate	Long	Moderate		Moderate	Partial (vegetation)		No
Senior Center Road	Moderate	Long	Moderate		Moderate	Partial (vegetation)		No
Recreation								
Ash Meadows NWR – Visitor Center	Moderate	Moderate	High		High	Minimal to complete (topography, vegetation)		No
Ash Meadows NWR – Crystal Springs Boardwalk Trail	Moderate	Moderate	High		High	Minimal to complete (topography, vegetation)		Yes
Ash Meadows NWR – Crystal Reservoir boat launch	Moderate	Moderate	High		High	Minimal to complete (topography, vegetation)		No
Ash Meadows NWR – Peterson Reservoir boat launch	Moderate	Moderate	High		High	Minimal to complete (topography, vegetation)		No
Ash Meadows NWR – Devils Hole	Moderate	Moderate	High		High	Minimal to complete (topography, vegetation)		No
Ash Meadows NWR – Point of Rocks Springs picnic area	Moderate	Moderate	High		High	Minimal to complete (topography, vegetation)		No

Table 3-41 Sensitive Viewers and Viewer Sensitivity Analysis

	Sensitivity					Visibility		
	Use Volume	Viewing Duration	Aesthetic Concern	Scenic/Historic	Overall Sensitivity	Screening	Comments	KOP
Amargosa Community Park	High	Moderate	High		High	Partial (vegetation)		No
Amargosa River ACEC	Low	Moderate	High	Scenic	High	Complete (topography and vegetation)	No numbers for visitors, just comments on <i>rarely visited</i>	No
Funeral Mountains Wilderness Area – unnamed hiking trails	Low	Moderate	High		High	Minimal	No numbers for visitors, just comments on <i>rarely visited</i>	Yes
Death Valley National Park	High	Long	High	Scenic	High	Complete (topography)		No
Death Valley National Park – Indian Pass	Low	Long	High		High	Complete (topography)		No
Big Dune	Moderate	Long	Moderate		Moderate	Minimal to partial (topography, vegetation)		Yes
Residences								
Amargosa Valley (east of Sandy Lane)	High	Long	High		High	Partial to Complete (vegetation)		Yes
Amargosa Valley (downtown)	High	Long	High		High	Partial to Complete (development and vegetation)		Yes
Dispersed Residences (west of Valley View Boulevard)	High	Long	High		High	Minimal to complete (topography, vegetation)		Yes

Table 3-41 Sensitive Viewers and Viewer Sensitivity Analysis								
	Sensitivity					Visibility		
	Use Volume	Viewing Duration	Aesthetic Concern	Scenic/Historic	Overall Sensitivity	Screening	Comments	KOP
Dispersed Residences (south of Amargosa Farm Road)	High	Long	High		High	Complete (topography, vegetation)		No
Death Valley Junction	High	Long	High		High	Complete (topography)		Yes
Community Facilities								
Amargosa Senior Center	Moderate	Moderate	Moderate		Moderate	Partial (vegetation)		No
Amargosa Valley School and Community Center	Moderate	Moderate	Moderate		Moderate	Partial (vegetation)		No
AVIA Community Center/Amargosa Raceway	Moderate	Moderate	Moderate		Moderate	Partial to Complete (development and vegetation)		No
Historical								
Tom Kelly Bottle House, Rhyolite	Moderate	Moderate	Moderate	Historic	Moderate	Complete (topography)	Only official SHPO Property in Rhyolite	No
Rhyolite cemetery	Moderate	Moderate	Moderate		Moderate	Minimal to Complete (topography, vegetation)		Yes

3.12.5 Inventory Results

Scenic Quality

The Project area is sited on terrain and vegetation characterized by flat to slightly rolling plains, with minimal vegetative diversity associated with creosote flats. Based on scenic quality inventory data provided by the BLM (see Figure 3-20), the Project area is characterized as Class C scenery. The natural character of the setting has been modified by cultural modifications including transmission lines, access roads and structures associated with the Town of Amargosa Valley. The majority of the visual ROI is also associated with Class C scenery extending east to west from the Rock Valley Wash to the Amargosa River and north to south from US 95 to the Nevada/California border. Although not directly affected by the Project, Class B lands exist within the ROI and are associated with the mountain ranges characteristic of the Basin and Range.

Distance Zones

The Project is located approximately five miles south of US 95, approximately 4 miles west of NV 373, and ranging from 800 feet thru 5 miles from Amargosa Valley residents. Based on distance zone data provided by the BLM, the Project area is within the foreground/middleground Distance Zone.

Sensitivity Level Rating Units

The Project area was designated by the BLM as a Low Sensitivity Level. VRI data is available at the Southern Nevada District Office for the public to review.

Visual Resource Inventory Class

As previously stated, VRIC is a combination of Scenic Quality (Class C) , Distance Zones (foreground/middleground), and Sensitivity Levels (Low). The Project area is located within a Class IV VRIC.

Visual Resource Management Class

The proposed Project would be located on BLM designated VRM Class IV land. The management objective for Class IV lands is, *"To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements"* (BLM VRM Manual 8410-1 VRI).

3.12.5.2 Cultural Modifications

- Cultural modifications that have modified natural landscape character were inventoried within the APVE using aerial photography and were field verified and include: Transmission/Distribution lines – electrical utility structures
- Industrial facilities – farm and ranching related facilities, mining
- Highways – paved with two or more traffic lanes and a median
- Primitive roads – regularly maintained dirt/gravel or unimproved roads
- Residences – Amargosa Valley residences and dispersed residences
- Community Facilities – local schools, community centers, churches

3.12.5.3 Nighttime Lighting

Existing or potential sources of nighttime light in the ROI include the residences of Amargosa Valley and several industrial or commercial operations, including mining facilities, commercial businesses on US 95, and agricultural facilities. Another source of lighting is the traffic along US 95. Las Vegas is a potential source of skyglow (i.e., nighttime light) in the region and is approximately 80 miles from Amargosa Valley.

3.12.5.4 Sensitive Viewers

Sensitive viewers within the 15-mile APVE and 50-mile ROI were initially identified as potential sensitive viewers. Sensitive viewers that were visually separated (screened) by topography and/or vegetation from the proposed Project were determined to have no effect and were documented as such. Refer to Table 3-41 for inventoried sensitive viewers.

Travel Routes

U.S. Highways – Travelers on these highways typically have moderate sensitivity and are typically focused on commuting to a destination with moderate concern of aesthetics.

- **US 95 (KOP 3, KOP 7)** – This eligible scenic corridor is a major regional transportation highway for local travelers between Las Vegas and Beatty, and a major connector route from Las Vegas and the Reno area that eventually connects to California. Travelers along this route typically are focused on utility over aesthetics and would have a short viewing duration of the Project in the background to middleground distance zone. The proposed Project would be back-dropped by the northeastern edge of the Funeral Mountains (Death Valley National Park) to the southwest, and partially backdropped by the Resting Spring Mountain Range to the southeast for east-bound travelers (KOP 3) and by the Funeral Mountains for west-bound travelers.

State Routes – These routes typically have travelers with moderate sensitivity with a moderate concern for aesthetics. Travelers on these routes are more frequent (local) travelers with a concern for shorter trips (commute) to their destinations over aesthetics.

- **NV 373 (KOP 10)** – This local travel route is used primarily by residential travelers and travelers to local community facilities. NV 373 is a primary travel route to Ash Meadows NWR and an alternate route to Death Valley National Park. The proposed Project would be in the middleground with partial screening due to vegetation and slight rolling topography from a level viewpoint. Travelers would typically travel at a moderate rate of speed connecting to local residences and local commercial facilities (e.g., convenient stores, casino, bank).
- **NV 160 (KOP 11)** – This regional travel route is used primarily by local commuters to and from Pahrump and the small community of Crystal and US 95. Travelers along NV 160 are typically traveling at a moderate rate of speed, although the road is an alternate travel route for recreational visitors to Death Valley National Park and Humboldt-Toiyabe National Forest. The proposed Project would be located in the background distance zone (more than 15 miles) and backdropped by the Funeral Mountains. Some sections of NV 160 provides a superior view of Amargosa Valley.
- **CA 127 (KOP 13)** – This travel route is a continuation of NV 373 into California. CA 127 is primarily for travelers to Death Valley Junction; an alternate connection to Pahrump, Nevada and Death Valley National Park from Nevada; and a primary travel route to Ash Meadows NWR from California. The Project would be in the background with partial screening due to vegetation and slight rolling topography from a level viewpoint.
- **NV 374 (KOP 14)** – This travel route is used primarily by recreation travelers between Beatty and Death Valley National Park. Travelers along this route typically travel at a moderate rate of speed with a higher concern for aesthetics. The proposed Project would be visible in the background distance zone (more than 15 miles) from a superior viewing position.
- **Lathrop Wells Rest Park (KOP 2)** – Lathrop Wells Rest Park is an NDOT rest area for travelers along US 95. Visitors to the rest area would have short duration, level, and partially screened background views of the Project.

Local Access Routes – These routes typically have travelers with moderate sensitivity based on a moderate concern for aesthetics and moderate viewing durations due to local speed limits and local commuter routes. These routes provide direct access to local destinations such as commercial, agricultural, and residential areas that are frequented daily.

- **Sandy Lane** – This local street is adjacent to the Project site along the eastern boundary. Travelers would have the proposed Project in the foreground with no screening and a level vantage point.
- **Amargosa Farm Road (KOP 6, KOP 9)** – This local connector road is adjacent to the Project site along the southern boundary. Travelers heading east-bound would view the Project in the foreground distance zone with no screening and a level vantage point (KOP 6). West-bound travelers (KOP 9) will have level, partially screened to unobstructed foreground views of the Project. The realignment of Amargosa Farm Road

is part of the proposed Project which would result in direct, unobstructed views of the solar facility on the north side of the future road.

- **Valley View Boulevard** – This road is a primary travel route for residences and local travelers that connects US 95 to the Amargosa Valley community. The first mile off of US 95 is an alternate travel route to Big Dune recreation area with the primary entrance to Big Dune off of US 95, approximately 5 miles northwest of Valley View Boulevard. Travelers along Valley View Boulevard would have level views of the proposed Project in the middleground to foreground distance zone as one travels south. The potential for skylining would be greater for travelers along Valley View Boulevard than any other viewer in the ROI.

Recreation Areas

These areas typically have visitors (viewers) with primarily high sensitivity to landscape change based on their expectation for high quality landscapes and long viewing durations. For some recreation viewers, aesthetics are second to the actual recreation activity, such as target shooting or OHV activities.

- **Ash Meadows NWR (KOP 12)** includes recreation travel routes, trails, and trailheads, as well as wilderness and wildlife viewing opportunities. Due to a high concern for aesthetics and wildlife viewing and concern for solitude, viewer sensitivity would be high. Users would have level to slightly inferior views of the proposed Project in the background distance zone. However, the potential for direct unobscured views is low due to topography and vegetation. Death Valley National Park manages Devils Hole, a 40-acre site within Ash Meadows. Distant views of the proposed Project from Devils Hole would be completely screened by topography.
- **Death Valley National Park** is a major tourist destination drawing approximately 1 million visitors (viewers) per year. Visitors to all formalized trailheads, in-park travel routes, visitor centers, and campgrounds/picnic areas will not have views of the proposed Project because the topography of the Funeral Mountains physically separates formal recreation areas with the park and Amargosa Valley.
- **Big Dune (KOP 4)** – Big Dune recreation area is an area of approximately 1,000 acres consisting of natural sand dunes on BLM land that is easily accessible to the public. The primary recreation is OHV use on informal trails throughout the recreation area. OHV users typically focus their attention on their immediate surroundings, typically decreasing their overall concern/expectations for aesthetics. These moderate sensitivity viewers would view the Project in the middleground for short durations. In addition to OHV activities, Big Dune offers primitive camping, including recreational vehicle camping.
- **Funeral Mountains Wilderness (KOP 15)** – The wilderness located approximately 10.5 miles south of the Project area offers dispersed recreation within the wilderness area and non-vehicular access to Death Valley National Park. The Funeral Mountain Wilderness is closed to vehicular traffic, but is open to non-vehicular pedestrian traffic who would have a superior, background view of the proposed Project. Several unnamed

trails are oriented north-south in the narrow valleys between mountains and offers views of the Amargosa Valley (KOP 15). Visitors to Funeral Mountain Wilderness are anticipated to have moderate to long viewing durations and a high concern for aesthetics.

- **Amargosa River ACEC** – Three distinct units comprise the Amargosa River ACEC, with the nearest unit being the Upper Amargosa Mesquite Bosque Unit – a 2,720-acre site west of CA 127 and south of the Nevada/California state line. The ACEC is situated around the Amargosa River and is located 8 miles south of the Project area. The proposed Project would not be seen from the Upper Amargosa Mesquite Bosque Unit. The Upper Amargosa Mesquite Bosque Unit was established primarily as a unit of the Amargosa River ACEC due to its recreation value and the natural setting “provides opportunities for activities such as sightseeing, bird and wildlife viewing, photography, and solitude.” The Upper unit visitors would not have views of the Project area due to topography and vegetation.

Residences

Each grouping of residences listed below are anticipated to have a high sensitivity based on a long viewing duration, and heightened concern for aesthetics or changes in the landscape. Development within Amargosa Valley can be characterized as low density (1-acre lots and larger). All residences are located within the Amargosa Valley in which the proposed Project would be located and all have level viewing positions. A large number of residences immediately adjacent to the Project area have dense and mature vegetation borders around their respective properties, which tend to screen views toward the Project area. The majority of the vegetation screening is Salt Cedar, an evergreen invasive tree that is known for its size and dense foliage.

- **Valley View Estates (KOP 5)** – Residential viewers in Valley View Estates and along the western side of Valley View Boulevard are typically more dispersed and would view the proposed Project in the foreground. Two partially constructed houses along Frontier Road between Valley View Boulevard and the Project site have no vegetative screening and would have level, unobstructed foreground views of the Project.
- **Residents along Sandy Lane (KOP 1)** would have direct, unobstructed foreground views of the proposed Project from a level viewing position. However, for some viewers, mature vegetation partially screens views toward the Project area. The residential units of Sandy Lane would be within 50 feet of the Project right-of-way and 700 feet of the proposed Project facilities.
- **Residences east of Sandy Lane (KOP 8 representational of these residences)** – Residential viewers in Amargosa Valley east of the Project site would have foreground, unobstructed to completely screened views of the Project, respectively. A large number of residences in this area have mature vegetation that follow property lines in a straight, linear fashion which provides screening of the Project area.
- **Residences south of Amargosa Farm Road** – Residences south of the Project area are dispersed and are typically located within farming complexes. Residences in this area

would have level, foreground to middleground partially to fully screened views of the proposed Project.

Community Facilities

- **Amargosa Valley School and adjacent Community Center** – Providing services to local residents, these facilities are level with the proposed Project and are generally surrounded by vegetation and residential structures. Views of the proposed Project would therefore be partially to fully screened and in the foreground of viewers using these facilities. Sensitivity to landscape change is typically moderate because views are largely focused inward and the facilities themselves occur with a modified rural- to suburban setting.
- **Community Park, Amargosa Senior Center, and AVIA Community Center** – These facilities offer local residents recreational and social opportunities, with the park having outdoor recreational opportunities. The community park and Senior Center have vegetative screening along the western boundary of their respective properties, partially screening foreground views of the proposed Project. Viewers from the AVIA Community Center would have foreground to middleground views of the proposed Project, partially screened by residences and their associated vegetation closer to the Project area. Sensitivity is anticipated to be moderate for viewers using these facilities.

Historic Features

- Rhyolite is a historic Ghost Town and associated cemetery with no commercial business or occupied residences. The cemetery (KOP 14) is located approximately 25 miles northwest from the Project area with potential views in the background. Visitors to Rhyolite are typically there for a short duration as most are passers-thru to other destinations. Viewers would have superior views with short to moderate time durations. Due to topography between the Project site and Rhyolite, the majority of the ghost town, including Tom Kelly Bottle House (the only SHPO listed property in Rhyolite) is completely screened by Ladd Mountain. For the remaining properties not screened by Ladd Mountain, rolling topography as well as atmospheric conditions due to the distance from the Project reduces the potential visibility of the proposed Project.

3.13 HUMAN HEALTH AND SAFETY/HAZARDOUS MATERIALS

Certain chemicals and materials to be used during the construction and operational phases of the proposed Project are characterized as hazardous materials. In addition, construction and operational activities would generate certain hazardous and non-hazardous solid waste streams. This section discusses existing conditions in the Project area relevant to hazardous materials and hazardous and non-hazardous waste. Regulations that would govern the management of these materials and waste during construction and operation are described. The types of materials to be used or types of waste generated during construction and operations, and the potential impact on the human environment are described in Chapter 4.

3.13.1 Affected Environment

A consideration for health and safety/hazardous materials analyses is the proximity of residential and other sensitive receptors, such as schools, daycare centers, emergency response facilities, and long-term care facilities. The nearest sensitive receptor is the area surrounding the Amargosa Community Complex, which is located approximately 0.5 mile east of the proposed Project site and adjacent to the community center, town offices, the emergency services center, sheriff's substation, a town library, the health clinic, and the Amargosa Valley School. The Amargosa Valley Community Complex also includes a residential area between Sandy Lane and Williamson Road. Several homesteads are located west of Valley View Boulevard, approximately 0.5 mile west of the proposed Project site. The area north and south of the Project site is primarily undisturbed desert land.

The general population may include sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding the Project site may have a large bearing on health risk. The potential impact on sensitive receptors from construction and operation of the proposed Project is described in Chapter 4.13.

3.13.2 Potential Hazardous Wastes, Contaminated Soils/Groundwater

There is potential for the Project site to have some level of contamination due to prior land uses or from surrounding land uses. Examples of past and current land uses that could have resulted in unknown contamination include the following:

- Rural residences and farms that commonly have old or inactive underground storage tanks
- Pesticide-polluted runoff from agricultural properties
- Commercial and industrial sites (historic and current) that could have soil or groundwater contamination from unreported hazardous substance spills

The importance of disclosing information about potentially hazardous sites is to protect worker health and safety and to minimize public exposure to hazardous materials during construction and waste handling. If encountered, contaminated soil may qualify as hazardous waste, thus requiring handling and disposal according to local, state, and federal regulations.

Table 3-42 lists potential contaminant sources within 2 miles of the Project site. This information was obtained from the Wellhead Protection Plan for Nye County Operated Systems in Amargosa Valley (2006).

Table 3-42 Inventory of Potential Contaminant Sources Within 2 Miles of the Project Area		
Facility ID	Risk	Comments
Substations	A – high	Electrical Substation
Storage Facility Exchange	A, C – high	Heavy equipment, trailers, tanks, railroad freight car line
Turquoise ST PSP	A,C – high	PSP, construction vehicles, heavy equipment
Avia Community Center	A,C – high	Cinder block building, shelter, asphalt parking
Amargosa Raceway Park	B – mod	Sand drag, baseball field, playground, asphalt parking
Amargosa Desert Memorial Cemetery	D – mod	Cemetery, decaying corpses
Amargosa Valley Volunteer Fire Department	A,C, D – mod	Multiple buildings, parking lot, ambulance, fire, sheriff
Amargosa Valley Medical Center	D – low	Medical care facility, parking lot
Amargosa Valley Library	B, C – mod	Library, Community Environmental Monitoring Program Station
Amargosa Valley Community Center	A, C – mod	Large building
Amargosa Valley Maint. Facility	A, C – high	Equipment storage yard
Amargosa Elementary School	B, C – mod	School building, parking lot
Amargosa Valley Park Ballfield	B, C – high	Park and ball field, maintenance building
Farm Equipment Storage Unused	A, C – high	Scrap pile for old and used farm equipment
PSP Property 514 Farm Rd.	A, C – high	Drums, cars, tractor, metal shed
Amargosa Valley Country Store	A, B, C – mod	Local general store, aboveground storage tank
Church of Amargosa	B – mod	Church building, parking lot, playground
Heavy equipment dumpsite	A, C – high	Construction site, water tanks, fuel trucks
Irrigated field NW Corner	B – mod	Irrigated field
Irrigated field SE Corner	B – mod	Irrigated field with some scrap vehicles
LG Pine Nursery Irrigated Field	B, C – high	Nursery, irrigated field
VEA Substation	A – high	Switching Station
West Anvil Agricultural. Pump Fuel Tank	A – high	Irrigated field, water pump, fuel tanks
West Anvil Farm Equipment Storage	A, B, C – high	Farm equipment storage, old trucks, farm equipment, metal building
Irrigated Field Equipment Storage	B – mod	Old mobile homes, rusty car, 55 gallon drum, semi trailer
Antenna Array Prop. 858	A, B, C – high	Antenna array, fuel tank, sheet metal shed, vehicles
Industrial Building	A, B, C – high	Aboveground storage tank, mobile homes, buildings

Table 3-42 Inventory of Potential Contaminant Sources Within 2 Miles of the Project Area

Facility ID	Risk	Comments
Funeral Mountain Ranch	B – high	Hay and straw farm, above ground diesel tanks, used vehicles, farm equipment, junk
Private Farm Fuel Tanks	A – high	Farm homesite, farm equipment, horses, fuel tanks
Corral with a two-story Shed	A, C – low	Sheds
Commercial Building	A, B, C – high	Metal building, containers

A = volatile organic compounds, B = synthetic organic compounds, C = inorganic compounds, D = microbiological

3.13.3 Regulatory Framework

3.13.3.1 Hazardous Materials

Use, storage, and disposal of hazardous materials are regulated by numerous local, state, and federal laws. Table 3-43 summarizes regulations applicable to storage and use of hazardous materials.

Table 3-43 Summary of Applicable Regulations for the Use, Storage, and Disposal of Hazardous Materials

Regulation	Requirements/Applicability
CERCLA or Superfund, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA): 42 USC § 9601 et seq. Title 40 CFR Part 302	Requires notification to various agencies when there is a release of hazardous substances from a facility.
Emergency Planning and Community Right to Know Act of 1986 (EPCRA), commonly known as SARA Title III: 42 USC § 11001 et seq.; Title 40 CFR Parts 350, 355 370, and 372	Requires inventory reporting, planning, and reporting for storage and release of hazardous and acutely hazardous materials.
EPCRA, § 302 (Pub. L. 99-499), 42 USC 11022	Requires agency notification if extremely hazardous substances are stored in excess of Threshold Planning Quantities.
EPCRA, § 311, (Pub. L. 99-499, 42 USC 11021)	Requires that either material data safety sheets for all hazardous materials or a list of all hazardous materials be submitted to Nevada Emergency Response Commission and local fire department.
EPCRA, § 313, (Pub. L. 99-499, 42 USC 11023)	Requires annual reporting of releases of hazardous materials.
OSHA 29 USC Section 651 et seq., Title 29 CFR Part 1910 Safety and Health Regulations for Construction: Title 29 CFR Part 1926	Specifies standards for hazardous materials storage, handling, and worker protection in emergencies.

Table 3-43 Summary of Applicable Regulations for the Use, Storage, and Disposal of Hazardous Materials	
Regulation	Requirements/Applicability
Oil Pollution Prevention: Title 40 CFR Part 112	Requires the preparation of a SPCC Plan if storage capacity exceeds certain volumes, and should there be a reasonable possibility that the tank(s) may discharge oil into navigable waters of the United States.
Hazardous Materials Transportation §§ 49 CFR 171-172	Requires transporters of hazardous materials to properly label, manifest, package, and ship hazardous materials.
Chemical Accident Prevention Provisions, Title 40 CFR Part 68	Requires the preparation of a Risk Management Plan if certain listed toxic or flammable substances are used in excess of the listed threshold quantity.
Chemical Facility Antiterrorism Standard (CFATS), 6 CFR Part 27	Requires facilities that possess any “chemicals of interest” above threshold quantities must register and provide specified information to the Department of Homeland Security.
Hazard Communication (HAZCOM) Program 29 CFR § 1910.1200 Safety and Health for Construction 29 CFR § 1926.1 et seq	Requires employers to implement HAZCOM Standard that gives workers the right to know the hazards and identities of chemicals in their workplaces (29 CFR 1910.1200) Requires written procedures and personnel protective equipment for employees working with hazardous materials.

Comprehensive Environmental Response, Compensation, and Liability Act, 42 USC Section 9601 et seq.; Title 40 CFR Part 302. CERCLA (also known as Superfund) prescribes that the National Response Center be notified for any release of a reportable quantity of a hazardous substance (42 USC Section 9603); describes notification requirements for any potentially injured parties in connection with any such release (42 USC Section 9611(g)); and sets forth requirements for demonstration of financial responsibility in connection with the storage of hazardous substances (42 USC Section 9608(b)).

Superfund regulations define “hazardous substance” as any material appearing on lists referenced in Section 101, 42 USC Section 9601(14). The EPA’s regulation, at Title 40 CFR Section 302.4, sets forth the list of hazardous substances under CERCLA and the reportable quantities for each.

Emergency Planning and Community Right to Know Act of 1986, 42 USC Section 11001 et seq.; Title 40 CFR Parts 350, 355, 370, and 372. The EPCRA is a stand-alone law passed in 1986 as part of the SARA, and is known as SARA Title III. Its purpose is to encourage and support emergency planning efforts at the state and local levels, and to provide the public and local governments with information to react to hazardous materials emergencies, as well as providing access to information about hazardous materials to the public.

The EPCRA requires each state to have a State Emergency Response Commission (SERC). The Nevada SERC is established by NRS 459.738. The SERC designates planning districts within the state and appoints Local Emergency Planning Committees (LEPC) to coordinate the

activities of each planning district. The SERC has designated each county as a planning district, and each county has designed the LEPC with the approval of the SERC.

EPCRA specifies what kinds of chemical releases and quantities require notification, to whom reports and notification are required to go to, and establishes threshold planning quantities. The provisions of EPCRA require industries to comply with reports of storage, manufacture, and releases to specific agencies. Along with these reporting requirements, fees required by NAC 459.9918, 459.99181, and 459.99182, and NRS 459.744 are collected and granted to state and local agencies to provide assistance in planning, training, and equipment activities to prevent, respond to, and mitigate hazardous materials incidents.

Occupational Safety and Health Standards, 29 USC Section 651 et seq.; Title 29 CFR Part 1910 and Safety and Health Regulations for Construction, Title 29 CFR Part 1926. These standards require employee training, PPE, safety equipment, and written procedures, programs, and plans for ensuring worker safety when working with hazardous materials or in hazardous work environments. Although intended primarily to protect worker health and safety, these requirements affect general facility safety. To comply with these requirements, the Project will prepare and implement appropriate worker health and safety plans and policies.

Oil Pollution Prevention, Title 40 CFR Part 112. The Oil Pollution Prevention regulations require the preparation of an SPCC Plan if oil is stored at the facility in excess of 1,320 gallons in aboveground storage, and should there be a reasonable possibility that the tank(s) may discharge oil into navigable waters of the United States. The SPCC regulations place restrictions on the management of petroleum materials; therefore, SPCC regulations have some bearing on hazardous materials management.

Hazardous Materials Transportation Act, 49 CFR 171-172. The Hazardous Materials Transportation Act regulates transportation of hazardous materials, and is implemented by the USDOT under 49 CFR Parts 171-179. Analogous requirements are promulgated for hazardous waste under 40 CFR Part 263 by the EPA. The Hazardous Materials Transportation Act requires chemical manufacturers and hazardous waste generators and transporters to follow certain preparation, packaging, handling, loading/off-loading, routing, emergency planning, notification, and insurance requirements.

The Hazardous Materials Transportation Act requirements supplement the RCRA requirements regarding hazardous wastes. To comply with these requirements, employees who are involved in the shipping or receiving of chemicals, or shipping parts, products, or subassemblies that could be contaminated with hazardous substances, wastes (or residue) must follow the specified procedures for packaging, labeling, and shipping of these regulated materials.

Chemical Accident Prevention Provisions, Title 40 CFR Part 68. Title 40 CFR Part 68 requires the preparation of a Risk Management Plan if certain listed toxic or flammable substances are used in excess of the listed threshold quantity. The Risk Management Plan addresses in detail the emergency plan implemented at the facility and the response actions planned by the facility in the event of a hazardous materials release. The Risk Management Plan is based on studies identifying potential hazards associated with the handling of the listed materials used at the facility.

Two chemicals listed as Chemicals of Interest in the regulation, propane and acetylene, would be used on-site. However, only propane will be stored or used on-site during construction or operation of the Project in excess of the applicable threshold quantity. A maximum of approximately 76,000 pounds of propane will be stored above the threshold of 10,000 pounds. The amount of acetylene that will be stored on-site will be well below the applicable threshold of 10,000 pounds.

Pursuant to Title 40 CFR Section 68.126, flammable substances listed in Tables 3 and 4 of Section 68.130 are excluded from all provisions of the Federal Chemical Accident Prevention regulations when said substances are used as fuel or held for sale as fuel at a retail facility. Therefore, a Risk Management Plan would not be required for the proposed Project.

Chemical Facility Antiterrorism Standard, Title 6 CFR Part 27. The CFATS of the Department of Homeland Security regulations requires that facilities that use or store certain hazardous materials in substantial quantities submit information to the Department of Homeland Security so that a vulnerability assessment can be conducted to determine what security measures should be implemented to ensure facility security. The administering agency is the Department of Homeland Security.

The Project proposes to use two chemicals listed as Chemicals of Interest in the regulation: propane and acetylene. However, only propane will be stored or used on-site during construction or operation of the Project in excess of the applicable threshold quantity. A maximum of approximately 76,000 pounds of liquefied petroleum gas (LPG) (principally propane) will be stored and present in each of the two power generation units on the Project site; this is above the threshold of 60,000 pounds. The amount of acetylene that will be stored on-site will be well below the applicable threshold of 10,000 pounds. The CFATS will apply to the Project for propane.

3.13.3.2 Wastes, Hazardous and Regulated Non-Hazardous Solid Waste

The laws and regulations applicable to hazardous wastes and regulated, non-hazardous solid wastes that would be generated at the proposed Project facility are summarized in Table 3-44.

Table 3-44 Summary of Regulations Applicable to Hazardous and Non-Hazardous Wastes		
Regulation	Requirements/Applicability	Administering Agency
Federal		
RCRA 42 USC s/s 6901 et. Seq. (1976) 40 CFR Part 260, 261, 262 Hazardous Waste Management applicable to Generators	Requires hazardous waste generators to obtain an EPA Identification number and annually register with the NDEP to accumulate and store hazardous waste for no more than 90 days and ship hazardous waste under a manifest to a licensed disposal site. Requires generator to identify and profile hazardous waste, store hazardous waste in appropriate containers, label containers stored on-site and transported to disposal site, and train	EPA Region IX, NDEP

Table 3-44 Summary of Regulations Applicable to Hazardous and Non-Hazardous Wastes		
Regulation	Requirements/Applicability	Administering Agency
	operators in hazardous waste management.	
RCRA 42 USC s/s 6901 et. Seq. (1976) 40 CFR 263 Hazardous Waste Transportation, NRS 459	Requires hazardous waste generator to use registered transporters of hazardous waste that have an EPA ID number, use manifests to accompany waste shipments, and proper cleanup of any hazardous waste discharges.	EPA Region IX, NDEP, NDOT
Universal Waste 60 FR 25542, May 11, 1995, as amended at 64 FR 36488, July 6, 1999; 70 FR 45520, Aug. 5, 2005 40 CFR 273	Requires management, employee training, and proper disposal of universal waste that includes batteries, fluorescent lamps, mercury switches, and pesticides.	EPA Region IX, NDEP
Used Oil Solid Waste Disposal Act, as amended (42 USC 6905, 6912(a), 6921 through 6927, 6930, 6934, and 6974); and CERCLA (42 USC 9601(37) and 9614(c)). 40 CFR 279 NAC Chapter 444	Requires generators of used oil to prevent spills and correctly label, store, transport, and dispose/recycle used oil.	NDEP, EPA Region IX

Resource Conservation and Recovery Act, 42 USC Section 6901 et seq. RCRA establishes requirements for the management of solid wastes (including hazardous wastes). The statute also addresses program administration, implementation and delegation to states, and enforcement provisions and responsibilities. Provisions are established for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing generator record keeping, labeling, manifests, emergency response information, training, and contingency plans.

Solid Wastes, Title 40 CFR Parts 240 – 257. These regulations were established by the EPA to implement the provisions of the Solid Waste Disposal Act. The regulations establish the criteria for classification of solid waste disposal facilities (landfills), provide operating standards for landfills, and provide storage requirements of solid wastes.

- Part 243 addresses general storage standards and recommended practices for solid wastes
- Part 246 addresses source separation for materials recovery guidelines
- Part 257 addresses the criteria for classification of solid waste disposal facilities and practices

Hazardous Wastes, Title 40 CFR Parts 260-268, 273, and 279. These regulations were established by the EPA to implement the provisions of RCRA. The regulations establish the

criteria for classification of materials as hazardous wastes, define hazardous waste generator requirements, and specify requirements for management of used oil and universal wastes.

- Parts 260 through 268 provide the basic framework for characterizing, transporting and manifesting hazardous waste, as well as the storage requirements and requirements for disposing of hazardous wastes to land
- Part 273 addresses management of hazardous universal wastes (i.e., batteries, mercury containing equipment, and lamps)
- Part 279 addresses management of used oil and universal wastes (i.e., batteries, mercury containing equipment, and lamps)
- The EPA implements the regulations at the Federal level. However, Nevada is an authorized state, and so the regulations are implemented by state agencies and authorized local agencies in lieu of the EPA.

Hazardous Materials Regulations, Title 49 CFR Parts 171–180. The USDOT has established standards for the transportation of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests, vehicle placards, and security plans.

3.13.4 Spills

Title 40, CFR, Part 112 requires that any facility with aboveground storage capacity of 1,320 gallons or greater of oil design and implement a SPCC Plan. An SPCC Plan will be required for the proposed Project due to the amount of fuel to be stored onsite.

The proposed Project will be required to obtain a hazardous materials storage permit from the Nevada State Fire Marshal before any hazardous materials are stored on site in excess of the amount set forth in the International Fire Code, 2006 Edition. A list of hazardous materials stored on-site that are over the threshold will be submitted to the Nevada State Fire Marshal annually.

The EPCRA requires facilities that maintain Extremely Hazardous Substances on-site in quantities greater than corresponding Threshold Planning Quantities to cooperate in emergency plan preparation. The Proponent will cooperate in emergency plan preparation and designate a facility emergency coordinator to participate in the emergency response plan process with the LEPC. The LEPC is responsible for developing an emergency response plan for their emergency planning district, and providing information about chemicals in the community to citizens.

The National Oil and Hazardous Substances Pollution Contingency Plan, provides framework for the federal government to respond to both oil spills and hazardous substance releases. Under the plan, national and regional response teams are established to help plan, coordinate, and respond to discharges of oil or hazardous substances. The Proponent will be required to notify the National Response Center of any discharges or releases. In the event of a hazardous substance release, the National Oil and Hazardous Substances Pollution Contingency Plan authorizes the lead agency to initiate appropriate removal action. Decisions of action will be based on threats to

human or animal populations, contamination of drinking water supplies or sensitive ecosystems, high levels of hazardous substances in soils, weather conditions that may cause migration or release of hazardous substances, the threat of fire or explosion, or other significant factors affecting the health or welfare of the public or the environment.

3.13.5 Fuels and Fire Management

The Project area is located on federally managed land within Amargosa-Indian Springs; NV050-16 Wildland Urban Interface Fire Management Unit (FMU) (BLM 2004). The wildland portion of this FMU mainly consists of creosote bursage and Mojave scrub vegetation, with scattered stands of mesquite/acacia woodland (BLM 2004). The proposed project falls within an area and vegetation type where fire is uncommon according to historic BLM fire records (Oliver 2010). Between 1980 and 2003, three human/other caused fires have burned a total of 0.2 acres within the FMU (Oliver 2010).

Wildland fire protection on all BLM public lands within the FMU is provided by the BLM Southern Nevada District Office. Structural fire protection on private lands within this FMU is provided by the Amargosa Valley Volunteer Fire Department.

CHAPTER 4 - ENVIRONMENTAL EFFECTS

This chapter evaluates the environmental consequences that would result from construction and operation of the proposed Project, under the Proposed Action (dry-cooled alternative), wet-cooled alternative, and the No Action alternative. The impact analysis for environmental consequences focuses on potential direct, indirect, and cumulative effects on resources described in Chapter 3.0 – Affected Environment. In most cases, impacts are categorized and described without reference to facility type or location. As described in Chapter 3.0, the ROI varies depending on the resource being analyzed and the predicted locations of direct and indirect impacts from construction and operation of the proposed Project.

Direct effects are impacts that are caused by the construction and operation of the proposed Project and occur at the same time and place. These effects would result from the granting of the right-of-way by the BLM and subsequent construction and operation of proposed facilities. Indirect effects are those impacts that are caused by construction and operation of the proposed Project which are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include the effects of the withdrawal of groundwater, growth-inducing effects, and other effects related to induced changes in the pattern of land use, changes to the population density or growth rate, and related effects on the physical attributes of associated ecosystems.

The cumulative effects analysis is focused on the potential effects (direct and indirect) of construction, operation, and maintenance of the proposed Project combined with other past, present, and reasonably foreseeable future actions that could have effects in the ROI for a given resource. The CEQ (40 CFR § 1508.7) defines “cumulative impact” as: “...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”

4.1 AIR QUALITY

To determine the potential impacts of the Proposed Action (dry-cooled alternative) on air quality during construction and operations, site specific air quality dispersion modeling was conducted for the Project. Construction and operation related emissions at the Project site were modeled using the AERMOD model (version 09292). Criteria pollutant emissions were modeled to determine maximum air quality impacts. The maximum modeled concentrations were then added to ambient background concentration and compared to the applicable standards. For the analysis, 5 years of surface observations and upper air data (1988–1992) from the Mercury Desert Rock Airport in Mercury, Nevada (approximately 26 miles east of the proposed Project site), were used for dispersion modeling.

4.1.1 Proposed Action

4.1.1.1 Construction Phase Inventory and Emissions

Construction of the proposed Project is expected to take 39 months. During construction, emissions will be similar to those associated with any large industrial construction project. Construction activities will be staged to provide an efficient strategy for Project construction. Construction-related air emissions will include exhaust and fugitive dust from vehicle and construction equipment, windblown fugitive dust from grading, and other soil disturbing activities and the installation of the solar panels.

Emission tables in the Final EIS are site-specific. In the Draft EIS the air quality modeling was for a facility in California that utilized similar technology in a similar climate. However, because Nevada and California have different regulations for air quality monitoring and reporting, there is some inconsistency between what was reported on in the Draft EIS and what is now reported in the Final EIS. This inconsistency exists only because of the differing regulatory compliance measures for air quality modeling between Nevada and California. The tables below reflect the results of modeling that was done for the Project site, which is located in Nevada and would be regulated by the NDEP–BAPC.

Construction-related emissions would be transient in nature and may cause some unavoidable, localized short-term impacts. Since the Project surface disturbance will exceed 5 acres, a Class II Air Quality Permit for SAD would be required. The SAD permit could be a stand-alone permit if the grading for the Project began prior to the stationary air permit being issued, or it could be part of the stationary air permit (Phillips, personal communication, November 11, 2009). Table 4-1 summarizes projected maximum daily emissions during construction of the Project. Table 4-2 summarizes projected maximum annual emissions from Project construction.

Table 4-1 Maximum Daily Construction Emissions

Phase of Construction	NO _x (lb/day)	VOC (lb/day)	CO (lb/day)	SO ₂ (lb/day)	PM ₁₀ (lb/day)	PM _{2.5} (lb/day)
Power Plant (on-site)	1,042	116	554	2.25	1,009	188
Power Plant (off-site)	375	153	1,507	2.05	353	66

Source: AECOM 2010

Table 4-2 Maximum Annual Construction Emissions

Phase of Construction	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO ₂ (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
Power Plant (on-site)	130	14	68	0.28	120	22
Power Plant (off-site)	43	17	167	0.23	39	7

Source: AECOM 2010

The exhaust emission factors used for the calculations of CO, VOC, NO_x, SO_x, and PM₁₀ are model year and horsepower-based off-road emission factors for 2010, derived from the California Air Resources Board's OFFROAD2007 Model (version 2.0.1.2, December 15, 2007). The OFFROAD2007 Model calculates total daily emissions by equipment category (crane, dozer, grader, etc.), type of fuel (diesel, gasoline, etc.), and model year within engine horsepower ranges in a geographic area. The model also calculates activity rate (total operating hours per day) within the geographic area by equipment category, fuel, model year, and horsepower range. The total daily emissions were divided by the total daily operating hours to calculate emission factors (in pounds per hour) by equipment category, fuel, model year, and horsepower range (AECOM 2010).

4.1.1.2 Operational Phase Inventory and Emissions

Criteria pollutant emissions (i.e., NO_x, SO_x, CO, VOC, PM₁₀, and PM_{2.5}) are expected from each power plant unit during normal facility operations. The proposed plant will include two power block units, each of which consists of:

- One 35-MMBtu/hr LPG-fired auxiliary boiler used for start-up
- One 41-MMBtu/hr LPG-fired HTF heater used for freeze protection for the HTF
- One 300-Hp diesel-fired emergency fire water pump engine
- One 2292-Hp diesel-fired emergency generator engine
- One two-cell wet-cooling tower
- One HTF expansion/ullage system
- Maintenance vehicles

Summaries of emission estimates are provided in the following section. The emissions were calculated for each power plant unit, and the emissions from both power plant units were combined to estimate emissions for the proposed Project.

Auxiliary Boiler Emissions

Combustion of LPG results in the emissions of NO_x, SO_x, CO, VOC, PM₁₀, and PM_{2.5}. The assumptions made regarding auxiliary boiler operation used as the basis for emission calculations include:

- One 35-MMBtu/hr boiler per power plant unit, a total of two identical boilers for the Project
- LPG will be the only fuel used by the boilers
- Boilers to be equipped with ultra-low-NO_x burners
- Daily operation of each boiler is limited to 15 hours per day at 25 percent load, and 2 hours per day at full load

- Annual operation of each boiler is limited to 5,000 hours per year, with a duty cycle of 10 percent at full load and 90 percent at 25 percent load
- 100 percent of the PM₁₀ emissions are PM_{2.5}
- Maximum controlled emissions are equivalent to maximum uncontrolled emissions, because the auxiliary boilers will not utilize add-on controls

Based on maximum annual operation, the boilers will operate at an average capacity factor of 18.6 percent. The fuel will be commercial grade LPG; the typical composition would be 97.5 percent propane and 2.5 percent butane. Boiler criteria pollutant emissions for a single boiler are shown in Table 4-3.

Table 4-3 Auxiliary Boiler Criteria Pollutant Emissions			
Pollutant	Emissions		
	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
NO _x	0.39	2.24	0.32
VOC	0.18	1.01	0.14
CO	1.31	7.56	1.07
PM ₁₀	0.35	2.01	0.28
PM _{2.5}	0.35	2.01	0.28
SO _x	0.40	2.27	0.32

Source: AECOM 2010

HTF Heater Emissions

Combustion of commercial grade LPG results in emissions of NO_x, SO_x, CO, VOC, PM₁₀, and PM_{2.5}. The assumptions made regarding HTF heater operation used as the basis for emission calculations include:

- One 41-MMBtu/hr HTF heater per power plant unit, a total of two identical HTF heaters for the Project
- LPG will be the only fuel used by the heaters
- Heaters will be equipped with ultra-low NO_x burners
- Operation of each heater is limited to 10 hours per day and 50 hours per year
- 100 percent of the PM₁₀ emissions are PM_{2.5}
- Maximum uncontrolled emissions are equivalent to maximum controlled emissions, because the HTF Heaters do not have add-on controls

Based on 500 hours per year of operation at full load, the heaters will operate at an average capacity factor of 0.57 percent. The fuel will be commercial grade LPG. HTF heater criteria pollutant emissions for a single heater are shown in Table 4-4.

Table 4-4 Heater Criteria Pollutant Emissions			
Pollutant	Emissions		
	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
NO _x	0.46	4.55	0.01
VOC	0.21	2.05	0.01
CO	1.54	15.40	0.04
PM ₁₀	0.41	4.10	0.01
PM _{2.5}	0.41	4.10	0.01
SO _x	0.46	4.63	0.01
Source: AECOM 2010			

Emergency Diesel-Fired Engine Emissions

Combustion of diesel fuel results in the emissions of the criteria pollutants. The assumptions made regarding emergency engine operation used as the basis for emission calculations include:

- One 300-Hp diesel-fired fire water pump engine per power plant unit, a total of two identical fire water pump engines for the Project
- One 2292-Hp diesel-fired emergency generator engines per power plant unit, a total of two emergency generator engines for the Project
- All engines will use ultra-low sulfur (15 ppm) diesel fuel
- All engines have Tier 3 Certification
- The diesel fire water pump hours for each engine are based on a single 1-hour test per week, not to exceed 50 hours per year, and do not reflect emergency use
- The diesel fire emergency generator hours for each engine are based on one 1-hour test per week, not to exceed 50 hours per year, and do not reflect emergency use
- 100 percent of the PM₁₀ emissions are PM_{2.5}
- Maximum controlled emissions are equivalent to maximum uncontrolled emissions, because emergency engines do not have add-on controls

Emission estimates for NO_x, CO, VOC, and PM₁₀ are based on emission factors for EPA Tier 3 certified engines. Emission estimates for SO_x are based on estimated fuel use of 15.3 gallons per hour for each engine with a heating value of 137,000 Btu per gallon and fuel sulfur content of 15 ppm. Fire water pump engine criteria pollutant emissions are shown in Table 4-5 and the emergency generator criteria pollutant emissions are shown in Table 4-6.

Table 4-5 Fire Water Pump Criteria Pollutant Emissions			
Pollutant	Emissions		
	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
NO _x	1.883	1.883	0.047
VOC	0.099	0.099	0.002
CO	1.718	1.718	0.043
PM ₁₀	0.099	0.099	0.002
PM _{2.5}	0.099	0.099	0.002
SO _x	0.003	0.003	0.000
Source: AECOM 2010			

Table 4-6 Emergency Generator Engine Criteria Pollutant Emissions			
Pollutant	Emissions		
	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
NO _x	29.3	29.3	0.734
VOC	1.54	1.54	0.039
CO	16.7	16.7	0.418
PM ₁₀	0.97	0.97	0.024
PM _{2.5}	0.97	0.97	0.024
SO _x	0.03	0.03	0.001
Source: AECOM 2010			

Cooling Tower PM₁₀ Emissions

The solar power plant will utilize dry-cooling for the primary steam cycle, but will employ an auxiliary cooling tower to remove residual heat from the Balance of Plant equipment. Because cooling towers provide direct contact between the cooling water and the air passing through the tower, some of the liquid water may be entrained in the air stream and be carried out of the tower as "drift" droplets. PM₁₀ is generated when the drift droplets evaporate and leave PM_{2.5} formed by precipitation/crystallization of dissolved solids. Dissolved solids found in cooling tower drift can consist of mineral matter and chemicals used for corrosion inhibition.

The assumptions made regarding cooling tower operations that were used as the basis for the emission calculations include:

- One cooling tower unit per power plant unit, a total of two cooling tower units for the Project
- Circulation rate of 6,034 gallons per minute
- Cooling tower blowdown will contain a maximum of 2,000 milligrams per liter (mg/L) TDS
- Each cooling tower will be equipped with a drift eliminator with drift losses of less than or equal to 0.0005 percent by weight based on circulation flow rate
- Each cooling tower will have a maximum run time of 16 hours per day and 3,700 hours per year
- 100 percent of the PM formed is PM₁₀/PM_{2.5}
- Maximum controlled emissions are equivalent to maximum uncontrolled emissions, because the cooling tower drift eliminators are integral to the operation of the cooling towers and are not treated as add-on controls

PM emissions are calculated according to the method described in EPA’s Compilation of Air Pollutant Emission Factors (AP-42), Section 13.4 Wet-Cooling Towers. Cooling tower PM₁₀ emissions are shown in Table 4-7.

Table 4-7 Cooling Tower Emissions			
Pollutant	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
PM ₁₀	0.03	0.73	0.13
PM _{2.5}	0.03	0.73	0.13
Source: AECOM 2010			

HTF Ullage System Vent Emissions

The total uncontrolled VOC emissions from the HTF expansion/ullage tank vent were estimated based on data provided by an existing solar plant (Kramer Junction Solar Energy Generating Systems facility), extrapolated to account for HTF system size. The assumptions made regarding HTF Expansion Tank operation that were used as the basis for the emission calculations include:

- One HTF ullage system per power plant unit
- The VOC emissions are controlled with the use of two carbon adsorption canisters in series, with an overall control efficiency of 98 percent
- VOC emissions are limited to a maximum 0.75 lb/hr or 1.5 lb/day after pollution control
- The HTF ullage system are vented for a maximum of 2 hours per day
- The maximum annual operation is estimated at 400 hours per year

The controlled and uncontrolled emissions are presented in Table 4-8. For these emission estimates, it is assumed that there will be no VOC emissions from waste load out of heavy ends from the ullage system as the heavy ends are expected to have a vapor pressure that is substantially lower than the HTF fluid itself, and the vapor pressure of HTF at ambient conditions is negligible.

Table 4-8 VOC Emissions for One HTF Ullage System Vent			
	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
VOC	0.75	1.50	0.15
Source: AECOM 2010			

VOC Emissions from Bioremediation

The facility will use bioremediation in an on-site land farm to remediate HTF-contaminated soils. Bioremediation will be conducted at ambient temperatures. At ambient temperatures, the vapor pressure of the HTF is negligible; therefore, the expected VOC emissions are negligible and have not been estimated for this application.

Fugitive VOC emissions may occur in the HTF piping in the solar field from components such as pumps, seals, flanges, and valves. The fugitive VOC emissions are estimated based on component count data obtained from a recent application filed for a solar facility in California (the Beacon Solar Energy Plant), then extrapolated to account for the relative difference in the proposed Project (HTF system) size. The assumptions made for the fugitive emission calculations include:

- Fugitive emissions can occur 24 hours per day, 365 days per year
- Fugitive emissions only consist of VOCs
- Maximum controlled emissions are equivalent to maximum uncontrolled emissions, because the fugitive emissions are not controlled

The fugitive pollutant emission factors were taken from the EPA 1995 Protocol for Equipment Leak Emission Estimates for Oil and Gas Production. Since the HTF has a very low vapor pressure, the values for Heavy Oil were used to estimate the emissions. The fugitive emissions are presented in Table 4-9.

Table 4-9 HTF Fugitive Emissions			
	Max Hourly (lb/hr)	Max Daily (lb/day)	Annual (ton/yr)
VOC	0.18	4.39	0.80
Source: AECOM 2010			

Maintenance Vehicle Emissions

The facility will require periodic vehicle travel over the unpaved portions of the solar field to perform routine maintenance, including mirror washing, maintenance inspections and repairs of the piping network, herbicide application, and dust suppressant application. Criteria pollutant emissions are expected from the combustion of fuels in the vehicles, and fugitive PM emissions are expected from vehicle traffic on unpaved surfaces in the solar fields.

The emissions were calculated as the anticipated vehicle miles traveled multiplied by an emission factor for each pollutant. The fugitive PM₁₀ and PM_{2.5} emission factors take into account entrained unpaved road dust. Vehicle emissions are shown in Table 4-10.

Vehicle	Maximum Hourly (lb/hr)								
	CO	VOC	NOx	SOx	Exh. PM ₁₀	Fug. PM ₁₀	Diesel PM	Exh. PM _{2.5}	Fug. PM _{2.5}
Mirror Wash Truck	0.061	0.012	0.120	0.001	0.003	32.994	0.003	0.003	3.300
Weed Abatement	0.017	0.003	0.033	0.000	0.001	8.989	0.001	0.001	0.899
Soil Stabilizer Application	---	---	---	---	---	---	---	---	---
Maintenance Vehicles	0.019	0.001	0.001	0.000	0.000	6.938	---	0.000	0.694
Total	0.097	0.016	0.154	0.002	0.005	48.922	0.004	0.004	4.894
Vehicle	Maximum Daily (lb/day)								
	CO	VOC	NOx	SOx	Exh. PM ₁₀	Fug. PM ₁₀	Diesel PM	Exh. PM _{2.5}	Fug. PM _{2.5}
Mirror Wash Truck	0.490	0.098	0.961	0.010	0.027	263.951	0.027	0.025	26.402
Weed Abatement	0.134	0.027	0.262	0.003	0.007	71.915	0.007	0.007	7.194
Soil Stabilizer Application	---	---	---	---	---	---	---	---	---
Maintenance Vehicles	0.154	0.005	0.012	0.001	0.001	55.507	---	0.001	5.552
Total	0.778	0.130	1.235	0.014	0.036	391.373	0.035	0.033	39.148
Vehicle	Annual (ton/yr)								
	CO	VOC	NOx	SOx	Exh. PM ₁₀	Fug. PM ₁₀	Diesel PM	Exh. PM _{2.5}	Fug. PM _{2.5}
Mirror Wash Truck	0.057	0.011	0.112	0.001	0.003	30.882	0.003	0.003	3.089
Weed Abatement	0.002	0.000	0.003	0.000	0.000	0.912	0.000	0.000	0.091
Soil Stabilizer Application	0.016	0.003	0.031	0.000	0.001	8.437	0.001	0.001	0.844
Maintenance Vehicles	0.026	0.001	0.002	0.000	0.000	9.188	---	0.000	0.919
Total	0.100	0.016	0.148	0.002	0.004	49.419	0.004	0.004	4.943

Source: AECOM 2010

Off-site Delivery Vehicles

Deliveries of various supplies, materials, and services to the facility will occur on a regular basis. These deliveries will result in additional truck travel on paved roads. The combustion of fuel in offsite delivery vehicle engines results in the generation of CO, VOC NO_x, SO_x, PM₁₀, and PM_{2.5} emissions. Motor vehicle brake and tire wear and travel on paved roads with entrained road dust results in the generation of fugitive PM₁₀ and PM_{2.5} emissions. The assumptions made regarding the off-site vehicle emissions from LPG and other deliveries for the Project used as the basis for emission calculations include:

- Up to 10 miscellaneous deliveries to the facility per month (120 trips per year)
- LPG delivery is based on maximum boiler and HTF heater usage at both power plant units
- A LPG delivery truck can hold 8,000 gallons of LPG
- The LPG and other miscellaneous suppliers are located in Pahrump and Las Vegas
- The delivery trucks are heavy-duty diesel-fueled vehicles

Off-site delivery vehicle criteria pollutant emissions are shown in Table 4-11.

Trip Type	Daily Emissions (lb/day)								
	CO	VOC	NO _x	SO _x	Exh. PM ₁₀	Fug PM ₁₀	Diesel PM	Exh. PM _{2.5}	Fug PM _{2.5}
Propane Delivery	1.565	0.413	5.593	0.006	0.241	0.245	0.241	0.221	0.085
Miscellaneous Delivery	3.130	0.826	11.186	0.013	0.482	0.489	0.482	0.443	0.171
Diesel Delivery	1.565	0.413	5.593	0.006	0.241	0.245	0.241	0.221	0.085
Maintenance Vehicles	0.385	0.013	0.029	0.003	0.003	0.459	---	0.003	0.161
Total	6.64	1.66	22.40	0.03	0.97	1.44	0.96	0.89	0.50
Trip Type	Annual Emissions (ton/yr)								
	CO	VOC	NO _x	SO _x	Exh. PM ₁₀	Fug PM ₁₀	Diesel PM	Exh. PM _{2.5}	Fug PM _{2.5}
Propane Delivery	0.176	0.046	0.629	0.001	0.027	0.028	0.027	0.025	0.010
Miscellaneous Delivery	0.094	0.025	0.336	0.000	0.014	0.015	0.014	0.013	0.005
Diesel Delivery	0.009	0.002	0.034	0.000	0.001	0.001	0.001	0.001	0.001
Maintenance Vehicles	0.008	0.000	0.001	0.000	0.000	0.010	---	0.000	0.003
Total	0.288	0.074	0.999	0.001	0.043	0.053	0.043	0.040	0.019

Source: AECOM 2010

Summary of Operational Criteria Pollutant Emissions

The total criteria pollutant emissions for the Project are summarized in Table 4-12.

Table 4-12 Summary of Project Criteria Pollutant Emissions						
Emissions Period (Units)	Pollutant (includes stationary and on-site mobile sources)					
	NO_x	VOC	CO	PM₁₀	PM_{2.5}	SO_x
Hourly (lb/hr)	64.3	5.93	42.7	52.6	8.61	1.79
Daily (lb/day)	77.3	21.3	83.6	407	55.0	13.9
Annual (tons/yr)	2.36	2.30	3.24	50.3	5.85	0.67
Emissions Period (Units)	Pollutant (off-site mobile sources)					
	NO_x	VOC	CO	PM₁₀	PM_{2.5}	SO_x
Daily (lb/day)	22.4	1.66	6.64	2.40	1.39	0.03
Annual (tons/yr)	1.00	0.07	0.29	0.10	0.06	0.00
Source: AECOM 2010						

Although new PM₁₀ emissions are predicted during Project operation, the solar plant could potentially reduce overall PM₁₀ emissions in this region. As noted in Chapter 3, the majority of dust in the Amargosa Valley is naturally occurring. However, by its nature, a solar energy project must keep dust to a minimum through the use of dust control measures, as a film of dust on the mirrors will reduce their efficiency for power production. Experience at other existing solar facilities has been that PM₁₀ emissions from driving in the solar field are negligible. Dust control is achieved by a combination of watering, soil stabilizers, water from the mirror washing, and compaction of the driving surface over time. These control measures will be utilized by the proposed Project. Therefore, the emission estimates and impact analyses for PM₁₀ and PM_{2.5} should be considered very conservative (i.e., an over-estimate of emissions and corresponding impacts).

The proposed Project will be a minor source of criteria pollutant emissions from facility operation (e.g., emissions from auxiliary boilers and heaters, emergency generators, on-site maintenance traffic, etc.). However, controlled emissions sources would not exceed major source thresholds for any pollutant. Upon completion of final engineering design, the Proponent will consult with the NDEP – BAPC to obtain required air quality permits. The facility will require either a Class I Air Quality Operating Permit (if emissions from PM₁₀, NO_x, CO, SO₂, and VOC exceed 100 tons per year), or a Class II Air Quality Operating Permit, if emissions of these constituents are less than 100 tons per year.

4.1.2 Wet-Cooled Alternative

Impacts to air quality from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative). The primary

difference is the additional PM₁₀ and PM_{2.5} emissions from the cooling tower associated with a wet-cooled plant due to solids in the entrained moisture in the cooling tower drift. Because wet-cooling towers provide direct contact between the cooling water and the air passing through the tower, some of the liquid water may be entrained in the air stream and carried out of the tower as “drift” droplets. PM₁₀ is generated when the drift droplets evaporate and leave fine PM formed by precipitation/crystallization of dissolved solids. Dissolved solids found in cooling tower drift can consist of mineral matter, chemicals used in corrosion inhibition, etc. The assumptions made regarding cooling tower operation that are used as the basis of the emissions calculations for the wet-cooling alternative are as follows:

- Circulation rate of 149,000 gallons per minute
- Cooling tower blowdown will contain a maximum of 1,600 mg/L TDS assuming 15 cycles of concentration
- The cooling tower will be equipped with a drift eliminator with drift losses of less than or equal to 0.0005 per cent by weight based on the circulation flow rate
- The cooling tower run time will be a maximum of 24 hours per day at rated capacity and at a minimum load overnight for ancillary equipment cooling, i.e., lube oil cooling. The total hours of operation at rated capacity would be 8,760 hours per year
- 100 percent of the TDS is PM₁₀/ PM_{2.5} emissions

In contrast the auxiliary cooling tower for the dry-cooled alternative will use demineralized makeup water. The assumptions made regarding auxiliary cooling tower operation that are used as the basis of the emissions calculations for the dry-cooling alternative are as follows:

- One auxiliary cooling tower per power unit, a total of two cooling towers per project site
- Circulation rate of 6,034 gallons per minute
- Cooling tower blowdown will contain a maximum of 2,000 mg/L TDS
- The cooling tower will be equipped with a drift eliminator with drift losses of less than or equal to 0.0005 per cent by weight based on the circulation flow rate
- The cooling tower run time will be a maximum of 24 hours per day at rated capacity and at minimum load overnight for ancillary equipment cooling, i.e., lube oil cooling. The total hours of operations at rated capacity would be 8,720 hours per year
- 100 percent of the TDS is PM₁₀/ PM_{2.5} emissions

Pollutant	Dry-Cooled Alternative			Wet-Cooled Alternative		
	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)	Hourly (lb/hr)	Daily (lb/day)	Annual (tpy)
PM ₁₀	0.03	0.73	0.13	0.60	14.32	2.61
PM _{2.5}	0.03	0.73	0.13	0.60	14.32	2.61

4.1.3 No Action Alternative

Under the No Action Alternative, there would be no impacts from construction and operation of the proposed Project to air quality.

4.1.4 Mitigation

The Proponent will maintain compliance with laws and regulations concerning prevention and control of air pollution during construction and operation of the proposed Project, and will implement measures to minimize fugitive dust emissions from construction activities through the following activities:

1. Traffic on the project site will be restricted to designated roadways within the site to minimize the disturbance of soil unrelated to actual construction of solar troughs within the Project site.
2. Designated roadways that could be disturbed by vehicles or wind will be treated with an approved dust suppressant during both construction and operation. The approved suppressant will be one that has been applied previously on federally managed lands in the regional area.
3. Construction areas within the Project site that could be disturbed by wind will be treated with a BLM-approved dust suppressant during both construction and operation. The approved suppressant will be one that has been applied previously on federally managed lands in the regional area. The application of approved suppressants during the long-term operation of the proposed Project will be made based upon determination of a need for additional coverage from time to time.

Additional mitigation can be found in Appendix A. Following consultation with the NDEP on the final Project design, additional compliance measures may be required as part of their permit and approval process.

4.2 GEOLOGICAL HAZARDS AND MINERAL RESOURCES

This section describes and evaluates the impacts that geological hazards may have on the Proposed Action. This section also describes and evaluates the potential impacts on mineral resources that may result from the Proposed Action.

4.2.1 Proposed Action

4.2.1.1 Geological Hazards

The potential for earthquakes and ground subsidence in the Project area is low, but not non-existent. Ground-shaking as a result of earthquakes represents the most significant geological

hazard to the Project. Earthquakes have been recorded near the Project area and can be expected to occur in the future at essentially the same magnitude and frequency that have been previously recorded. Seismicity is a measure of the ground-shaking that is likely to occur in a given area as a result of earthquakes. The construction, operation, and maintenance of the proposed Project would not directly or indirectly impact earthquakes within the Project area or alter the seismicity in the vicinity of the Project area. While the Proposed Action would not affect earthquakes or seismicity in the Project area, earthquakes and the seismicity of the local area may potentially impact the proposed Project.

Quaternary faults have been mapped within the Project area (Slate et al. 1999). A fault crosses the southeastern portion of the Project area. A second fault crosses within 0.5-mile of the southwestern edge of the Project area. The construction, operation, and maintenance of the Proposed Action would not directly or indirectly impact Quaternary faults within the Project area.

Ground subsidence is the sinking or downward motion of the earth's surface resulting from either natural or manmade processes, such as mining, oil and gas extraction, or groundwater withdrawal (Bates and Jackson 1987). Local withdrawal of groundwater may result in ground subsidence by removing water from the pore spaces of consolidated sediments. As groundwater is removed, unoccupied pore spaces may collapse, thereby decreasing the total volume of the geological unit, which may cause the land surface to drop. Katzenstein and Bell (2005) observed 2.5 to 3.5 centimeters of ground subsidence in Amargosa Valley, which was in close proximity to areas of groundwater withdrawal.

The construction, operation, and maintenance of the proposed Project would not directly or indirectly impact ground subsidence within the Project area. The dry-cooling method as proposed will not increase the amount of groundwater being removed from the local area. As withdrawal of groundwater is the main cause of ground subsidence, it is unlikely that subsidence will continue to a degree that the facility will be damaged. Section 4.2.4 (Mitigation) lists subsidence as one of the geological factors that would be considered in the design and construction of the facility.

4.2.1.2 Unique Geological Resources

Unique geological resources will not be impacted by the proposed Project, because there are no known unique geological resources associated with the Project area. The nearest unique geological resource to the Project area is the Big Dune ACEC. However, because the Big Dune ACEC is approximately 4 miles from the Project area, and because there is no evidence of the Big Dune moving out of the ACEC, it is unlikely that the proposed Project will have any impacts to the Big Dune ACEC.

4.2.1.3 Mineral Resources

The primary impact issue for mineral resources is the loss of economically significant mineral resources. Two types of impact can potentially affect mineral resources:

- 1) Direct and permanent disturbance of the mineral-resource host rock during construction
- 2) Indirect and permanent disturbance due to changes in public accessibility to mineral resources

The primary cause of direct and permanent disturbance of mineral resources is ground disturbance associated with construction of the proposed Project, such as grading and cutting of roads and excavation for building foundations, which may damage or remove the geological units that host the mineral resources.

Given the absence of currently active mining or known mineral resources in the Project area, the potential impact to mineral resources is considered low. Nevertheless, indirect and permanent disturbance of mineral resources will be caused by the loss of mining-claim eligibility within the Project area. The mineral resource inventory found a single defunct placer mining claim within the Project area, which demonstrates past interest and the potential for future interest in placer-mineral resources within the Project area.

4.2.2 Wet-Cooled Alternative

Impacts to geological resources and mineral resources from construction and operation of a wet-cooled solar plant would be the same as to the impacts described for the Proposed Action (dry-cooled alternative).

4.2.3 No Action Alternative

Under the No Action Alternative, there would be no impacts from geological hazards or Project-related impacts to mineral resources.

4.2.4 Mitigation

Impacts from geological hazards or to mineral resources are expected to be minor. Site-specific geotechnical, seismic, and soil conditions will be appropriately addressed during the design and construction of the Project. In accordance with the National Electrical Safety Code, the Proponent would design and construct the Project facilities to withstand geological hazards by taking earthquake activity, seismicity, fault locations, and ground subsidence into consideration. Therefore, geological hazards in the Project area are expected to have a minimal impact on Project facilities.

4.3 SOILS

This section discusses the effects on soil resources that may occur with implementation of the Proposed Action or alternatives.

4.3.1 Proposed Action

Up to 4,350 acres of desert lands will be cleared and graded to accommodate construction of the solar facility and ancillary facilities. The removal of vegetation and soil crusts would expose soil and increase the potential for wind- and water-driven erosion. The runoff designations for the soils affected by Project construction and operation and maintenance, range from negligible (Arizo) to rapid (Yermo). Soils within the Project area exhibit rapid permeability, with the exception of the moderately permeable Sanwell series.

The soils within the Project area exhibit a moderate susceptibility for wind erosion. The dominant soil series within the Project area, the Yermo series, is assigned to a WEG of 5. The least extensive soil series within the Project area, the Lewdlac series, exhibits a moderate-high susceptibility to wind erosion and is assigned to a WEG of 3. Watering of active construction areas, such as grading of power blocks and cutting of roads, is expected to reduce susceptibility to wind erosion, consequentially reducing wind-blown, fugitive dust.

Grading activities will be conducted during the first 24 months of the construction schedule, and would be phased to minimize water needed for dust control. A small portion of the overall plant site would be paved, primarily the site access road, the service roads to the power blocks, and portions of the power block (paved parking lot and roads encircling the steam turbine generator and solar steam generator areas). The remaining portions of the power block would be gravel surfaced. The solar field would remain unpaved and without a gravel surface in order to prevent rock damage from mirror wash vehicle traffic. Water would be used for dust suppression on the dirt roadways within and around the solar field. Roads and parking areas located within the power block area and adjacent to the administration building and warehouse would be paved with asphalt.

Prior to construction, a Project-specific SWPPP will be developed that includes site-appropriate BMPs to reduce localized soil impacts from wind and water erosion. The site-appropriate BMPs may include stormwater BMPs; temporary erosion control measures, including BLM-approved dust suppression; and construction of berms and ditches, all of which will prevent accelerated soil erosion or dust generation. Following construction, permanent erosion and sediment control BMPs would include continued watering for dust control, use of diversion berms, and redirection of stormflows into a detention/sediment or settling basin prior to discharging stormwater off-site.

4.3.2 Wet-Cooled Alternative

Impacts to soil resources from construction and operation of a wet-cooled solar plant would be similar to the impacts described below for the Proposed Action (dry-cooled alternative).

4.3.3 No Action Alternative

Under the No Action Alternative, there would be no Project-related impacts to soil resources.

4.3.4 Mitigation

Site-specific mitigation measures would be required during construction of the proposed Project in order to avoid or minimize damage resulting from erosion, prevent acceleration of natural-erosion processes, increased sedimentation, and reduce the creation of fugitive dust that may affect both the Project and surrounding area. Temporary mitigation measures would be implemented during Project construction and then replaced with permanent measures upon completion of the proposed Project. Permanent mitigation measures would be maintained throughout the lifespan of the proposed Project. These mitigation measures are detailed in Appendix A.

4.4 WATER RESOURCES

This section discusses effects on water resources that may occur with implementation of the Proposed Action or alternatives. A numerical groundwater flow model was used to simulate existing pumping in the Amargosa Desert Hydrographic Basin and to evaluate the potential regional effects to water resources associated with construction and operation of the proposed Project. The following sections provide a summary of the groundwater modeling and predictive scenarios. The complete groundwater model report can be found in Appendix B.

4.4.1 Groundwater Model

4.4.1.1 Groundwater Model Background

Groundwater flow modeling was performed using the USGS DVRFS Model (Belcher 2004). During the preparation of this EIS, the DVRFS was the only numerical model available. The USGS is currently developing the Southern Amargosa Embedded Model (SAMM), a refinement of the DVRFS. The SAMM is a refinement to a portion of the DVRFS model which will enable improved modeling of the Amargosa Valley by utilizing a smaller model grid size. The higher resolution will facilitate more accurate simulation of groundwater flow and the effects of geologic structures more accurately than possible with the DVRFS. Funding for the SAMM, as well as the data used to construct the model, is derived from multiple sources, including the USGS, Nye County, USFWS, NPS, DOE and BLM. Once developed, the model will serve as a tool to simulate the potential effects of pumping groundwater in the Amargosa Desert Hydrographic Area under various scenarios (Nye County 2010). As part of water mitigation measures requested by the USFWS, the Proponent will contribute \$6,000 annually, for the life of the Project, to the operation and maintenance of three monitoring wells associated with the Amargosa Monitoring Network. The Amargosa Monitoring Network is an integral component of the DVRFS and the SAMM.

For the analysis in this EIS, the DVRFS was calibrated to both pre-pumping and pumping conditions. The Amargosa Basin is one of the areas covered by the model in which there has been significant pumping; water-level changes measured in the area were used to guide calibration of the model.

The model was developed with MODFLOW-2000, using a grid with a lateral spacing of 1,500 meters, and a variable vertical spacing. There are 16 model layers, with an interpretation of the

water table used as a reference surface from which to base the elevation of the upper model layer. A large number of layers are needed to capture the geologic complexity incorporated into the geologic framework model, which is itself a simplification and interpretation of the actual geology. The model assumes that all layers are fully saturated and that dewatering does not occur. Thus, transmissivities do not become smaller with drawdown, and the model is approximately mathematically linear. Because the Drain package is used to simulate springs, the model would not be strictly linear if drawdown is sufficient to cause water levels in a cell to decrease below the specified elevation of a drain.

The model was calibrated using a non-linear regression technique which optimizes modeling parameters to minimize the objective function, which was in turn the sum of squared weighted residuals. A residual is defined as the difference between the observed (or estimated) value for a calibration target, and the corresponding simulated value. Hydraulic heads, water-level changes, discharge rates in spring areas, and lateral boundary fluxes were used as calibration targets. As the objective function represents the entire model, rather than concentrating on the Amargosa Farms and Ash Meadows areas, the agreement of simulated water-level change and measured change at Devils Hole is reasonable, but could be improved.

4.4.1.2 Groundwater Model Limitations

Before evaluating predictions of drawdown at Devils Hole or change in discharge at Ash Meadows using the DVRFS model, the reader needs to be aware of the limitations of using a regional-scale groundwater model to evaluate potential water resource impacts at springs or other sites (e.g., Devils Hole) that are local in scale (feet). These limitations include (1) model grid size (1,500 m x 1,500 m); (2) calibration to regional groundwater flow conditions; (3) estimates in historic pumping dataset; and (4) simplification of geology. The DVRFS model report states “the use of the [DVRFS] model to address regional-scale issues or questions is the most appropriate use of the model.” Thus, using the DVRFS model to predict hydraulic heads or water-level change at Devils Hole is not an appropriate use of the model. However, the DVRFS model gives the reader a qualitative sense of how water levels change over time at a given location, and serves as an effective tool for evaluating impacts from the proposed Project on resources such as Devils Hole.

Before conducting predictive modeling simulations, it is important to compare calculations of water-level change at Devils Hole with measured changes. Provisional water-level data after 1989 was received from NPS. Several features should be noted:

- Both the measurement dataset and the simulated levels show declining water levels prior to the start of significant pumping in the Ash Meadows area. The simulated rate of decline is faster than the observed rate. The model is also slower to respond to changes in pumping rates.
- The effects of pumping in Ash Meadows are readily apparent in both the measurements and simulated results beginning in approximately 1970, but the simulated change is greater than the measured change.
- In the original 1998 model, during three periods beginning approximately in 1975, 1987, and 1998, there are simulated declines that do not occur in the measured values. The

model values do not recover as much as the measurements following cessation of nearby pumping. In the updated 2003 model, the simulated decline starting around 1975 still remains to a lesser degree, but the other two declines have been corrected. We suspect there is still an error in the historical pumping dataset prepared by the USGS for the 1975 period.

- The effects of seasonal barometric changes, seasonal pumping, and earthquakes are not incorporated in the model.
- Beginning in 1989, until 2003, the updated 2003 model simulates a decline in water levels.

In summary, the DVRFS model over-predicts the drawdown caused by historical local pumping by approximately 30 percent.

4.4.1.3 Groundwater Model Simulations and Assumptions

After updating the USGS DVRFS model through 2003 with the revised pumping and return flow dataset, groundwater modeling scenarios using this updated model were conducted. Based on discussions with the BLM and USFWS water resources team, the following modeling scenarios were simulated as part of this Project:

- Run existing DVRFS model an additional 200 years past the transient calibration period with 2003 pumping (i.e., existing pumping).
- Same as Scenario 1, except add the Proposed Action of groundwater withdrawal of 400 afy (600 afy during the 39 month construction period) from the proposed Project well south of the site from 2010-2039 (i.e., the approximate operation lifetime of the proposed Project).

The following assumptions were made during the modeling scenario simulations:

- No climatic effects – The current recharge dataset was used for the 200-year simulations. The effect of water rights users irrigating more or less due to climate than 2003 amounts was not estimated.
- The Project groundwater withdrawal of 400 afy for the 30 year operational period (600 afy during the 39 month construction period) was added to the 2003 pumping dataset.
- Water infiltration from mirror washing was not accounted for because it is assumed to not contribute to groundwater recharge.

4.4.1.4 Groundwater Model Results

The water-level contours indicate that the potentiometric surface of the valley fill has a broad and gently sloping gradient from the northeast toward the central axis of the valley and southwest toward the Funeral Mountains.

Within the Amargosa Basin, the most rapid water level declines occurred in the Amargosa Farms area, which is consistent with observed water level changes from other studies (Kilroy 1991). Devils Hole is approximately 15 miles from the proposed pumping, and the simulated drawdown at Devils Hole in 2003 from existing regional pumping is approximately 1.8 feet.

Scenario 1 (No Action) Results

For Scenario 1 (existing pumping), 2003 pumping and return flow was repeated every year for the next 200 years to determine the change in water levels at Devils Hole. Drawdown is predicted to be more than 5 feet over a large area. However, the drawdown is predicted to decrease rapidly in the Ash Meadows discharge area. The drawdown is buffered by the reduction in spring discharge that occurs with declines in water level. Simulated water levels at Devils Hole decline over 13 feet after 200 years, due to existing pumping. Note that “time zero” is assumed to be the simulated water-level elevation on December 31, 2003 from the model, not pre-development conditions.

Scenario 2 (Proposed Action) Results

For the Proposed Action, the 400 afy of groundwater withdrawal for the 30 year operational period was extracted from a single Project well. Pumping from this well is assumed to start in 2010 and concludes in 2039. The first 39 months (construction phase) of the Project will require 600 afy of groundwater instead of the long-term groundwater withdrawal of 400 afy. Table 4-14 shows the proposed groundwater withdrawal from the Project well.

App. No.	Easting (m)	Northing (m)	Duty (afy)	Proposed w/d (afy)	Model Row	Model Column	Model Layer
15893	542362.42	4044948.68	603	400	116	71	1

The model results from the Proposed Action scenario show that simulated water levels at Devils Hole decrease by approximately 0.05 of a foot or 0.6 of an inch after 200 years. It is important to keep in mind that this reduction in water levels may be over-predicted, based on the historical over-prediction of water level declines at Devils Hole. The DVRFS model calibration to hydraulic head change is also not accurate to 0.05 feet. The DVRFS model report considers the model fit to hydraulic heads to be good if the difference between simulated and observed hydraulic heads is less than 10 meters (Belcher 2004).

The DVRFS model is also not designed to exactly measure drawdown at a spring location several miles away, such as Devils Hole, because of its (1) grid size [1,500 meters x 1,500 meters]; (2) emphasis on calibration to regional groundwater conditions; (3) estimates in historic pumping dataset; and (4) simplification of geology. Thus, the regional model has a limited capability to accurately evaluate incremental changes in pumping tens of miles away on Devils Hole; however, it is the only groundwater flow model currently available.

Ash Meadows Discharge

The USGS code ZONEBUDGET was used to evaluate the changes in water movement for the Amargosa Basin. Under the present-day pumping rates, the model predicts that only minor changes to the discharge rate at Ash Meadows would have occurred by 2003, the end of the model calibration period. When the present-day pumping is continued into the future, the model predicts that impacts to the discharge will occur. In 2203, the discharge is predicted to be reduced from approximately 18,095 afy to 15,607 afy. When the Project pumping is added, the discharge rate in 2203 is predicted to be reduced to only 15,600 afy or a difference of 7.4 afy or 0.05 percent.

4.4.1.5 Groundwater Model Summary

Comparison of simulated and observed changes in water levels at Devils Hole through 2003 indicated that the model overestimated the change in water level caused by pumping in Amargosa Basin. There may be an error in the historical pumping dataset that affects this comparison. Although the model could be improved by additional work, specifically in the Amargosa Desert and Ash Meadows areas, the pumping estimates developed for the model are reasonable.

The simulations predict that pumping from the Project well will cause water levels in Devils Hole to decline approximately 0.05 feet after 200 years. Again, when considering this prediction, it is important to recognize that the model cannot accurately predict hydraulic heads or water-level changes at Devils Hole due to its original objective of modeling groundwater flow at a regional scale. The results of these simulations should be regarded as a qualitative assessment of how hydraulic heads may change over time with a given set of circumstances and assumptions.

The model predicts that the Project pumping will reduce the discharge rate from springs at Ash Meadows an amount of 7.4 afy or 0.05 percent.

Groundwater pumping in the Amargosa Farms area has caused tens of feet of drawdown near the pumping wells. Simple modeling using the Theis equation and superposition, coupled with regression procedures, indicates that the pumping in the Amargosa Farm area is the primary cause of the present-day drawdown at Devils Hole

4.4.2 Proposed Action – Dry Cooled Alternative

Under this alternative, the Proponent would construct, operate, maintain, and ultimately decommission two 250-MW dry-cooled solar power plants equipped with thermal energy storage capability and associated facilities on lands managed by the BLM. Overall, the footprint of the proposed Project and related facilities will result in permanent disturbance of approximately 4,350 acres.

4.4.2.1 Impacts from Construction

As described in Chapter 2, Proposed Action and Alternatives, the proposed Project would require up to 600 afy, or 1,950 acre-feet of groundwater over the 39-month construction period. Water from groundwater during construction will be used for:

- Dust suppression during grading and along roadways as necessary
- Grading and compaction for the solar field and power block areas, infrastructure, and building foundations
- Concrete work and other uses

Water Rights and Use

The water right of the well to be used during construction and operations has an annual duty of 603 acre-feet and is currently permitted for agricultural use. Over the last 25 years (1983–2008), the average annual duty used by the water rights holder has been 413.88 afy. In this average, 1984 was not included as no pumping data is available for that year. The Proponent has filed an application (No. 79699) with the Nevada State Engineer's Office to change the place and manner of use of the water right. The Proponent has requested that 400 acre-feet of the 603 acre-feet annual duty be changed from agricultural to industrial use.

Following approval of a second application (No. 79783) by the Nevada State Engineer, the Proponent intends to drill a new well approximately 300 feet west of the existing well, and move 400 acre-feet from its current point of diversion to the new well. The remaining 203 acre-feet will remain with the existing well. This will allow for redundancy should one of the wells fail. During construction, the Proponent will lease the full annual duty (603 afy) from the water rights holder for the Project well. During this period, the water rights holder will fallow farmlands that were previously irrigated. After construction, the water rights holder may continue to irrigate up to 40 acres of farmland with the 203 acre-feet assigned to the existing well.

The water to be used during construction will be piped from the Project well to temporary water storage tanks to be located throughout the construction site. Meters will be placed on both wells to ensure there is no exceedance of the permissible annual duty.

Water Quality

Potential impacts to water resources during construction would be primarily associated with surface disturbing activities, but could also be a result of accidental spills and handling and storage of hazardous chemicals. These chemicals can potentially contaminate surface waters during heavy storm events, or groundwater through infiltration. A number of mitigation measures are proposed to prevent spills of chemicals, as well as to respond to spills should they occur. The site-specific SWPPP will include stormwater BMPs, and temporary erosion control measures including BLM-approved dust suppression, and construction of berms and ditches, all which will prevent accelerated soil erosion or dust generation. Adhering to proper material handling procedures and complying with the SWPPP would ensure that construction-related water quality impacts would not occur.

Surface Water

The proposed solar field improvements will change the historic drainage patterns of the Fortymile Wash within the boundaries of the Project site. The Proponent performed hydrologic and hydraulic modeling to assess existing site drainage and develop a Conceptual Stormwater Control Plan (Slater Hanifin Group 2009). The plan was designed to quantify and accommodate a 100-year flood flow event in the Fortymile Wash.

As described in Chapter 2.3.13, Site Drainage and Earthwork, flood protection of the property from off-site flows will be provided by means of a continuous channel around the northern and western perimeter of the site. The channel will be designed to effectively intercept the 100-year storm event off-site runoff and convey the concentrated flow to one of the historic discharge locations of the Fortymile Wash in the southwest corner of the property. The channel will discharge within the property limits and energy dissipation facilities will disperse the concentrated flow back to a shallow sheet flow condition before the flow leaves the property boundary. Additionally, a channel is proposed along the eastern side of the solar field in order to intercept and collect flows impacting the site from the east. Similar to the northern and western perimeter channels, the concentrated flow will be released on property in its historic location and an energy dissipation facility will return the flow to a shallow sheet flow condition before it leaves the property. Perimeter channels will be concrete lined due to the high velocity potential and for maintenance reasons. Off-site flows will be intercepted and conveyed around the site to ensure no direct contact with on-site stormwater runoff.

Due to the size of the solar field area, the site itself has potential to generate large storm flows during a rain event. For this reason, stormwater control facilities are necessary to protect on-site facilities, and to convey stormwater runoff to historic discharge locations in both quantity and manner of flow. The four primary (major) onsite channels, traversing the site north to south, will provide 100-year event stormwater runoff interception from four equal divisions of the entire Project site. The two power block areas would contain the most sensitive equipment on the site and therefore would each be located along one of the primary channels; The design would achieve flood protection during a 100-year storm event. The stormwater runoff generated between the primary channels will be collected in a series of swales and small channels that will direct the flow to the appropriate primary channel. All minor channels within each section will be designed to intercept and convey the 25-year storm event. Stormwater runoff in areas between the primary channels and in excess of the 25-year event will sheet flow (shallow depth, low velocity) below the solar panel systems. This flow would eventually be intercepted by an appropriate primary channel before the flow impacted a power block area. This concept was selected in order to reduce costs for on-site drainage facilities, while still providing desired flood protection.

The USACE has indicated that it may assert jurisdiction over certain drainages that traverse the Project site. A complete assessment of the potential effects to jurisdictional waters from Project construction and operation will be completed once the USACE issues a Jurisdictional Determination. That document will identify all jurisdictional waters, including ephemeral waters; describe the Project's impacts on those waters; and prescribe appropriate mitigation measures.

Groundwater

The existing well was drilled in 1960 to a total depth of 330 feet. Table 4-15 lists wells within 1-mile of the existing well.

Well Log No.	Date Completed	Total Depth (feet)	Static Water Level (feet)	Type of Use	Perforation (feet)
107413	06/09/2008	240	137	Domestic	140-220
43503	10/22/1993	260	135	Domestic	180-250
105038	03/06/2008	240	138	Domestic	140-230
4113	04/28/1958	250	110	Irrigation	N/A
2852	02/24/1955 (deepened in 1962)	140 / 349	100 / 110	Irrigation	146-349
43672	11/14/1993	260	95	Domestic	160-260
7212	05/18/1963	300	112	Irrigation	150-300
4379	11/26/1958	240	92	Irrigation	100-240
2868	01/12/1955	421	N/A	Irrigation	140-421
86706	04/30/2002	600	118	Irrigation	80-600
3351	03/05/1956	480	N/A	Irrigation	N/A
52318	01/31/1966	161	96	Domestic	134-161
99031	03/01/2006	222	135	Domestic	126-186
24932	09/05/1983	404	118	Irrigation	120-404
6122	08/25/1961	503	60	Irrigation	270-503
6123	08/10/1961	510	62	Irrigation	170-485
20045	01/18/1979	497	0	Irrigation	216-497
78018	04/12/1999	230	97	Domestic	150-203
52317	N/A	500	0	Irrigation	N/A
5120	03/23/1960	330	94	Irrigation	100-330
5606	04/05/1960	330	84	Irrigation	80-330
5621	04/21/1960	300	83	Irrigation	90-300

Source: NDWR 2010c

There are currently seven domestic wells within 1 mile of the proposed Project well. Average depth of these wells is approximately 134 feet, with an average static water level of 70 feet. The majority of domestic wells were drilled in the 1990's. As described in Chapter 3.4, since a domestic well is not required to obtain a water right permit for use, it is unknown how many of these wells are being actively used.

There are 15 wells within 1 mile that were drilled for agricultural use. In reviewing the Nevada State Engineers water rights database, only six of these have an associated water right, one of which includes the proposed Project well (Well Log No. 5120/Certificate No. 5717). The majority of irrigation wells were drilled pre-1970s, to an average depth of 400 feet. The average static water level for wells used for irrigation is approximately 87 feet.

4.4.2.2 Impacts from Operations

Once construction is complete, the Proponent will continue to lease 400 afy from the water rights holder and will relinquish back to the holder the remaining 203 afy. The water rights holder may continue to irrigate up to 40 acres of farmland with the 203 acre-feet assigned to the existing well. The Proponent will lease 400 afy for the remainder of the life of the Project. This may result in an increase in pumping in the basin, as the full duty of the right has not been exercised on an annual basis over the past 25 years. To offset the impacts associated with this potential increased pumping, as well as the loss of recharge that may result from the change in manner of use of the water right from irrigation to industrial, the Proponent, per the stipulated agreement with NPS, USFWS and BLM, must acquire no less than 236 afy of senior groundwater rights in the vicinity of the Project well or closer to Devils Hole and Ash Meadows NWR. The acquired water rights will preferably be historically fully utilized. If fully-utilized rights totaling 236 afy are unavailable for purchase, sufficient rights must be purchased such that the cumulative total of their historic pumping average is no less than 236 afy.

Water Use

Estimated water uses for the proposed dry-cooled Project will be used for the following consumptive uses:

- Solar mirror wash water to maintain solar collector efficiency
- Power cycle makeup water to supply the steam driving the steam turbine generators
- Equipment heat rejection for cooling generators, pumps, and other equipment
- Dust suppression
- Domestic potable uses include drinking water, showering, toilets, hand washing, etc.

Estimates for operational water usage are listed in Table 2-4, and are based on:

- Power cycle makeup water and auxiliary equipment heat rejection – expected monthly power production rates
- Solar mirror washing – experience at other locations with similar climatic conditions

- Domestic potable use – number of employees and number of hours expected to be worked during the year; an average consumption of 37 gallons per person per day was assumed
- Dust suppression – The RO discharge water will be used for dust suppression on an as needed basis

Water Quality

Operation of the proposed Project has the potential to impact water quality through improper storage and use of materials and from soil erosion. Adhering to proper material storage and handling procedures and complying with the operation SWPPP will result in minor to no impacts to water quality. The SWPPP will identify BMPs to manage pollutant releases, including spill and leak prevention, waste handling, employee training, and erosion and sedimentation controls. Through compliance with the General Industrial Permit, all potential pollutants generated during the industrial phase will be sufficiently mitigated such that water quality standards will not be violated. Thus, surface water and groundwater quality impacts during the operations phase would be minor and not significant.

The Project will produce one primary wastewater stream: sanitary wastewater. Sanitary wastes will be collected from the power blocks, administration building, and warehouse for treatment in several septic tanks. Septic tanks are the most common method of on-site wastewater treatment and disposal. Liquid effluent from the septic tanks will have biological oxygen demand of approximately 175 mg/L and suspended solids concentration of approximately 75 mg/L. Heavy solids will settle to the bottom of the septic tank, undergo anaerobic decomposition and slight compaction, and will be removed and properly disposed of every 3 to 5 years.

Liquid effluent from the septic tanks will be distributed to multiple leach fields (in close proximity to the septic tanks). Based on the current estimated average of 185 employees on a 24-hour, 7 day per week work schedule, a total leach field of approximately 16,500 square feet will be required. It is expected that the leach fields will satisfy the needs of the plant for its entire service life. At this time, the leach field is anticipated to be sited adjacent to the bioremediation field. However, the final location will be determined following additional engineering design. The Proponent will coordinate the development of the leach field and bioremediation facility with NDEP as part of their permitting and approval process with that agency.

There are no processes or operational wastewaters that will be connected to the septic system and leach field. The use of a septic system and associated leach field is a well established process and acceptable method of treatment and disposal when there is no local sewer system available, when the local soil and groundwater conditions are acceptable to this method, and when the chemical makeup of the wastewater is not a hazard to the local environment. The local soils are very permeable and the depth to groundwater in this area is approximately 135 feet below ground surface. At this depth, the soil overlying a leach field is generally considered sufficient for the biological treatment of domestic wastewater.

The power cycle makeup water will be recycled back into the process at rates between 34,500 and 52,500 gallons per day for each power block. Other water streams like plant drains and other miscellaneous water waste streams are collected and recycled back into the process.

4.4.3 Wet-Cooled Alternative

Under the wet-cooled alternative, the demand for water would be 4,600 afy, which is substantially more than that required for the Proposed Action (dry-cooled alternative). Under the wet-cooled alternative, the Proponent would either lease or purchase existing certified water rights for water needs during construction and operation of the proposed Project. Water rights would be acquired from existing water right owner(s), as no new appropriations are granted by NDWR due to Nevada State Engineer Order 1197. Since it is unknown where water rights would ultimately be obtained for a wet-cooled project, the groundwater flow model simulations and hydrologic analysis were not performed. Nevertheless, it is virtually certain that the potential impact to water resources, particularly groundwater availability, would be substantially greater than with the dry-cooled alternative. These different impacts would result from the more than ten-fold increase in the quantity of extracted water, as well as from the change in the manner of use from agriculture to industrial.

Whereas the dry-cooled alternative is estimated to result in a recharge loss of 32 afy (that is, recharge that occurs through using water for irrigation versus industrial use), the wet-cooled alternative could increase that loss by an order of magnitude of several thousand acre-feet. The amount of recharge would be based upon current agricultural practices, depth to water, and average water application rates.

Construction-related impacts on surface and groundwater resources for this alternative would be the same as the Proposed Action (dry-cooled alternative). Plant components and layout are similar under both the wet- and dry-cooled alternatives, the primary difference being the amount of water used for plant operations, the need for cooling towers for heat rejection from the steam cycle, and the size and number of evaporation ponds. Impacts to surface and groundwater quality and jurisdictional waters would be similar to the Proposed Action.

4.4.4 No Action Alternative

Under the No Action alternative, the proposed Project would not be constructed, and there would be no effects of construction and operation of the proposed Project on local or regional water resources. However, groundwater would continue to be pumped in the Amargosa Desert Hydrographic Basin and DVRFS with unknown impacts to sensitive water resources area, including Devils Hole and springs and seeps in the Ash Meadows NWR. In addition, the Proponent would not contribute \$6,000 annually, for the life of the Project, to the operation and maintenance of the Amargosa Monitoring Network.

4.4.5 Mitigation

Prior to beginning any clearing, grading, or excavation activities associated with construction of the Project, the Project owner will develop and implement an site-specific construction-phase SWPPP as required under the General Storm Water Construction Activity Permit, as well as implement any other Project-specific mitigation measures required by other agencies (e.g., NDEP, Nye County, USACE). The Project owner will obtain and comply with permits for construction of Project-specific water pipelines or septic system prior to construction of the plant.

Prior to commercial operation, the Project owner, as required under the General Industrial Activity Stormwater Permit, will develop and implement a site-specific operations phase SWPPP.

To address potential effects to sensitive species at Ash Meadows NWR and Devils Hole, the Proponent will acquire no less than 236 afy of additional existing water rights (Minimization Water Rights) from within the Amargosa Desert Hydrographic Basin. A copy of the stipulation requirements are provided in Appendix A.

In addition, the Proponent will contribute \$6,000 annually, for the life of the Project, to the operation and maintenance of the Amargosa Monitoring Network. The \$6,000 is the estimated cost of operating three monitoring wells for one year.

4.5 NOISE

To determine potential noise impacts of the proposed Project during the construction and daily operations of the facility, a detailed noise model was constructed to evaluate all aspects of significant noise sources on the surrounding residential community. Modeling of the Project site and surrounding environment was accomplished using Cadna (Computer Aided Noise Abatement) Version 3.7, which is a model-based computer program developed for predicting noise impacts in a wide variety of conditions. Cadna allows for the input of Project information such as noise source data, barriers, structures, and topography to create a detailed CAD (Computer Aided Design) model, and uses the most up-to-date calculation standards to predict outdoor noise impacts to property lines and adjacent surrounding areas.

The potential significance of impacts are defined by comparing the Project-related noise levels at the adjacent residential land use areas to the EPA outdoor noise guidelines of 55 dBA Ldn. If Project-related noise impacts to the adjacent residential property lines exceed the 55 dBA Ldn noise guidelines established by the EPA, then mitigation is required.

Also, noise impacts to defined outdoor work environments located within the Project site from potential noise sources, such as the power block areas, is defined by the federal OSHA hearing conservation noise exposure regulation. The regulation states that the acceptable OSHA 8-hour Time Weighted Average (TWA) noise threshold limit must not exceed 90 dBA. If an employee or service contractor is shown to be exposed to a noise level of 90 dBA for a continuous 8-hour period, then it shall be necessary to develop and implement a hearing conservation plan to protect the worker during the noise impact condition, thus, satisfying the OSHA requirement.

4.5.1 Proposed Action

4.5.1.1 Construction Noise Impacts

Throughout the construction of the proposed Project, noise impacts from the operation of construction machinery are expected. The temporary construction noise evaluation assesses the anticipated construction noise impacts to the defined property line sensitive receptor locations, and is compared to the EPA outdoor guidelines of 55 dBA Ldn.

The construction noise impact analysis is based on a phased construction schedule for the proposed Project that incorporates a total of three distinct construction phases. The following analysis evaluates the three construction phase scenarios and is based upon the noise emission data from the equipment manufacturer and expected operational utilization within each phase.

The noise impact calculations assume worst-case conditions with all equipment running simultaneously. All sound pressure levels within the equipment noise emission database are standardized at a distance of 50 feet from the noise source. The noise evaluation for each phase is based on the construction equipment operating during a 12-hour time period between 7:00 a.m. and 7:00 p.m. The noise generated from the equipment operating during the daytime 12-hour time period is then incorporated into the 24-hour Ldn calculation to determine worst-case construction noise impacts to the sensitive receptor locations. The equipment percent operating use is based on typical land use development construction practices and our professional experience. The noise calculations of each phase will provide a realistic prediction of the noise impact range to be expected from typically intermittent construction equipment operations.

Phase 1 - Project Site Grading

The proposed construction equipment to be used in the Project site grading phase is summarized in Table 4-16.

Equipment	Quantity	Operation Usage Percentage for 12 Hours	Sound Pressure Level at 50 feet (dBA)
Generator	2	66%	82.0
Back Hoe	2	66%	80.0
Loader	2	66%	80.0
Dump Truck	2	66%	84.0
Excavator	1	66%	85.0
Water Truck	1	66%	84.0
Bull Dozer	2	66%	85.0

The noise impacts from the Project site grading construction activities were evaluated at five worst-case sensitive receiver locations, placed within and along the Project property lines. The worst-case noise impact calculations from the Project site grading construction activities to the sensitive receivers are summarized in Table 4-17.

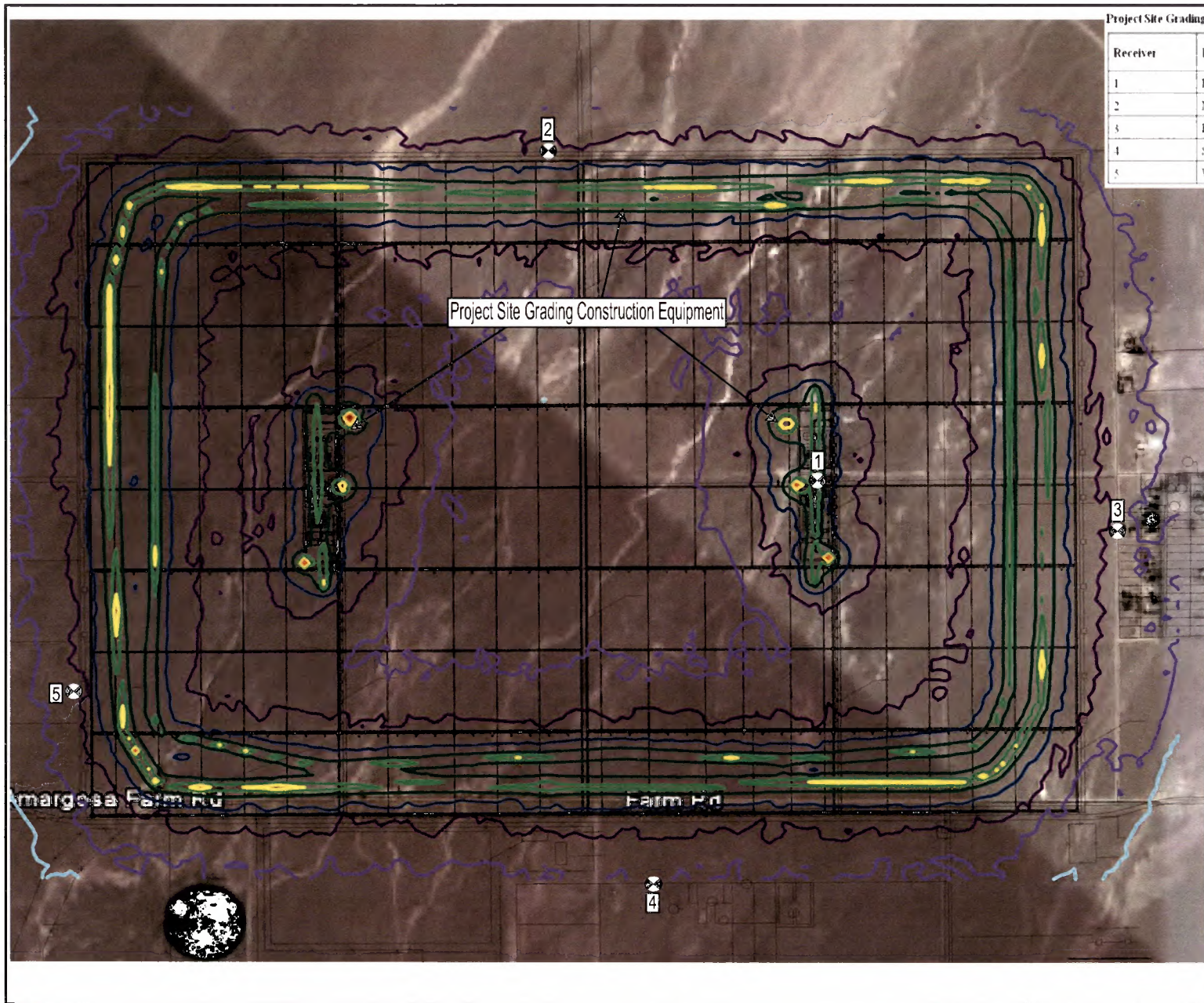
Receiver	Location	Construction Noise Impacts (dBA Ldn)
1	Eastern Power Block	70.8
2	Northern Property Line	57.1
3	Eastern Property Line	53.2
4	Southern Property Line	49.9
5	Western Property Line	53.1

The EPA provides a guideline for outdoor noise impacts to residential property lines of 55 dBA Ldn. The calculations show that the worst-case construction noise levels at the property lines range from 49.9 dBA Ldn at the southern property line to 57.1 dBA Ldn at the northern property line. There are no sensitive noise receptors located along the northern property line; therefore, these noise impacts are considered to be minor and no mitigation will be required for the Project site temporary grading operations. A graphical representation of the noise impacts from the Project site temporary grading activities phase are presented on Figure 4-1.

Phase 2 - Roadway Access Paving and Project Structural Foundation

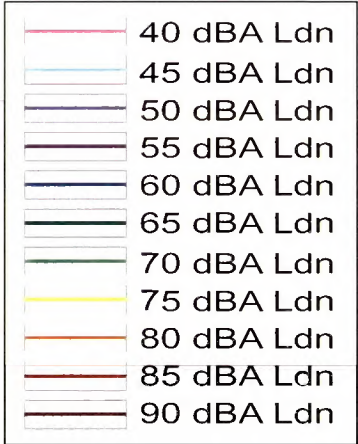
The proposed construction equipment to be used for the Project related roadway access paving and structural foundation phase is summarized in Table 4-18.

Equipment	Quantity	Operation Usage Percentage for 12 Hours	Sound Pressure Level at 50 feet (dBA)
Generator	2	66%	82.0
Compactor	2	66%	80.0
Concrete Truck	2	66%	85.0
Concrete Pump	2	66%	82.0
Asphalt Paver	2	66%	85.0
Roller	2	66%	85.0
Vibratory Roller	2	66%	85.0
Grader	2	66%	85.0



Project Site Grading Phase Temporary Construction Noise Impacts

Receiver	Location	Construction Noise Impacts (dBA Ldn)
1	Eastern Powerblock	70.8
2	Northern Property Line	57.1
3	Eastern Property Line	53.2
4	Southern Property Line	49.9
5	Western Property Line	55.1



Amargosa Farm Road Solar Energy Project
Amargosa Valley, Nevada

**Aerial Image Showing Noise Impact
Contours from Project Site Grading
Phase Construction Operations**




FIGURE
4-1

The noise impacts from the roadway access paving and Project structural foundation construction activities were evaluated at five worst-case sensitive receiver locations placed within and along the Project property lines. The worst-case noise impact calculations from the roadway access paving and Project structural foundation construction activities to the sensitive receivers are summarized in Table 4-19.

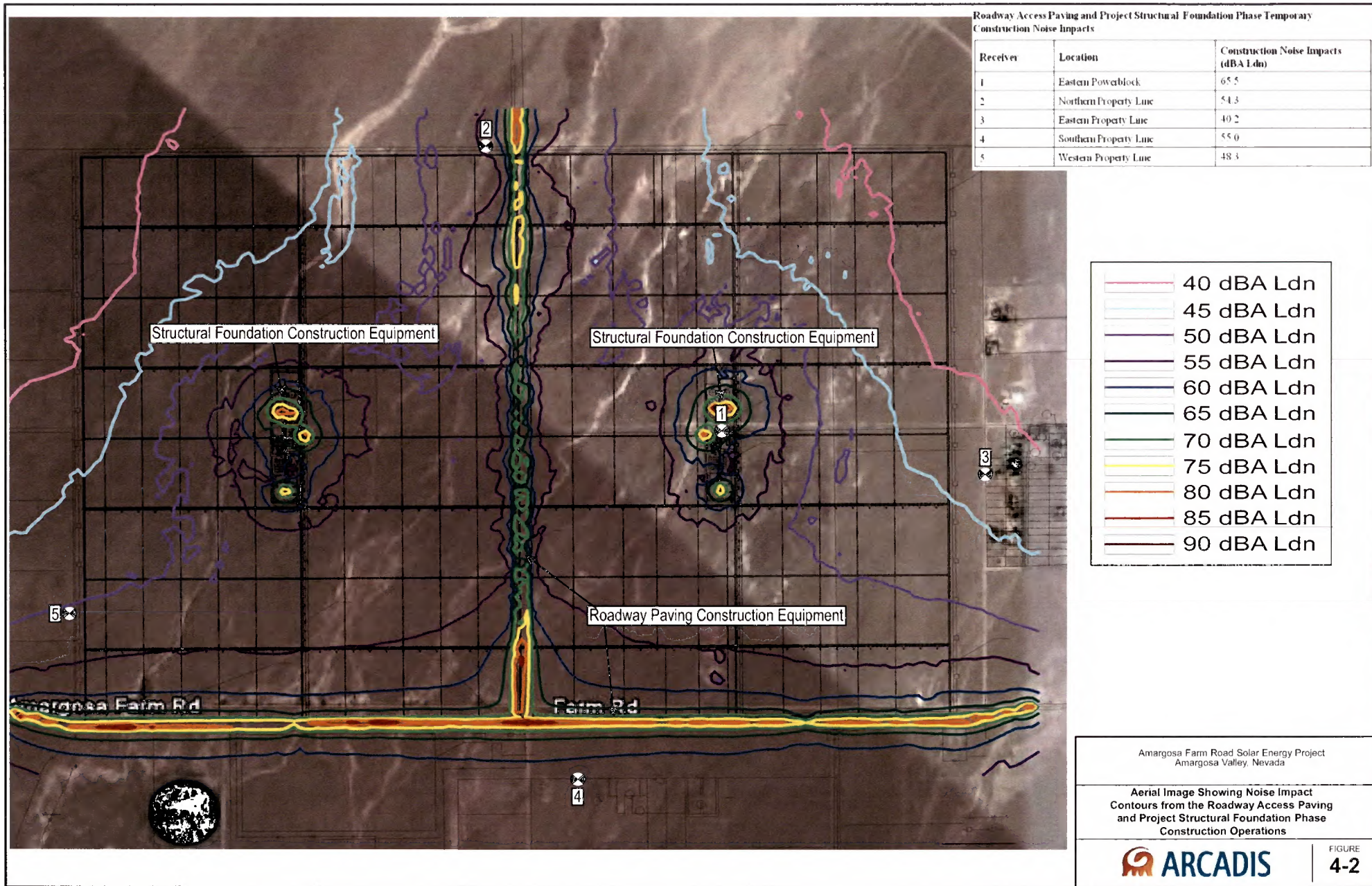
Receiver	Location	Construction Noise Impacts (dBA Ldn)
1	Eastern Power Block	65.5
2	Northern Property Line	54.3
3	Eastern Property Line	40.2
4	Southern Property Line	55.0
5	Western Property Line	48.3

The EPA provides a guideline for outdoor noise impacts to residential property lines of 55 dBA Ldn. The calculations show that the worst-case construction noise levels at the property lines range from 40.2 dBA Ldn at the eastern property line to 55.0 dBA Ldn at the southern property line. These noise impacts are considered to be minor and no mitigation will be required for the roadway access paving and Project structural foundation temporary construction operations. A graphical representation of the noise impacts from the Project site grading phase construction activities are presented in Figure 4-2.

Phase 3 - Project Mechanical Equipment Installation

The proposed construction equipment to be used in the Project mechanical equipment phase is summarized in Table 4-20.

Equipment	Quantity	Operation Usage Percentage for 12 Hours	Sound Pressure Level at 50 feet (dBA)
Generator	2	66%	82.0
Crane	4	66%	85.0
Forklift	4	66%	85.0



The noise impacts from the Project mechanical equipment installation construction activities were evaluated at five worst-case sensitive receiver locations placed within and along the Project property lines. The worst-case noise impact calculations from the Project mechanical equipment installation construction activities to the sensitive receivers are summarized in Table 4-21.

Table 4-21 Project Mechanical Equipment Installation Phase Temporary Construction Noise Impacts		
Receiver	Location	Construction Noise Impacts (dBA Ldn)
1	Eastern Power Block	65.8
2	Northern Property Line	35.3
3	Eastern Property Line	38.7
4	Southern Property Line	31.7
5	Western Property Line	38.0

The EPA provides a guideline for outdoor noise impacts to residential property lines of 55 dBA Ldn. The calculations show that the worst-case construction noise levels at the property lines range from 31.7 dBA Ldn at the southern property line to 38.7 dBA Ldn at the eastern property line. These noise impacts are considered to be minor and no mitigation will be required for the Project mechanical equipment installation temporary construction operations. A graphical representation of the noise impacts from the Project site grading phase construction activities are presented in Figure 4-3.

4.5.1.2 Operational Noise Impacts

The operational activities of the proposed Project were evaluated to determine the worst-case daily operational noise impacts to the defined sensitive receptors. This evaluation will determine if the daily operational noise impacts will exceed the EPA guidelines.

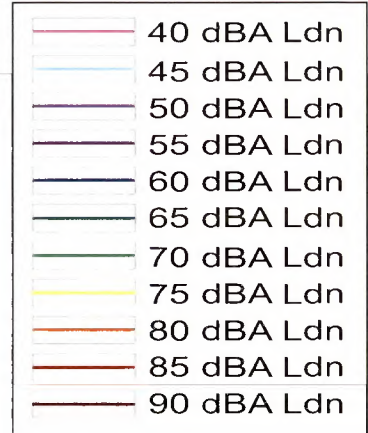
The proposed Project would operate continuously for 24 hours a day, 7 days a week. However, power generation noise would occur primarily during daytime hours, when the sun’s energy is utilized in the power-generating process. The primary noise sources of a typical solar thermal power plant are centered around the power block area, where the steam turbine generator, air cooled condensor, and other noise generating pump equipment are located.

Operation of the Project would generate an increase in vehicular traffic on local roads and area highways in the vicinity of the Project site. According to the Palen Noise Impact Report, dated August 2009, it is shown that an estimated 536 average daily traffic trip volume would be generated by the employees needed for the service and operation of the proposed Project. Employee and service vehicle access to the Project site would use US 95, then Valley View Boulevard to access the Project site via Amargosa Farm Road. Table 4-22 summarizes the proposed equipment and associated noise emission levels.



Project Mechanical Equipment Installation Phase Temporary Construction Noise Impacts

Receiver	Location	Construction Noise Impacts (dBA Ldn)
1	Eastern Powerblock	65.8
2	Northern Property Line	35.3
3	Eastern Property Line	38.7
4	Southern Property Line	31.7
5	Western Property Line	38.0



Amargosa Farm Road Solar Energy Project
Amargosa Valley, Nevada

Aerial Image Showing Noise Impact Contours
from the Project Mechanical Equipment Installation
Phase Construction Operations




FIGURE
4-3

Quantity	Equipment Description	Manufacturer	Daytime Occurrences	Nighttime Occurrences	Sound Level Distance (meter)	Noise Level (dBA)
4	Demineralized Water Pump	N/A	100%	25%	1	92.0
4	Fire Protection Pump	N/A	100%	25%	1	92.0
8	Service Water Pump	N/A	100%	25%	1	92.0
6	Condensate Pump	N/A	100%	25%	1	92.0
4	Cooling Tower	N/A	100%	25%	1	85.0
4	Auxiliary Cooling Water Pump	N/A	100%	25%	1	92.0
4	Closed Cooling Water Pump	N/A	100%	25%	1	92.0
2	Emergency Diesel Generator	N/A	100%	25%	1	85.0
2	Generator	N/A	100%	25%	1	85.0
2	Generator Setup Transformer	N/A	100%	25%	1	108.0
2	Feedwater Pump	N/A	100%	25%	1	92.0
4	Freezer Protection Pump	N/A	100%	25%	1	92.0
20	HTF Pump	N/A	100%	25%	1	92.3
6	Overflow Return Pump	N/A	100%	25%	1	92.0
2	Air Cooled Condenser	N/A	100%	25%	1	122.0
2	Auxiliary Boiler	N/A	100%	25%	1	102.0
8	Steam Generator	N/A	100%	25%	1	85.0
2	Steam Turbine	N/A	100%	25%	1	85.0

The combined mechanical equipment noise impacts from the proposed solar energy Project were evaluated at five strategically placed worst-case receivers located within and along the Project property lines. Table 4-23 shows the calculated operational mechanical noise impacts at these five worst-case receiver locations.

Receiver	Location	Operational Noise Impacts (dBA Ldn)
1	Eastern Power Block	80.5
2	Northern Property Line	39.1
3	Eastern Property Line	54.7
4	Southern Property Line	50.0
5	Western Property Line	54.7

Calculations show that the noise impacts from the solar facility's daily operations would range from 39.1 dBA Ldn at the northern property line to 54.7 dBA Ldn at the eastern property line. The noise impacts associated with the Project's operational activities are shown to be minor and no mitigation will be required. A graphical representation of the noise impacts from the Project's combined daily operations are presented on Figure 4-4.

The Project-generated traffic will be routed to bypass the residential community by using US 95, then diverting to Valley View Boulevard. This route will ensure the preservation of the community ambient noise environment in the area. The cumulative traffic noise impacts from the increased Project-related traffic to the local roads and highways will result in an increase to the existing ambient noise level by less than 3 dB; therefore, the increase is considered minor.

The employees and contractors proposed for servicing the equipment within the Project's operational mechanical areas may be considered as a sensitive noise receptor location. The federal OSHA Standards regulate an individual worker's noise exposure level based on a continuous 8-hour work day. The exposure level is based on the noise source and the duration that the worker is exposed to the noise. The combined mechanical equipment noise impacts from the proposed Project within these Project operational power block areas were evaluated at a single receptor location within the eastern power block. Table 4-24 shows the calculated mechanical noise exposure levels to the eastern power block based on a continuous 8-hour workday.

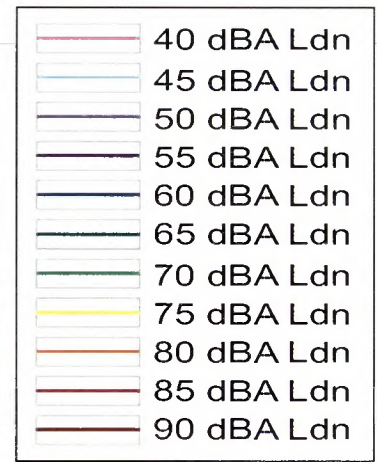
Receiver	Location	Operational Noise Impacts (dBA)
1	Eastern Power Block	79.2

Based on the overall worst-case noise emission levels of the proposed mechanical equipment and the hours of the facility's operation, calculations show that workers located within the operational power block areas will be exposed to noise impacts of 79.2 dBA. The result of this worst-case calculated noise level demonstrates that a typical 8-hour work schedule will not expose a worker or contractor to an 8-hour TWA noise exceedance exposure limit of 90 dBA, as described by the OSHA regulations; therefore, noise exposure is considered less than significant.



Noise Impacts to the Surrounding Area from the Project Operations

Receiver	Location	Operational Noise Impacts (dBA Ldn)
1	Eastern Powerblock	80.5
2	Northern Property Line	39.1
3	Eastern Property Line	54.7
4	Southern Property Line	50.0
5	Western Property Line	54.7



4.5.2 Wet-Cooled Alternative

Noise impacts from construction and operation of a wet-cooled solar plant may be similar to the impacts described for the Proposed Action – Dry-Cooled Alternative. The wet-cooled alternative would require an increase in the number of pumps and specialty type equipment, such as a cooling tower. According to a study conducted for the Beacon Solar Energy Project, a proposed wet-cooled solar plant in California, the noise emission levels presented for this wet-cooled solar plant are similar to the noise emission levels for a dry-cooled solar plant (Beacon Solar Energy Project 2008). The main difference between the two systems is the layout and height of the noise-producing mechanical equipment. Preliminary analysis for the wet-cooled solar plant alternative indicates the noise levels would be less than the Proposed Action – Dry-Cooled Alternative. In the dry-cooled alternative, the ACC is taller and has more fans than the wet-cooled alternative's cooling tower. While the cooling tower will be noisier near the tower due to the falling water and pump noise, this noise is generated low to the ground and will not carry because it is partially blocked by the height of the troughs in the solar field. Noise emanating from the top of the ACC will not be blocked and will only dissipate with the square of the distance from the tower.

4.5.3 No Action Alternative

Under the No Action Alternative, there would be no noise impacts from temporary construction or permanent operation of the proposed Project.

4.5.4 Mitigation

Even though significant noise impacts are not anticipated during construction and operation of the project, the following environmental protection measures will be implemented:

- Personnel would be required to comply with applicable federal, state, and local laws and regulations concerning prevention and control of noise during Project construction and operation.
- Equipment and trucks used for Project construction would utilize the best available noise control techniques (e.g., improved mufflers, equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, wherever feasible).
- Stationary noise sources would be located as far from adjacent receptors as possible and would be muffled and enclosed within temporary sheds, incorporate insulation barriers or other measures to the extent feasible.
- At least 15 days prior to the start of ground disturbance, the Project owner shall provide written notification to all residents within 1 mile of the site of the start of Project construction. At the same time, the Project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with construction or operation. This number shall be posted at the construction site.

- The Project owner shall investigate, evaluate and attempt to resolve all Project-related noise complaints. If necessary, the Project owner shall take all feasible measures to reduce the noise at its source. If the noise can not be reduced at its source, the Project owner shall investigate feasible means of reducing noise levels at the nearby residence that filed the complaint and take appropriate measures to resolve the issue.

4.6 BIOLOGICAL RESOURCES

4.6.1 Vegetation

4.6.1.1 Proposed Action

Up to 4,350 acres of desert lands will be cleared and graded to accommodate construction of the solar facility and ancillary facilities. During the life of the Project, zero vegetation will exist within the facility. Permanent impacts involve areas that are paved or otherwise precluded from restoration to a pre-Project state. Mojave desert scrub generally has a slow recovery rate, but recovery potential also depends on the nature and severity of the impact. There are permanent impacts to vegetation when there is no evidence to indicate that pre-disturbance levels of biomass, cover, density, soils, and plant community structure could be achieved within approximately 5 years.

Removal of vegetation would involve mostly shrubs such as creosote bush, saltbush, and burrobrush, and widely scattered forbs and grasses, primarily cryptantha, Mediterranean grass, goldfields, and devils spineflower. Other forb species that would be removed include various annual buckwheat species (e.g., flat-topped buckwheat, Thomas' buckwheat) and several species of the primrose family (e.g., devils lantern and Booth's evening primrose).

In areas where permanent clearing and grubbing would occur, there would be coordination between the Proponent and the BLM to determine the best approach to create a level, hard packed surface in order to control dust. In other areas, construction activities could promote the proliferation of non-native invasive weeds, particularly Russian thistle, which was observed on the Project site during the 2009 surveys. This species is currently not listed by the Nevada noxious weed list, but is considered aggressive and opportunistic, and often portrays weed-like trends. Other weed species that could invade the Project site over the long term include puncture vine (*Tribulus terrestris*), perennial pepperweed (*Lepidium latifolium*), gumweed (*Grindelia* spp.), yellow star thistle (*Centaurea solstitialis*), and Russian knapweed (*Acroptilon repens*). Clearing of vegetation also could affect habitat structure and ecological function of riparian communities.

Non-native weeds may also become established in the agricultural fields whose water rights will be retired or held in abeyance as part of the water minimization agreement. Under the Proposed Action (dry-cooled alternative), up to 130 acres may be temporarily or permanently fallowed pending further discussions between the Proponent and agencies that are part of the water rights stipulations (see Appendix A).

Impacts to Special Status Species or Species Protected by the State of Nevada

The construction of the Project would directly impact two cactus species, including golden cholla (also called silver cholla) and beavertail pricklypear. Under NRS 527.060-120, it is illegal for any company or individual to cut, destroy, mutilate, remove, or possess cactus and yucca, or portions of these plants. The golden cholla and beavertail pricklypear occurrences are located in three main areas of the Project area. All cacti that are planned for removal must be approved and tagged by the BLM and translocation coordinated. No other special status plant species occur within the Project area.

Impacts to Federally Endangered, Threatened, Proposed, and Candidate Plant Species

No federally listed plant species were found in the Project area, but seven species were identified by the USFWS as occurring within the ROI, which includes the Ash Meadows NWR, located approximately 7 miles southeast of the Project area. (See Section 3.6 for the list of species.)

A BA has been prepared for the seven species that occur in the Project's ROI that could be affected by implementation of the Project. With the implementation of the water mitigation measures, there will be no direct effects from construction and operation of the proposed Project to these seven species. While, long-term groundwater pumping of the Project could indirectly impact six of the seven plant species at Ash Meadows, the impacts would be minimal. The acquisition of the 236 afy by the Proponent as provided in the BA, is anticipated by the USFWS to likely avoid any potential adverse impacts to the aquatic species and designated critical habitats occurring at Ash Meadows NWR and Devils Hole that may be affected by groundwater pumping.

The USFWS identified the white bearpoppy (*Arctomecon merriamii*), a species at risk by the NNHP, as warranting impact analysis. During extensive plant surveys conducted within the Project area in 2009, the bearpoppy was not found, although low quality habitat is present. Based on its absence, there are no known impacts to the species as a result of the Project, and no avoidance and mitigation measures developed for the plant.

4.6.1.2 Wet-Cooled Alternative

Under the wet-cooled alternative, direct impacts to on-site vegetation would be similar to those under the Proposed Action. Under both alternatives, up to 4,350 acres would be graded and cleared for the Project footprint. Indirect impacts from use of groundwater for Project operations would be similar to current conditions, as no increased pumping would occur. With either a wet- or dry-cooled option, water rights would be leased or purchased from existing water right owner(s) who have utilized their annual duty on a regular basis. It could be assumed that the water that would be acquired for the wet-cooled option may still be used on an annual basis by the current water rights owner(s) in the current capacity. Therefore, impacts to nearby sensitive plant species would have minimal change if the usage average remains consistent throughout the life of the Project. The minimal change will be due to the conversion of agricultural use to industrial uses because of the reduction of return flow from irrigation.

The principal indirect impact to vegetation resources under the wet-cooled alternative would be from groundwater stipulations mandated by the NPS, USFWS, and BLM to acquire and properly manage additional water rights above and beyond those needed for Project construction and operation. Should similar agreements be required under the wet-cooled alternative, the Proponent would be required to acquire and either retire or hold these water rights in abeyance until studies could be conducted to better understand how these minimization water rights would impact area resources. These include flows at Devil's Hole, Ash Meadows NWR, and overall local and regional water levels.

4.6.1.3 No Action Alternative

Under the No Action alternative, the proposed Project would not be constructed, and there would be no effects of construction and operation of the proposed Project on local or regional vegetation resources. However, groundwater would continue to be pumped in the Amargosa Desert Hydrographic Basin and DVRFS with unknown impacts to sensitive water resources area, including Devils Hole and springs and seeps in the Ash Meadows NWR.

4.6.1.4 Mitigation

A comprehensive Noxious Weed Management Plan (Plan) will be prepared with the goal of keeping the Project area free from noxious weeds (Mitigation Measure Veg5). Adherence to the specific weed control mitigation measures in this Plan will minimize the introduction and spread of noxious and invasive weeds during and following construction of the Project. Early detection and rapid response are important considerations in the development of the Plan which includes: (1) Identification of problem areas or potential weed sources such as existing seed banks, vehicles, incoming fill materials, and construction control methods such as straw bales, (2) preventative measures that will be implemented to prevent the spread of these and other noxious weeds during construction such as the establishment of vehicle wash stations, (3) treatment methods during construction and post-construction, and (4) reclamation and post-construction monitoring to prevent the rapid spread of noxious weeds. This Plan will also help minimize impacts to native plant communities temporarily impacted by the Project. In lieu of a completed weed plan at this time, the weed control expectations and requirements are summarized as follows, and need to be represented in the EIS document:

- Weeds in the Project area will be controlled/eradicated to the degree established by BLM approving officials, which is a level of zero tolerance. The term 'weed' applies to seed production as well as plant growth.
- Weed populations of existing weeds that are ubiquitous in immediate adjacent lands are to be controlled to a level equal to or below that of the original Project site and adjacent lands. At this time, these weeds are limited to red brome, filaree, and schismus. Populations will not be allowed to exceed ambient densities.
- Herbicide use for vegetation control is restricted to areas fenced off to Desert Tortoise travel and inhabitation. There are no herbicides approved for use in Desert Tortoise habitat at this time, or in the near foreseeable future. It is understood that weed and vegetation control without the use of herbicides may greatly increase costs of control.

These costs are acknowledged and weed levels will continue to be maintained to the required degree established by the BLM.

Refer to Appendix A for a compilation of mitigation measures that will be used to minimize or eliminate impacts to native vegetation resulting from construction and operation of the Project (Mitigation Measures Veg1-4 and Veg6-8). Following the implementation of these measures, impacts would be reduced to vegetation by keeping construction vehicles and other activities restricted to pre-designated areas, instructing construction personnel on the protection of native vegetation, limiting Project construction to pre-determined areas based on the temporary and permanent disturbance areas, and flagging, salvaging, and replanting those species identified by BLM as sensitive. Proper mitigation measures would be required during all phases of the Project, including construction, and operation and maintenance.

4.6.2 Wildlife

4.6.2.1 Proposed Action

Clearing and grubbing vegetation would directly impact wildlife resulting in loss of, and fragmentation of cover, breeding, traveling, and foraging habitat. Clearanee surveys prior to construction would ensure that construction activities would not cause mortality to individuals from collapsing dens and burrows, thereby entombing adults their eggs or young. Mortality could occur from collisions with equipment and vehicles. In addition, predation could increase as construction displaces wildlife from protected cover to uncovered habitat. Common predators attracted to areas of increased activity and noise include coyotes, foxes, raptors, ravens, and domestic dogs. The less mobile species (e.g., reptiles, small mammals, ground-nesting birds) would be particularly susceptible from grading and construction activities, as these activities could cause mortality to those animals (see discussion on *mammals, migratory birds, and reptiles* below).

During the scoping phase of the Project, other general wildlife issues were identified including: (1) impacts from shading of desert habitat caused by solar fields; (2) effects of fencing on wildlife; (3) impacts to local ecosystems; (4) impacts to birds resulting from heat generated by mirrors; (5) impacts resulting from use of security lighting; and (6) increased noise during construction and operation of the Project. These issues are discussed below.

Permanent clearing and grubbing would be performed for the solar fields; as such, no native vegetation would remain. Although 4,350 acres of wildlife habitat loss is a significant impact, there would be no impacts from shading of desert habitat. Fencing typically creates a barrier for wildlife movement through an area, but if vegetation is completely removed for construction of the solar field, it is highly unlikely wildlife would use the site as a travel corridor. According to NDOW, big game such as mule deer and bighorn sheep do not utilize the area regularly (see section on *Big Game* below), although other wildlife may use Fortymile Wash as a movement corridor. Lighting may contribute to the collision risk of birds and bats, especially nocturnal species, and other wildlife that occur adjacent to the Project site such as nesting birds, foraging mammals, and flying insects. Noise can disrupt normal activity and behavior of wildlife, especially nesting and foraging birds (see discussion on migratory birds below).

Evaporation ponds used to collect blowdown water from the cooling tower would introduce a potential threat to wildlife. Since the tortoise-proof perimeter fencing will restrict most terrestrial wildlife from entering the plant site, it is anticipated that birds and bats will face the greatest potential risk from constituents in the evaporation ponds. To the extent the evaporation ponds could lead to increased predation of terrestrial wildlife by birds, the measures described below to prevent birds from visiting, drinking, or otherwise using the ponds will avoid that effect.

The primary constituents of the evaporation pond water that could have a potential adverse effect on wildlife are hyper-saline conditions resulting from high TDS concentrations. Species at risk are those with the potential for nesting at the facility, residents of the area that would drink and forage from the ponds or feed on insects associated with the ponds, and migrants that would use the ponds for a stopover during migration. To reduce the potential for impacts from the ponds, a series of avian and bat deterrence measures will be incorporated into the design and operation of the evaporation ponds to minimize pond access by birds and bats. The use of anti-perching devices around the perimeter of each pond will prevent ravens and other birds from accessing the edge of the ponds to drink any of the water. Additionally, the operational design of the ponds is such that a minimum freeboard of 2 feet will be kept at all times, and the interior sides of the ponds will be at a 33 percent slope (3:1, horizontal:vertical). These design features will make it difficult for perching birds and/or shorebirds to access the water and are anticipated to minimize risks to wildlife by minimizing availability of a new water source.

Mammals

Big Game – Desert (Nelson) Bighorn Sheep (*Ovis Canadensis nelsoni*) and Mule Deer (*Odocoileus hemionus*) occupy the mountainous areas surrounding the Project area, but according to NDOW (Tierra Data 2009) there is no evidence to suggest there is population connectivity or regularly traveled movement corridors east to west across the Amargosa Valley; as such, impacts to big game species are not anticipated for this Project.

Other Mammals – During biological surveys conducted in 2009 in support of this Project, a total of 18 mammal species were observed in the Project area. Construction and operation of the Project may cause direct mortality to burrowing mammals identified in Section 3.6. Those animals displaced during construction could be crushed by equipment and vehicles or be killed by increased predators in the area. The bats forage on insects, so removal of vegetation and rechanneling of washes during construction could disrupt natural foraging habitats for bats in the Project area. After completion of the Project, bats may find Project components attractive for roosting or foraging.

Migratory Birds

Habitat in the Project area provides cover, breeding, foraging, and traveling habitat for a number of bird species. During biological surveys conducted in 2009, 27 species were observed in the Project area.

Bald and Golden Eagles are not known to frequent the Amargosa Valley on a regular basis. Although adjacent agricultural fields may provide foraging habitat for these species, the Project site is sparsely vegetated and contains low quality foraging habitat. The nearest higher quality

foraging habitat is the Ash Meadows NWR area. Therefore, the construction and operation of the proposed Project will not affect Bald and Golden Eagles. To further reduce potential impacts to Bald and Golden Eagles the Proponent has voluntarily agreed to prepare and implement a project-specific Avian and Bat Protection Plan. The Avian and Bat Protection Plan will be prepared in consultation with the BLM and USFWS.

The Project area contains suitable habitat for Burrowing Owl and the LeConte's Thrasher, and both species are known to occur in the area. LeConte's Thrashers build their nests in shrubs 2 to 4 feet off the ground, so shrub removal would eliminate nesting, cover, and foraging potential for the bird within the Project footprint. Suitable nesting and foraging habitat are absent for the Phainopepla. Therefore, no impacts are anticipated for this species, even though it was observed in the Project area in the Spring 2009.

The Project area does not contain suitable nesting or roosting habitat for raptors, and only marginal foraging habitat for these species. Suitable nest sites for Swainson's Hawk may occur in adjacent agricultural areas; however, no nesting habitat exists in the vicinity for Prairie Falcon.

The NDOW and USFWS identified other species with heightened conservation priority that could be impacted by construction and operation of the Project. They include Bendire's Thrasher and Loggerhead Shrike. Neither of these species were detected during 2009 surveys.

Bendire's Thrasher is included as a Watch List species by Partners in Flight, which calls for the species conservation due to restricted continental range and small population size. Since no occurrence of Bendire's Thrasher have been documented within the Project area, it is highly unlikely that the construction and operation of the proposed Project would impact this species.

The Loggerhead Shrike is included as a Priority Species by Partners in Flight due to declines from habitat loss, pesticides, and winter mortality. Habitat in the Project area contains unsuitable nest tree structure, and does not provide adequate perch areas for the bird, making it highly unlikely the Loggerhead Shrike would nest within the Project area. However, if suitable nesting trees or shrubs are present nearby, the Project could provide foraging habitat, and foraging potential could increase after completion of the Project due to the presence of taller structures that could serve as perches or lookouts.

For those bird species that have the potential of nesting in the Project area, the loss of active bird nests or young is regulated by the federal MBTA, so it is unlawful to pursue, hunt, take, capture, kill, or possess any migratory bird or part, nest, or egg of such bird listed in 50 CFR 10.13. The MBTA applies to the bird species that will be impacted during the construction phase of the Project. Compliance with the MBTA will require surveying for and delineating non-disturbance buffers for nesting birds during the breeding season.

Noise from construction activities could temporarily disturb wildlife from foraging and nesting immediately adjacent to the Project area. Birds rely on vocalizations during the breeding season to attract a mate within their territory and to respond to potential dangers in the area and young begging for food. Noise levels from certain construction and operation activities could reduce the reproductive success of nesting birds.

Reptiles

Grading and construction activities and vehicle use could cause direct mortality to slower-moving reptiles. These cold-blooded animals use their environment to thermoregulate, and because they cannot shelter themselves from heat and cold during construction activities, they would likely die from exposure, predation, or crushing from vehicles and equipment.

Snakes and Lizards – During biological surveys conducted in 2009 for the proposed Project, a total of six snake species and six lizard species were found in the Project area (see Section 3.6 for identified list of species). Of the 12 total species of snakes and lizards present in the Project area, the Desert Iguana is on the NNHP Plant and Animal Watch List, which means the iguana is vulnerable to decline by habitat loss. Construction of the Project would eliminate iguana habitat that includes creosote bush on sandy soils. The second reptile that has been identified as a conservation priority species is the Nevada Shovel-nosed Snake. The reach of Fortymile Wash located inside the Project limits will be bladed and rechanneled around the periphery of the solar facility; therefore, Nevada Shovel-nosed Snake habitat will be eliminated during construction of the Project.

Amphibians

The southern limit of the Amargosa Toad's range is located in Oasis Valley near Beatty, approximately 25 miles north of the Project area. Due to the lack of permanent water this species is not expected to occur within the Project area. Furthermore, groundwater pumping for the Project is not expected to impact the hydrological function of the Oasis Valley watershed, and therefore will not impact toad habitat in Oasis Valley.

Impacts to Federally Endangered, Threatened, Proposed, and Candidate Wildlife Species

Desert Tortoise

The Project is located in the Desert Tortoise Eastern Mojave Recovery Unit and near the border of the Northwestern Mojave Recovery Unit, but is not designated as critical habitat. Construction of the Project would eliminate approximately 4,350 acres of low quality Desert Tortoise habitat. During surveys conducted in 2009 for the proposed Project, no live or dead tortoises were found, but four old Class 4 burrows were located in the northwest portion of the Project area.

In the event that a tortoise is found in the Project area, impacts would include loss of foraging, nesting, and cover sites; loss of dispersal areas and connectivity to other areas; and contracted home ranges. Juvenile Desert Tortoise may face an increased risk of predation from raptors and ravens attracted to the site and increased availability of perches. Tortoises may also face impacts due to increased risk from roads and traffic. The site will be surrounded by tortoise-proof fencing to prevent any Desert Tortoise from becoming entrapped by the flood control channels or impacted by work occurring within the facility.

Ash Meadows NWR Species

Four fish (Devils Hole Pupfish, Ash Meadows Amargosa Pupfish, Warm Springs Pupfish, and Ash Meadows Speckled Dace) and one invertebrate (Ash Meadows naucorid) inhabit the Ash

Meadows NWR within the Project's ROI and could be affected by implementation of the Project. It is anticipated that there will be no direct effects to the species. However, long-term groundwater pumping of the Project could indirectly impact these species. Based on the results of the DVRFS model, it has been found that these impacts would be minimal resulting in a drawdown of 0.05 feet over 200 years.

Groundwater mitigation measures stipulated by the NPS, USFWS, and the BLM will avoid the potential effect of groundwater pumping for Project water requirements on sensitive wildlife resources in Ash Meadows NWR and Devils Hole.

4.6.2.2 Wet-Cooled Alternative

Under the wet-cooled alternative, impacts to wildlife would be similar to those under the Proposed Action. The primary difference would be the number and size of evaporation ponds for each alternative (four 4-acre evaporation ponds with the dry-cooled alternative [total 16 acres], versus three 8.3-acre evaporation ponds with the wet-cooled alternative [total 25 acres]).

For either the wet- or dry-cooled alternatives, the Proponent would either lease or purchase existing certified water rights for water needs during construction and operation of the proposed Project. Water rights would be acquired from existing water right owner(s). Groundwater flow model simulations and a hydrologic analysis have been performed for the dry-cooling alternative. It could be assumed that the water that would be acquired for the wet-cooled option may still be used on an annual basis by the current water rights owner(s) in the current capacity. Therefore, impacts to nearby wildlife resources would have minimal change if the current 10-year average remains consistent throughout the Project life. The minimal change would be due to the conversion of agricultural water rights to industrial water rights, because of the reduction of return flow from irrigation.

The principal indirect impact to wildlife resources under the wet-cooled alternative would be from groundwater stipulations mandated by the NPS, USFWS, and BLM to acquire additional water rights above and beyond those needed for Project construction and operation. Since up to 4,600 ac-ft is required for operation of a wet-cooled plant, it is likely that the agencies would require the Proponent acquire several thousand acre-feet of additional water to offset potential effects to sensitive resources at Ash Meadows NWR and Devils Hole. This action would result in the reduction of groundwater pumping in the Amargosa Desert Hydrographic Basin and the fallowing of large parcels of active farmland in the Amargosa Valley. While the reduction of groundwater pumping in the basin may indirectly reduce impacts to sensitive resources in Ash Meadows NWR and Devils Hole, the fallowing of farmland in the Amargosa Valley will reduce foraging habitat for certain wildlife species including, but not limited to, migratory birds, reptiles, and the prey that depend on these species. The spread of invasive species and noxious weeds on fallowed lands would be substantially worse under the wet-cooled alternative, since much more land would need to be fallowed.

4.6.2.3 No Action Alternative

Under the No Action alternative, the proposed Project would not be constructed, and there would be no effects of construction and operation of the proposed Project on local or regional vegetation resources. However, groundwater would continue to be pumped in the Amargosa Desert Hydrographic Basin and DVRFS with unknown impacts to sensitive water resources area, including Devils Hole and springs and seeps in the Ash Meadows NWR.

4.6.2.4 Mitigation

The creosote bush series of Mojave desert scrub provides foraging, cover, and breeding habitat for migratory birds. The construction and operation of the proposed Project would eliminate nesting habitat and result in direct and cumulative impacts to these species due to habitat loss or injury/mortality of individuals. To avoid and minimize impacts to migratory birds, mitigation measures WL1 through WL2 have been proposed; mitigation measures WL3 and WL4 address the Burrowing Owl specifically. To discourage raptors from perching on the 230kV transmission line, mitigation measure WL5 is proposed. In addition, the Proponent has voluntarily agreed to prepare and implement a project-specific Avian and Bat Protection Plan. The Avian and Bat Protection Plan will be prepared in consultation with the BLM and USFWS.

The construction and operation of the proposed Project would result in the loss of approximately 4,350 acres of low quality tortoise habitat. According to the BLM's "*Desert Tortoise Habitat Management on the Public Lands: A Rangewide Plan*," compensatory mitigation is required to offset the impact and fully mitigate for Desert Tortoise. Mitigation measures WL6 through WL22 will be implemented to minimize and avoid impacts to Desert Tortoise. Following USFWS review of the BA, the level of compensatory mitigation required for this Project will be determined. All terms and conditions detailed in the Biological Opinion will be adhered to. It is anticipated that by following the guidance in the Biological Opinion as well as the mitigation detailed below, impacts to biological resources will be minimized.

Remuneration fees will be collected by the BLM for the Project. Tortoise remuneration fees will be used for management actions expected to provide a benefit to the Desert Tortoise over time. Actions may involve habitat enhancement, population enhancement, education, and research, studies, and monitoring. Habitat enhancement may include such actions as restricting uses that may have detrimental effects on habitat quality, restoration of disturbed areas, and restricting uses that may have detrimental effects on habitat quality. Population enhancement may include such actions as predator control, captive breeding, and relocation programs. Education programs can be developed that are aimed at school-aged children, community leaders, special interest groups, or the general public. Research is critical to the recovery of any species. Remuneration fees may be applied to research projects that can enhance knowledge of tortoise biology, threats to the species, and applied management methodology. Fees collected for the Project will be utilized at the discretion of the BLM for Desert Tortoise recovery or improvement.

Gila Monsters were not found during the biological surveys conducted in 2009, but the species is difficult to detect and cannot be assumed to be absent based on the surveys. If they are present in the Project area, they could be harmed or killed during construction activities. To avoid or

minimize potential impacts to the Gila Monster, conservation measures WL23 and WL24 are proposed.

Appropriate mitigation measures would be required during, construction, and operation and maintenance of the proposed Project. A list of mitigation and conservation measures is included in Appendix A.

4.7 HISTORIC AND CULTURAL RESOURCES

The following presents possible environmental consequences to known cultural sites.

4.7.1 Proposed Action

Based upon the complete cultural inventory of the proposed Project's APE, 13 prehistoric and/or historic cultural sites in the currently proposed Project area were newly recorded and evaluated to whether they were eligible for listing on the NRHP. The BLM and the Nevada SHPO both concurred that only one prehistoric site (26Ny13440) is an eligible property that could yield important information regarding prehistory in southern Nevada. Due to the site's size and composition, it would be adversely impacted by proposed Project activities in both action alternatives.

Mitigation for Site 26Ny13440, in consultation with the SHPO as per 36 CFR 800.6, would be addressed under a Memorandum of Agreement between BLM and the SHPO, regarding site treatment that would involve formal data recovery measures prior to Project-related ground-disturbing activities. Tribal representatives are also in agreement with the BLM and SHPO on the eligibility status of the cultural sites and regarding the fact that data recovery needs to occur for Site 26Ny13440. Given the low density of sites in this large Project area, the potential for unanticipated discoveries is low.

In the unlikely event that human remains, funerary items, or intact deposits of buried cultural materials are discovered during construction of the proposed Project, all work in the immediate area would be immediately halted, and the resource would be protected by following the protocols set forth in the October 26, 2009 State Protocol Agreement between the BLM and the Nevada SHPO. Work in the area would not be allowed to proceed until the finds were examined and assessed for eligibility for listing on the NRHP.

A field inspection of the viewshed surrounding the Project area was also performed and resulted in the determination that there would be no visual impacts to any historic properties in the town of Amargosa.

4.7.2 Wet-Cooled Alternative

Impacts to cultural and historic resources from construction and operation of a wet-cooled solar plant would be the same as to the impacts described for the Proposed Action (dry-cooled alternative).

4.7.3 No Action Alternative

Under the No-Action alternative, the proposed Project would not be constructed and neither Site 26Ny13440 nor any undiscovered historic or cultural resources would be affected by any Project activities.

4.7.4 Mitigation

Mitigation for Site 26Ny13440 or any undiscovered eligible sites, in consultation with the SHPO as per 36 CFR § 800.6, would be addressed under the approved Treatment Plan and would involve all appropriate formal data recovery prior to Project-related ground-disturbing activities.

4.8 PALEONTOLOGICAL RESOURCES

This section describes and evaluates the potential impacts on paleontological resources that would result from the construction, operation, maintenance, and decommissioning of the proposed Project.

4.8.1 Impact Assessment Methodology

In order to assess the relative impact each alternative may potentially have on paleontological resources, potential impact levels were determined for each alternative based on the PFYC, the inventory database of fossil localities, and the paleontological resources survey. Literature research, institutional record searches, the paleontological resources survey, and the PFYC provided the information necessary to assign a potential impact level of high, low, or moderate/undetermined to portions of the Project area. Future provisions for mitigation of adverse impacts to significant paleontological resources exposed during construction-related activities in the Project area are based upon these determinations of potential impact level. The terms “high potential impact level,” “low potential impact level,” and “moderate/undetermined potential impact level” are defined as follows.

High Potential Impact Level. Geological units with a high potential for containing significant paleontological resources are determined to have a high potential impact level. In these cases, the geological unit contains a high density of recorded fossil localities, has produced fossil remains in or near the vicinity of the proposed Project, and is very likely to yield additional remains during construction. Areas identified as having a class 4 or 5 in the PFYC system are considered to have a high potential impact level.

Low Potential Impact Level. The geological unit contains no or a very low density of recorded fossil localities, has produced little or no fossil remains in the vicinity of the proposed Project, and is not likely to yield any fossil remains. Nevertheless, geological units with few or no prior recorded fossil localities can still prove fossiliferous during paleontological mitigation activities. Areas identified as having a class 1 or 2 in the PFYC system are considered to have a low potential impact level.

Moderate/Undetermined Potential Impact Level. The geological unit has limited exposure in the Project area, is poorly studied, or contains no recorded paleontological resource localities. However, in other areas, the same or similar geological units may contain sufficient paleontological localities to suggest that exposures of the unit in the Project area would have at least a moderate potential for yielding fossil remains. Areas with a class 3 in the PFYC system are considered to have a moderate or undetermined potential impact level.

The analysis of impacts to paleontological resources is based on a literature review of known resources, record searches at paleontological institutions, the paleontological resources survey, and assignment of paleontological potential based on geological units and known fossil localities. The following indicators were considered when analyzing the potential impacts to paleontological resources:

- known fossil localities
- proximity to geological units with potential to contain paleontological resources
- depth of excavations associated with Project components

The following section describes the potential impacts on paleontological resources for each Project alternative.

4.8.2 Proposed Action

The Proposed Action is anticipated to have a low impact on paleontological resources within the Project area. Low impact areas comprise young alluvial deposits (Qay) and intermediate alluvial deposits (Qai). These geological units are considered to contain a low potential for paleontological resources.

4.8.3 Wet-Cooled Alternative

Impacts to paleontological resources from construction and operation of a wet-cooled solar plant would be the same as the impacts described for the Proposed Action (dry-cooled alternative).

4.8.4 No Action Alternative

Under the No Action Alternative, there would be no Project-related impacts to paleontological resources.

4.8.5 Mitigation

The primary impact issue for paleontological resources is the loss of scientifically significant fossils and their contextual data. Two types of impacts could potentially affect paleontological resources:

- Direct and permanent ground disturbance during construction

- Indirect and permanent disturbance due to changes in public accessibility

The primary concern regarding impacts to paleontological resources is that direct damage or destruction of fossils would result in the loss of important scientific information. It is possible that ground disturbance, such as grading and cutting of access roads, could encounter important paleontological resources. In addition, adverse impacts indirectly associated with construction are a concern. For example, fossils could be subject to damage or destruction by erosion that is accelerated by construction disturbance. Improved access and increased visibility as a result of construction could cause fossils to be damaged, destroyed, or collected as a result of unauthorized collection or vandalism. However, not all impacts of construction are adverse to paleontology. Excavation can and often does reveal significant fossils that would otherwise remain buried and unavailable for scientific study. In this manner, excavation can result in beneficial impacts. Such fossils can be collected properly and catalogued into the collection of a museum repository so that they can be available for scientific study.

Results of the data inventory, paleontological resources survey, and impact assessment demonstrate that the geological units present in the Project area have a low potential to contain significant paleontological resources. As a result, specific mitigation measures are not necessary. However, should significant paleontological resources be discovered during construction, then mitigation measures should be implemented to reduce potential adverse impacts to significant paleontological resources resulting from Project construction. The mitigation measures described in Appendix A are in compliance with the SVP standard guidelines for mitigating adverse construction-related impacts on paleontological resources and should be followed if significant paleontological resources are discovered during construction (SVP 1995). Implementation of these mitigation measures will effectively reduce potential impacts to paleontological resources to a negligible level by allowing for the collection of fossils and corresponding geological and paleo-environmental data that otherwise might be lost to earth-moving activities. The scientific and educational value of the fossils and their associated contextual data constitute the chief significance of the resource. Their collection, therefore, mitigates the impacts to paleontological resources. These mitigation measures are subject to review by the BLM.

4.9 SOCIOECONOMIC RESOURCES

The following sections discuss the potential effects of construction and operation on the socioeconomic resources within the ROI.

4.9.1 Proposed Action

Implementation of the Proposed Action would have a direct and indirect effect on regional social and economic resources from the increase in the level of economic activity in the area that would result from construction and operation of the proposed Project.

4.9.1.1 Project Work Force and Population

Construction

Project construction is expected to occur over a 39-month period. During construction, manpower needs would average approximately 650 employees per day, peaking to approximately 1,300 workers in Month 17 of construction. This would make the proposed Project the largest employer within the Amargosa Valley, with the next highest being Ponderosa Dairy with approximately 120 employees.

The primary trades required for construction of the proposed Project will include pipefitters, skilled and unskilled laborers, electricians, carpenters, cement finishers, equipment operators, sheet metal works, ironworkers, and truck drivers. The proposed Project would be expected to draw from available construction labor in the regional area. Prior to commencement of construction activities, the Proponent will conduct at least two public meetings in the Town of Amargosa to provide information about employment opportunities. The Proponent has agreed as part of the Development Agreement signed with Nye County to make commercially reasonable efforts to hire applicants that reside in Nye County and request that its subcontractors do the same (Nye County 2010).

As shown in Table 4-25, even at the peak of construction (approximately 1,300 workers), the current availability of approximately 86,000 construction workers in Nye and Clark counties in 2010 would be sufficient to meet the employment needs during construction, although a small number of workers in some specialized trades may come from outside the region. Construction of the proposed Project would require less than 2 percent of the available workforce in the regional area; thus, construction labor demand would not significantly affect the availability of construction labor in the region.

	2006	2008	2010 Forecast	% Change 2006 to 2010
Nevada	141,874	118,837	85,895	
Annual Percentage Change	-	-16.2%	-27.7%	-39.5%
Las Vegas Metropolitan Statistical Area	108,430	94,149	68,392	
Annual Percentage Change	-	-13.2%	-27.4%	-36.9

Source: Nevada Department of Employment, Training and Rehabilitation: Nevada Workforce Informer 2009.

In addition, Nevada and particularly the Las Vegas area have been hit hard by the recent economic downturn, which has led to high job losses in construction. Thus, a plentiful workforce is likely to be available in the region to fill the employment needs of the Project.

Operations

The Project site would be staffed 24 hours a day, 7 days per week during operations. An estimated workforce of 70 to 100 full-time employees would be needed to staff the first phase of the Project (Unit #1). When the second of the 2 units comes online, an estimated total of 170 to 200 full-time staff would be needed (Table 4-26). The operations workforce would consist of plant and solar field supervisors, and operators and maintenance technicians working 12-hour shifts, and management and administrative personnel working 8-hour shifts per day. Skill levels for the various staff positions would be a combination of management, technical, and lesser skilled operational positions.

Table 4-26 Estimated Employment for Operation and Maintenance		
	Unit 1	Units 1 & 2
Gross Capacity per plant, MW	250	500
General & Administration		
Plant Manager	1	1
Administrative Assistant	1	1
Administrative Clerk	1	1
Accountant	1	1
Computer Technician	1	2
Plant Engineer	1	2
Performance Engineer (Service Contractor)	1	1
Planner/Purchasing	1	2
Material Handler	2	3
Security/Guard	3	3
Custodian (Office Maintenance & Cleaning)	1	2
Subtotal	14	19
Solar Field Maintenance		
Solar Field Manager	1	1
Solar Field Supervisor (Service Contractor)	3	4
Mechanical Technician	7	11
Welder	3	5
Instrumentation & Control Technician	3	5
Field Laborer	5	7
Reflectivity Technician	15	25
Subtotal	37	58

Table 4-26 Estimated Employment for Operation and Maintenance		
	Unit 1	Units 1 & 2
Power Plant Operations		
Operations Manager	1	1
Operations Supervisor	1	1
Control Room Operator	4	8
Power Plant Operator	4	8
Solar Field Operator	4	8
Subtotal	14	26
Power Plant Maintenance		
Maintenance Manager	1	1
Plant Maintenance Supervisor	3	5
Electrician	3	5
Instrumentation & Control Technician	3	5
Mechanic	3	5
Welder	3	5
Machinist	3	5
Subtotal	19	31
Total Staff	84	134

The more skilled operations would generally require some secondary education and greater mechanical/electrical equipment experience than the lesser skilled operation position. Project construction workers and more experienced farm or other equipment operators would be expected to have transferrable skills suitable to those required for these positions.

Approximately half the operations jobs would be lesser skilled positions. All employees would be provided with necessary training. The basic job requirements for the lesser skilled operations workers would likely be high school diplomas and basic mechanical equipment operating abilities.

On-the-job training could be expected to enable, over time, some lesser skilled employees to gain the expertise necessary to staff the more skilled operations positions. In addition, Great Basin College in Pahrump has recently developed solar job training courses specifically designed to provide its students with the training necessary to work in the solar industry. The Proponent and other solar energy developers in the Amargosa Valley (e.g. Abengoa, SolarReserve) have met with various educational institutions and agreed to work with them to ensure training is available (Pahrump Valley Times 2010).

While the need for skilled plant operators for the facility's future operations would likely exceed the region's existing supply of unemployed plant operators, there would also be individuals amongst the region's unemployed that have or could obtain the necessary training to perform the facility operations. Also, it is likely that some of the currently employed workers would change their jobs to obtain a better paying job and/or to work closer to home. Given the region's high unemployment levels, any currently employed worker switching jobs could expect to have their vacated position filled by other workers (possibly including others living outside of the regional study area). Consequently, it is expected that most of the facility's operations employment would be provided by workers living within the regional study area from the site.

4.9.1.2 Population and Housing

Construction

It is anticipated that the vast majority of the construction workforce (peak workforce of approximately 1,300 workers and an average of approximately 650 workers per day over the 39-month duration of construction) would commute to the Project area. Given the high construction unemployment rates in Nye County and the Las Vegas area factored with the current economic condition, including the inability of homeowners to sell their homes to cover what they owe, it is assumed that the majority of workers will commute rather than relocate to the Amargosa Valley. Thus, impacts to the local population are expected to be minimal, and would not induce substantial growth in the Amargosa Valley. Additionally, the Project area is in a remote, sparsely inhabited area and would not displace existing populations.

A few construction workers may choose to permanently relocate to the communities near the Project area during the construction phase. These include the Town of Amargosa Valley, Beatty, and Pahrump. There are approximately 613 hotel/motel rooms and suites among nine different establishments in the Amargosa Valley, Beatty, and Pahrump, with extensive additional temporary housing available in the Las Vegas metropolitan area. Thus, should some construction workers choose to stay temporarily at a local area motel or hotel, there would be ample transient housing.

Additional housing opportunities are available in the form of RV and mobile home sites. There are over 225 RV spaces in three locations in Amargosa Valley: Longstreet Inn & Casino, My Own Mobile Home Park, and Fort Amargosa RV Park. Additional RV spaces are available in Beatty and Pahrump. Availability varies depending on season, with greater availability during the summer months. Should a portion of the workers relocate to the area for the duration of their construction assignments, effects to available housing and population would be minor, as the 2008 residential vacancy rate was over 15 percent in Pahrump, and the 2000 vacancy rates in Amargosa Valley and Beatty were over 20 and 26 percent respectively. Because the construction workforce largely will commute to the area rather than relocate, increased demand on the local housing supply is expected to be minor.

Operations

Operation of the Project is expected to have a minor impact on the availability of regional housing due to the relatively small number of workers needed for plant operations, and the abundance of available local housing and land in the Amargosa Valley.

The proposed Project would be constructed on undeveloped BLM managed lands. Because the Project area is designated by the BLM for disposal and incorporated into the Amargosa Valley Area Plan as future energy development, the views from residential subdivisions could change, depending on existing site conditions and current viewshed. Visual impacts of the proposed Project are discussed in section 4.12. Indirect socioeconomic impacts may also include noise, air quality issues, and increased traffic.

Future facility operations may encourage, at most, a small number of people to relocate to the area. The small magnitude of the potential action-related in-migration would be readily accommodated by the local area's existing housing and, consequently, would not result in new and unplanned growth or land use changes. Therefore, it is concluded that the Proposed Action would not induce substantial growth or concentration of population in the Amargosa Valley.

4.9.1.3 Affected Groups and Attitudes

This section focuses on the potential social, cultural, and health impacts on stakeholder groups. The quality of life or subjective well-being of affected groups and individuals is of particular concern. Relevant here are stakeholder perceptions of potential impacts on the integrity, quality, use, and enjoyment of the environment and of socioeconomic resources, including direct, indirect, and cumulative impacts. Resources here are defined to include the traditional landscape and its uses, the community and its characteristic way of life, and the stakeholder's values. The quality of life can be affected by the proposed Project itself in all its phases, by perceptions of the proponents of the proposed Project as trustworthy, and by opportunities for participation in governance and the policy making processes concerning stewardship of public lands resources. It is particularly important that participants recognize that their input has real consequences and has a real impact on agency decisions.

Immediate Neighbors / Immediate Neighbors with Responsibility for the Health and Safety of Community Residents

Under the Proposed Action, job and local economic development during construction and immediately after would be a tremendous benefit to those residents who acquire these jobs. In the Development Agreement with Nye County, the Proponent has agreed to make commercially reasonable efforts to hire Nye County workers and will request its contractors to do the same (Nye County 2010). This would provide beneficial impacts for currently unemployed local residents. Moreover, some local businesses that have been affected by the economic downturn may experience economic growth providing job stability to their employees. The business generated by the proposed Project may provide the economic stimulus to prevent employees from job loss and exposure to the negative economic, health, and social consequences of job loss, thereby having indirect beneficial impacts on them.

An influx of new individuals with different values, lifestyles and/or socio-demographic backgrounds could have a positive or negative influence on the quality life and/or community values. As noted in Section 3.9.2.3, there are mixed views of immediate neighbors about the proposed Project. Besides jobs, potential perceived positive impacts include enhanced town services and facilities through an expanded tax base and through the proposed Project's proponents voluntary contributions, and potential for youth to get apprenticeships. Residents were concerned about the increased fire risk and risk to volunteer firefighters that the proposed Project would present, but several mitigations address these concerns: (1) contributing to fire-fighting equipment acquisition and upgrading (Fuller 2010); (2) as per the Development Agreement, providing emergency and fire protection training for up to four people, with priority for Amargosa Valley volunteer firefighters; (3) as per the Development Agreement, providing the county with access to a water supply to fight fires (Nye County 2010).

Other potential impacts include enhancement of subjective well-being through developing a local identity and local pride as being a national leader in the provision of solar energy.

Immediate neighbors were also concerned about the Project having detrimental effects on their quality of life through negative visual impacts, use of groundwater for construction and operations, health and safety issues, and increased construction traffic, fugitive dust, and noise. These issues and mitigation measures, if required, are described in the specific section for that resource (i.e. fugitive dust, see Air Quality – Section 4.1; use of groundwater, see Section 2.3.6 and Water Resources – Section 4.4; construction and operation noise, see Noise – Section 4.5; visual impacts, see Section 4.12; and health and safety concerns, see Section 4.13).

Outdoor Recreationalists

The Project area is used for OHV riding, horseback riding, strolls from town, and hiking and acts as access for some town residents to more distant public lands. While the construction and operation of the proposed Project would remove these lands from these types of uses, adjacent public and private lands remain available for these uses. Per the Nye County Development Agreement, the Proponent will develop a landscaped buffer between the eastern boundary of the Project site and Sandy Lane. Although final plans have not been developed, the Proponent envisions the landscaped area would include walking paths for recreational opportunities.

Environmental Groups and Stewards

The people in this group are especially concerned about water use and its impact on wildlife, on plants, and on the very physical structure of the land, with the cumulative impacts being of particular concern. If the proposed Project does not go forward it is likely that the water issues will recur when other developers seek those same water rights. Loss of open space is a detrimental impact for these groups, but as open space is abundant in the vicinity, the impact of the loss of this space is likely to be small.

Federal, State and Local Governmental Agencies

Federal, State, and local governments will continue to comply with their jurisdictional responsibilities. However, due to the increased interest in renewable energy development in the United States, and federal and state regulations requiring the development and use of renewable energy, agencies affected by renewable development will adopt policies and procedures for addressing impacts of the construction and operation of these facilities.

4.9.1.4 Economy and Employment

Economic impacts for the proposed Project were estimated using a Nye County Impact Analysis for Planning (IMPLAN) economic impact model. IMPLAN is a commonly used analytical software tool to estimate socioeconomic impacts originally developed by researchers at the USFS. The model is owned and administered by the Minnesota IMPLAN Group, Inc. The IMPLAN software is an input-output based model that describes the inter-industry relationships between industries and commodity purchases within a local economy. The model relies on county and state-level data sets that are continually updated by the United States government and by Minnesota IMPLAN Group, Inc. IMPLAN is used to measure the multiplier impacts or total economic impacts associated with a given project's spending relationships or linkages to a region's vendors, suppliers, households, and government entities. A multiplier describes the response of the regional economy to a stimulus (e.g., construction period spending associated with a project's local capital expenditures and payroll) that is a change in final demand. The multiplier process represents the predictive part of the model. The model supplements the traditional input-output framework with a social accounting matrix that takes into account non-industrial transactions such as the payment of taxes by businesses and households.

Economic impacts are defined as total expenditures, personal income, and employment. Total impacts are estimated using the following components:

- **Direct Impacts** – Represents the impacts for the expenditures and/or production values specified as direct final demand changes.
- **Indirect Effects** – Represents the impacts caused by the iteration of industries purchasing from industries and local businesses resulting from direct final demand changes.
- **Induced Effects** – Represents the impacts caused by the iteration of households purchasing from industries and local businesses resulting from direct final demand changes.
- **Total Impact** – The total impact is the sum of the direct, indirect, and induced effects.

Two phases of impacts are considered that have different levels of impacts on the ROI. Phase One is the construction of the Project and is projected to last 39 months; this is considered a short-term impact that does not have any long-term economic sustainability. Phase Two is the annual operations of the Project that will provide the ongoing economic sustainability and have positive economic impacts on the ROI for several years. Description of each phase and economic impacts will be discussed in the following sections.

Phase One – Construction Activity

Phase One includes the construction of two 250 MW plants for a total of 500 MW. This phase is projected to last 39 months. During the construction period, communities in the ROI will experience temporary increases in the levels of overall economic activity through the purchases of goods and services, employment, and personal income. Also during this period, Nye County will experience an increase in property and sales tax collections. The following section will describe the levels of projected increased activities during construction.

Purchases

Construction of both plants is estimated to cost between \$2.5 and \$3.0 billion. The main components of construction costs include labor, materials, equipment, supplies and taxes. Due to the confidentiality of detailed component construction cost estimates, only total estimated construction costs are reported. However, the detailed construction cost estimates by type and place of purchases is integrated in the Nye County IMPLAN economic model. In addition, it is assumed that during the construction phase all attempts will be made to purchase local labor and supplies when available. The components that will be difficult to purchase locally are specialized solar equipment, power plant equipment, and transmission facilities that are only available in other markets. Increased local business activity and revenues are projected to come from the purchases of water, sand and gravel, cement, electricity, propane, building materials, equipment rentals, miscellaneous construction supplies and sales taxes. It is estimated that approximately \$50 to \$75 million of supplies and materials will be purchased from local businesses over the 39 month period.

Employment

Amargosa Valley has a relatively small workforce; however adjacent communities of Beatty and Pahrump will also be a local source for construction employment. Solar Millennium will make all attempts to hire local residents that meet required job qualifications. In addition, Clark County will likely be a recruiting base for all types of specialty construction employment, especially under current economic conditions and high levels of construction worker unemployment in the State of Nevada.

Table 4-27 reports the average projected monthly skilled construction employment over the 39-month construction period. A total of 23 construction skill trades will be required to complete the Project. The greatest job activity occurs between months 14 and 23, with more than 1,000 active construction jobs each month. In month 16 construction jobs peak at 1,318. The monthly average construction employment over the 39-month period is 634 jobs.

Table 4-27 Construction Workforce by Skill (Monthly)

Trade or Skill	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19
Surveyor	0	16	12	12	16	18	17	21	21	18	20	20	25	24	18	17	14	10	12
Operator	25	51	56	58	64	92	92	97	97	97	97	97	115	107	104	104	104	104	104
Laborer	14	36	37	39	69	91	69	156	190	230	230	230	230	230	230	213	213	213	213
Truck Driver	21	17	15	16	28	30	35	44	44	36	32	29	39	40	40	40	38	38	38
Oiler	1	5	3	2	3	3	3	5	5	3	5	3	7	7	6	5	3	2	2
Carpenter	0	6	20	23	22	30	23	81	92	92	104	104	104	115	115	115	115	115	115
Boilermaker	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	13	13	13
Paving Crew	-	-	-	-	6	6	-	5	-	-	-	-	5	-	-	-	-	-	-
Pipe Fitter	-	1	14	16	12	14	13	16	32	58	115	115	167	173	190	307	375	352	340
Electrician	-	0	6	12	12	13	13	18	25	28	43	52	68	108	150	169	173	173	173
Cement Finisher	-	3	14	16	15	22	17	24	44	92	92	92	92	115	115	115	115	115	115
Ironworker	-	5	12	12	12	29	29	29	48	48	48	68	68	68	68	68	68	68	68
Millwright	-	-	-	-	-	-	-	-	-	-	23	23	23	23	23	29	29	29	29
Tradesman	-	14	49	58	59	85	67	52	31	29	14	9	9	12	9	15	12	3	2
Project Manager	1	1	1	1	1	1	1	3	3	3	3	3	3	3	2	3	3	3	3
Construction Manager	1	1	1	1	1	1	1	3	3	3	3	3	3	3	2	3	3	3	3
PM Assistant	1	1	1	1	1	1	1	3	3	5	5	5	5	5	5	5	5	5	5
Support	1	1	1	1	1	1	1	3	3	5	5	5	5	5	5	5	5	5	5
Support Assistant	1	1	1	1	1	1	1	3	3	5	5	5	5	5	5	5	5	5	5
Engineer	3	3	2	3	3	3	3	10	10	9	12	12	12	12	12	12	12	14	14
Timekeeper	1	1	1	1	1	1	1	3	3	3	3	3	3	3	2	3	3	3	3
Administrator	2	2	2	2	2	2	2	7	7	7	7	7	7	7	7	7	7	7	7
Welder	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	73	166	249	276	330	445	390	584	665	772	867	886	996	1066	1109	1254	1318	1281	1270

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Table 4-27 Construction Workforce by Skill (Monthly) Cont.

Trade or Skill	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36	M37	M38	M39	Avg	
Surveyor	13	16	14	18	16	16	8	1	3	3	1	-	-	2	3	3	3	3	-	-	11.1	
Operator	104	84	81	74	74	64	47	17	10	9	5	2	2	6	8	8	8	8	2	-	58.4	
Laborer	183	143	143	116	97	97	97	68	68	49	49	40	35	29	29	25	17	12	6	-	106.0	
Truck Driver	38	30	29	29	26	26	18	18	17	17	17	14	14	14	12	12	6	6	3	-	24.8	
Oiler	3	5	3	5	5	5	3	1	1	1	0	-	-	1	1	1	1	1	-	-	2.8	
Carpenter	115	115	115	115	92	92	92	81	58	58	46	12	12	12	6	6	-	-	-	-	62.0	
Boilermaker	13	13	13	13	13	13	13	13	-	-	-	-	-	-	-	-	-	-	-	-	4.0	
Paving Crew	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	
Pipe Fitter	328	315	315	315	315	288	288	282	230	196	115	89	68	12	12	12	6	6	6	-	141.2	
Electrician	162	162	146	146	129	129	62	62	52	52	41	10	10	10	6	6	6	6	6	-	62.5	
Cement Finisher	115	115	92	92	92	92	92	92	81	81	81	63	29	23	12	12	-	-	-	-	60.9	
Ironworker	68	68	68	49	49	23	23	23	23	23	12	12	12	12	12	12	6	6	6	-	33.9	
Millwright	29	29	29	29	29	17	17	17	17	12	12	12	12	12	12	12	-	-	-	-	13.5	
Tradesman	2	2	2	2	2	5	5	3	-	-	-	-	-	-	-	-	-	-	-	-	14.2	
Project Manager	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	1	2.5
Construction Manager	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	1	2.5
PM Assistant	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	3	3	3	1	3.7
Support	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	3	3	3	1	3.7
Support Assistant	5	5	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	3	3	3	1	3.7
Engineer	14	14	14	14	14	14	14	14	14	14	10	10	10	9	10	10	9	10	9	5	9.9	
Timekeeper	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3	1	2.5
Administrator	7	7	7	7	7	7	7	7	7	7	7	7	7	6	7	7	6	7	6	2	5.8	
Welder	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1.0
Total	1219	1143	1096	1049	985	913	811	721	606	547	421	296	230	167	149	145	87	89	63	13	63.4	

Table 4-28 Nye County Prevailing Wage by Construction Occupation	
Trade or Skill	Nye County Prevailing Wage*
Surveyor	\$42.14
Operator	\$53.92 – \$58.77
Laborer	\$42.94 – \$45.96
Truck Driver	\$46.13 – \$48.12
Oiler	\$57.60
Carpenter	\$48.70 – \$55.24
Boilermaker	\$59.50
Paving Crew	\$42.94 – \$56.98
Pipe Fitter	\$34.28
Electrician	\$34.82 – \$63.62
Cement Finisher	\$46.28 – \$50.03
Ironworker	\$56.74 – \$63.40
Millwright	\$49.70 – \$56.65
Tradesman	\$40.00 – \$50.00**
Project Manager	\$50.00 – \$60.00**
Construction Manager	\$45.00 – \$55.00**
PM Assistant	\$25.00 – \$35.00**
Support	\$25.00 – \$30.00**
Support Assistant	\$20.00 – \$25.00**
Engineer	\$40.00 – \$50.00**
Timekeeper	\$15.00 – \$20.00**
Administrator	\$25.00 – \$30.00**
Welder	\$49.70 – \$58.20
*Does not include benefits.	
** Trade or skill not listed in the Nevada Office of Labor Commissioner Rate Sheet. Information provided by Solar Millennium.	
Source: Nevada Office of the Labor Commissioner 2010	

Personal Income

During construction, communities in the ROI are expected to have positive, short-term effect on employee earnings and personal incomes. Total earnings corresponding to the employment levels reported in Table 4-27 are estimated using the 2010 Nye County prevailing wage rate by construction occupation (Table 4-28). The average non-benefited wage for the construction of

the Project is \$43.30. Overall it is estimated that Project construction will provide over \$190 million of direct personal income over the full 39-month construction period. These rates do not include benefits which normally could add another 30 to 40 percent to the full compensation package.

Construction Scenarios

Four construction scenarios were considered using different levels of locally hired employment and locally earned wages. Analyzing different local employment and income levels is important, because the availability of types of skilled labor may require hiring from outside Nye County. Nonresident employment and incomes will have minimal impacts on Nye County.

Local is defined as coming from within Nye County. Although each scenario needs to be considered, hiring 50 percent locally seems to be very realistic given the current economic conditions. For example, Southern Nye County, specifically Pahrump, continues to experience high levels of local residents commuting to Clark County for work, estimated at 20 to 25 percent of residents who work. Several factors contribute to this result, but the main reason is the lack of local employment opportunities; so an increase in employment opportunities locally could result in more residents receiving employment in Nye County and reduce the exporting of Nye County's workforce. Given the temporary nature of the construction phase jobs, residents may be hesitant to leave a permanent job in Clark County for a temporary job in Nye County. However, considering on-the-job training provided by Solar Millennium and the availability of solar job training courses offered by Great Basin College in Pahrump, local construction workers may be inclined to pursue permanent employment during Project operations. Table 4-29 summarizes the average monthly construction scenarios over the total 39 months.

Table 4-29 Average Monthly Construction Employment and Personal Income Scenarios (39 Months)		
Scenario	Employment	Personal Income
100% Hire Local	634.0	\$4,884,997
75% Hire Local	475.5	\$3,663,744
50% Hire Local	317.0	\$2,442,496
25% Hire Local	158.5	\$1,221,248

Under the 50 percent scenario, a total of 317 employees will be hired from within Nye County, while the remainder of required employment will likely come from the Las Vegas market and will not take on permanent Nye County residency. Non-local workers will provide a small temporary stimulus to the Nye County economy as they spend per diem money on hotels, meals, and consumables. However, unlike the local workers who permanently reside in Nye County, non-local workers would be expected to spend most of their earning outside of the region. Some direct spending generated from local workers would also be expected to leak out of the region, as the total regional demand for goods and services could not be entirely satisfied from local (i.e., Nye County) production.

Phase Two – Annual Operations Activity

At the conclusion of the construction phase, communities in the ROI will realize a new level of sustainable economic impacts through annual operations. Annual operations for both plants will require consistent purchases of labor, supplies, materials, services, and payment of federal, state, and local taxes. Table 4-30 summarizes the direct economic projections for the annual operations.

Input Purchases

Annually it is projected that the Project will spend \$16 to \$18 million on materials and supplies to operate both plants. Similar to the construction phase, there is a strong commitment to purchases labor, supplies, materials, and services from local sources and businesses. Specifically, the majority of water, propane, gasoline, and electricity will come from businesses located in Nye County. Additionally it is not unusual for new supportive businesses and industries to be created to support annual operations. Projected revenues are difficult to estimate at this time because of market fluctuations.

Employment

Permanent annual full-time employment at both plants is estimated to be between 170 and 200 full-time employees. With the permanent nature and sustainability of these positions, it is assumed that a minimum of 75 percent of the workforce will be from local communities in Nye County (i.e., Amargosa Valley, Beatty, and Pahrump). The remaining 25 percent of employees will more than likely come from Clark County or Las Vegas. Currently it is estimated by the Bureau of Census Journey to Work data that nearly 23 percent of Nye County residents works outside Nye County (U.S. Census 2010). Much of the outward-migration of workers from Nye County is due to the fact that few employment opportunities exist, and with the construction of the Project more employment opportunities will be available for local workers.

Personal Income

According to Solar Millennium, permanent full-time employment wages and salaries at both plants are estimated to be \$8.6 to \$9.9 million annually. Solar Millennium estimates that the annual wages and salaries per job will average \$50,000, which is near or well above current average wages for most of the communities in the ROI.

Table 4-30 Summary Annual Operations for the Project		
	Amount	Local (Nye County)
Input Purchases	\$16 to \$18 million	30%
Employment	170 to 200 Full-Time	75%
Personal Income	\$8.6 to \$9.9 million	75%

4.9.1.5 Economic Impacts

Economic impacts are defined as the economic activity, employment, and personal income. Both phases, construction and annual operations, are estimated and presented below.

Phase One – Construction Economic Impacts

Table 4-31 through Table 4-33 summarize the total economic impacts for the construction phase of the Project based on the IMPLAN model. Summary results include:

Direct Expenditure Impact Assumptions & Results:

- Total construction expenditures over 39 months are estimated at \$2.5 to \$3.0 billion.
- Approximately \$50 to \$75 million of supplies and materials will be purchased from local businesses during construction phase.
- An expenditure multiplier of 1.27 is estimated for direct expenditures in Nye County. That is for every \$1 spent locally another \$0.27 is generated in Nye County.

Direct Local Expenditure Activity	Indirect Expenditure Impact	Induced Expenditure Impact	Total Expenditure Impact	Expenditure Multiplier
\$50,000,000	\$7,709,127	\$5,931,866	\$63,640,992	1.27
\$75,000,000	\$11,563,691	\$8,897,800	\$95,461,488	

Direct Average Monthly Employment Impact Assumptions & Results:

- Total construction employment over 39 months varied each month from a high of 1,318 employees in month 17, to 13 employees in month 39.
- Total employment impacts were estimated for each month of construction (see Figure 4-5).
- Average monthly direct employment impacts were estimated at 634 employees over 39 months.
- Four employment scenarios were considered based on the estimated percentage of employees that would be hired from within Nye County.
- The preferred scenario for the construction phase was that 50 percent of hired labor would come from Nye County.

- An employment multiplier of 1.32 was estimated for direct construction employment. This means that for every one locally hired construction job for the Project, another 0.32 jobs will be supported in Nye County.

Scenarios	Direct Employment Impact	Indirect Employment Impact	Induced Employment Impact	Total Employment Impact	Employment Multiplier
100% Local Hire	634	113	90	837	1.32
75% Local Hire	475	84	67	628	
50% Local Hire	317	56	45	418	
25% Local Hire	158	28	22	209	

Direct Average Monthly Personal Income Impact Assumptions & Results:

- Total construction personal income over 39 months varied each month from a high of \$10 million in month 17, to \$96,000 in month 39.
- Total personal income impacts were estimated for each month of construction (see Figure 4-6).
- Average monthly direct personal income impacts were estimated at \$4,883,151 over 39 months.
- Four personal income scenarios were considered based on the estimated percentage of employees and their corresponding wages and salaries that would be hired from within Nye County.
- The preferred scenario for the construction phase was that 50 percent of hired labor would come from Nye County and corresponding wages and salaries would stay in Nye County.
 - A personal income multiplier of 1.38 was estimated for direct construction personal income. This means that for every \$1.00 earned locally from Project construction, an additional \$0.38 of income is generated in Nye County.

Scenarios	Direct Employment Impact	Indirect Employment Impact	Induced Employment Impact	Total Employment Impact	Employment Multiplier
100% Local Hire	\$4,883,151	\$1,395,721	\$442,112	\$6,722,899	1.38
75% Local Hire	\$3,662,363	\$1,046,790	\$331,584	\$5,042,174	
50% Local Hire	\$2,441,575	\$697,860	\$221,056	\$3,361,449	
25% Local Hire	\$1,220,787	\$348,930	\$110,528	\$1,680,725	

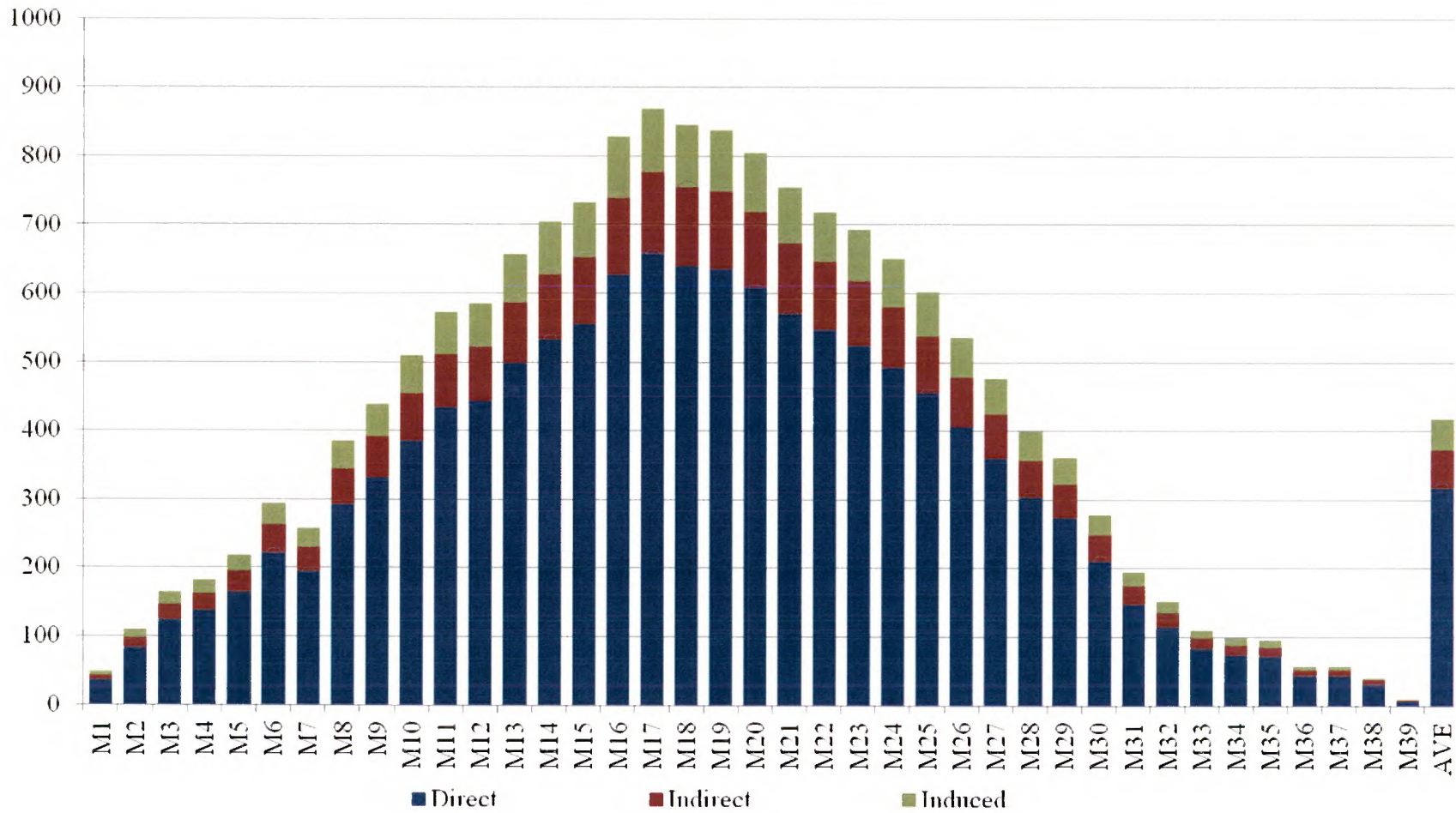


Figure 4-5 Employment Impacts from the Construction Phase of the Project on Nye County (50% Nye County Hire)

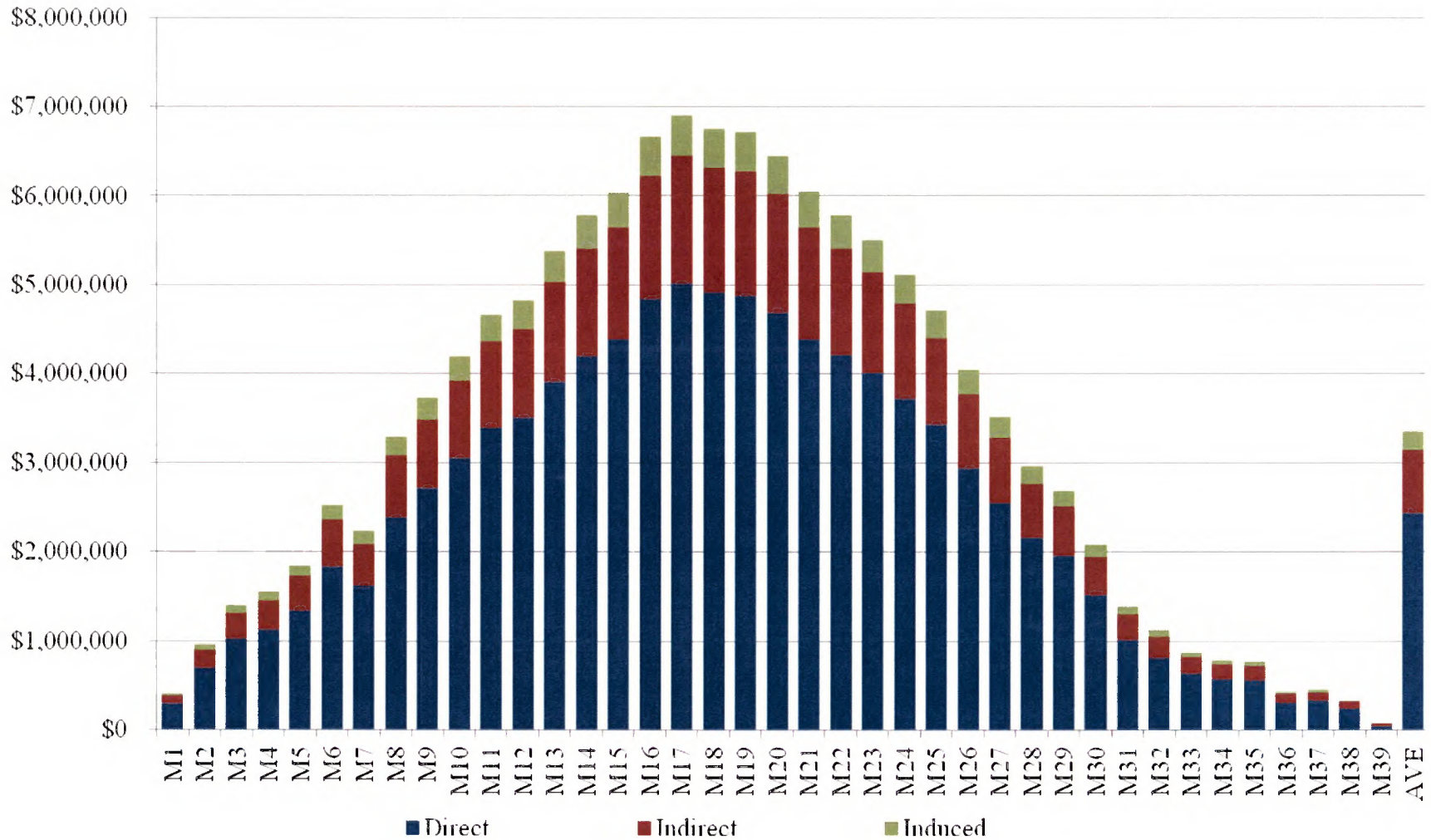


Figure 4-6 Personal Income Impacts from the Construction Phase of the Project on Nye County (50% Nye County Hire)

Under each employment and personal income scenario, the following sectors reported the greatest impacted sectors (Table 4-34). With this type of project, these sectors could be further developed and expanded to meet newly created demand.

NAICS Sector	Description
23	Construction of other nonresidential structures
5413	Architectural, engineering, and related services
531	Real Estate Services
722	Food Service and Drinking Places
452	Retail – General Merchandise
8111	Automotive repair and maintenance, except car washes
6211	Offices of physicians, dentists, and other health practitioners
8113	Commercial and industrial machinery and equipment repair and maintenance
454	Retail Nonstore – direct and electronic stores
441	Retail – motor vehicle parts

Phase Two – Annual Operations Economic Impacts

Table 4-35 and Table 4-36 summarize the total economic impacts for the operational phase of the Project. Summary results include:

Direct Annual Employment Impact Assumptions & Results:

- Total annual operations employment is estimated at between 170 and 200 employees; analysis is conducted on estimated average 185 direct annual employees.
- Assumed 75 percent of employment would be from Nye County.
- An employment multiplier of 1.48 is estimated for direct annual operations; this means that every direct job will support an additional 0.48 percent of a job throughout Nye County.

Scenarios	Direct Employment Impact	Indirect Employment Impact	Induced Employment Impact	Total Employment Impact	Employment Multiplier
100% Local Hire	185	23.7	65.1	273.8	1.48
75% Local Hire	139	17.8	48.8	205.6	

Direct Annual Personal Income Impact Assumptions & Results:

- Total annual personal income is estimated between \$8.6 and \$9.9 million. Analysis is conducted on \$9.1 total annual income.
- Assumed 75 percent of total personal income will be paid to Nye County residents.
- A personal income multiplier of 1.19 is estimated for direct personal income; this means that for every direct dollar earned locally from the Project, an additional 0.19 of personal income will be generated in Nye County.

Table 4-36 Average Annual Personal Income Impacts for Project Annual Operations					
Scenarios	Direct Employment Impact	Indirect Employment Impact	Induced Employment Impact	Total Employment Impact	Employment Multiplier
100% Local Hire	\$9,101,408	\$1,013,024	\$711,948	\$10,826,380	1.19
75% Local Hire	\$6,826,056	\$759,768	\$533,961	\$8,119,785	

4.9.1.6 Public Services

The Proponent has entered into a Development Agreement with Nye County in which it has agreed to the following to help mitigate any increase in demand on local emergency services (Nye County 2010):

- Annually provide emergency and fire protection training for up to four individuals identified by Nye County, with priority given to individuals who serve in the Amargosa Valley Volunteer Fire Department. This training will be equivalent to the training provided to the Proponent's on-site personnel. Training will be compliant with the guidelines of the National Fire Protection Agency standards as it relates to structures, materials, and hazards present on-site and wildlands adjacent to the proposed Project site.
- Annually pay \$20,000 to the county for use in providing police services in the Town of Amargosa.
- Provide a water supply for the County's use in responding to fires within the Town of Amargosa.
- Annually pay \$20,000 for the County's use in providing staff and equipment for the Town of Amargosa medical clinic.

These agreements will become effective 60 days after the Proponent obtains financing for construction and will be in effect for the term of the Development Agreement.

Construction

The proposed Project will rely on both on-site security and the Nye County Sheriff's Department law enforcement protection services during construction. Site guards will be trained, uniformed,

unarmed personnel. Their primary responsibility will be to control egress and ingress of personnel and vehicles, perform fire and security watch during off hours, and perform security badge administration. A Project-wide photo security badge system for all construction and operations personnel will be used to control security. The perimeter of the Project site will be fenced with an 8-foot-high security fence with barbed or razor wire on the north and south side of the Project, and a 30-foot-high security wind fence on the east and west sides of the Project.

As described in Section 2.3.9, the proposed Project will rely on both on-site fire protection systems and as needed, local (e.g., Amargosa Valley Volunteer Fire Department) fire protection services during construction. The Amargosa Valley Volunteer Fire Department Station is located at 851 E. Amargosa Farm Road, which is approximately 1.3 miles from the southeast corner of the solar field. If needed, mutual aid would be provided by the Pahrump, Beatty, and Mercury fire departments. A Construction Fire Protection and Prevention Plan will be developed and followed throughout all phases of construction. During construction, the permanent facility fire suppression system will be placed in service as early as practicable. Prior to installation of the facilities, permanent fire suppression system, fire extinguishers, and other portable firefighting equipment will be available on-site.

Operations

Project operation may increase demands on local police, fire, medical, and other emergency services. However, population in-migration into the Amargosa Valley, Pahrump, and Beatty as result of the proposed Project is expected to be minimal. The modest size workforce would not be expected to have an adverse impact on demand relative to the capacity of most local public services.

Services provided by the Nye County Sheriff's Department and the Amargosa Valley Volunteer Fire Department could be augmented by emergency services in Pahrump and Clark County, if requested; however, there would be a significant delay in response from these emergency services. Project health and safety programs and fire protection systems and procedures would be expected to help reduce the need for fire, medical, and other emergency services.

4.9.1.7 Utilities

Construction

Although minimal population impacts are expected, there would be some demands on existing utility services during construction as a result of on-site activities. Water needed for construction would be obtained from a well located southwest of the Project area. Potable water would be brought in and stored in approved water tanks. Sanitary wastes generated during construction will be collected in portable, self-contained toilets and hauled to an approved disposal site.

Operations

The proposed Project would utilize approximately 400 acy of existing groundwater currently being used for agriculture; thus, it would not impact local water supplies nor increase basin usage

and represents less than 2 percent of the total perennial yield of the Amargosa Basin. Project sanitary wastes would be disposed of by an on-site septic system and leach field. Operations of the proposed Project would not impact available electrical needs; and by its very nature, would represent a net gain in regional capacity.

4.9.1.8 Schools

Construction

Since it is anticipated that the majority of construction workers would commute, rather than relocate, construction of the proposed Project is not expected to increase enrollment in area schools. Furthermore, construction workers who relocate temporarily for a work assignment typically do not bring their families with them.

The Amargosa School, a combined elementary and middle school, is within 1 mile of the Project site and had a 2009 enrollment of 194 students. High school age students in Amargosa Valley attend Beatty High School which has a 2009 enrollment of 139. The Nye County School District is currently negotiating with the BLM to acquire 20 to 30 acres for a new school site in Amargosa Valley (Amargosa Area Plan 2009). Potential impacts during construction include increased traffic along Amargosa Farm Road, fugitive dust from construction activities, and increased noise. Construction activities will normally occur during daylight hours between sunrise and sunset.

All construction traffic will be off of Valley View Boulevard to the Project site. Some residual increase in traffic along Amargosa Farm Road is anticipated, depending on the commuting route of the construction worker. As part of the Development Agreement between Nye County and the Proponent, the Proponent is required to conduct a Master Traffic Impact Analysis prior to commencement of construction. The traffic study must be submitted and approved by Nye County. The Proponent will improve Valley View Boulevard in accordance with the approved Master Traffic Impact Analysis.

Fugitive dust must be controlled per requirements of the SAD Permit and the SWPPP. Implementation of BMPs to control dust will minimize fugitive dust impacts. Mitigation measures to control dust and noise impacts are described in Appendices A.1, A.3, and A.5.

Operations

Operation of the proposed Project is expected to have minor local and regional effects on schools because of the relatively small number of workers needed for operation of the plant (estimated average of 185 employees).

4.9.1.9 Fiscal Resources

Construction

Total expenditures for the proposed Project within the ROI and outside the ROI on construction materials, supplies, and equipment over the 39-month construction period is estimated to be approximately \$1.8 billion.

Pursuant to Nevada law Assembly Bill 522, approved renewable energy projects are only required to pay sales and use tax at the rate of 2.25 percent, which is allocated in the same manner as other taxes collected under the Local School Support Tax. Over the 39-month construction period, the Project would pay approximately \$35 million in sales tax to the State of Nevada for the Local School Support Tax (Table 4-37).

In addition to sales tax revenue, the proposed Project would generate for Nye County up to \$30 million in property taxes during construction, after taking into account the 55 percent property tax abatement for renewable energy projects under Assembly Bill 522 (Table 4-37).

Table 4-37 Total Property and Sales Tax Revenue from Project Construction (over 39 months)		
	Dispersal Percentage*	Estimated Payment/Income*
Property Tax Dispersal		
State of Nevada	45.00%	\$13,545,000
Nye County	20.24%	\$6,092,240
Nye County School District	20.075%	\$6,042,575
Amargosa Town Fund	12.10%	\$3,642,100
State Capital Debt and Parks	2.585%	\$788,085
Total Property Tax	100.00%	\$30,080,000
Sales Tax Dispersal**		
Local School Support Tax Fund	100.00%	\$35,200,000
*Based on personal property, real property, and land value during construction. Estimated payment based on a total estimated value of \$2.6 billion.		
**Based on purchases of \$1.8 billion of equipment, materials, and supplies over 39-month period at a 2.25% abatement rate.		

Operations

During operation, it is expected that the annual purchases for materials, supplies, equipment, and services within the ROI would total approximately \$17 million. As part of the Development Agreement signed with Nye County, the Proponent has agreed to make a good faith effort to purchase a reasonable amount of goods related to operations from Nye County vendors. The Proponent has also agreed to conduct annual vendor information sessions in Nye County to help educate local vendors on the Proponent’s procurement process (Nye County 2010). In the event

that all purchases are made within Nye County, which has a tax rate of 7.1 percent, these expenditures would generate approximately \$1.2 million in annual sales tax revenue. In addition, using an estimated property value of \$2.6 billion during the first year of operation, the Project would generate approximately \$13.9 million in property tax revenue (Table 4-38).

Table 4-38 Total Property and Sales Tax Revenue from Project Operation (Year 1 or 12 Months)		
	Dispersal Percentage*	Estimated Payment/Income*
Property Tax Dispersal		
State of Nevada	45.00%	\$6,255,000
Nye County	20.24%	\$2,813,360
Nye County School District	20.075%	\$2,790,425
Amargosa Town Fund	12.10%	\$1,681,900
State Capital Debt and Parks	2.585%	\$359,315
Total Property Tax	100.00%	\$13,900,000
Sales Tax Dispersal**		
State General Fund	2.0%	\$336,000
Nye County School District	2.6%	\$444,000
Nye County	0.5%	\$84,000
Nye County Transportation & Air Quality	0.25%	\$48,000
Supplemental City-County Relief Tax	1.75%	\$300,000
Total Property Tax	7.1%	\$1,212,000
*Based on personal property, real property, and land value during construction. Estimated payment based on a total estimated value of \$2.6 billion.		
**Based on purchases of \$17.0 million of equipment, materials, and supplies over 39-month period at a 2.25% abatement rate.		

4.9.2 Wet-Cooled Alternative

Impacts to socioeconomic resources from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative). Those affected groups with concerns about water conservation would experience a more negative impact when compared to the Proposed Action – dry-cooled alternative.

The principal indirect impact to socioeconomic resources under the wet-cooled alternative would be from groundwater stipulations mandated by the NPS, USFWS, and BLM to acquire additional water rights above and beyond those needed for Project construction and operation. Since up to

4,600 afy is required for operation of a wet-cooled plant, it is likely that the agencies would require the Proponent acquire several thousand acre-feet of additional water to offset potential effects to sensitive resources at Ash Meadows NWR and Devils Hole. This action would result in the reduction of groundwater pumping in the Amargosa Desert Hydrographic Basin and the fallowing of large parcels of active farmland in the Amargosa Valley. Farming revenue in Amargosa Valley would be reduced; however, this lost revenue would be offset by wages and indirect economic stimulus provided by the construction and operation of the proposed Project.

4.9.3 No Action Alternative

Under the No Action Alternative, the BLM would not grant a right-of-way to the Proponent. The BLM land on which the Project is proposed would continue to be managed within the BLM's framework of a program of multiple use and sustained yield, and the maintenance of environmental quality (43 USC 1781 (b)) in conformance with applicable statutes, regulations, policy, and land use plan.

The results of the No Project/No Action Alternative would be the following:

- The impacts of the proposed Project would not occur; however, the land on which the Project is proposed would become available to other uses that are consistent with the BLM's land use plan, possibly including another renewable energy project.
- The benefits of the proposed Project in reducing greenhouse gas emissions from gas-fired generation would not occur; both state and federal law support the increased use of renewable power generation.

If the proposed Project were not approved, renewable projects would likely be developed on other sites in the Mojave Desert or in adjacent states as developers strive to provide renewable power that complies with utility requirements and state/federal mandates.

4.9.4 Mitigation

No mitigation is required.

4.10 ENVIRONMENTAL JUSTICE

Information about the proportion of population that may be impacted by the alternatives and are characterized as minority and/or low-income is provided in Section 3.10. Overall, the data show that there is a slightly higher proportion of Hispanic residents in the Amargosa Valley, and there are higher proportions of low-income populations in the Amargosa Valley compared to the overall population in Nye County and Las Vegas.

4.10.1 Proposed Action

Income and revenue benefits associated with the proposed Project would be distributed throughout all areas, including EJ populations. Adverse impacts associated with the proposed Project would not likely be experienced disproportionately by an EJ population.

There are no special issues, such as housing, transportation access, or resource use in the Project area that would affect the EJ population disproportionately.

4.10.2 Wet-Cooled Alternative

Impacts to EJ from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative).

4.10.3 No Action Alternative

Under the No Action Alternative, the right-of-way would not be granted. No Project-associated impacts would occur to minority or low-income populations under the No Action Alternative.

4.10.4 Mitigation

No mitigation is required.

4.11 LAND USE, RECREATION, TRANSPORTATION, AND ACCESS

The following section describes the potential impacts of construction and operation of the proposed Project on land use, recreation, and transportation and access within their respective ROI, as defined in Chapter 3. The impact analysis for these areas is based on review of the existing conditions and focuses on the following issues: the conformity of the proposed Project with federal and local land use plans, ordinances, and policies; and the potential for the Project to have direct and/or indirect land use, recreation, transportation, and access conflicts with existing and planned uses.

4.11.1 Proposed Action

All public land, unless otherwise classified as ACEC or Wilderness Study Area, are available for land use rights-of-way, leases, and other decisions under Section 302 of the FLPMA. Land use must be consistent with other resource management objects, while considering local land uses. The BLM's evaluation of the Proponent's right-of-way application considered not only the Projects conformance with adopted management objectives and directions as summarized in the Las Vegas RMP/EIS, but also local planning guidelines (Amargosa Valley Area Plan) and comments from stakeholders and the public.

4.11.1.1 Existing Land Use

The requested right-of-way is located on primarily undisturbed BLM desert lands designated for disposal in the Las Vegas RMP/EIS. The Project area is adjacent to a low density residential area east of Sandy Lane. Smaller rural residential areas are located west of the Project area. No residential, commercial, industrial, or institutional uses are located within the Project area. The

nearest school is approximately 1 mile east of the the Project area. The proposed Project will have long-term direct impacts on potential uses of BLM land within the Project area by removing public land available for disposal and dispersed recreation. Under the Proposed Action, approximately 6,320 fewer acres (the requested acreage under the Applicants right-of-way application) would be available for BLM disposal for other federal actions, and up to 4,350 acres of existing desert land will be converted to utility/industrial use. Construction and operation of the proposed Project would restrict multiple use opportunities on the Project site to a single dominant use. Multiple use opportunities could be available after decommissioning.

4.11.1.2 Future Land Use

The Project area is located within an area designated by the Amargosa Valley Area Plan as a Special Development Area. The term “Special Development Area” is a mixed-use designation to set aside public or private areas where a variety of land uses might be proposed for approval, including projects under review by the BLM, such as Solar Energy Facilities (Amargosa Valley Area Plan Committee 2009).

Impacts to future land use include the change of land use identified by the Amargosa Valley Area Plan from future residential use south of Amargosa Farm Road, and east of Powerline Road to utility use. However, the Project is consistent with the policies, goals, objectives and land use descriptions set forth in the Amargosa Valley Area Plan as the designated Special Development Area permits the uses contemplated.

4.11.1.3 Transportation and Access

The construction of the proposed Project would have short-term direct impacts to the existing traffic load on existing roadways within the ROI. There would be an increase in vehicular traffic in relation to the existing traffic load and capacity of the street system. During construction of the proposed Project, the majority of workers are expected to commute from Las Vegas within Clark County, resulting in a direct increase in average daily traffic on US 95. Construction workers will commute as much as 2 hours to construction sites from their homes. Normal construction hours are expected to be between 6 a.m. and 6 p.m., Monday through Friday, depending on the time of year. Some activities may require extended evening construction hours and weekend work, as necessary, to meet the overall Project schedule.

During construction, access to the Project site will be from Amargosa Farm Road via Valley View Boulevard. As stipulated in the Nye County Development Agreement (Appendix F), prior to commencement of construction, the Proponent will submit a Master Traffic Impact Analysis for review and approval by the County. This analysis will build upon the analysis contained in the Final EIS, and will address impacts, if any, of the transportation of employees to and from the Project site. The Proponent will provide improvements required in the approved Master Traffic Impact Analysis in order to mitigate the land use impacts of the Project. Any work to public roads will be done in accordance with Nye County Public Works standards and the appropriate permits will be obtained from NDOT. As a part of the proposed Project, a portion of Amargosa Farm Road would be realigned. The proposed roadway alignment would be coordinated with Nye County Public Works and be constructed in conformance with the current standards. The locations of the principal site entry gates for both the construction and the

commercial operating period would be evaluated in consultation with the BLM, NDOT, and Nye County Public Works to ensure ingress and egress from the site do not have adverse impacts on existing traffic flow patterns.

The average construction workforce is estimated at 650 individuals per day, resulting in an increase of approximately 1,300 average daily vehicle trips on US 95 or NV 373 if each worker drove alone to and from the Project site. Peak workforce levels are estimated at 1,300 individuals per day, resulting in an increase of approximately 2,600 average daily vehicle trips on US 95 if each worker drove alone to and from the Project site.

Traffic levels are expected to peak during month 17 of the 39-month construction period. Where the construction workers currently reside would determine patterns of traffic increase. Other roads in the vicinity of the Project area could potentially see increased traffic from workers travelling to and from the Project site to area services and other work-related activities.

The proposed Project is expected to employ a estimated average of 185 full-time workers during operation, or an estimated increase of 370 daily vehicle trips on US 95, if each worker drove alone to and from the Project site.

Permanent changes to transportation networks would include improvement of the selected access road, as well as improvements on Amargosa Farm Road. There are no planned improvements to US 95 related to the proposed Project.

Short and long-term, direct and indirect impacts would result from the realignment of Amargosa Farm Road's right-of-way. Its construction would impact local residents of Amargosa Valley by restricting or rerouting access to areas served by the road during the construction of the re-alignment.

4.11.2 Wet-Cooled Alternative

Impacts to land use, recreation, transportation and access from construction and operation of a wet-cooled solar plant would be similar to the impacts described for the Proposed Action (dry-cooled alternative). However, direct impacts to agricultural lands within the Amargosa Valley would increase due to this alternative's higher water requirements, and the need to acquire a stable water supply from historically fully-utilized water rights (most likely certificated or permitted for agricultural use). The additional 4,200 afy needed over the Proposed Action would require that the fields currently being irrigated be fallowed. The Nevada State Engineer generally allots 5 afy/acre for irrigation. Therefore, under the wet-cooled alternative, approximately 840 acres in the Amargosa Desert Hydrographic Basin would be fallowed.

In consideration of the NPS, USFWS, and BLM's concerns regarding the use of water for Project construction and operation on federal rights and resources under their jurisdiction, similar water mitigation measures, as required under the Proposed Action (dry-cooled alternative), would most likely be required under this alternative. The amount of groundwater the agencies would require the Applicant acquire and either retire or hold in abeyance is unknown.

4.11.3 No Action Alternative

Under the No-Action alternative the Project would not be constructed, and there would be no impact to land use, recreation, or transportation.

4.11.4 Mitigation

No mitigation is required.

4.12 VISUAL IMPACT ASSESSMENT

The purpose of the visual impact assessment is to identify and characterize the level of visual impact resulting from the construction, operation, and maintenance of the proposed Project. Visual impact levels are derived by assessing the level of visual change associated with the physical elements of the proposed Project as compared to the existing setting.

Visual change is measured in terms of contrast and typically affects sensitive viewers, scenic quality, and compliance with the applicable agency visual management objectives. Contrast resulting from the proposed Project was assessed using a methodology consistent with the BLM's Manual 8431-1, Visual Resource Contrast Rating. Levels of potential contrast are largely based upon the visibility of cleared vegetation, grading and topographical modifications, and the introduction of new facilities (structures) from sensitive viewing locations. The visual analysis also considered the presence of existing cultural modifications (i.e., transmission lines, industrial developments, primitive roads, etc.) and their effect on the landscape (see Figure 3-18). The following section describes the methodology used to measure potential visual impacts followed by the results of the impact assessment.

4.12.1 Visual Resource Impact Methodology

4.12.1.1 Project and Visual Contrast

Visual Contrast is a measurement of visual change in the landscape resulting from construction and operation of the proposed Project (Project Contrast) as visible from KOPs or other viewpoints. Visual contrast is affected by the viewer's viewing conditions of the Project (i.e. if Project Contrast is not visible, then Visual Contrast would be low or none), the Project Specific Distance Zone in which the Project would be viewed (as distance increase, Visual Contrast decreases), time of day, etc. Per BLM VRM Manual 8431, Visual Contrast can range from weak to strong. In some cases it was appropriate to identify a contrast level between two of the four levels. For example, the Project may demand attention, but does not completely dominate the landscape from a given viewpoint. In this example the contrast level would be moderate/strong. Following are definitions of the four primary BLM Visual Contrast as described in VRM Manual 8431:

- Strong – The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

- Moderate – The element contrast begins to attract attention and begins to dominate the characteristic landscape.
- Weak – The element contrast can be seen but does not attract attention.
- None – The element contrast is not visible or perceived.

Sensitive Viewers

Effects to sensitive viewers and their associated KOPs were identified using the following criteria:

- viewer sensitivity (high or moderate)
- distance of sensitive viewer from the Project (foreground, middleground, or background)
- viewing position (superior, level, or inferior views)
- visibility (screened or backdropped views)
- Project contrast (overall visual change)

The consideration of these elements resulted in a Visual Contrast level rating for each KOP, per the BLM's VRM Manual H-8431-1, Visual Contrast Rating.

For sensitive viewers with level views of the proposed Project, as distance from the Project increases, the visibility of Project Contrast decreases due to the relatively low profile of the solar collecting arrays. The Project tends to be less dominant in the landscape because a level viewer would not see the overall surface of the solar collection fields, which based on the time of the day, produce strong color contrast by replicating the typically blue skies. Based on these visual attributes of the Project and typical climatic patterns for Amargosa Valley, Project-specific distance zones were identified within the framework of BLM-specified distance zones as specified below for assessing visual effects.

Project-Specific Distance Zones

As stated, Project-specific distance zones were generated within the framework of BLM criteria for moderate and high sensitivity viewers including:

- 0 to 0.25 mile – BLM Foreground Zone
- 0.25 mile to 1 mile – BLM Foreground Zone
- 1 mile to 3 miles – BLM Foreground Zone
- 3 to 5 miles – BLM Middleground Zone
- 5 miles and beyond – BLM Background Zone

Distance zones are critical in providing context for the proposed Project within the landscape. Within the foreground distance zone of 0 to 0.25 mile, the Project is in close proximity to the viewer which, for a project of this scale, results in strong Visual Contrast. Within the context of Amargosa Valley, views of the Project within the 0.25 to 1 mile distance zone become partially to fully screened by the typically dense vegetation borders and residential/commercial

construction to the east and south of the Project area. The low profile of the Project resembles the natural horizon line the farther the viewer is located from the Project site in the middle to background distance zone. The power blocks may be visible in this distance zone if unobstructed viewing conditions exist and the viewer is superior enough to see over the solar collecting arrays and 30-foot wind fence. However, due to the existence of cultural modifications in the landscape including, but not limited to, residential structures, existing utility lines, cell towers, etc., Visual Contrast would be reduced if the Project is seen within the context of such cultural modifications.

In addition to distance, and in the context of solar projects, viewing position or elevation of the viewer as compared to the elevation of the project, influences the visibility of Project Contrast because viewers at higher elevations tend to see larger portions of the Project within the context of the existing setting. The potentially strongest Project Contrast element for the proposed Project is color associated with the mirrors which predominantly reflect the typically blue Mojave Desert sky as seen from a superior viewing position (or during the early morning or late afternoon from a level viewing position when the mirrors are in a near-vertical position). Conversely, sensitive viewers that are inferior to the Project (i.e., looking up at a project) would have reduced visibility of Project facilities; thus Visual Contrast would be reduced. As the parabolic troughs rotate to track the sun, a glare would occur for a short duration at the beginning and ending of operations (morning and afternoon), increasing Visual Contrast for a short time. Other viewing conditions that contribute to contrast include screening (views that are blocked), backdropping (natural features behind the Project, typically darker than Project elements), and skylining (sky behind Project elements – typically providing a silhouette). Determination of Impacts

Scenic Quality

Due the relatively large size of the proposed Project, impacts to scenic quality considered not only the Project area, but adjacent land as well. Typically, impacts to scenic quality are based on Project Contrast resulting from the construction and operation of the proposed Project. The level of project contrast contributes to the modification of existing landscape character (setting); therefore, the landscape's inherent aesthetics are degraded and impacts would occur. The visual elements (form, line, color, and texture) associated with three major components of the proposed Project (i.e., power block, solar collectors, and transmission line) were evaluated in context with the existing visual elements of the Project site (Class C – creosote flat) and the resulting level of impact was documented.

Sensitive Viewers

Sensitive viewer impacts considered the sensitivity of the viewer and the visibility of Project Contrast based on distance and associated viewing conditions within the context of the existing setting. Using BLM form 8400-4 (Visual Contrast Rating Worksheet) perceived contrast was characterized and documented per BLM VRM requirements. Visual Contrast was combined with viewer sensitivity, to determine visual impacts to sensitive viewers. Visual Contrast Rating Worksheets developed for the Project can be found in Appendix D.

To represent and validate the range of potential visual impacts resulting from the construction and operation of the proposed Project, five photo simulations were prepared per BLM direction and are located in the following section. The simulations were prepared based on high-resolution

photography and corresponding GPS data gathered during field investigations. The photographs were taken using a 50mm lens which best replicates the perspective and depth-of-field associated with the human eye.

After the proposed KOP and simulation photographs were approved by BLM visual resource staff, the simulations were prepared using a proponent-provided 3D model of the proposed facilities combined with Project spatial data and 30-meter terrain models using a combination of GIS and CAD.

After construction of the 3D model associated with the Project, the Project model was combined or composited with the high-resolution photograph using a 3D rendering program. The location of the Project model in the photograph was validated using existing terrain and existing structure (distribution lines) data that was gathered during field investigations. The simulated model was then rendered using appropriate textures, lighting based on the time that the photographs were taken, and representative atmospheric conditions.

Compliance with VRM Classifications

Compliance with VRM classifications was assessed by evaluating Project Contrast within the context of scenic quality and sensitive viewers (Table 4-39). Per BLM requirements, contrast rating sheets (BLM for 8400-4) were prepared from KOPs that demonstrate compliance with VRM Class IV lands (see Appendix D).

Contrast Level	VRM Class			
	I	II	III	IV
Strong	No	No	No	Yes
Moderate/Strong	No	No	Yes	Yes
Moderate	No	Yes	Yes	Yes
Weak/Moderate	No	Yes	Yes	Yes
Weak	Yes	Yes	Yes	Yes

4.12.2 Proposed Action

Structural facilities for the proposed Project include solar collection fields which include two power blocks in the center of each solar field, and associated facility buildings at the south end of the solar field along Amargosa Farm Road. Construction of the proposed Project would require the removal of vegetation and land grading to achieve a level grade for the entire Project area. Under the Proposed Action, Amargosa Farm Road would be realigned 0.25 mile south of its current location for the length of the Project, with proposed buildings on the north side of the roadway. A 30-foot tall wind-fence with semi-transparent fabric mesh would be constructed

along the eastern and western Project boundaries. An 8-foot high security fence topped with barbed or razor wire would be constructed along the north and an south end of the Project site.

4.12.2.1 Project Contrast

The determination of Project Contrast was based on the introduction of the solar fields, power blocks, and associated Project components. The regular geometric forms and strong horizontal lines associated with the solar fields would occur as a result of clearing primarily creosote bush within the Project area and the construction of the solar arrays. At certain times of the day the blue reflection of the sky would strongly contrast in color with the surrounding landscape, which is predominately dark green (vegetation) to beige (soils and/or unpaved roads). The introduction of geometric and formal lines and forms associated with the power blocks would result in moderate/strong contrast when compared to the diagonal and angular lines associated with adjacent scenery (Funeral Mountains).

Nighttime Lighting

Potential effects to dark sky resources would result from nighttime operations of the proposed Project. Specifically, lighting of the power blocks for operational safety and security purposes and lighting required to clean mirrors have the potential to introduce a new light source in the immediate vicinity of the Project site. Project construction is anticipated to occur during normal Monday thru Friday daytime working hours. However, if nighttime lighting is needed for construction, any lighting would be directed to the center of the construction area and would be shielded. From a regional perspective, the nighttime operations of the proposed Project are anticipated to introduce a new source of nighttime lighting. No such measurements currently exist that are defensible, and nor do existing measurements meet the requirements of this EIS. Below, however, are recommended mitigation measures that would reduce or minimize dark sky impacts

To reduce lighting impacts during construction and operations, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded and lights would be directed on site so that light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security; this would allow these areas to remain un-illuminated (dark) most of the time and thereby minimizing the amount of lighting potentially visible off-site.

To minimize the risk of collision and disturbance to wildlife from lights, the Proponent proposes various measures, which include specifications that the lighting atop the towers use red lights, rather than steady burning or strobe lighting, and recommendations for lighting to be shielded downward and turned off when not needed.

To the extent feasible, consistent with safety and security considerations, the Proponent will design and install all permanent exterior lighting and all temporary construction lighting such that (1) lamps and reflectors are not visible from beyond the Project site, including any off-site security buffer areas; (2) lighting does not cause excessive reflected glare; (3) direct lighting does not illuminate the nighttime sky, except for any required Federal Aviation Administration

aircraft safety lighting (which should be an on-demand, audio-visual warning system that is triggered by radar technology); (4) illumination of the Project and its immediate vicinity is minimized; and (5) the plan complies with local policies and ordinances. The Project owner will submit to the BLM's Authorized Officer for review and approval and simultaneously to the appropriate local authority for review and comment a lighting mitigation plan that includes the following:

- Location and direction of light fixtures will take the lighting mitigation requirements into account
- Lighting design will consider setbacks of Project features from the site boundary to aid in satisfying the lighting mitigation requirements
- Lighting will incorporate fixture hoods/shielding, with light directed downward or toward the area to be illuminated
- Light fixtures that are visible from beyond the Project boundary will have cutoff angles that are sufficient to prevent lamps and reflectors from being visible beyond the project boundary, except where necessary for security
- All lighting will be of minimum necessary brightness consistent with operational safety and security
- Lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) will have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied

Scenic Quality

The proposed Project would be located within a BLM-designated Class C landscape (see Figure 3-18) where primarily flat to low rolling topography is occupied by primarily low-growing creosote shrubs. The local setting has been modified by several existing distribution lines, residential and community services facilities, transportation routes, and agricultural fields. Regionally, industrial facilities such as the Valley Substation to the south and a substation to the southeast, several gravel mining facilities, and dispersed residential and community facilities have modified the setting by introducing vertical and horizontal structures into a primarily low profile landscape. Due to the large scale of the Project and the modifications required to construct the Project (i.e., removal of all vegetation where the solar fields are proposed), Project contrast is anticipated to be moderate/strong. However, because the land in which the proposed Project would be located has been designated as Class C, and existing landscape character has already been substantially modified by human development at both the local and regional levels, impacts to scenic quality are anticipated to be moderate.

Sensitive Viewers

Impacts to sensitive viewers are anticipated to range from predominately low, where moderate/strong project contrast would be imperceptible due to distance or screening, to limited areas of high, where high sensitivity viewers have unobstructed views of the Project in the foreground (0 to .25 mile) distance zone. The regular geometric forms associated with the solar fields and dry-cooling system would contrast strongly with the irregular, organic forms

associated with the landscape setting. In addition, color contrast associated with the solar arrays would vary throughout the day as the parabolic mirrors that comprise the arrays track the sun from east to west and reflect the typically blue sky. In limited situations, glare associated with the reflection of the sun would increase contrast and could occur based on viewer position (typically elevated above the project), angle of solar arrays, and atmospheric conditions. It is anticipated that sensitive viewers would have direct to screened views of the solar arrays at a vertical to near vertical position in the early morning (from the east) and late evening (from the west). Hence, the highest impacts are anticipated to occur during these times within the foreground (0 to 0.25 mile) project specific distance zone. A 30-foot tall wind fence is proposed along the eastern and western perimeters; depending on final design and construction, the wind fence could reduce contrast by partially screening the views of the solar facility in the foreground distance zone. Viewers with a superior viewing position would likely perceive moderate/strong project contrast as compared to a level viewing condition. Thus, impacts for those viewers with superior viewing positions would be higher as compared to viewers at the same distance with a level viewing position. There are no sensitive viewers with superior views in the foreground or middleground for the proposed Project. Impacts to sensitive viewers are described below. Overall, impacts to sensitive viewers would be reduced because the Project would:

- be located in primarily the middleground to background distance zone of sensitive viewers (exceptions include the residences east of Sandy Lane and Valley View Boulevard)
- be constructed on land with minimal topographic variation occupied by primarily low growing, evenly spaced Mojave desert vegetation (i.e., creosote bush)
- occur at an elevation where viewers would have level (neutral) views of the Project; therefore, the majority of the Project would be screened by existing landscape features (i.e., vegetation, topography, commercial and residential development, etc.)

Travel Routes

U.S. Routes

- **US 95 (KOP3, KOP 7)** – Visual Contrast is anticipated to be weak/moderate for moderate sensitivity viewers traveling along US 95. The Project would be viewed from a level viewing position for a short duration in the middleground to background distance zone. At its closest point, the Project would be located approximately 5 miles from this travel route. Due to the low, horizontal nature of the solar arrays seen in context with the vast horizon lines associated with the Basin and Range, Visual Contrast would be weak. At certain times of the day, color contrast would increase as the solar arrays track the sun from east to west, and reflect the typically blue sky of the Great Basin. The cooling towers associated with the power blocks would be partially- to fully- skylined increasing contrast in form, color, and line as illustrated on Figure 4-7 A, B. Therefore, overall impacts are anticipated to range from low to moderate/low.

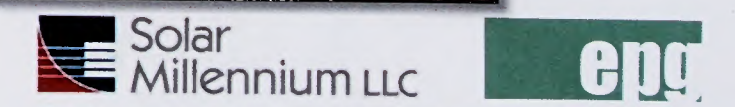


Existing Condition – View facing south-southeast from eastbound US 95 toward existing distribution lines and 230kV transmission lines



Simulated Condition – Proposed wind fence, solar fields, thermal energy storage tanks, 250 MW power blocks and associated transmission lines, switchyard, and maintenance building. Viewpoint is approximately 6.8 miles to nearest power block

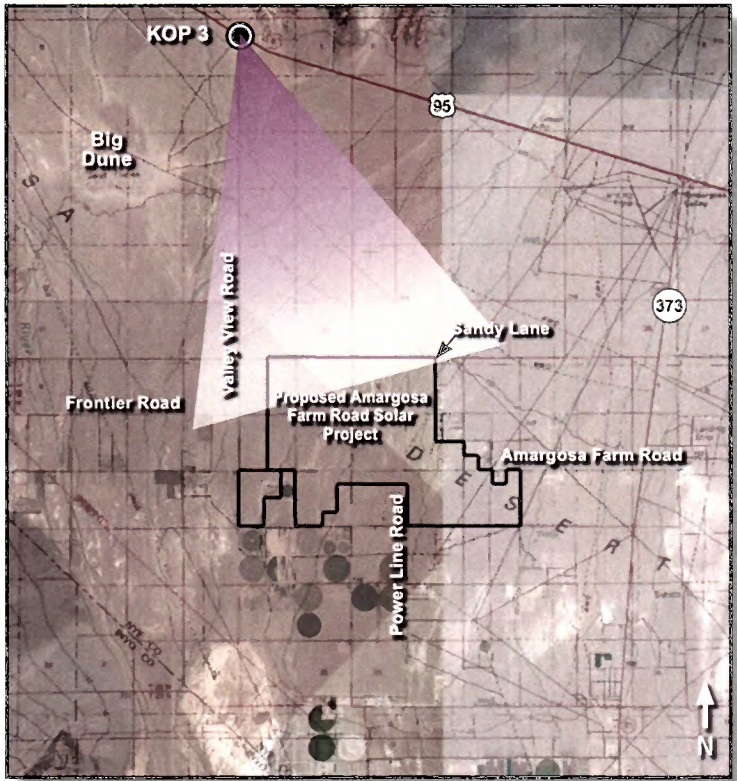
Photo Date and Time: 12-14-09, 2:39 p.m. Solar Collector Angle: 40 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
 Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
 This simulation represents the solar array, power blocks, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.



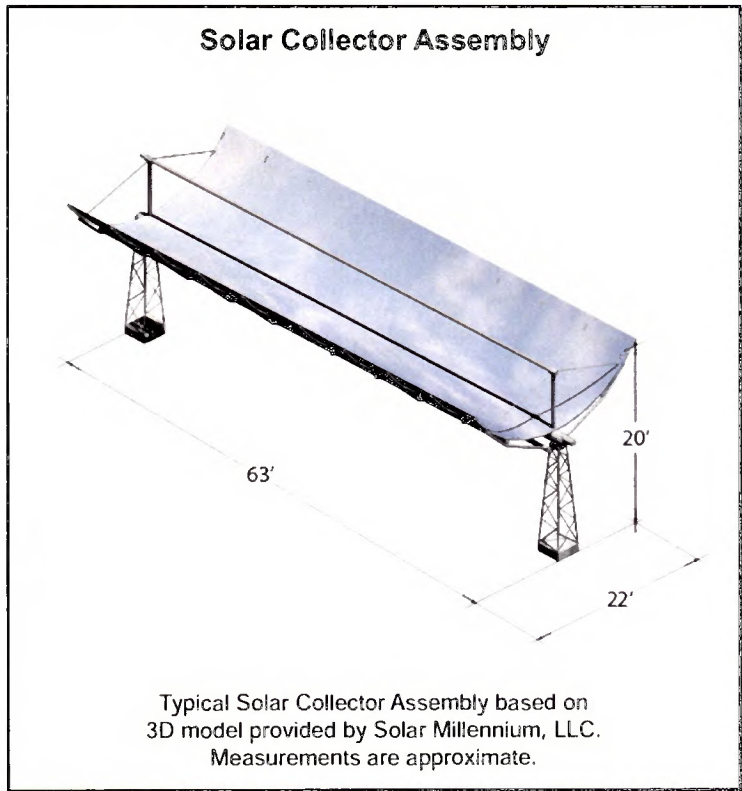
Amargosa Farm Road Solar Project
Key Observation Point Simulation 3

Figure 4-7A

June 2010



Photograph Location: Viewing south-southeast from the intersections of eastbound US 95 and Valley View Road, Amargosa Valley, Nevada.



**Amargosa Farm Road Solar Project
Key Observation Point Simulation 3**

Figure 4-7B

June 2010

State Highway Routes

- **NV 373 (KOP 10)** – Visual Contrast is anticipated to range from weak to weak/moderate for moderate sensitivity viewers returning from Death Valley Junction. The Project would be viewed from a level viewing position in the middleground (see KOP 10) to foreground distance zone(s). Visibility of the Project would be partially screened by topography and/or vegetation associated with residential land uses as travelers head north. Although portions of the solar fields and the taller power block components would be seen as travelers get closer to the Project site, existing residential structures, commercial development, town infrastructure (i.e., cell towers), and vegetation reduce Project contrast. Therefore, impacts to travelers using NV 373 are anticipated to range from low to low/moderate.

- **NV 374 (see KOP 14)** – Visual Contrast is anticipated to range from weak to weak/moderate for travelers using NV 374. The proposed Project would be located in the background distance zone (approximately 25 miles) from the viewer where atmospheric conditions and terrain reduce visibility. The reflective nature of the solar arrays would reflect the sky in the afternoon, resulting in a potential increase in visual contrast to weak/moderate. Based on these conditions, and the sensitivity of the viewer, impacts are anticipated to be low.

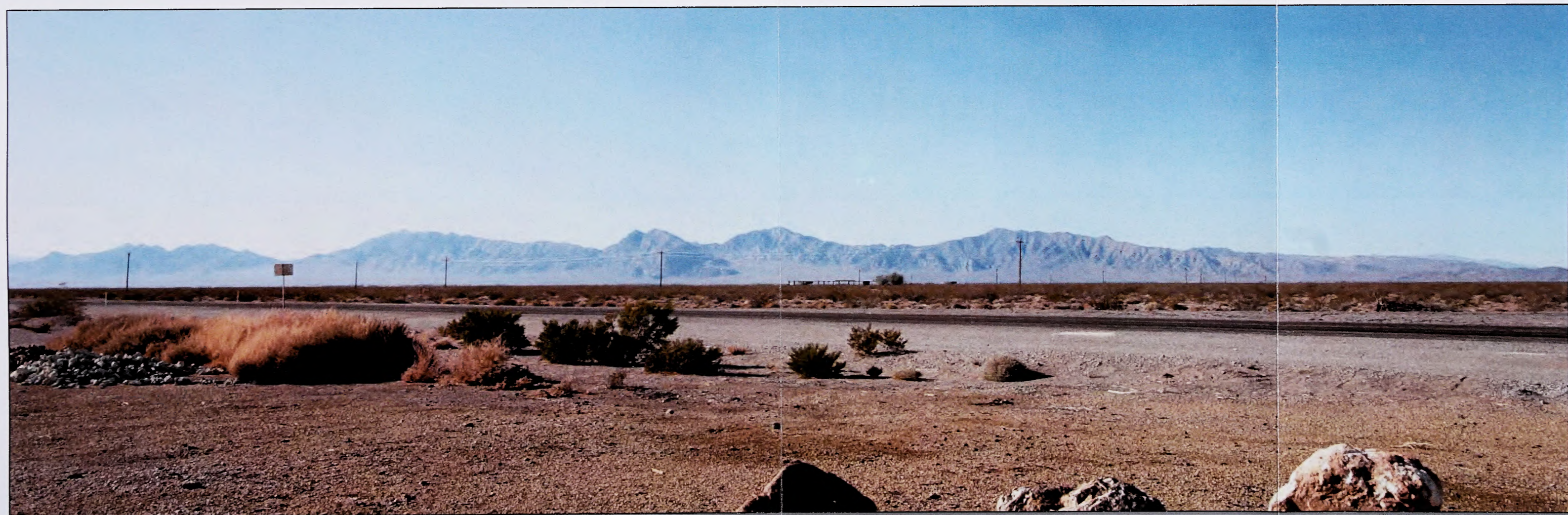
- **NV 160 (KOP 11)** – For moderate sensitivity travelers using NV 160, visual contrast would be weak with slightly superior views of the Project in the background distance zone (15+ miles). Atmospheric conditions may reduce visibility of the Project intermittently throughout the year. The Project would be partially screened by topography (unnamed hills approximately 8 miles east of the Project site), further reducing Project contrast. Therefore, impacts to this moderately sensitive travel route are anticipated to be low.

- **CA 127 (KOP 13)** – Visual Contrast is anticipated to be weak for moderate sensitivity viewers using CA 127. The Project would be viewed from a level viewing position in the background (approximately 18 miles) distance zone. Visibility of the Project would be partially obscured by topography between the Project and the viewer, although the taller power block components could be perceptible on a clear day. Therefore, low impacts are anticipated.

- **Lathrop Wells Rest Park (KOP 2)** – Moderate Sensitivity viewers are anticipated to have level views of the Project in the background (5.5 miles) distance zone resulting in weak visual contrast. The Project would be partially screened by topography and the out-buildings associated with the rest area based on the location of the viewer within the rest area. Farm-related structures are located between the rest area and the Project, which further reduces Project contrast. Impacts are therefore anticipated to be low as illustrated on Figure 4-8 A, B.

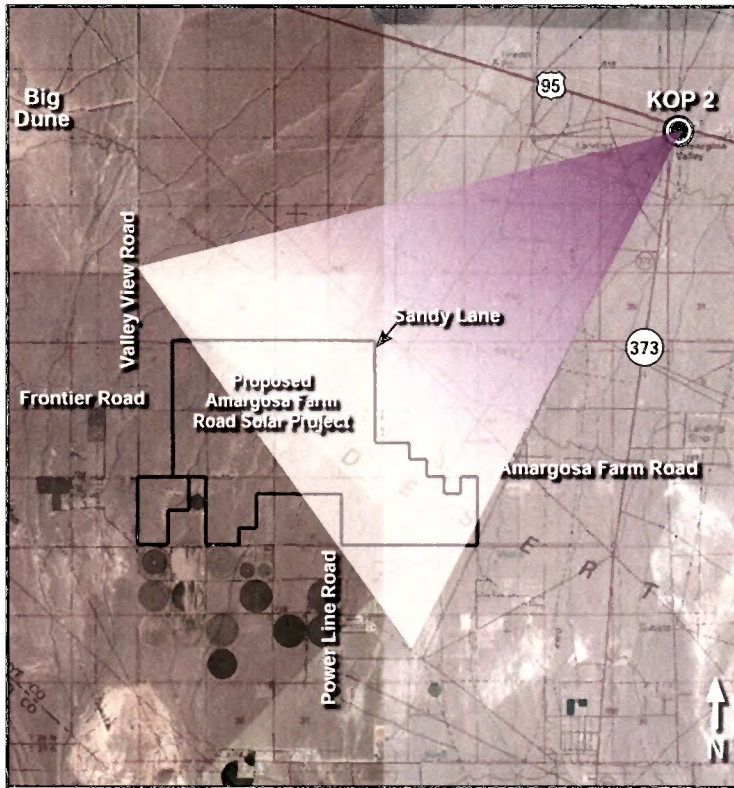


Existing Condition – Facing southwest from Lathrop Wells Rest Area toward NV 373, existing distribution lines, and the Funeral Mountains

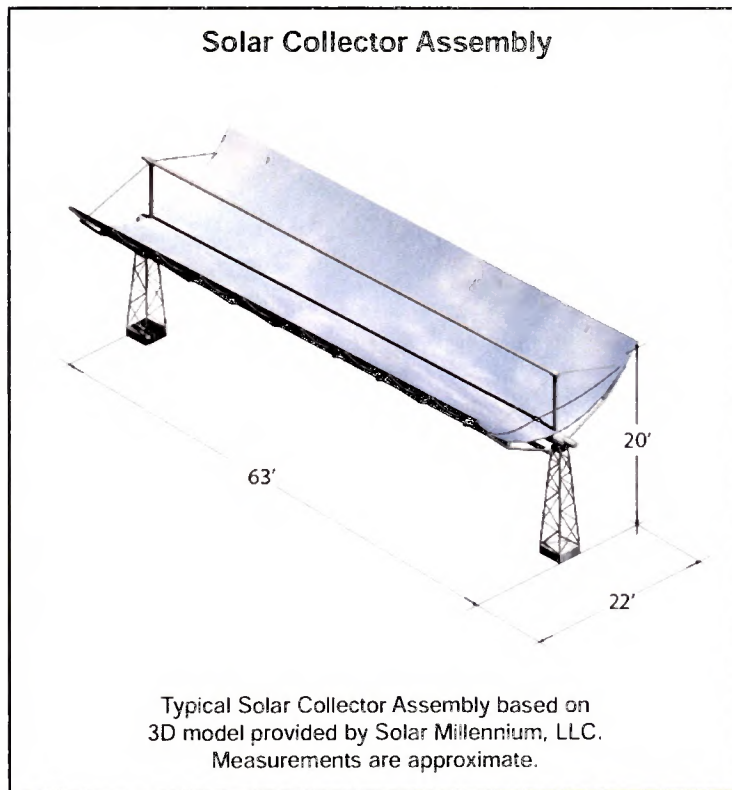


Simulated Condition – Proposed 250 MW power blocks
Viewpoint is approximately 6.75 miles from nearest power block

Photo Date and Time: 12-14-09, 10:04 a.m. Solar Collector Angle: 15 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
This simulation represents the solar array, power blocks, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.



Photograph Location: Viewing southwest from Lathrop Wells Rest area on US 95 and NV 373, Amargosa Valley, Nevada.



**Amargosa Farm Road Solar Project
Key Observation Point Simulation 2
Figure 4-8B**

Local Access Routes

- **Sandy Lane (see KOP 1)** – Moderate/Strong visual contrast is anticipated for the moderate sensitivity viewers that would have level views of the proposed solar fields, power blocks and their associated transmission lines, and wind fence in the foreground distance zone. The Project would be seen primarily by residents traveling to and from their homes along Sandy Lane with unobstructed views of the Project. An introduced landscape buffer (per Nye County Development Agreement) would aid in visually breaking up the expanse of wind fence and adding visual interest between the residents along Sandy Lane and the proposed Project. The wind fence would be 30 feet tall and approximately 600 feet from the edge of the road, obscuring western views of the Funeral Mountains. The semi-transparent material of the wind fence would mute the color, line, and forms associated with the solar troughs throughout the day; thereby reducing Project contrast may be reduced. Nonetheless, based on the close proximity to the Project, high impacts are anticipated.

- **Amargosa Farm Road (KOP 6, KOP 9)** – Moderate/Strong visual contrast is anticipated for the moderate sensitivity viewers that would have level views of the proposed solar fields, power blocks , and administrative buildings in the foreground distance zone. Changes to landform and vegetation color and texture would be weak, and changes to vegetation line and form associated with the wind fence would be moderate from KOPs 6 and 9. However, as commuters travel east or west respectively through the Project site (i.e., between administrative and maintenance buildings and the solar fields), landform, vegetation, and structure contrast would increase based on direct, unobstructed views into the proposed facility. Impacts, therefore, would be moderate/high based on the juxtaposition of the Project and the viewers.

- **Valley View Boulevard** – Moderate/Strong visual contrast is anticipated for the moderate sensitivity viewers commuting to and from their residences. The Project would be located immediately to the east of the road within the context of Amargosa Valley. The power block, and more specifically the dry-cooling unit, would be visible above the 30-foot wind fence, resulting in strong form and color contrast. Additionally, commuters, both north and south-bound, traveling towards the Project in the foreground distance zone, would see the solar fields, as well as portions of the power blocks through the proposed chain link fence. Based on the close proximity and visibility of the Project, high impacts are anticipated to occur.

Recreation Areas

- **Ash Meadows NWR (KOP 12)** – The view from KOP 12 is inferior as compared to the Project site from this background distance zone (10 to 15 miles) view. The Project features would be screened from high sensitivity viewers due to topography and vegetation in the vicinity around the Ash Meadows NWR area, as well as topography changes between the Project and the KOP resulting in weak visual contrast. The effect of the Project is expected to be weak from this view. Overall impacts are anticipated to be low.

- **Death Valley National Park** – There are no views anticipated for high sensitivity viewers with background views from the official recreation areas of the park due to complete screening from topography. Overall impacts are anticipated to be low.
- **Big Dunes (KOP 4)** – Weak/moderate visual contrasts are anticipated for moderate sensitivity users of the Big Dunes OHV area. Views of the Project would be unobstructed in the middleground distance zone (approximately 3.5 miles). The primary components that are discernable from this KOP are the dry-cooling units associated with the power blocks resulting in weak/moderate form and line contrast as illustrated on Figure 4-9 A, B. The solar fields and their associated transmission lines are backdropped by the Resting Spring Mountain and resemble the existing horizon line. Although the dry-cooling units are visible, the regional setting would still remain intact; therefore, impacts would be moderate/low.
- **Funeral Mountains Wilderness (KOP 15)** – The Project, as seen from KOP 15, the Funeral Mountains Wilderness, is expected to result in moderate visual contrast in the background distance zone (13 miles). Due to the north-south orientation of the solar troughs, the blue color that results from the reflection of the sky would be minimized except during mid-day hours. In addition, glare may occur late in the afternoon which would increase visual contrast for a limited time. The major power block elements would be seen, but their visual contrast would be reduced due to the distance, the power block's neutral color, and backdropping. Therefore, overall impacts are anticipated to be moderate.
- **Amargosa River ACEC** – The Project would not be visible from this ACEC; therefore, no impacts would occur.

Residences

- **Valley View Estates (KOP 5)** – The Project would result in moderate/strong visual contrast within the foreground distance zone of high sensitivity residential viewers. Residences would have level, unobstructed views of the Project facility due to the flat character of the existing landscape and low-growing, evenly spaced vegetation. Due to the large scale of the Project, structure contrast would be the dominant visual element. Specifically, views would comprise the solar fields and the top portion of the dry-cooling units as depicted in Figure 4-10 A, B. Views of these components would be partially muted by the opaque material associated with the proposed wind fence. In addition to the moderate/strong contrast, construction and operation of the Project would partially to fully obstruct views of the Spring Mountains to the east-southeast from residences within Valley View Estates; and therefore, impacts are anticipated to be high.
- **Sandy Lane (KOP 1)** – The Project would result in moderate/strong visual contrast within the foreground distance zone from residences along Sandy Lane. Due to the close proximity of the Project to the residences (approximately 700 feet), the wind fence and solar fields would obscure the power block and associated dry-cooling unit although contrast in line, form, and color would still be evident. An introduced landscape buffer (per Nye County Development Agreement) would aid in visually breaking up the expanse

of wind fence and adding visual interest between the residents and the proposed Project. Additionally, existing views of the Funeral Mountains to the west would be dominated by the Project with line and form contrast being the dominant visual elements as depicted on Figure 4-11 A,B. Therefore, impacts to residences along Sandy Lane are anticipated to be high.

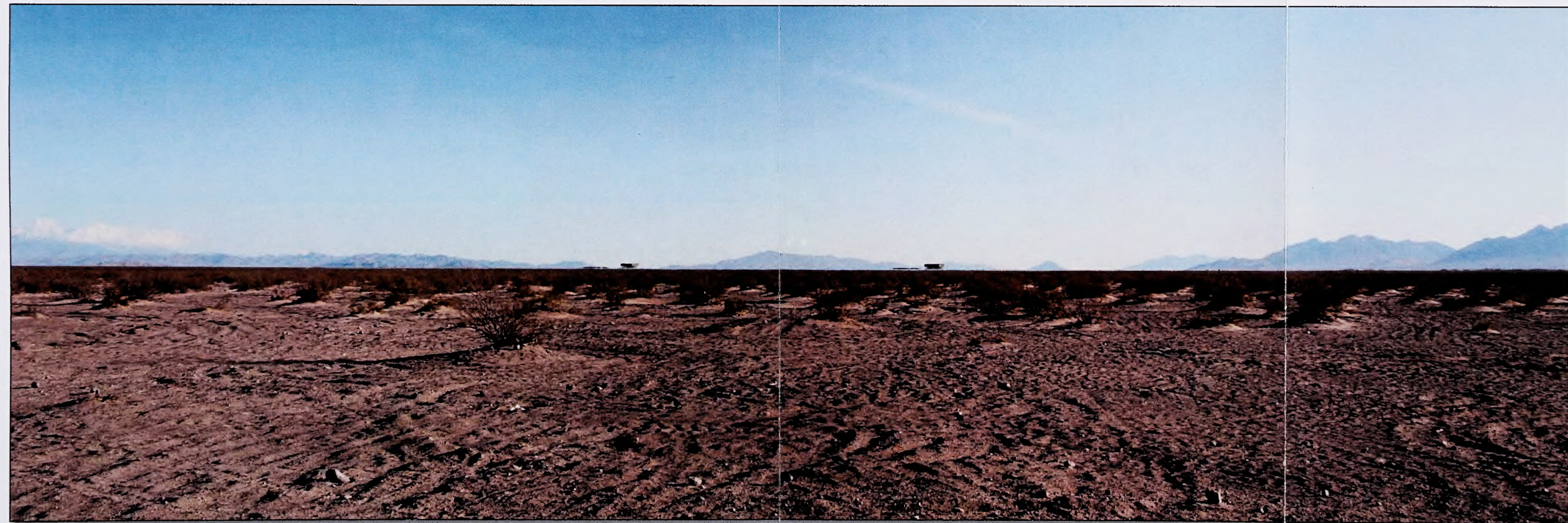
- **Residences East of Sandy Lane (KOP 8)** – Views of the Project from residences east of Sandy Lane would range from direct and unobstructed to completely screened in the foreground distance zone. Moderate/Strong visual contrast would be associated with those residences with unobstructed views of the Project and therefore impacts would be high (similar to those residences along Sandy Lane). Visual contrast would be incrementally reduced for those residences whose views of the Project would be partially- to fully- screened by the dense ornamental vegetation typical of Amargosa Valley and any screening afforded by the proposed landscape buffer. Therefore, impacts are anticipated to range from low to moderate to high.
- **Residences South of Amargosa Farm Road** – Residences are sporadically located from 1 to 5 miles south of Project site. Generally, views of the Project would be partially to fully screened by the mature vegetative borders typical of Amargosa Valley. For those residences that do have views of the Project, structure contrast would be low/moderate because the proposed facilities would be seen in context with the different components of the existing setting (e.g., cell towers, residences, agricultural facilities, etc.) which have similar visual elements as compared to the Project. Therefore, overall impacts are anticipated to range from moderate/low to low based on the level of screening and the context in which the Project is seen.

Community Facilities

- **Amargosa Elementary School and adjoining Community Center** – Views of the Project for this moderate sensitivity viewing location are anticipated to be partially to fully screened in the foreground distance zone (1 mile). Dense vegetation around residences to the west of the school would reduce the visibility of project contrast. Impacts, therefore, are anticipated to be low/moderate.
- **Community Park, Amargosa Senior Center, and AVIA Community Center** – Viewers from these locations would have partially screened to screened views of the Project based on the occurrence of vegetation, residences, and community facilities. Views of the Projects ancillary facilities proposed along Amargosa Farm Road, including the switchyard, administrative building, and assembly hall could be direct and unobstructed. However, visual contrast associated with these facilities is anticipated to be weak/moderate, because the visual elements associated with these features would be similar to existing features found within the town of Amargosa Valley. Moderate visual contrast would occur in those locations that the dry-cooling units would be visible. Therefore, impacts would range from low to moderate based on the visibility of the aforementioned Project components.

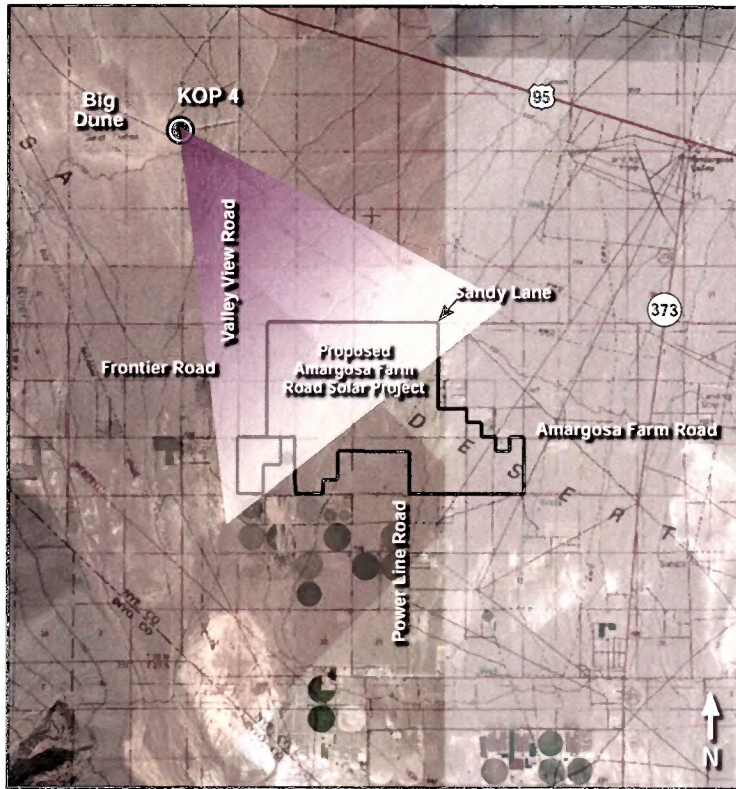


Existing Condition – View facing southeast from Big Dune Recreational Area

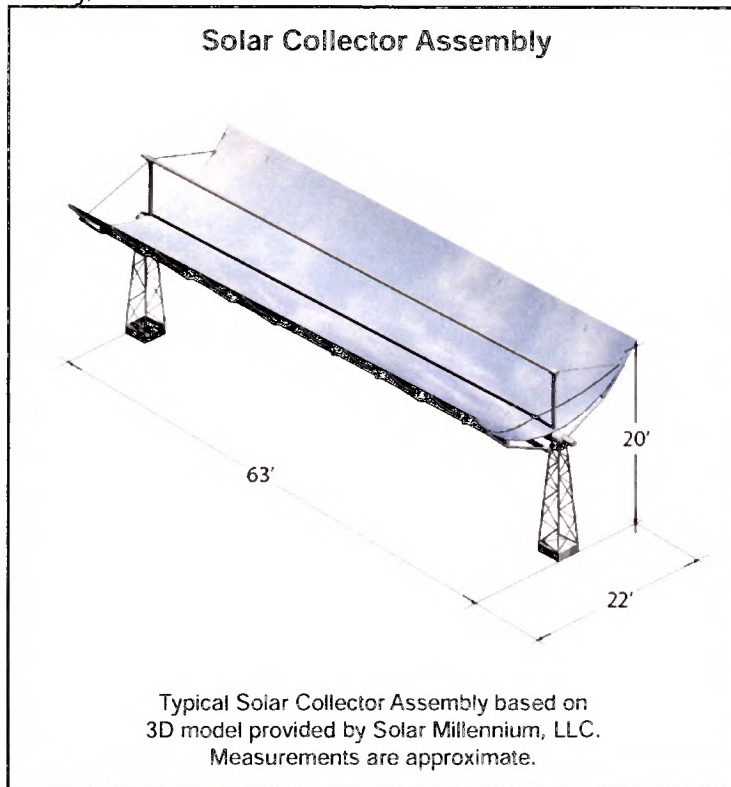


Simulated Condition – Proposed wind fence, solar fields, thermal energy storage tanks, 250 MW power blocks and associated transmission lines, and switchyard
Viewpoint is approximately 5.0 miles to nearest power block

Photo Date and Time: 12-14-09, 2:51 p.m. Solar Collector Angle: 40 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
This simulation represents the solar array, power blocks, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.

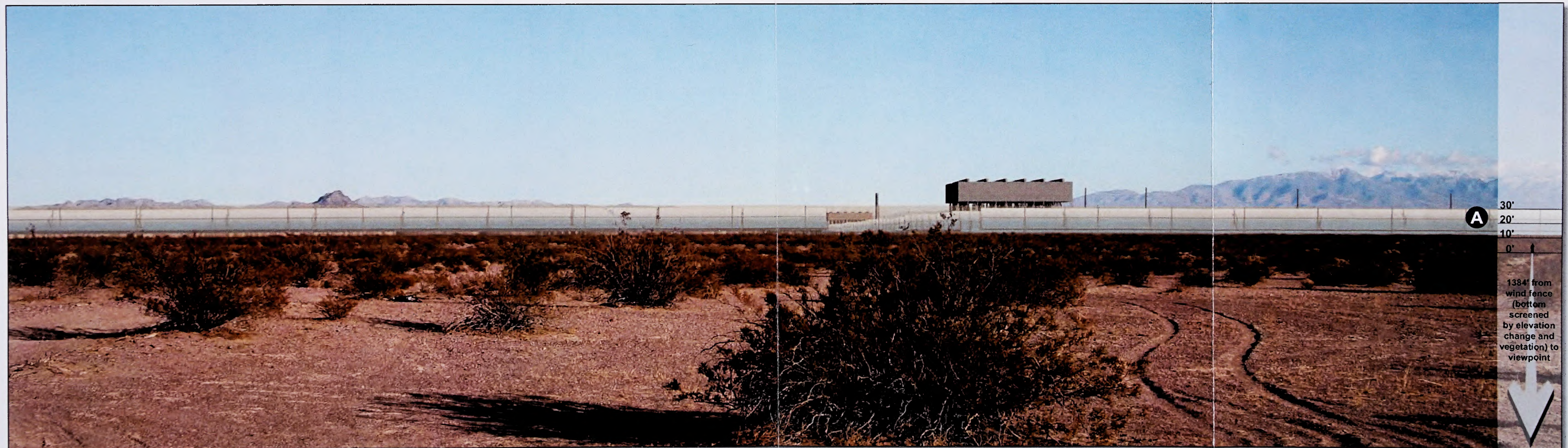


Photograph Location: Viewing southeast from Big Dune Recreational Area, 1 mile west of Valley View Road, Amargosa Valley, Nevada.



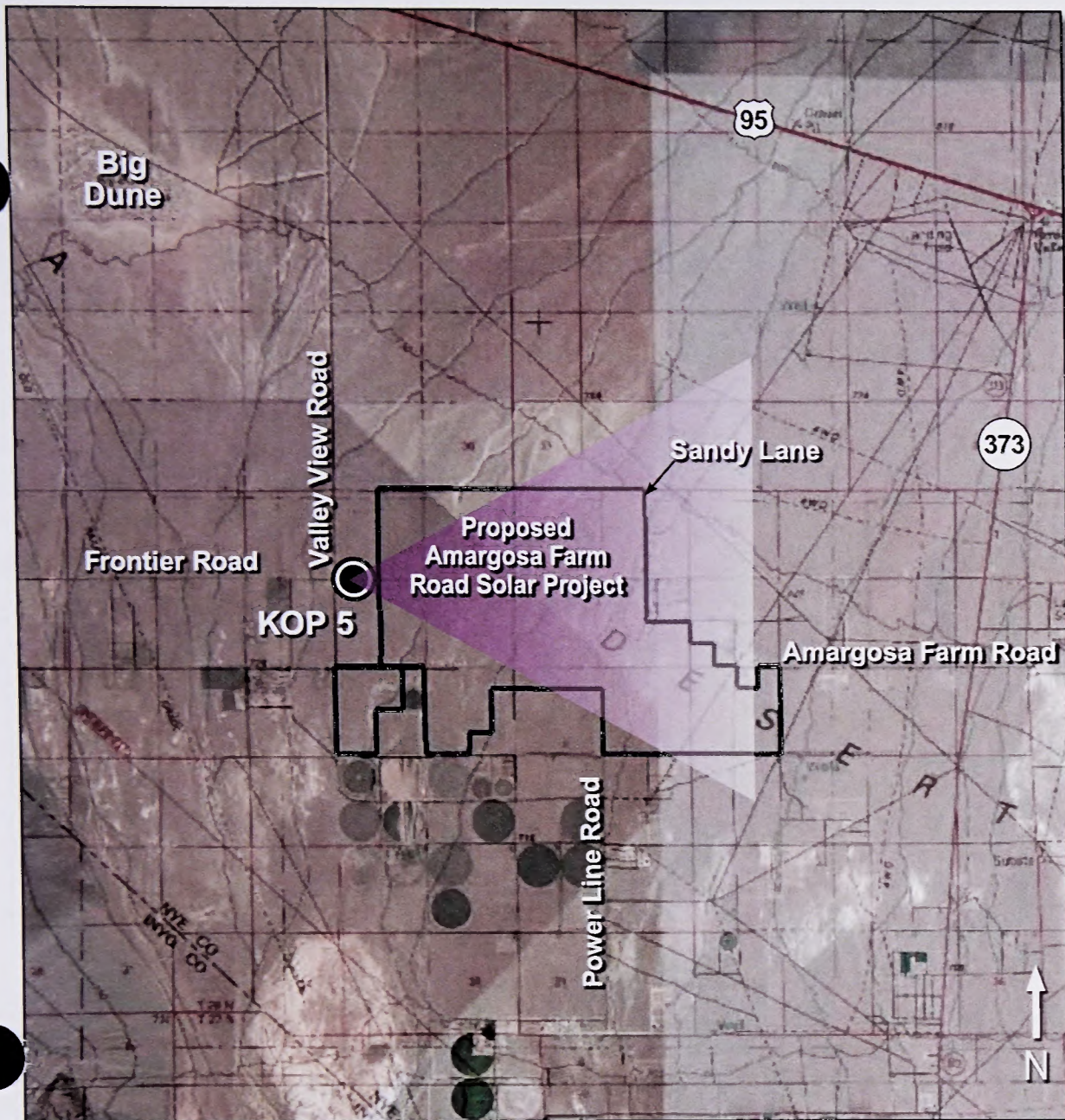


Existing Condition – View facing east from Valley View Estates toward the existing distribution line and the Spring Mountains

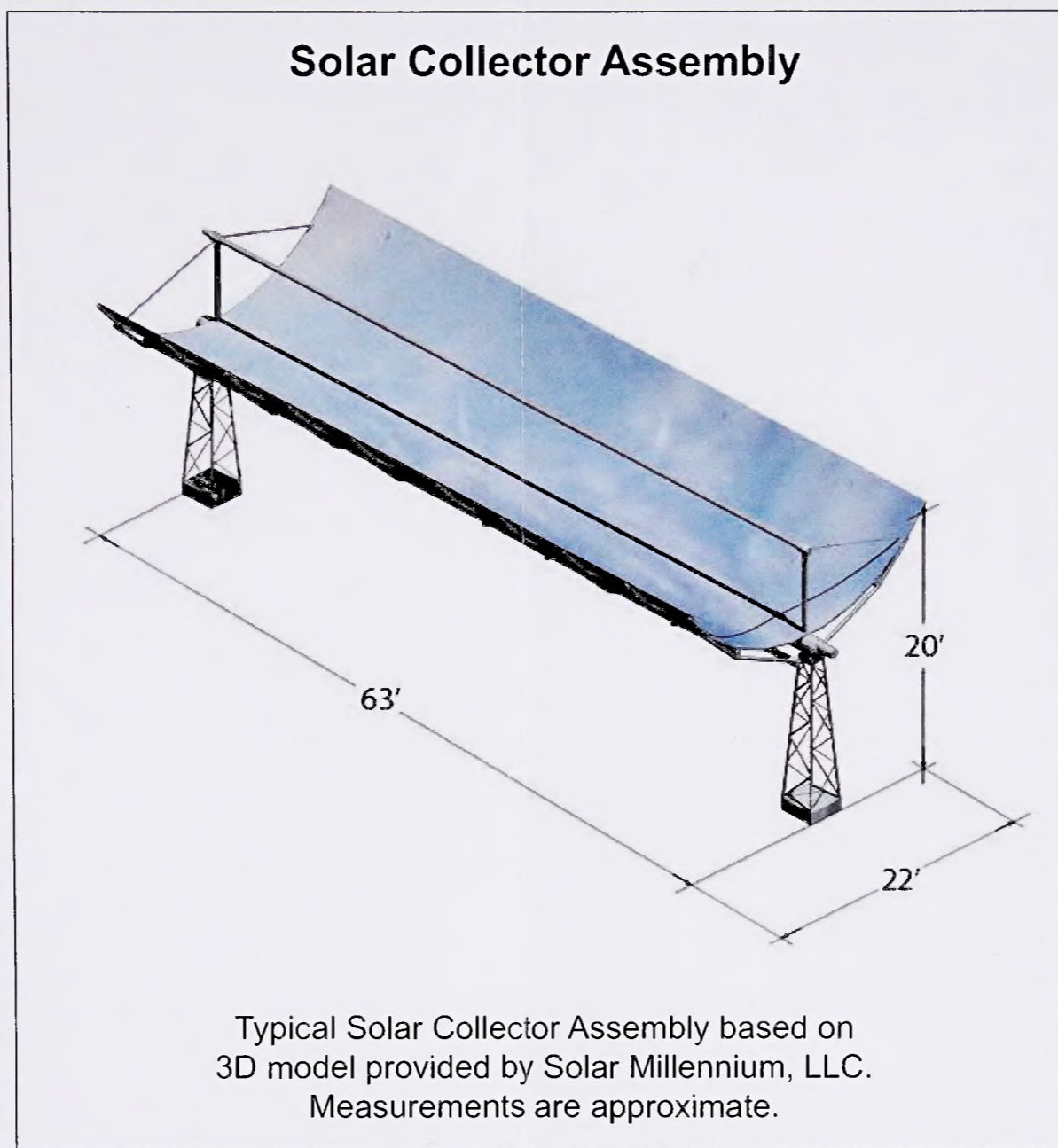


Simulated Condition – Proposed wind fence (30 feet tall), solar fields, 250 MW power blocks with associated transmission lines, and re-routed distribution lines
Viewpoint is approximately 0.25 mile from fence and 0.94 mile from cooling tower

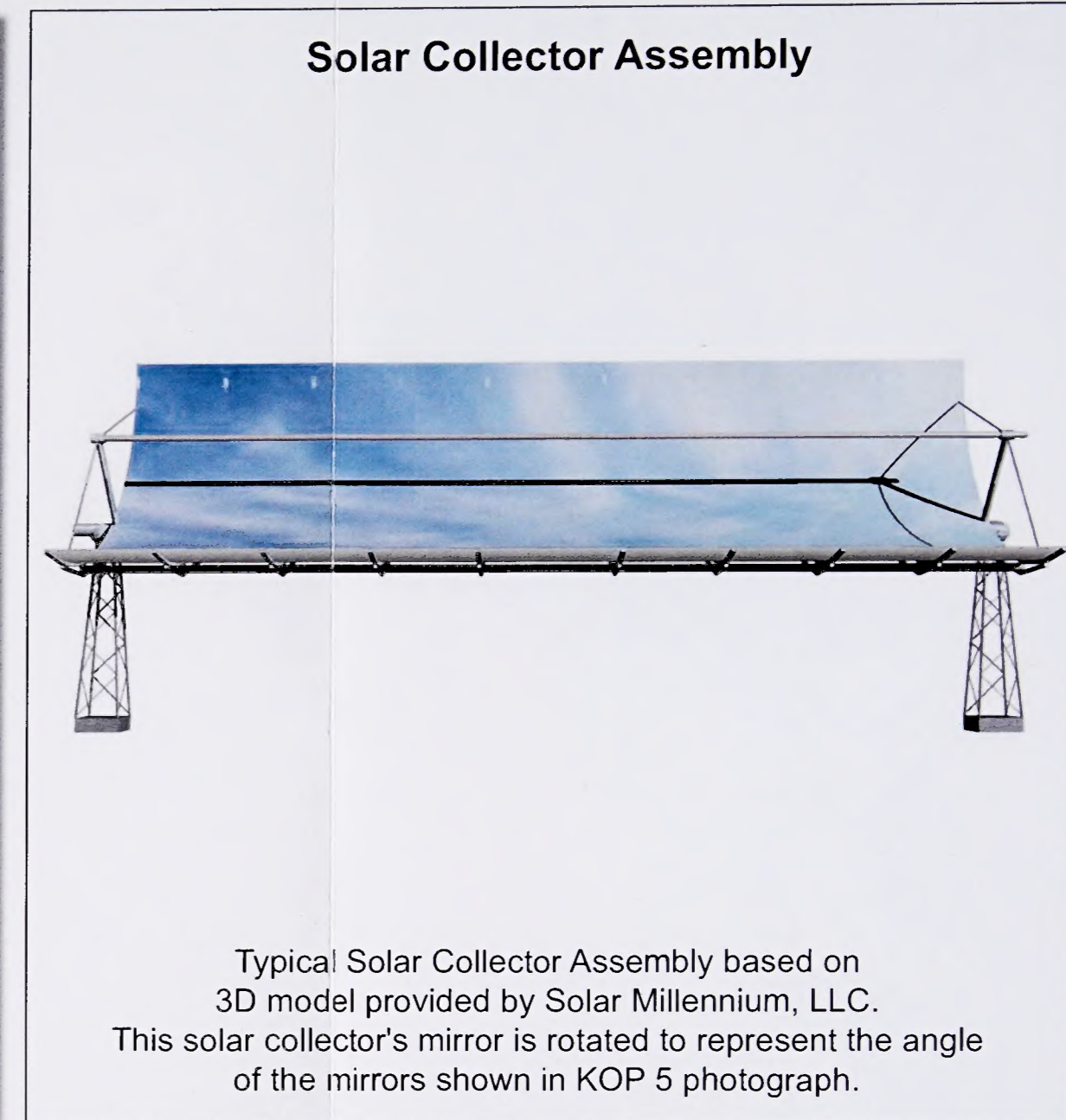
Photo Date and Time: 12-14-09, 3:06 p.m. Solar Collector Angle: 40 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
This simulation represents the solar array, power blocks, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.



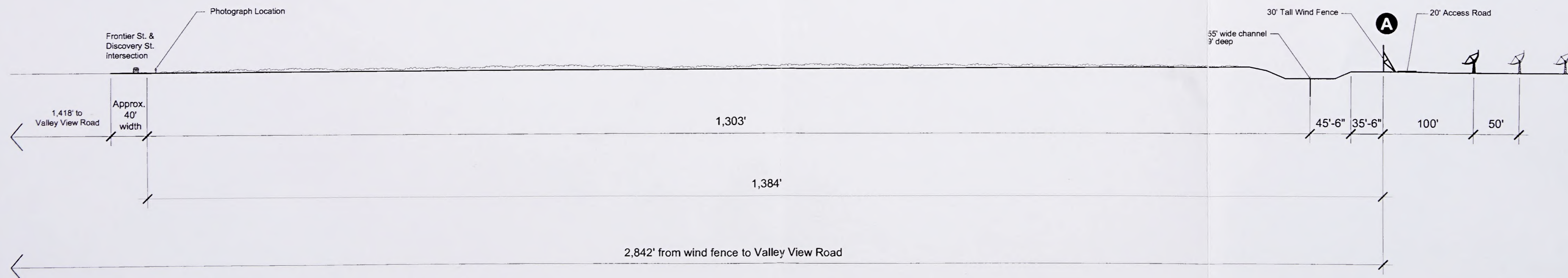
Photograph Location: Viewing east from Valley View Estates residential area at Frontier Road, 0.25 mile east from Valley View Road, Amargosa Valley, Nevada.



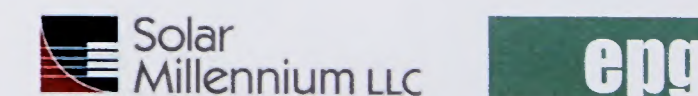
Typical Solar Collector Assembly based on 3D model provided by Solar Millennium, LLC. Measurements are approximate.



Typical Solar Collector Assembly based on 3D model provided by Solar Millennium, LLC. This solar collector's mirror is rotated to represent the angle of the mirrors shown in KOP 5 photograph.



Cross Section – Frontier St. and Discovery St. intersection to perimeter channel, wind fence (30 feet tall), access road, and solar collectors



Amargosa Farm Road Solar Project
Key Observation Point Simulation 5

Figure 4-10B

June 2010

Photo Date and Time: 12-14-09, 3:06 p.m. Solar Collector Angle: 40 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
This cross section represents the solar array, channel, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.



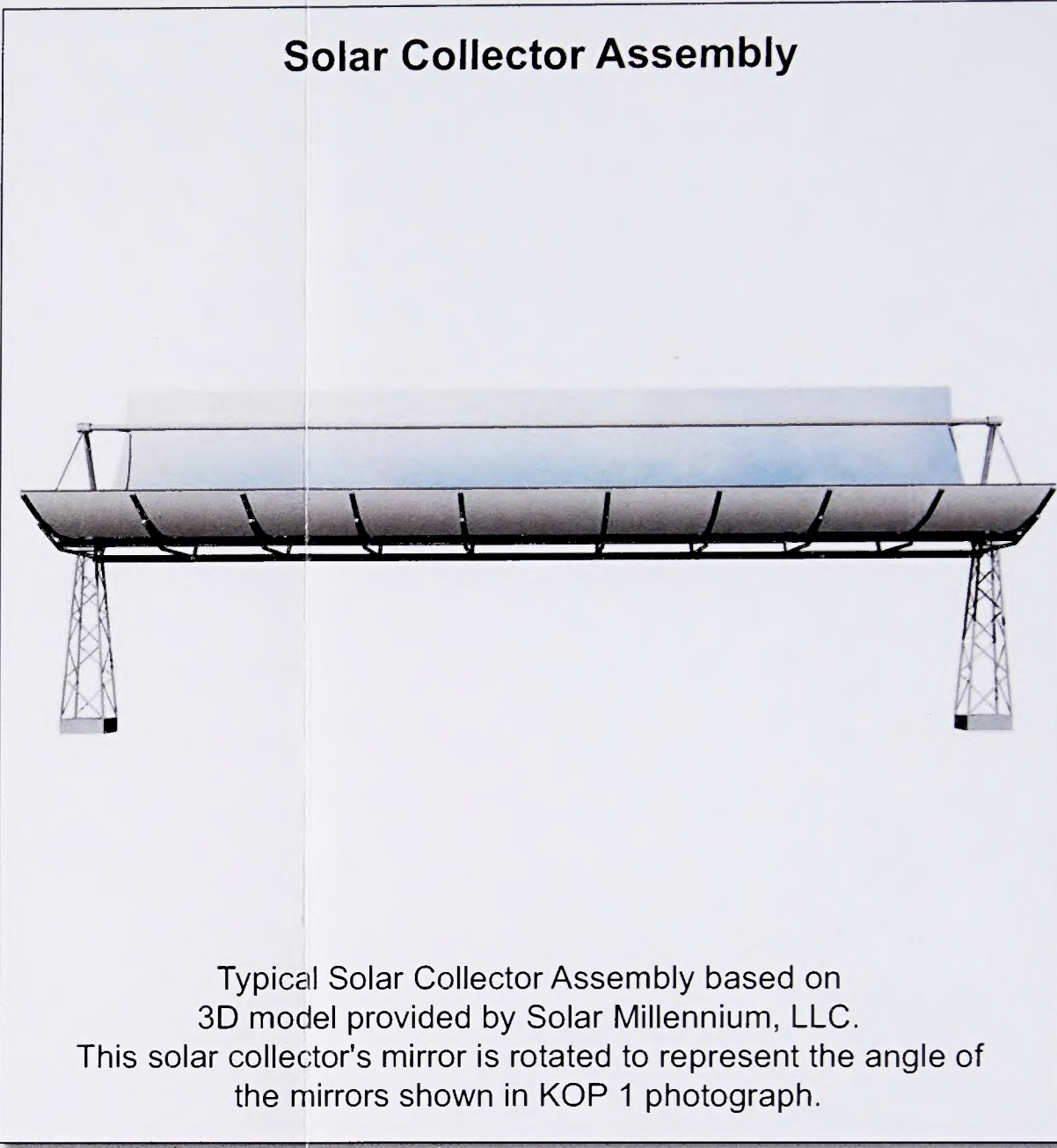
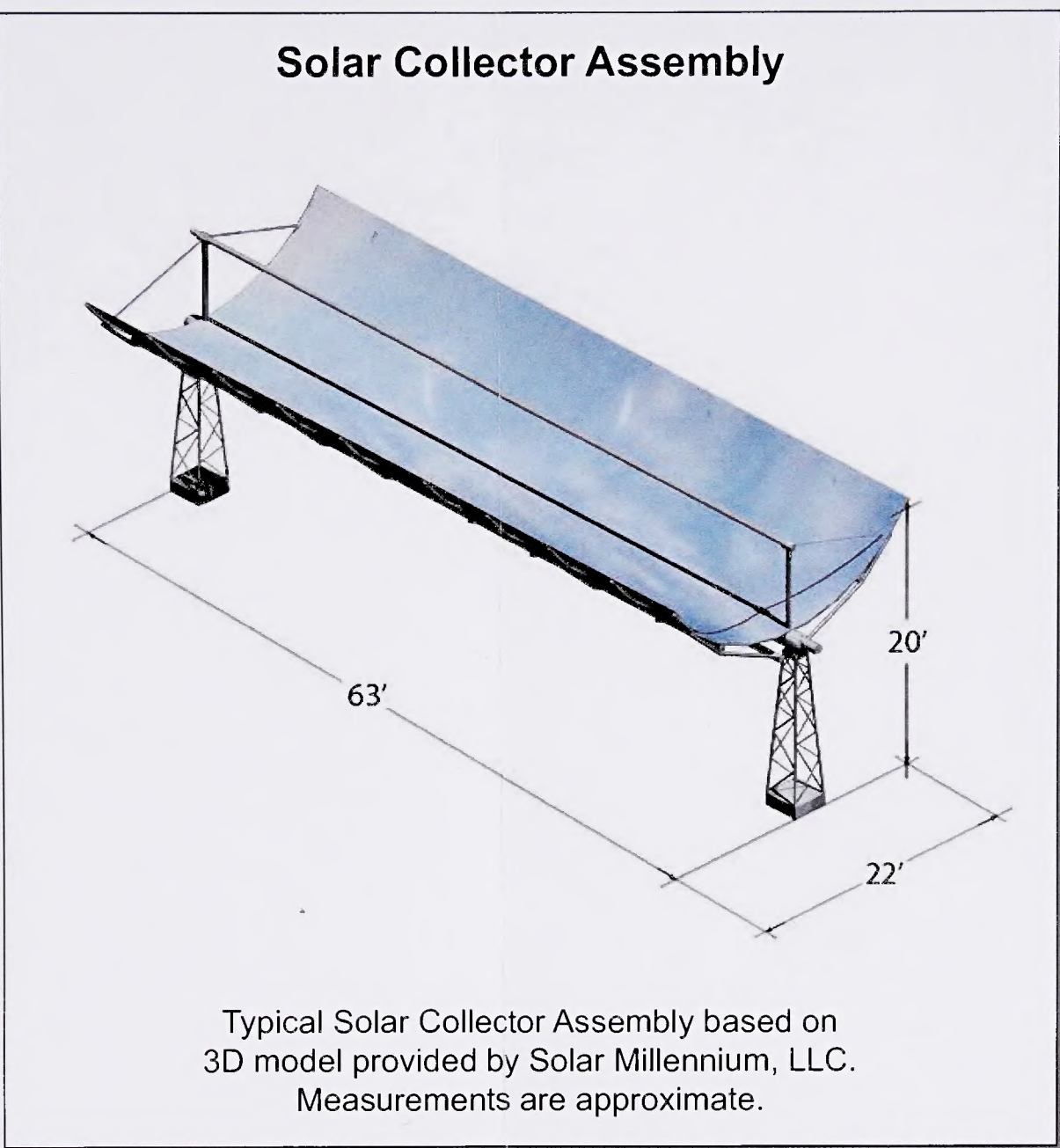
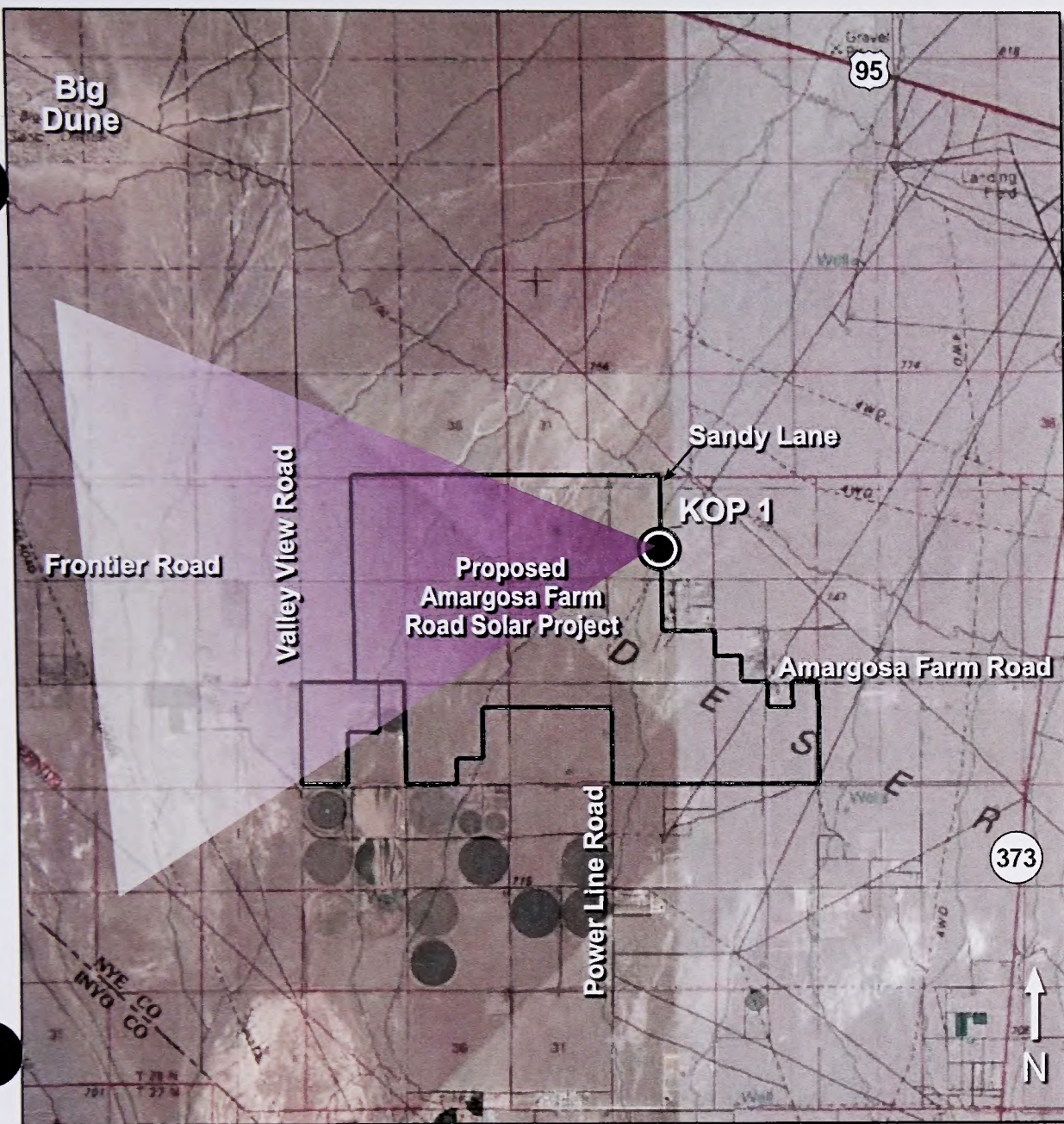
Existing Condition – Facing west from Sandy Lane Residential Area toward Sandy Lane, BLM lands, existing distribution line, and the Funeral Mountains



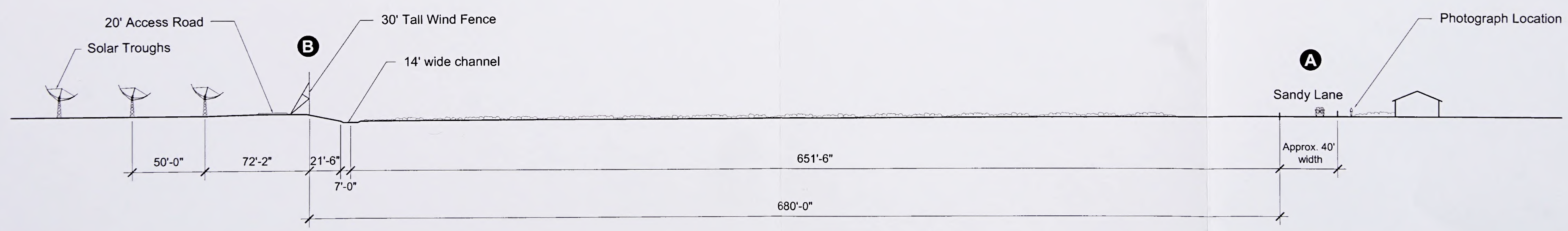
Simulated Condition – Proposed perimeter channel (screened by vegetation), wind fence (30 feet tall), solar fields, and thermal energy storage tanks

Viewpoint is approximately 720 feet from wind fence and 0.9 mile from nearest power block (obscured by solar fields and wind fence)

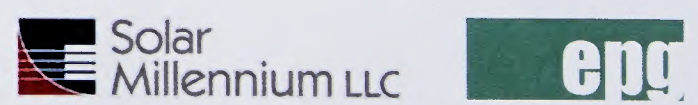
Photo Date and Time: 11-23-09, 10:33 a.m. Solar Collector Angle: 15 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
 Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
 This simulation represents the solar array, power blocks, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.



Photograph Location: Viewing west from a residential area at Sandy Lane, 0.32 mile north of Frontier Road, Amargosa Valley, Nevada.



Cross Section – Sandy Lane to perimeter channel, wind fence (30 feet tall), access road, and solar collectors



Amargosa Farm Road Solar Project
Key Observation Point Simulation 1
Figure 4-11B

Photo Date and Time: 11-23-09, 10:33 a.m. Solar Collector Angle: 15 degrees from vertical Atmospheric Conditions: Clear Focal Length: 50mm
 Structure models that were used in the simulations were created using 3D Models provided by Solar Millennium, LLC.
 This cross section represents the solar array, channel, and wind fence locations based on the preliminary site plan dated 12-22-09, which are subject to change based on final design and engineering.

Historic Features

- **Rhyolite and Rhyolite Cemetery (KOP 14)** – Visual contrast is expected to be weak in those locations in which the proposed Project would be visible in the background distance zone (25 miles). Viewers would have partially screened to screened views based on topography, although views would be from a superior vantage point. The Project would be completely backdropped due to the viewing angle, but the reflective nature of the solar mirrors could possibly be seen reflecting the sky in the afternoon which would raise visual contrast to weak/moderate for a short duration of time. An existing landfill is 0.5 mile east of the cemetery, which dominates the view towards the Project site. Impacts are anticipated to be low for viewers within both the Town of Rhyolite and the Rhyolite Cemetery.

4.12.2.2 Compliance with Visual Resource Management Objectives

The proposed Project would be located on BLM land designated as Class IV. Compliance with VRM objectives for Class IV designated land is anticipated because the proposed Project would be located in a Class IV landscape with the following management objective: *provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high* (BLM VRM Manual 8400). The visual contrast and resulting impacts identified through the visual assessment range from low in those locations that the Project would be screened or viewed in the background distance zone, to limited areas of high impacts where high sensitivity viewers would have direct, unobstructed views of the Project in foreground distance zone. These impacts and associated changes to landscape character are consistent with Class IV objectives; therefore, consistent with applicable planning documents.

4.12.3 Wet-Cooled Alternative

Impacts to visual resources under the wet-cooled alternative would be similar to those described for the Proposed Action (dry-cooling alternative), with two exceptions. First, under the wet-cooled alternative, visual contrast would be reduced for those KOPs with views of the dry-cooling unit associated with the Proposed Action, which include KOPs 1 thru 6, 9, 10, and 15. This reduced visual contrast results from the fact that the wet-cooling unit would be at least half the height of the dry-cooling unit, and therefore would be less visible to sensitive viewers. High impacts would remain for residences located along Sandy Lane and within Valley View Estates, but impacts would be reduced for all other identified sensitive viewers identified in section 4.12.1.2.

Second, the wet-cooling alternative would have greater visual impacts than the dry-cooled alternative in the form of a periodic vapor plume. The Proponent has completed a desktop study looking at other similar projects, such as the Beacon Solar Energy Project's Application for Certification filing with the California Energy Commission, and this analysis and its results are described below.

4.12.3.1 Vapor Plume Analysis

Cooling tower associated with wet-cooled solar projects are a potential source of visible water vapor plumes during daylight hours. As part of the Beacon Solar Energy Project impact studies, the solar developer conducted an analysis to estimate the potential size and frequency of visible plume formation during daylight hours. The Seasonal and Annual Cooling Tower Impacts (SACTI, Version 9/30/90) model was applied for this analysis. The following subsection presents a quantitative analysis of the vapor plumes emitted from the proposed Beacon Solar Energy Project facilities. The modeling results for the vapor plume are shown in Table 4-40.

Plume Length Case	Length (ft)	Daytime Frequency (hrs/yr)¹
Maximum	1,371	7
90 Percentile	958	128
50 Percentile	92	173

¹Yearly average based on 3 years of data
Source: ENSR 2008

4.12.4 No Action Alternative

The No Action Alternative would result in no Project related impacts to visual resources because no Project facilities would be constructed on BLM land.

4.12.5 Mitigation

Color mitigation – Surfaces of all ancillary facilities that are visible to the public, excluding the solar arrays, will be treated with paint colors that blend with the surrounding landscape (“desert” browns and tans).

The Project owner will treat the surfaces of all Project structures and buildings (including temporary structures related to construction) visible to the public such that (1) their colors minimize visual intrusion and visual contrast by blending with the existing characteristic landscape colors; (2) their colors and finishes do not create excessive glare; and (3) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors will be non-specular and non-reflective, and the insulators will be non-reflective and non-refractive. Following in-field consultation with the BLM Visual Resources specialist and other representatives as deemed necessary by the BLM, the Project owner will submit for review and approval a specific Surface Treatment Plan that will satisfy these requirements.

The treatment plan will include:

- A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes based on the characteristic landscape

- A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; mirror support structure; concrete-lined drainage channel and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and pantone number; or according to a universal designation system
- One set of color brochures or color chips showing each proposed color and finish
- A specific schedule for completion of the treatment
- A procedure to ensure proper treatment maintenance for the life of the Project

The Project owner will not specify to the vendors the treatment of any buildings or structures treated during manufacture, or perform the final treatment on any buildings or structures treated in the field, until the Project owner receives notification of approval of the visual treatment plan by BLM's Authorized Officer. Subsequent modifications to the treatment plan are prohibited without BLM's approval.

- Landscape Screening – Landscape screening may be used to reduce visibility of the Project in locations that high sensitivity viewers have unobstructed foreground views of the Project. This condition pertains to the residences located along Sandy Lane and just east of Valley View Boulevard. Per Nye County Development Agreement, a vegetated landscape buffer is proposed between Sandy Lane and the wind-fence approximately 600 feet from roadway right-of-way (Appendix F).
- Restoration of disturbed areas – Any temporary areas that are used during the construction process are to be restored (vegetation, topographic).
- Nighttime Lighting – The Proponent shall consider location and type of lighting and other dark sky mitigation measures to minimize potential light pollution to the greatest extent practicable. Mitigation measures include (but are not be limited to) light hoods/shields, directional lighting, minimum required brightness, setbacks from project perimeter, and 'as-needed' usage. See Section 4.12.3.1 under Nighttime Lighting for detail on the proposed lighting scheme.

4.13 HUMAN HEALTH AND SAFETY/HAZARDOUS MATERIALS

The anticipated direct and indirect impacts from construction, operation, and maintenance of the proposed Project are addressed in the following sections.

As discussed in Section 2.0, Project Description, the proposed Project will be designed to meet all applicable standards to reduce the risk of an accidental release, operated in a manner that complies with safety standards and practices, and maintained so as to provide a safe workplace for Project personnel and to prevent significant adverse off-site impacts to the public at large. In addition, construction and operation will incorporate up-to-date industrial technology and design standards, and adhere to regulatory health and safety codes and guidelines, as well as established

good industrial practices. Training, operating, inspection, and maintenance procedures that will minimize the risk and severity of potential upset conditions will be implemented.

4.13.1 Proposed Action

4.13.1.1 Construction Phase

Hazardous materials that are anticipated for use during construction include gasoline, diesel fuel, oil, lubricants, welding gases (e.g., acetylene, oxygen, and argon), and small quantities of solvents and paint. There are no feasible alternatives to these materials for operating construction vehicles and equipment, and conducting other construction activities such as welding. No acutely hazardous substances will be used or stored on-site during construction.

Diesel fuel is the hazardous material with the greatest potential for environmental consequences during the construction phase, due to the volume of diesel fuel that will be used in construction equipment and the frequent refueling that will be required. Diesel fuel as well as gasoline will be stored in an on-site fuel depot. When refueling of the on-site diesel and/or gasoline storage tank is required, a mobile fuel truck will be brought on-site. The fueling will be supervised by the fuel truck operators. Any fuel spilled will be promptly cleaned up, and any contaminated soil disposed of in accordance with the applicable state and federal requirements.

Small volumes of hazardous materials will be temporarily stored on-site inside fuel and lubrication service trucks. Paints and solvents will be stored in flammable material storage cabinets. Welding gases will be stored in steel cylinders and chained upright to a solid support structure, with the safety cover over the valve when not in use to prevent damage. Maintenance and service personnel will be trained in handling these materials. The most likely incidents involving these hazardous materials would be associated with minor spills or leaks. Impacts to site workers, the public, or the environment due to a minor spill or leak will be mitigated through the emergency response training program and procedures that will be implemented by Project construction contractors and employees, and by thoroughly cleaning up minor spills as soon as they occur.

Soil contaminated by a spill or leak will be disposed in accordance with applicable state and federal requirements. Minimal risk of fire and/or explosion exists with the use of these types of materials in the limited quantities that will be used. There is minimal potential for environmental impacts from incidents involving other hazardous materials during construction.

4.13.1.2 Operational and Maintenance Phase

Hazardous materials will be used and stored on-site during operations and maintenance. The hazardous material inventory, the general operational safety practices employed during hazardous material storage and use, the material-specific handling practices, and the toxicity of each hazardous material are discussed below.

4.13.1.3 Hazardous Material Inventory

A list of the large-quantity hazardous materials that may be stored and used at the Project site along with the toxicity and storage practices for each material is provided in Table 4-41. The quantities identified in the table are per power block. For the purpose of this discussion, “large quantity” is defined as those chemicals stored or used in excess of 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases. In addition to the chemicals listed in Table 4-31, small quantities (less than 55 gallons, 500 pounds, or 200 cubic feet) of janitorial supplies, office supplies, laboratory supplies, paint, degreasers, herbicides, pesticides, air conditioning fluids (chlorofluorocarbons), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be stored and used at the Project site. These materials will be stored in the maintenance warehouse or office building. Flammable materials (e.g., paints, solvents) will be stored in flammable material storage cabinet(s) with built-in containment sumps.

The remainder of the materials will be stored on shelves as appropriate. Due to the small quantities involved, the controlled environment, and the concrete floor of the warehouse, a spill can be cleaned up without significant environmental consequences.

4.13.1.4 General Operating Practices

Chemicals will be stored or processed in vessels or tanks specifically designed for their individual characteristics. All hazardous materials storage or process vessels will be designed in conformance with applicable ASME codes. Large quantity (bulk) liquid chemicals will be stored outdoors in aboveground storage tanks manufactured of carbon steel or plastic, or in 400-gallon (nominal) capacity plastic totes, if applicable.

Due to the amount of fuel to be stored onsite, a site specific SPCC Plan must be developed and adhered to during construction and operations. Spill containment structures (e.g., curbing, double-walled tanks or equivalent) to contain the chemicals in the event of a leak or spill will be constructed around each of the large-quantity hazardous chemical storage tanks or totes. Bulk storage tanks or totes will have secondary containment structures capable of holding the tank or tote volume plus an allowance for precipitation (25-year, 24-hour rain event). Concrete containment structures will be coated with a chemical resistant coating (e.g., epoxy) to ensure long-term integrity of the containment structure.

Small quantity chemicals will be stored in their original delivery containers in order to minimize risk of upset. Personnel working with chemicals will be trained in proper handling technique and in emergency response procedures for chemical spills or accidental releases. Appropriate PPE will be provided.

Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Sulfuric Acid, 29.5% solution CAS No. 7664-93-9	High toxicity; Hazard class – Corrosive, water reactive	1,000 lbs	PEL: 1 milligram per cubic meter (mg/m ³)	Contained in batteries; 2,000 gal total inventory	Isolated from incompatible chemicals and secondary containment
CO ₂ CAS No. 124-38-9	Low toxicity; Hazard class – Nonflammable gas	Not Applicable	TLV: 5,000 ppm (9,000 mg/m ³) TWA	Carbon steel tank; 15 tons maximum onsite inventory	Carbon steel tank with crash posts
Therminol VP-1 Biphenyl (26.5%) CAS No. 92-52-4 Diphenyl ether (73.5%) CAS No. 101-84-8	Moderate toxicity, Hazard class – Irritant; Combustible Liquid (Class III-B)	Biphenyl = 100 lbs (45.4 kg) Diphenyl ether = Not applicable	Biphenyl = PEL: 0.2 milliliters per cubic meter (ml/m ³) (8-hr TWA) TLV: 0.2 ml/m ³ (1 mg/m ³) (8-hr TWA) Diphenyl ether = TLV: 1 ml/m ³ (8-hr TWA) TLV: 2 ml/m ³ (15-min TWA) PEL: 1 ml/m ³ (7 mg/m ³) (15-min TWA)	1.3 million gal in system, no additional onsite storage	Continuous monitoring of pressure in piping network; routine inspections (sight, sound, smell) by operations staff; isolation valves throughout piping network to minimize fluid loss in the event of a leak; prompt clean up and repair
Lube Oil CAS No. 64741-97-5	Low toxicity Hazard class – NA	Not applicable	TLV: (oil mist, mineral) 5 mg/m ³ (ACGIH 2001)	Carbon steel tanks, 10,000 gallons in equipment and piping, additional maintenance inventory of up to 550 gallons in 55-gallon steel drums	Secondary containment area for each tank and for maintenance inventory

Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Mineral Insulating Oil CAS No. 8042-47-5	Low toxicity Hazard class – NA	Not applicable	None established	Carbon steel transformers; total onsite inventory of 36,000 gallons	Used only in transformers, secondary containment for each transformer
Diesel Fuel CAS No. 68476-34-6	Low toxicity; Hazard class – Combustible Liquid	Not applicable	PEL: none established TLV: 100 mg/m ³ (ACGIH)	Carbon steel tank (1,150 gallon [generator & fire water pump engine])	Stored only in fuel tank of emergency engine, secondary containment
Hydrogen	Low toxicity; Hazard class – Flammable gas	Not applicable	None Established	In generator cooling loop and “tube trailer”; piping system inventory 350 pounds; plus 650 lbs in storage trailer	Pressure safety tank, crash posts, pressure relief valves
Nitrogen CAS No. 7727-37-9	Low toxicity; Hazard class – Non-Flammable Gas	Not applicable	None established	Carbon steel tank; 7,500 lbs total inventory	Carbon steel tank with crash posts
Hydraulic fluid CAS No. 64741-89-5	Low to moderate toxicity; Hazard class – Class IIIB Combustible Liquid	Not applicable	TWA (oil mist): 5 mg/m ³ STEL: 10 mg/m ³	Carbon steel tanks and sumps; 500 gallons in equipment, maintenance inventory of 110 gallons in 55-gallon steel drums	Found only in equipment with a small maintenance inventory; maintenance inventory stored within secondary containment
Welding gas Acetylene CAS No. 74-86-2	Moderate toxicity; Hazard class – Toxic	10,000 lbs	PEL: none established	Steel cylinders; 200 cubic feet each, 800 cubic feet total on site	Inventory management, isolated from incompatible chemicals
Welding gas Oxygen CAS No. 7782-44-7	Low toxicity; Hazard class – Oxidizer	Not applicable	PEL: none established	Steel cylinders; 200 cubic feet each, 800 cubic feet total on site	Inventory management, isolated from incompatible chemicals

Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Welding gas Argon CAS No. 7440-37-1	Low toxicity; Hazard class – Non-flammable Gas	Not applicable	PEL: none established	Steel cylinders; 200 cubic feet each, 800 cubic feet total on site	Inventory management
Activated Carbon CAS No. 7440-44-0	Non-toxic (when unsaturated), low to moderate toxicity when saturated, depending on the adsorbed material; Hazard class – combustible solid	Not Applicable	TWA (total particulate): 15 mg/m ³ TWA (respirable fraction): 5 mg/m ³ TLV (graphite, all forms except graphite fibers): 2 mg/m ³ TWA	Used in two x 2,000-lb canisters, 4,000 lbs total inventory, no additional storage	No excess inventory stored on site, prompt disposal when spent
Calcium Hypochlorite 100% CAS No. 7778-54-3	Moderate toxicity; Hazard Class – Corrosive, Irritant	10 lbs	PEL: none established Acute oral toxicity (LD50): 850 mg/kg [Rat].	Minimal onsite storage for water treatment, not expected to exceed 50 lbs	Inventory management, isolated from incompatible chemicals
Water treatment chemical Sodium Carbonate (soda ash) CAS No. 497-19-8	Low toxicity; Hazard class – Irritant	Not Applicable	Not Applicable	10 tons	Stored in steel silos. Inventory management, isolated from incompatible chemicals
Water treatment chemical Lime (calcium oxide) CAS No. 1305-78-8	Moderate toxicity; Hazard class - Irritant	Not Applicable	TLV: 2 mg/m ³ as TWA;(ACGIH 2004). OSHA PEL: TWA 5 mg/m ³ NIOSH IDLH: 25 mg/m ³ See: 1305788	10 tons	Stored in steel silos. Inventory management, isolated from incompatible chemicals
Water treatment chemical Magnesium Chloride CAS No. 7786-30-3	Non-toxic; Hazard class – NA	Not Applicable	Not Applicable	500 gallons	Inventory management
Water treatment chemical Sodium Bisulfate (aka sodium hydrogen sulfate)	Low toxicity; Hazard class – Irritant	Not Applicable	Sodium bisulfate = PEL: none established: TLV: 5 mg/m ³ TWA	500 gallons	Inventory management, isolated from incompatible chemicals

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Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Boiler water treatment chemical Ferric Sulfate (35% solution) CAS Number 10028-22-5	Moderate toxicity; Hazard class - Irritant	1,000 lbs	TBD	10,000 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO Tri-Aet 1800 <i>or equivalent</i> Cyclohexylamine (5 – 10%) Monoethanolamine (10 – 30%) Methoxypropylamine (10 – 30%)	High toxicity; Hazard class – Corrosive, Class II Combustible liquid	Not Applicable	Cyclohexylamine = TLV: 10 ppm (41 mg/m ³) Monoethanolamine = TLV: 3 ppm (7.5 mg/m ³) TWA: 3 ppm (7.5 mg/m ³) STEL: 6 ppm (15 mg/m ³) Methoxypropylamine = TLV: 5 ppm TWA STEL: 15 ppm	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO Elimin-Ox Carbohydazide (5 -10%) <i>or equivalent</i>	Moderate toxicity; Hazard class – Sensitizer	Not Applicable	Carbohydazide = PEL: none established	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO 3D Trasar 3DT185 Phosphoric Acid (60 - 100%) <i>or equivalent</i>	High toxicity; Hazard class – Corrosive	Not Applicable	Phosphoric acid = PEL: 1 mg/m ³ (TWA) TLV: 1 mg/m ³ (TWA), STEL: 3 mg/m ³	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO 3D Trasar 3DT177 <i>or equivalent</i> Phosphoric acid (30%)	Moderate toxicity; Hazard class – Irritant	Not Applicable	Phosphoric acid = PEL: 1 mg/m ³ (TWA) TLV: 1 mg/m ³ (TWA), STEL: 3 mg/m ³	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment

Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Water treatment chemical NALCO 3D Trasar 3DT190 <i>or equivalent</i>	Low toxicity; Hazard class – Irritant	Not Applicable	None established for mixture	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO Acti-Brom (R) 7342 <i>or equivalent</i> Sodium bromide	Low toxicity; Hazard class – Irritant	Not Applicable	Sodium bromide = PEL: none established	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO pHreedom® 5200M <i>or equivalent</i> Sodium salt of phosphonomethylated diamine	Low to moderate toxicity; Hazard class – Irritant	Not Applicable	Sodium salt of phosphonomethylated diamine = PEL: none established	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO PCL-1346	Low toxicity; Hazard class – Irritant	Not Applicable	None established for mixture	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO Permacare (R) PC-7408 Sodium bisulfate CAS No. 7631-90-5	Low toxicity; Hazard class – Irritant	5,000 lbs	Sodium bisulfate = PEL: none established; TLV: 5 mg/m ³ TWA	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO BT-3000 <i>or equivalent</i> Sodium hydroxide CAS No. 1310-73-2 Sodium tripolyphosphate	High toxicity; Hazard class – Corrosive	Sodium Hydroxide 1,000 lbs	Sodium hydroxide = PEL: 2 mg/m ³ Sodium tripolyphosphate = PEL: none established	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment

Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Boiler water treatment chemical, pH adjustment Sodium Hydroxide (50%) CAS Number 1310-73-2	High toxicity; Hazard class – Corrosive	1,000 lbs	Sodium hydroxide = PEL: 2 mg/m ³	10,000 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical NALCO 8338 <i>or equivalent</i> Sodium nitrite Sodium tolytriazole Sodium hydroxide	Moderate toxicity; Hazard class – Toxic	Not Applicable	Sodium nitrite = PEL: none established Sodium tolytriazole = PEL: none established Sodium hydroxide = PEL: 2 mg/m ³	Plastic totes, 2 x 400 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical 93%-98% sulfuric acid CAS No. 7664-93-9	High toxicity; Hazard class – Corrosive, water reactive	1,000 lbs	TLV: 0.2 mg/m ³ MAK: 0.1 mg/m ³ NIOSH REL: TWA 1 mg/m ³ NIOSH IDLH: 15 mg/m ³ OSHA PEL: 1 mg/m ³	1,000 gallons	Inventory management, isolated from incompatible chemicals and secondary containment
Water treatment chemical Sodium Hypochlorite (13% solution) CAS No. 7689-52-9	High toxicity; Hazard class – Poison-B, Corrosive	100 lbs	Workplace Environmental Exposure Limit (WEEL) - STEL: 2 mg/m ³ PEL: 0.5 ppm (TWA) STEL: 1 ppm as Chlorine TLV: 1 ppm (TWA) STEL: 3 ppm as Chlorine	1,000 gallons	Inventory management, isolated from incompatible chemicals

Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Oxygen Scavenger Reagent Acetic Acid 60% CAS No. 64-19-7 Iodine 20% CAS No. 7553-56-2 De-ionized water 20% CAS No. 7732-18-5	Moderate toxicity; Hazard Class – Corrosive, Irritant	5,000 lbs	PEL: 10 ppm TWA PEL: 0.1 ppm N/A	Minimal onsite storage for water treatment, not expected to exceed 50 lbs	Inventory management, isolated from incompatible chemicals
Boiler water treatment oxygen scavenger Carbohydrazide CAS No. 497-18-7	High toxicity; Hazard class – Irritant	Not applicable	Carbohydrazide = PEL: none established	600 gallons	Inventory management, isolated from incompatible chemicals
Herbicide Roundup® or equivalent CAS No. 38641-94-0	Low toxicity; Hazard class – Irritant	Not applicable	Isopropylamine salt of glyphosphate = no specific occupational exposure has been established	No onsite storage, brought on site by licensed contractor, used immediately	No excess inventory stored on site
Soil stabilizer Active ingredient: acrylic or vinyl acetate polymer or equivalent CAS No. Active ingredient is 'Not Hazardous'	Non-toxic; Hazard class – NA	Not applicable	None established	No onsite storage, supplied in 55-gallon drums or 400-gallon totes, used immediately	No excess inventory stored on site

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Table 4-41 Summary of Special Handling Precautions for Large Quantity Hazardous Materials *

Hazardous Material and CAS No. ¹	Relative Toxicity ² and Hazard Class ³	RQ ⁴ pounds (kg)	Permissible Exposure Limit (PEL)	Storage Description; Capacity	Storage Practices and Special Handling Precautions
<p>* This table has been developed based on the applicant's understanding of the proposed processes at the time of development. Continued engineering and process refinements may likely necessitate additions, deletions and/or substitutions of materials identified above.</p> <p>¹ CAS No. – Chemical Abstracts Service registry number. This number is unique for each chemical.</p> <p>² Low toxicity is used to describe materials with an National Fire Protection Agency (NFPA) health rating of 0 or 1. Moderate toxicity is used describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3. Extreme toxicity is used to describe materials with an NFPA rating of 4.</p> <p>³ NA denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.</p> <p>⁴ RQ – Reportable Quantity for hazardous substance as designated under section 102(a) defined under CERCLA. (To note: This table includes those chemicals stored or used in excess of 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases.</p> <p>⁵ RQ – Reportable Quantity for extremely hazardous substance as designated under section 302(a)(2) defined under CERCLA.</p>					

Appropriate safety programs will be developed to address hazardous materials storage and use, emergency response procedures, employee training requirements, hazard recognition, fire safety, first aid/emergency medical procedures, hazardous materials release containment/control procedures, HAZCOM training, PPE training, and release reporting requirements. These programs include a fire response program, a plant safety program, and facility standard operating procedures.

As stated in the Development Agreement between Nye County and the Proponent (Nye County 2010) "Prior to accepting hazardous materials within the boundaries of the Proposed Development, developer shall provide the County a facility emergency plan which contains:

- a description of the training, equipment, facilities and procedures that will be used to respond to emergencies occurring within the boundaries of the Proposed Development
- certification that such equipment, facilities and procedures have been approved by all applicable state and federal authorities
- a description of the emergency response protocols and the respective responsibilities of Developer and County."

4.13.1.5 Chemical-Specific Operating Practices and Chemical Toxicity

Substance-specific operating practices and toxicity issues are described in the following paragraphs.

Fuel Gas Delivery

LPG will supply gas to boilers used for rapid daily plant startup and for HTF freeze protection. There will be two truck deliveries each week for both power plant units. A total of approximately 18,000 gallons of LPG will be stored at each power plant unit. LPG consists mainly of propane and butane. LPG is a flammable gas with a NFPA hazard rating of 4 with low toxicity. The fuel gas supplier will comply with all USDOT and NDOT regulations that apply to the transport of hazardous substances.

Diesel fuel as well as gasoline will be stored in an on-site fuel depot. When refueling of the on-site diesel and/or gasoline storage tank is required, a mobile fuel truck will be brought on-site. The fueling will be supervised by the fuel truck operators. Any fuel spilled will be promptly cleaned up, and any contaminated soil disposed of in accordance with the applicable state and federal requirements.

Compressed Gas Storage

Compressed gases stored and used at the facility may include gases typically used for maintenance activities, such as shop welding. These gases include acetylene, argon, and oxygen.

Acetylene is a flammable gas. It is highly reactive, however, it is not toxic. Oxygen is an oxidizer with low toxicity. Argon has low toxicity but may cause asphyxiation if released in a

confined area. The potential impacts presented by the use of these gases within the solar plant are less than significant based on the following site-specific conditions:

- Compressed gases will be stored in standard compressed gas cylinders at the facility (typically 200 cubic feet per cylinder), and the total quantity will be kept to the minimum required for operation and maintenance.
- The compressed gases will be delivered and stored in USDOT-approved safety cylinders, and secured to a solid support (such as a building or rack) to prevent tipping and physical damage.
- The compressed gases will be stored in an isolated storage area surrounded by crash posts to minimize potential for accidents or upset.
- Incompatible gases (e.g., flammable gases and oxidizers) will be stored in separate, isolated areas.
- Operators will be trained in the proper use of equipment and materials.

Water Treatment Chemicals

For the dry-cooled plant alternative, water treatment chemicals will be present in minimum quantities. Calcium hypochlorite and oxygen scavenger reagent are water treatment products that will be used in the boiler makeup water and auxiliary cooling tower application. Approximately 50 pounds of these products will be stored on-site and shipped to the site as required. Shipping and storing the products in the same container minimizes chemical transfers, and thus minimizes the chances of a spill. The toxicity of each mixture is moderate and they are classified as irritants and corrosives.

HTF

HTF is a synthetic hydrocarbon liquid mixture of diphenyl ether and biphenyl oxide. Dowtherm A, Solutia VP-1, and Therminol VP-1, are commercial products that have been used in concentrated solar trough plants to date. At present, the Proponent has indicated they intend to use Therminol VP-1 in the solar array and steam cycle of the proposed Project. The diphenyl/biphenyl oxide mixture is not classified as a hazardous material by the USDOT, nor is it listed under EPA CERCLA regulations. However, this material, when discarded, may be a hazardous waste as that term is defined by RCRA, 40 CFR 261.24, due to its toxicity characteristic. Biphenyl has a CERCLA Reportable Quantity of 100 lbs—the amount present in approximately 377 lbs (42 gallons) of Therminol. Therminol VP-1 is low odor, moderately toxic, a skin irritant, and a Class III-B combustible liquid.

Approximately 8,300 tons of HTF will be present in the heat transfer system, including the piping and necessary expansion tanks; no additional HTF will be stored on-site. The heat transfer system is a closed loop and the system pressure will be monitored continuously. The solar field will be regularly monitored by the operations staff using sight, sound, and smell to detect system leaks. Isolation valves will be installed throughout the solar field to minimize HTF loss in the event of a system leak. The isolation valves will be designed for automated operation triggered by a pressure drop in the system, or manual operation if a leak is detected by other means. The

Project is considering remote sensing equipment to allow for the detection of sudden large leaks. Leaks will be repaired promptly, and fluid spills will be cleaned up immediately.

Petroleum Products

In addition to petroleum products to be located within the on-site fuel depot, other petroleum products to be used within the solar facility include lube and insulating oil. Lube oil will be stored in a 10,000-gallon carbon steel tank and in equipment and piping associated with each steam turbine. The turbine enclosure will provide secondary containment sufficient to hold the full contents of the tank. The tank will be inspected daily to ensure that it is not leaking. Lube oil has low toxicity and does not meet the criteria for any hazard class defined by the Uniform Fire Code Diesel fuel will be used to fuel the emergency fire water pump engine. The fire water pump engine has a 300-gallon fuel supply in a carbon steel tank. The equipment skid provides secondary containment that can hold the full amount of the fuel. Diesel is a combustible liquid with low toxicity.

Insulating oil is used in the electrical transformers at the facility. The total quantity of insulating oil present at the facility will be 32,000 gallons. Each transformer is installed in a secondary containment structure that will contain 100 percent of the transformer capacity plus an allowance for precipitation.

Activated Carbon

The HTF expansion tank will be vented through a two-stage activated carbon system for the control of air emissions from the tank. Each stage of the system comprises a 2,000-lb capacity carbon canister. The facility will not maintain an inventory of additional carbon. New activated carbon has low toxicity; however, once in use, the activated carbon will adsorb VOC and toxic air contaminants, including benzene, diphenyl ether, and biphenyl, and the toxicity will increase. Activated carbon is difficult to ignite, but will smolder once ignited.

The emissions control system will be monitored periodically (with a frequency specified in the air operating permit) to determine the saturation level of the carbon. When saturated with VOC and toxic air contaminants, activated carbon is disposed of as a hazardous waste.

Herbicide

Herbicide will be used in the solar field to kill weeds in order to minimize the fire potential. The weed control program will be contracted to an outside contractor. Accordingly, herbicides will not be stored on site but will instead be brought on-site on an as-needed basis. The Proponent will ensure that the contractor has the appropriate licenses and a robust safety program for its employees.

The BLM is required to analyze the potential direct, indirect, and cumulative impacts of herbicide use on BLM-managed land. In 2007, the BLM issued the Final Programmatic Environmental EIS titled Vegetation Treatments Using Herbicides (BLM 2007). The Programmatic EIS (PEIS) requires the BLM to develop a noxious weed risk assessment when it

is determined that an action may introduce or spread noxious weeds. Weeds present on or near the site are identified, a risk assessment completed, and weeds controlled as necessary adhering to standard operating procedures and mitigation measures. Standard operating procedures and mitigation measures for applying herbicides are identified for each resource and would be followed to minimize risks to human health and the environment. Mitigation measures identified in the PEIS apply to resources at the programmatic level in 17 western states; however, local BLM field offices must develop more site-specific mitigation and management plans (i.e., timing restrictions) based on local conditions and resource management goals. Herbicide treatments must comply with the U.S. EPA label directions and follow BLM procedures outlined in BLM Handbook H-9011-1 (Chemical Pest Control), and Manuals 1112 (Safety), 9015 (Integrated Weed Management), and must include the development of a treatment plan prior to implementation. Table 4-42 lists active ingredients of herbicides that may be used at the Project site.

Table 4-42 List of Active Ingredients in Herbicide

Herbicide Active Ingredient	CAS No.	Acute Toxicity ¹	Carcinogen ²	Water Solubility (mg/L)	Aerobic Soil Half-Life (average, days)	EPA Minimum Hazardous Air Pollutant ³
2,4-D	94-75-7	Moderately	Unclassifiable	27,600	34	Yes
Bromacil	314-40-9	Unlikely	Possible	929	347	No
Chlorsulfuron	64902-72-3	Unlikely	Unlikely	28,300	28	No
Clopyralid	1702-17-6	N/A	Unlikely	106,000	152	No
Dicamba	1918-00-9	Slightly	Unclassifiable	27,200	10	No
Diuron	330-54-1	Unlikely	Likely	36	372	No
Fluridone	59756-60-4	Unlikely	Unlikely	N/A	N/A	No
Glyphosate	1071-83-6	Unlikely	Unlikely	11,600	96	No
Hexazinone	51235-04-2	Slightly	Unclassifiable	29,800	222	No
Imazapic	104098-48-8	N/A	Unlikely	259,000	1,200	No
Imazapyr	81334-34-1	Unlikely	Unlikely	10,500	507	No
Metsulfuron methyl	74223-64-6 5585-64-8	Unlikely	Unlikely	N/A	24	No
Picloram	1918-02-1	Unlikely	Unlikely	N/A	N/A	No
Sulfometuron methyl	74222-97-2	N/A	N/A	4,250	52	No
Tebuthiuron	34014-18-1	Slightly	Unclassifiable	2,600	1,220	No

Table 4-42 List of Active Ingredients in Herbicide

Herbicide Active Ingredient	CAS No.	Acute Toxicity ¹	Carcinogen ²	Water Solubility (mg/L)	Aerobic Soil Half-Life (average, days)	EPA Minimum Hazardous Air Pollutant ³
Triclopyr	55335-06-3	Slightly	Unclassifiable	N/A	N/A	No

¹ Source: World Health Organization Acute Hazard Rankings. May be: Extremely hazardous, Highly hazardous, Moderately hazardous, Slightly hazardous, Unlikely to be hazardous, or Not Classified. N/A indicates the information is not available.

² Source: U.S. EPA Office of Pesticide Programs Carcinogen List. May be: Possible, Unlikely, or Unclassifiable. Unclassifiable indicates there is not enough data to make a determination. N/A indicates the information is not available.

³ Source: U.S. EPA Section 112 Hazardous Air Pollutants (<http://www.epa.gov/ttn/atw/orig189.html>).

4.13.1.6 Hazardous Material Transportation

Hazardous materials will be delivered to the Project site via truck along US 95 and then into the gated and fenced site via the Project access road. US 95, is a major north-south transportation route through Nevada and is currently used for the transport of hazardous materials; the Project will cause a small increase in hazardous material traffic along this route.

4.13.1.7 Off-Site Consequence Analysis

The propane storage tanks and handling facilities will be equipped with continuous tank level monitors, temperature and pressure monitors and alarms, and excess flow and emergency island valves. Only trained technicians will conduct system maintenance and repairs.

Delivery

Propane is typically delivered in 5,000-gallon tank trucks. The tank trucks will be unloaded in an unloading area immediately adjacent to the propane tanks. The unloading area will be paved with concrete and curbed. During unloading operations, the driver performing the unloading operation will wear appropriate protective equipment, and will have a cut-off switch to stop the propane transfer in case of an emergency. The offloading operation will also be monitored by a control room operator via camera to provide backup support if there is a leak, hose break, or other accident during unloading.

With respect to the transport of propane to the Project site, USDOT and NDOT regulations require all truck tank trailers to meet strict requirements for collision and accident protection. Hazardous materials shipments will comply with applicable regulations in terms of route selection, operator training and qualifications, etc. The tank trucks are designed to withstand violent accidents without breach of containment.

Storage

Storage of propane in an 18,000-gallon tank at each unit creates the potential for leak, spill, or rupture of the tank, releasing propane to the atmosphere. Propane is a flammable gas. Pressurized metallic storage tanks have a mean time to catastrophic failure of 0.0109 per million hours of service, or on average one failure every 10,500 years. Thus, failure of a pressurized propane tank during the lifetime of the facility is unlikely. Additionally, the storage tank will be protected by concrete curbing and steel columns to reduce the likelihood of accidental vehicle impacts.

4.13.1.8 Facility Fire and Explosion Risks

The proposed Project will utilize two materials that pose potential risks of fire and explosion because of their flammability. These are propane and HTF, each of which is discussed below. Propane will be used as a fuel for the two boilers at the facility and poses a fire and/or explosion risk as a result of its flammability. Propane will be delivered to the site weekly by trucks owned and operated by a licensed vendor and will be stored on-site in an 18,000-gallon above ground storage tanks at each power block. The HTF at high temperatures can also present a fire hazard.

An on-site fire protection system, designed in conformance with the International Fire Code 2006 edition with Nevada State Fire Marshal Amendments, would be provided to limit personnel injury, property loss, and downtime in the event of a fire. The system would include a fire protection water system and portable fire extinguishers. Separate fire flow storage tanks would be sited within each of the two power blocks and an additional storage tank may be required for the Assembly Hall depending upon the final location of the structure. Firewater would be sourced from the Project well, and would be pumped to the site and stored in tanks for fire suppression. On-site fire pumps would be required to deliver water to the fire protection piping network for each of the buildings located within the power blocks.

The piping network would be configured in a loop so that a piping failure could be isolated with shutoff valves without interrupting water supply to other areas in the loop. Fire hydrants would be placed at intervals throughout the plant site that would be supplied with water from the supply loop. The water supply loop also would supply firewater to a sprinkler deluge system at each unit transformer, HTF expansion tank and circulating pump area and sprinkler systems at the steam turbine generator and in the administration building.

Fire protection for the solar field would be provided by zoned isolation of the HTF lines in the unlikely event of a rupture that results in a fire. Since vegetation and other combustible materials would not be present in the solar field area, the HTF would be allowed to self extinguish.

A Construction Fire Protection and Prevention Plan will be developed and followed throughout all phases of construction. The permanent facility fire protection system would be put into use during construction as soon as is practicable. Prior to the availability of this system, fire extinguishers and other portable fire-fighting equipment would be available on site. All equipment would be OSHA compliant. Locations of portable firefighting equipment may include portable office spaces, welding areas, flammable chemical areas, and vehicles and other mobile equipment.

Finally, as per the Nye County Development Agreement (Appendix F): “Developer shall annually, for as long as the ASPP is operating, provide emergency and fire protection training for up to four (4) individuals identified by County. County shall give priority to individuals who serve in the Amargosa Volunteer Fire Department. Such training shall be the equivalent of training provided to Developer’s on-site personnel.” In addition, the “Developer shall provide County, in a location selected by Developer, for as long as the ASPP is operating, access to a water supply for County’s use in responding to fires within the Town of Amargosa. County agrees to utilize the water supply only for such purposes.”

4.13.1.9 Wildland Fire Management and Fuels Consideration

No short-term effects or concerns are expected with regards to wildland fire. Long-term effects or activities which promote invasive species such as an increase to the water regime or change to soil characteristics may increase wildland fire risk. Wildland fire risk within the proposed Project area will be mitigated by the preparation and adherence to the Weed Management Plan.

Due to the lack of vegetation in the Project area, spacing between existing vegetation, and a lack of continuous fine fuels such as invasive annual grass, there are no apparent wildland fire risk to the Project or adjacent area based on fire history. Annual grass growth is dependent on seasonal precipitation which can vary from year to year. The creosote-bursage vegetation types do not commonly burn with active fire spread unless fine fuels are present.

Windblown vegetation such as Russian thistle found in adjacent agricultural lands in the area may accumulate along fences, roadways, and ditches and may present a fuels hazard to the site. Such accumulations should be managed to reduce fire risk.

4.13.1.10 Seismic Risk

The possibility exists that an earthquake could cause the failure of a hazardous materials storage tank or HTF piping somewhere in the solar field. An earthquake could also cause the failure of the secondary containment system (berms and dikes), as well as electrically controlled valves and pumps.

The failure of all these preventive control measures might then result in a leak or discharge of hazardous materials. Due to the limited types and quantities of hazardous materials to be stored on-site and the sparsely inhabited surroundings, it is unlikely that hazardous materials could move off the site and impact residents and workers in the surrounding area.

The piping in the solar array contains the vast majority of the HTF and the solar field will not be constructed with secondary containment. However, it is very unlikely that an earthquake could cause the failure of the piping in the solar array, resulting in a loss of HTF that would have an off-site impact.

The piping in the solar array will be specifically constructed to allow movement due to thermal expansion – the steel piping in the mirrored trough sections of the array is connected to the HTF distribution headers with ball joints and the piping is not rigidly mounted to foundations or other structures. Furthermore, the solar array will be constructed with isolation valves to limit the HTF

losses in the event of a piping failure. Due to these inherent design features, piping failures during seismic events are not likely and do not represent a significant risk to the public.

4.13.2 Wet-Cooled Alternative

The primary difference between a dry- and wet-cooled solar thermal plant is the additional amount of water-treatment chemicals needed to treat the larger volume of water required for a wet-cooled solar thermal plant. The wet-cooled alternative would require a treatment system 10 times larger than the dry-cooled alternative, with a corresponding increase in the amount of required treatment chemicals.

Under the wet-cooled plant alternative, water conditioning chemicals would be mixed with the makeup water to minimize corrosion and inhibit mineral seale formation. In addition to other water conditioning additives, sulfuric acid will be fed into the circulating water system for alkalinity reduction to control the tendency for mineral scaling in the circulating water. The sulfuric acid is supplied in an amount proportional to the circulating water makeup flow. All water conditioning additives will require separate storage tanks and metering equipment. For the sulfuric acid system, which is the chemical added in the largest quantities, the feed equipment would consist of a bulk storage tank and two acid metering pumps. Delivery, storage, and use of these additional chemieals would introduce manageable, but new risks not present with the dry-cooled alternative.

4.13.3 No Action Alternative

Under the No Action Alternative, the BLM would not grant the right-of-way and the potential impacts from construction and operation of the proposed Project would not occur.

4.13.4 Mitigation

Mitigation measures for the use, storage, and disposal of hazardous materials is provided in Appendix A.

4.14 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The CEQ's regulations state in 40 CFR 1502.16 that the discussion of environmental consequences include the ". . . environmental impacts of the alternatives including the proposed action . . . and . . . any adverse environmental effects which cannot be avoided should the proposal be implemented . . ." While all environmental effects that may result from BLM's granting of the right-of-way are discussed in Section 4.0 of this document, this section summarizes the significant environmental effects for the Proposed Action and alternatives that cannot be avoided.

Unavoidable adverse impacts are those that would occur after implementation of all committed and recommended mitigation. Unavoidable impaets do not include temporary or permanent

impacts that would be mitigated. They also do not include impacts from speculative events such as hazardous waste spills that are not cleaned up promptly in accordance with accepted industry standards or regulatory requirements.

The Proponent has committed to implementing mitigation measures in its Project design to avoid or minimize potential impacts from construction and operation of the Proposed Action. Implementation of Proponent-committed environmental protection measures, and adherence to stipulations associated with any required federal, state, or local permit or approval, would reduce unavoidable adverse impacts on the human and natural environment.

Unavoidable adverse environmental impacts include the direct and cumulative impacts from the loss of up to 4,350 acres of desert habitat and native vegetation for the life of the Project. In addition, construction of the proposed Project would cause unavoidable short-term and long-term adverse impacts on visual resources by disrupting the viewshed in the Project area. However, the overall change in the landscape would not exceed the VRM class standards set for the area by the Las Vegas RMP.

4.15 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section describes the irreversible and irretrievable commitments of resources associated with construction and operation of the proposed Project. A commitment of resources is irreversible when primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the lost production or use of a resource that would cause the resource to be unavailable for use by future generations. Examples of these types of resources include nonrenewable resources, such as minerals and cultural resources, and renewable resources that would be unavailable for the use of future generations such as loss of production, harvest, or habitat.

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 and diesel petroleum products 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.

Implementation of the proposed Project would result in the loss of over 4,350 acres of vegetation and habitat. The loss of this habitat would be long-term. 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 habitat. However, it is likely that restoration of native vegetation would be slow, and the success uncertain. Therefore, the loss of onsite Desert Tortoise habitat is assumed to be permanent since the restoration of vegetation on which Desert Tortoise depend for foraging, and other factors affecting the quality of the restored habitat, are uncertain. Compensatory mitigation would serve to indirectly mitigate this impact.

Per the stipulated agreement with the NPS, USFWS, and the BLM, the Proponent must acquire no less than 236 afy of senior groundwater rights in the vicinity of the Project well, or closer to Devils Hole and Ash Meadows NWR. These water rights are in addition to the water needed for Project construction and operations (600 afy during the 39-month construction period; 400 afy during operations). During the 39-month construction period, up to 836 afy of existing water rights will be used for Project-related uses or mitigation. During operations, up to 636 afy of existing water rights will be used for Project operations and mitigation. The 236 afy consists of 204 afy identified as “Minimization Water Rights” (see Appendix A), and an additional 32 afy to offset the potential reduction in groundwater return flow as a result of changing the manner of use from agricultural to industrial. The Proponent would sign over the minimization water rights (204 afy) to Nye County upon a signed Memorandum of Understanding (MOU). Though details yet to be determined by the MOU, Nye County, in cooperation with the other MOU signatories and other appropriate agencies shall perform studies to better understand how the use of the minimization water rights would impact area resources. These include Devil’s Hole, Ash Meadows, and overall local and regional water levels. The details and ultimate goals of the studies shall be agreed upon by Nye County, BLM, NPS, and USFWS.

The majority of access required for construction and operation of the proposed Project would utilize existing public rights-of-way and access roads. The proposed Project would require re-routing the existing Amargosa Farm Road, but the re-routed road would re-connect with the existing road to the west of the facility.

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 BMPs and 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 conditions of certification, potential degradation of the environment due to accidental spills associated with the proposed Project’s use of hazardous materials would not occur.

Visual impacts would be significant and long-term considering the context and intensity of the Project effects in general. Intensity of potential effects involves the unique scenic characteristics of the local landscape as indicated by the rural character of the Project viewshed; concerns expressed by public commenters to date; a degree of uncertainty as to the level of discomfort or disability glare from parabolic mirrors; and concern over cumulative visual effects of renewable projects in the Amargosa Valley as a whole. The loss of visual quality would be long-term, enduring throughout the proposed 30-year lifespan of the facility. After the end of the Project’s useful life, it would be decommissioned per BLM requirements, to be further described in the Applicant’s Decommissioning Plan.

As part of the decommissioning process, the facility would be removed to a depth of approximately 5 feet below grade, original contours restored, and the site revegetated. However, the removal of the existing facility would leave a very prominent visual impact over the entire site due to the strong color contrast created between graded, disturbed soil areas and undisturbed soil areas in the vicinity of the Project site, at least until revegetation occurs. Revegetation of areas in this desert region is difficult and generally of limited success, at least in the near term.

Thus, visual recovery from land disturbance of closure and decommissioning would likely occur only over a very long period of time.

4.16 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY OF THE ENVIRONMENT

NEPA requires consideration of the relationship between short-term uses and long-term productivity of the environment (40 CFR 1502.16). This section discusses the short-term use of the local environment and the maintenance and enhancement of long-term productivity as a result of construction of and operation of the proposed Project.

For the purposes of this discussion, “short-term” is defined as the period from the onset of construction activities through the initiation of project operation. “Long-term” is defined as the entire operational life of the solar energy plant, which is anticipated to be 30 years or more.

4.16.1 Short-Term Uses

The proposed short-term uses of the natural environment associated with the Proposed Action are the development of about 4,350 acres of land for the footprint of the proposed solar power plant and ancillary facilities; the consumptive use of approximately 600 afy of groundwater over a 39 month construction period; the fallowing of up to 120 acres of farmland, and the direct loss of vegetation and wildlife habitat. Short-term effects on the natural environment would result from land-clearing and construction activities. These would be related primarily to soil disturbance and air quality effects from site clearing and grading, and an increase in noise and traffic in the local area.

Short-term effects on social and economic resources would include an increase in revenue for some local businesses such as construction suppliers, hotels, restaurants, gas stations, and grocery stores.

4.16.2 Long-Term Uses

Approximately 4,350 acres of land would be permanently converted to utility uses, and flora and fauna within the Project footprint would be permanently removed. Disturbances of previously undisturbed biological habitats could result in long-term reductions in the biological productivity of the area, as biological communities in arid regions tend to recover very slowly from disturbances. Longer term effects include the permanent loss of some visual quality from the introduction of the solar plant and ancillary facilities and the consumptive use of approximately 400 afy of groundwater over a 30 year period. The conversion of 400 afy of groundwater from agricultural use to industrial use, would result in the fallowing of up to 80 acres of farmland. The additional 236 afy will either be converted to other water right uses or retired per the stipulation agreement between the NPS, USFWS, BLM, and Proponent (see Appendix A). If the 236 afy of existing water rights are retired, an additional 47 acres of farmland in the Amargosa Valley would be fallowed.

4.17 CUMULATIVE IMPACTS

4.17.1 Regulations and Guidance

The CEQ (40 CFR § 1508.7) defines “cumulative impact” as: “...the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”

These actions include current and projected area development, management activities, and authorizations on public or private land, land use trends, and applicable industrial/infrastructure components. Although the individual impacts of each separate project may not be significant, the additive effects of multiple projects could be. These past, present, and reasonably foreseeable future actions are analyzed to the extent that “they are relevant and useful in analyzing whether the reasonably foreseeable effects of the agency proposal for action and its alternatives may have an additive and significant relationship to those effects.”

The U.S. DOI and, more specifically, the BLM are seeking opportunities to develop renewable energy resources on federal land. The BLM’s policy is to encourage development of renewable energy projects on BLM land consistent with the National Energy Policy of 2001 and the EPL Act. In furtherance of that goal, the BLM completed a PEIS assuring a common direction and policy for permitting wind facilities on public land. The BLM, together with the DOE, is currently preparing a Solar Energy PEIS that will serve the same purpose. The BLM is considering whether to establish an agency-wide solar energy development program to supplement or replace existing policy, and whether to amend land use plans in the six-state study area to adopt the new program. The agency also expects to identify BLM-administered land in California, Arizona, Colorado, New Mexico, Nevada, and Utah that may be environmentally suitable for solar energy development, as well as land that would be excluded from such development. The PEIS will consider whether designation of additional electricity transmission corridors on BLM-administered land is necessary to facilitate utility-scale solar energy development. Similarly, through this PEIS the DOE is considering a program of solar energy environmental policies and mitigation strategies as guidance to all DOE-funded solar projects.

The Solar PEIS is not intended to eliminate the need for site-specific environmental review for individual utility-scale solar projects. Site-specific environmental reviews are expected to be tiered to the PEIS and to be simplified and improved by it.

Under the No Action PEIS alternative, the DOE and the BLM would continue to evaluate solar energy projects on a case-by-case basis. Under the proposed action, the BLM and DOE would create a reasonably foreseeable development scenario to define the potential for future utility-scale solar energy development activities over a 20-year study period. The release of the Draft Solar Energy Development PEIS was originally scheduled for spring of 2009. However, BLM and DOE decided to postpone completion of the Draft PEIS so that the PEIS could be made consistent with a U.S. DOI policy goal of identifying and prioritizing the specific locations best suited for large-scale solar energy production. The BLM solicited public comment on the 24 tracts of BLM-administered land identified for in-depth study for solar development. The draft PEIS is still under development, and will not be released for several additional months at the

earliest. For this reason, the PEIS is not available to provide guidance for the preparation of cumulative impacts analysis in this EIS, and that analysis must be conducted separately.

4.17.2 Methodology for Assessing Cumulative Impacts

Information about past, present, and reasonably foreseeable future activities in the cumulative resource ROI were gathered from the BLM, USFWS, Nye County, and other agencies; adopted plans; environmental documents; and personal communications with public agencies and utility companies.

The approach to cumulative impacts of the proposed Project considers “past” or “existing” projects to be those that have completed construction and are in operation. “Present” projects include those that are currently under construction or have been fully permitted such that they are likely to be part of the existing environment when the proposed Project would begin construction. “Reasonably foreseeable” future projects are those for which a formal permit application has been filed. The working definition of “reasonably foreseeable” projects on BLM land is based on whether or not a draft or final POD has been filed with the BLM by an applicant.

The proposed Project is most likely to have potential cumulative impacts when viewed together with other large-scale renewable energy projects given their similar direct and indirect impacts. As such, the cumulative impacts analysis in this Final EIS focuses primarily on other renewable energy projects, but other types of projects that may impact resources are considered as well. Table 4-43 lists existing and reasonably foreseeable commercial projects within the Amargosa Valley.

Chapter 4 - Environmental Effects

Table 4-43 List of Projects Considered Within or Near Amargosa Valley

Project Name	Project Description	Project Type	Status	Cumulatively Affected Resources
Existing Projects				
Nevada Joe's	Restaurant, brothel, gas station, helicopter pad, and convenience store	Commercial	Existing	Socioeconomics, Traffic
Alamo Fireworks	Fireworks store	Commercial	Existing	Socioeconomics, Traffic
Amargosa Valley Community Complex	Emergency services center, library, medical clinic, senior center, park, cemetery, rodeo grounds, AVIA Community Center and Raceway, and Amargosa Valley School	Public services, medical, and recreational.	Existing	Socioeconomics, Traffic, Noise, Air Quality, Visual
Horizon Academy	Private boarding school	Education	Existing	Socioeconomics, Traffic, Visual
First International Bank	Bank	Commercial	Existing	Socioeconomics, Traffic, Visual
Longstreet Hotel and Casino	Hotel, casino, RV resort, 9-hole golf course, and restaurant	Commercial and Recreational	Existing	Socioeconomics, Traffic, Water Resources, Noise, Visual
Ruby's Store	Grocery/convenience store	Commercial	Existing	Socioeconomics, Traffic, Visual
State Line Saloon	Dining, RV Park, golf course, convenience store, and lounge	Commercial	Existing	Socioeconomics, Traffic
Church of Amargosa	Church Facilities	Religious	Existing	Socioeconomics, Traffic, Visual
Ponderosa Dairy	Dairy farm covering approximately 1,800 acres	Agriculture	Existing	Socioeconomics, Water Resources, Air Quality, Visual, Noise
Valley Substation	Electrical substation and related facilities	Utilities	Existing	Socioeconomics, Visual

Chapter 4 - Environmental Effects

Table 4-43 List of Projects Considered Within or Near Amargosa Valley

Project Name	Project Description	Project Type	Status	Cumulatively Affected Resources
Transmission Line	VEA is the holder of a ROW for a 138 kV line near/on the Project area	Utilities	Existing	Socioeconomies, Visual
Telephone Line	Nevada Bell is the holder of a ROW for a telephone line near the Project area	Utilities	Existing	None
IMV Nevada Mining	Mining claims on 10,000 acres for specialty clays	Mining	Existing	Socioeconomies, Soils, Water Resources, Air Quality, Visual
Cinder Cone Mine	Volcanic-mineral material mining (pumice and cinder)	Mining	Existing	Socioeconomies, Water Resources, Air Quality, Visual
Sand and Gravel Pit	Sand and gravel pit mining	Mining	Existing	Socioeconomies, Soils, Water Resources, Air Quality, Visual, Noise
Big Dune	Primarily an OHV recreation area	Recreation	Existing	Socioeconomies, Soils, Air Quality, Visual, Noise, Recreation, Traffic
Foreseeable Future Projects				
VEA Transmission Line Upgrade	Upgrade transmission line from a 138 kV to a 230 kV line and build a new 230 kV switchyard	Utilities	Proposed	Socioeconomies, Visual, Air Quality, Temporary Construction Noise, Temporary Construction Traffic
Renewable Energy Transmission Company (Solar Express Project)	Proposed 120 mile 500kV transmission line that will connect solar energy generation in the Amargosa Valley, Nevada with the Marketplace, Eldorado, McCullough substation complex in southern Nevada	Utilities	Right-of-way Pending	Socioeconomies, Visual, Air Quality, Temporary Construction Noise, Temporary Construction Traffic

Chapter 4 - Environmental Effects

Table 4-43 List of Projects Considered Within or Near Amargosa Valley

Project Name	Project Description	Project Type	Status	Cumulatively Affected Resources
<p>Abengoa Solar Inc. Lathrop Wells Solar Facility. NVN-086571; filed 12/12/2008; 5,280 acres.</p>	<p>Proposed 250 MW parabolic-trough, dry-cooled solar power plant with the option to expand the facility by adding a second 250 MW unit. Additionally, the proposal may include up to 20 MW of photovoltaic solar power.</p> <p>Notice of Intent to prepare an EIS published in the Federal Register on July 15, 2010. Scoping meetings held August 2010.</p> <p>Located southwest of the intersection of US 95 and Hwy 373; approximately 2-3 miles northeast of the proposed Project.</p>	<p>Utilities</p>	<p>Right-of-way Pending</p>	<p>Construction Impact: Air Quality; Biology; Cultural; Hazard Materials; Water Resources; Noise; Recreation; Soils, Socioeconomic; Traffic</p> <p>Operational Impact: Biology; Land Use; Water Resources; Soils, Recreation; Socioeconomic</p>
<p>Amargosa Flats Energy, LLC (Ausra). NVN-084704, filed 03/12/2008.</p>	<p>Proposed 140 MW linear fresnal solar power plant. No POD available for review. Located east of Highway 160.</p>	<p>Utilities</p>	<p>Right-of-way Pending</p>	<p>Construction Impact: Air Quality; Biology; Cultural; Hazardous Materials; Water Resources; Noise; Recreation; Socioeconomic; Traffic, Soils</p> <p>Operational Impact: Biology; Land Use; Hydrology; Recreation; Socioeconomic</p>

Table 4-43 List of Projects Considered Within or Near Amargosa Valley

Project Name	Project Description	Project Type	Status	Cumulatively Affected Resources
<p>Cogentrix Solar (seven separate right-of-way applications on BLM parcels totaling 74,477 acres throughout Amargosa Valley. Right-of-way applications filed in 2007 and 2008 with the BLM Pahrump Field Office. Many of these application are overlapping or “second in line” applications.</p>	<p>Seven separate right-of-way applications for the construction and operation of solar thermal power plants throughout Amargosa Valley. No POD’s available for review.</p> <p>NVN-083220, 12,800 acres; NVN 083221, 22,400 acres; NVN-085656, 7,500 acres; NVN-085657, 7,700 acres; NVN 083150, 13,440 acres; NVN-085654, 3,597 acres; NVN-085602, 7,040 acres</p>	<p>Utilities</p>	<p>Right-of-way Pending</p>	<p>Construction Impact: Air Quality; Biology; Cultural; Hazards; Water Resources; Noise; Recreation; Soils, Socioeconomic; Traffic</p> <p>Operational Impact: Aesthetics; Biology; Land Use; Water Resources; Recreation; Socioeconomic, Soils</p>
<p>EwindFarm Inc. NVN 088156; filed 12/16/2009; 50,470 acres NVN 085201; filed 5/14/2008; 11,238 acres</p>	<p>Proposed 8 gigawatt solar energy project on the DOE Yucca Mountain, Nevada Test Site. No POD available.</p> <p>Proposed 500 MW photovoltaic flat plate facility near the Johnnie substation north of Pahrump along SR 160. No POD available.</p>	<p>Utilities</p>	<p>Right-of-way Pending</p>	<p>Construction Impact: Air Quality; Biology; Cultural; Hazards; Water Resources; Noise; Recreation; Soils, Socioeconomic; Traffic</p> <p>Operational Impact: Biology; Land Use; Water Resources; Recreation; Socioeconomic, Soils</p>
<p>Nye County Solar One, LLC. NVN-086217; filed 09/29/2008; 14,160 acres.</p>	<p>Proposed 300 MW parabolic trough solar plant. No POD available for review.</p> <p>Project located near Highway 160.</p>	<p>Utilities</p>	<p>Right-of-way Pending</p>	<p>Construction Impact: Air Quality; Biology; Cultural; Hazard Materials; Water Resources; Noise; Recreation; Socioeconomic; Traffic</p> <p>Operational Impact: Biology, Water Resources; Land Use, Socioeconomic</p>

Chapter 4 - Environmental Effects

Table 4-43 List of Projects Considered Within or Near Amargosa Valley

Project Name	Project Description	Project Type	Status	Cumulatively Affected Resources
<p>Pacific Solar Inc., c/o Iberdrola Renewables</p> <p>Amargosa North - NVN-084465; 10,005.53 acres; filed 12/07/2007;</p> <p>Amargosa South - NVN-084466; 4,480 acres; filed 12/07/2007.</p>	<p>Proposed 150 MW photovoltaic solar plant(s). Notice of Intent to prepare an EIS published in Federal Register on December 14, 2009. Scoping meetings held January 2010.</p> <p>Project located near Big Dunes, approximately 2-3 miles northwest of proposed Project.</p>	<p>Utilities</p>	<p>Right-of-way Pending</p>	<p>Construction Impact: Air Quality; Biology; Cultural; Hazards; Water Resources; Noise; Recreation; Soils Socioeconomic; Traffic along Valley View Boulevard</p> <p>Operational Impact: Biology, Water Resources; Land Use, Socioeconomic; Traffic along Valley View Boulevard</p>
<p>Altgas Renewable Energy/Rhyolite Energy Park; NVN-084067; filed 08/30/2007</p>	<p>Met tower installation approved. Pending Wind Energy facility if wind data is viable.</p> <p>Project located near Beatty.</p>	<p>Utilities</p>	<p>Approved (Met tower installation only)</p>	<p>Construction Impact: None</p> <p>Operational Impact: None</p>

4.17.3 Geographic Context for Cumulative Analysis

Cumulative impacts occur in a geographic context; but the area over which cumulative effects potentially would be of concern varies for different environmental resource areas. For example, noise and vehicular traffic impacts usually are evaluated in localized terms, impacts on protective services and utilities require evaluation of larger service areas, and the scope of water resources and air quality impacts can involve an entire groundwater basin and/or be affected by topographic features (e.g., mountains). In short, the scope of cumulative impacts evaluations varies spatially, with the variability based on the nature of the environmental resource area being considered.

While the discussions in the various environmental resource areas often consider a broad regional perspective, the specific projects that are the primary focus of the cumulative analyses in this EIS are proposed projects identified between Beatty and Highway 160, basically the Amargosa Valley in Nevada. These proposed projects are shown on Figure 4-12.

In addition, cumulative impacts analysis must consider the variable of time as well as geography. The length of time for cumulative effects analysis varies according to the duration of impacts from the Proposed Action on the particular resource. The timeframe for the cumulative impact analysis begins at the time of Project construction (assume 2011, if the Project is approved) and extends sufficiently forward in time with consideration of past trends and activities on current and reasonably foreseeable future actions and trends that may affect the sustainability of the resource.

In some resource areas, the overlap in project construction schedules is particularly important because potential impacts that are enhanced by large overlapping construction work forces (e.g., impacts on traffic and socioeconomic conditions and infrastructure) could be considerable. However, these impacts are short-term and temporary because solar project operation-phase work forces are small compared to the construction phase.

4.17.4 Cumulative Projects

The focus of the cumulative analyses in this EIS is to evaluate the potential impacts of the proposed Project combined with impacts of past, present, and reasonably foreseeable projects within the Amargosa Valley in Nevada.

4.17.4.1 Past Actions

Approximately 92 percent of the land in Amargosa Valley is public land, with the remaining 8 percent of private lands scattered throughout the Valley. Past actions in the area include agricultural development, including farming and dairy operations; isolated mining exploration in the surrounding desert and mountains; isolated pockets of commercial and residential development and associated road and utility infrastructure construction and operation; and recreational opportunities in the surrounding desert and mountain areas, including Big Dunes, Ash Meadows NWR, and Funeral Mountain Wilderness Area. Military and defense related

activities have occurred, and are ongoing, at the Nevada Test Site, Nevada Test and Training Range, and the proposed Yucca Mountain Nuclear Waste Repository.

Existing residences, businesses, and public facilities are clustered in various locations in the Amargosa Valley. These include the highway commercial center at the junction of US 95 and NV 373; the commercial and residential area near the California/Nevada border along NV 373; and the Amargosa Valley Community Complex, which includes the community center and town offices, the emergency services center and sheriff's substation, a town library, the health clinic, a senior center, and the Amargosa Valley School. Isolated pockets of residential development are interspersed in the Amargosa Valley Community Complex primarily north of Amargosa Farm Road and east of Sandy Lane. The majority of land development evolved around agricultural uses, and commercial activity evolved around the main roads through the valley (Amargosa Valley Area Plan 2009).

Existing utility facilities in the project area include electrical distribution and transmission lines owned and operated by VEA, and fiber optic and telephone lines owned by Nevada Bell. In addition, there are three operating cellular towers in the valley. Most of the higher voltage electrical transmission lines were installed in the early 1960s, with distribution lines installed as development increased in the Amargosa Valley.

There are seven private water systems throughout the valley and only four communal sewer systems. Most residents in the Amargosa Valley rely on individual wells and septic systems. The town of Amargosa Valley does not forecast expansion of private water systems or communal sewer systems to serve the broader community (Amargosa Valley Area Plan 2009).

4.17.4.2 Reasonably Foreseeable Future Actions

Reasonably foreseeable future projects considered in this EIS are shown on Figure 4-12, and are summarized in Table 4-42. Each of the projects was evaluated to determine if it is sufficiently defined (reasonably foreseeable) to be: (1) relevant to potential impacts, (2) within the Project area of influence, and (3) of a magnitude or duration that could potentially result in a cumulative impact.

Renewable Energy Development

In a broad geographic context, the BLM has received more than 220 applications for utility-scale solar energy projects in California, Nevada, Arizona, New Mexico, Colorado, and Utah. These applications cover more than 2.3 million acres of land. There are also hundreds of applications for utility-scale wind and geothermal energy projects on BLM land in the western United States. In addition, there are an unknown number of renewable energy development projects being proposed on private lands throughout the Southwest. Regional cumulative impacts could occur as a result of implementation of the proposed Project in conjunction with these solar, wind, or geothermal energy projects.

There are uncertainties in any large-scale, complex, and costly industrial project as it moves from concept toward realization. However, the level of uncertainties with some of the proposed renewable energy projects in the desert Southwest is unusually great. Cumulative analysis under NEPA requires consideration of the likelihood that the proposed projects actually will occur. To

quote the California Energy Commission Staff in the Ivanpah Solar Electric Generation System Preliminary Staff Assessment:

“[While there is]...a very large number of applications to BLM, it is unlikely that all of these projects will be constructed for the following reasons:

- Not all developers will develop the detailed information necessary to meet BLM and Energy Commission standards. Most of the solar projects with pending applications are proposing generation technologies that have not been implemented at large scales. As a result, preparing complete and detailed PODs is difficult, and completing the required NEPA and California Environmental Quality Act documents is especially time-consuming.
- After approval by the appropriate Lead Agency under California Environmental Quality Act (only applies to California projects) and NEPA (generally the CEC and/or BLM), all permits must be obtained. The large size of these projects may result in permitting challenges related to endangered species mitigation requirements, and other issues.
- Also after project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent on the status of competing projects, the laws and regulations related to renewable project investment, and the time required for obtaining permits.”

In addition, the proposed renewable energy projects, whether proposed on public or private land must successfully compete for Power Purchase Agreements with utility organizations that are working to meet their state-mandated Renewable Portfolio Standards.

Within the cumulative effects analysis area (Amargosa Valley), there are 10 proposed solar facilities and one proposed wind project. As of September 2010, BLM-approved PODs have been filed for only two of the proposed solar and wind projects within the cumulative impact study area. A NOI to prepare an EIS for the Pacific Solar Investment, Inc. – Amargosa North Solar Power Project was published in the Federal Register on December 14, 2009. Scoping meetings for this Project were held January 19–21, 2010. The proposed project, would consist of solar photovoltaic panels, including an electrical transmission substation and switchyard facilities. The proposed project would produce approximately 150 MW of electricity and would be located on approximately 2,356 acres within a 7,500 right-of-way on public lands managed by the BLM Pahrump Field Office (See Figure 4-12).

On July 15, 2010, an NOI to prepare an EIS for the Abengoa Solar – Lathrop Wells Solar project was published in the Federal Register. The proposed project would consist of a concentrated solar power facility—including a solar parabolic trough, photovoltaic panels, an electrical transmission substation, switchyard facilities, and a transmission line. The project would produce approximately 250 MW from a parabolic-trough, dry-cooled solar power plant with the option to expand the facility by adding a second 250 MW unit. Additionally, the proposal may include up to 20 MW of photovoltaic solar power. The proposed project would be located on approximately 5,336 acres of public land immediately north of the proposed Project that is the subject of this Final EIS. Scoping meetings for the Lathrop Wells Solar project were held in mid-August 2010.

Various renewable energy developers have submitted right-of-way applications to the BLM but have not advanced their planning process beyond the initial application stage. There are several solar developers who have submitted applications to the Pahrump BLM Field Office that are “second in line,” meaning that they proposed development of sites for which applications have already been submitted. The proponents have not submitted detailed Project-specific information for these projects, but only basic information such as type of technology to be used, proposed size, and requested acreage. This information is publicly available on BLM’s LR-2000 database. In an effort to be conservative, the available data were used to evaluate the potential cumulative effects when considered with the proposed Project even though these projects, ultimately may not be developed.

Electrical Transmission

The West-Wide Energy Corridor PEIS has delineated energy corridors running through the region, including proposed corridors that parallel US 95 north of the Project area. Electric transmission providers are evaluating various transmission line alternatives in the Amargosa Valley area; however, to date, no formal applications have been filed with either the BLM or the Public Utilities Commission of Nevada.

NV Energy submitted a Statement of Interest (SOI) in response to the Western Area Power Administration (Western) Request for Interest dated March 4, 2009. NV Energy submitted the SOI for the potential joint development and construction of 500kV transmission lines and associated facilities to access renewable energy resources within Nevada and deliver the power from those resources to Nevada and other markets in the southwest (Renewable Energy Transmission Access Advisory Committee 2009). The NV Energy proposal is for a phased approach to match the demand for renewables with actual resource development. Their SOI identified four separate phases. Phase I would consist of a 500 kV line extending from NV Energy’s existing Harry Allen 500 kV substation north of Las Vegas to its Northwest Substation. From there the line would extend northward to a new collector substation in the Amargosa Valley. Phase II and III, would be interchangeable or concurrent depending on demand and Western’s and NV Energy’s wants and needs. Phase II could extend south from a proposed Desert Rock Station to Western’s Mead substation south of Boulder City. Phase III would extend north from the Amargosa Valley to NV Energy’s Blackhawk Substation in northern Nevada. Finally, Phase IV could be an option to extending into the Transmission Agency of Northern California if Western so desired.

In consideration of NV Energy’s SOI, and as part of their long-term planning to support renewable energy development in the Amargosa Valley, VEA intends to upgrade its existing transmission lines in their service territory. The first phase would include the upgrade of an existing transmission line located south of US 95 and west of US 160 from 138kV to 230kV. The second phase would be the construction of a new 230kV line from the VEA substation at the corner of Powerline Road and Anvil Road to the existing Valley Switching Station. The line would then parallel VEA’s existing 138kV transmission line to the proposed Johnnie Substation. VEA is currently performing system impact studies based on interconnection requests to determine whether other upgrades are required to accommodate future load growth. VEA will file a right-of-way application or update to accommodate these upgrades, and the BLM will prepare a separate NEPA review of VEA proposed action.

In a separate action, Renewable Energy Transmission Company has filed a right-of-way application to construct, operate, and maintain a 120-mile long 500kV transmission line to connect new renewable energy generation in the Amargosa Valley to energy markets in southern Nevada and California. The proposed transmission line, known as the Solar Express Project, will be subject to separate NEPA review and studies.

4.17.5 Evaluation of Potential Cumulative Impacts

The following sections provide an analysis of potential cumulative impacts related to the Proposed Action on each resource when viewed in conjunction with other past, present, and reasonably foreseeable actions in the cumulative impact study area. This analysis considers the anticipated additive effect that the Proposed Action would have to cumulative impacts after BLM-approved mitigation measures are implemented.

Because many of the renewable energy projects are in the early stages of development, there are limits to understanding whether and how those projects' direct and indirect impact may combine with the proposed Project's potential impacts to yield cumulatively significant impacts. As noted above, many of the proposed renewable energy projects may never be developed, and each project that advances into the permitting phase, will be required to more fully study cumulative impacts based on better and more detailed information. In addition, in this EIS, general assumptions can be made based on impacts that normally occur with any large scale industrial project.

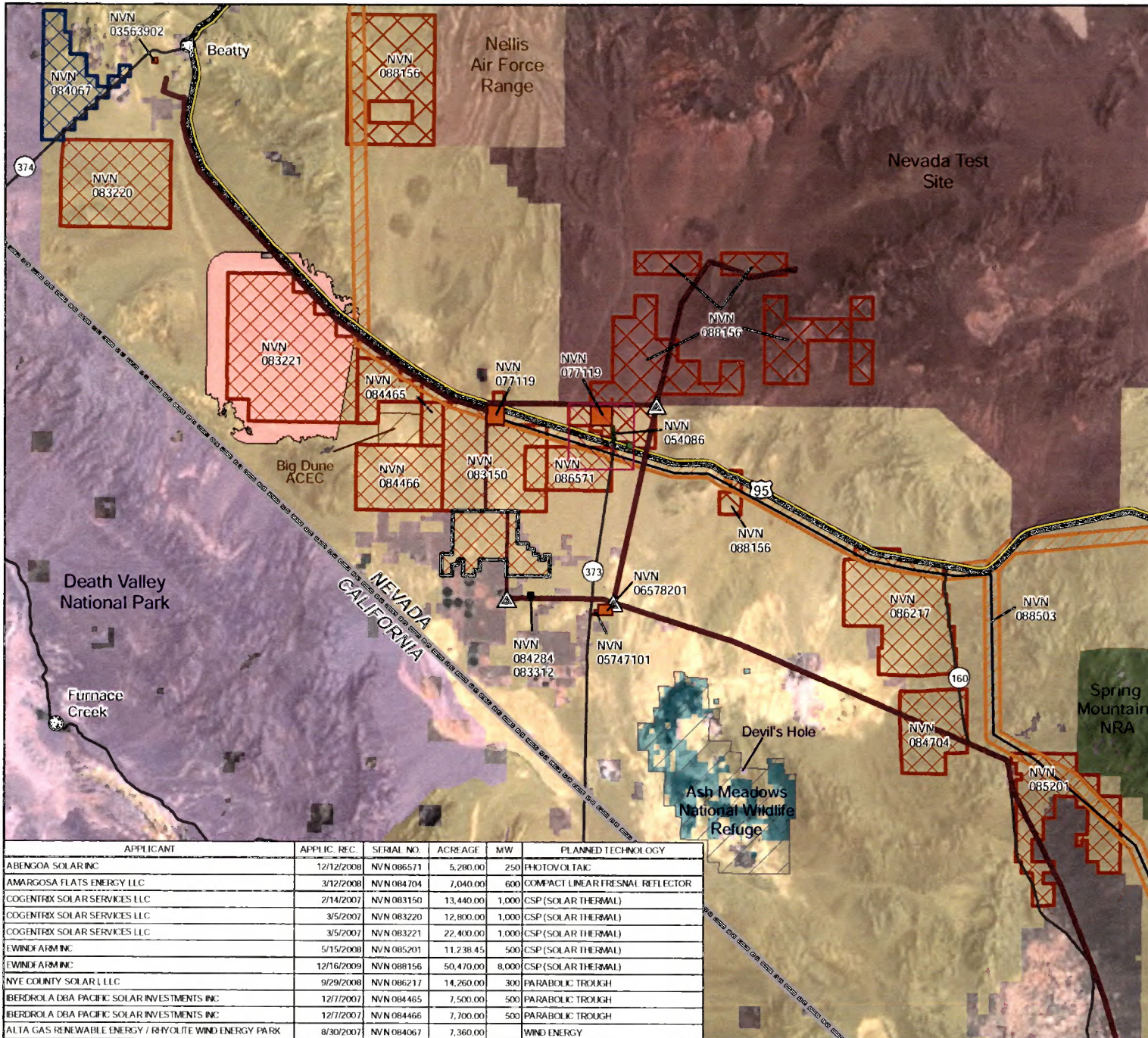
During construction some impacts would be temporary in nature, such as increases in air pollution and dust, construction noise, and a disruption in local traffic patterns due to an increased amount of labor. Potential permanent impacts would be loss of habitat for local wildlife and plant species, possible loss of cultural or historical resources, and use or disturbance of water resources. Therefore, additional project-specific impacts might result.

During operations, permanent impacts might include the loss of habitat for wildlife, possibly increased air emissions depending on the type of technology being used, alteration of visual and aesthetic characteristics, increase use of water resources, increases in local employment, and other project-specific impacts.

Impacts can and would be required to be mitigated using site-specific BMPs. Permits required for construction and operation will include stipulations that require the operator/owner to utilize BMPs to establish and maintain compliance with the permits. It is important to note that each of the cumulative proposed projects on federal land will undergo its own NEPA review process, and will be required to comply with applicable regulatory requirements and to mitigate impacts that are identified in the review process.

Amargosa Farm Road Solar Energy Project (NVN-84359)

Cumulative Impacts Figure 4-12



LEGEND

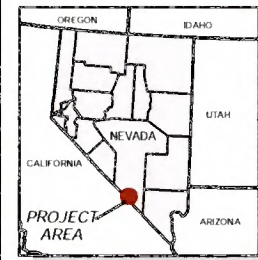
- Project Area
- Science and Technology Park
- Proposed Landfill
- Proposed Nevada Science Museum
- Proposed School
- West-wide Energy Corridor (Sec 386)
- Pending Wind
- Pending Solar
- BLM Solar Study Area
- Conceptual Yucca Mtn Project Gateway Area
- Proposed 500kV Transmission Line

Surface Management

- Bureau of Land Management
- Department of Defense
- Department of Energy
- National Park Service
- US Fish and Wildlife Service
- US Forest Service
- Private

General Reference Features

- Existing Transmission Line (<230kV)
- US Highway
- Existing Substation
- State Highway
- State Boundary



Source: Cases, WWEC, Land Ownership - BLM, 2009; Ash Meadows - USFWS, 2005; Imagery - ESRI, 2009; Wells - Nevada State Engineer, 2008; Transmission Lines, Substations - Platts, 2009

September 2010



APPLICANT	APPLIC. REC.	SERIAL NO.	ACREAGE	MW	PLANNED TECHNOLOGY
ABENGOA SOLAR INC	12/12/2008	NVN 086571	5,280.00	250	PHOTOVOLTAIC
AMARGOSA FLATS ENERGY LLC	3/12/2008	NVN 084704	7,040.00	600	COMPACT LINEAR FRESNEL REFLECTOR
COGENTRIX SOLAR SERVICES LLC	2/14/2007	NVN 083150	13,440.00	1,000	CSP (SOLAR THERMAL)
COGENTRIX SOLAR SERVICES LLC	3/5/2007	NVN 083220	12,800.00	1,000	CSP (SOLAR THERMAL)
COGENTRIX SOLAR SERVICES LLC	3/5/2007	NVN 083221	22,400.00	1,000	CSP (SOLAR THERMAL)
EWIND FARM INC	5/15/2008	NVN 085201	11,238.45	500	CSP (SOLAR THERMAL)
EWIND FARM INC	12/16/2009	NVN 088156	50,470.00	8,000	CSP (SOLAR THERMAL)
NVE COUNTY SOLAR L LLC	9/29/2008	NVN 086217	14,260.00	300	PARABOLIC TROUGH
BERDROLA DBA PACIFIC SOLAR INVESTMENTS INC	12/7/2007	NVN 084465	7,500.00	500	PARABOLIC TROUGH
BERDROLA DBA PACIFIC SOLAR INVESTMENTS INC	12/7/2007	NVN 084466	7,700.00	500	PARABOLIC TROUGH
ALTA GAS RENEWABLE ENERGY / RIVOLITE WIND ENERGY PARK	8/30/2007	NVN 084067	7,360.00		WIND ENERGY

4.17.5.1 Air Quality

Proposed Action

Construction of the reasonably, foreseeable projects within the Amargosa Valley airshed would generate similar types of emissions and could contribute individually and cumulatively to impacts to local and regional air quality. During construction of the proposed Project, mitigation measures will be in effect to control and minimize equipment and fugitive dust emissions. However, as cited in Section 4.1, construction activities would generate short-term emissions of CO, NO_x, VOCs, SO₂, PM₁₀ and PM_{2.5}. Since construction impacts on air quality would be localized and short-term, only projects less than 5 miles from the proposed Project are considered that could, when added to the Proposed Action, contribute to cumulative impacts.

There are four solar development right-of-way applications within 1 mile of the Project site. These include the proposed Lathrop Wells Solar Project being developed by Abengoa Solar, Inc., the Amargosa North Solar Project being developed by Pacific Solar Investment, Inc., and two applications filed by Cogentrix for yet to be named solar facilities. As of August 2010, the Lathrop Wells Solar Project and Amargosa North Solar Project have begun their permitting process, including commencement of the federal NEPA process.

The Lathrop Wells Solar project is a proposed 250 MW parabolic trough, dry-cooled solar power plant, with an option to add an additional 250 MW dry-cooled unit and 20 MW of photovoltaic solar panels. The project site is located southwest of the intersection of US 95 and NV 373, approximately 1 mile northwest of the proposed Project. Abengoa Solar, Inc., filed a right-of-way application with the Pahrump Field Office for 5,336 acres of BLM managed land. The actual acreage required for the project footprint is unknown.

The Amargosa North Solar project is a proposed multi-phase photovoltaic solar project near the Big Dune Recreation Area, approximately 2.5 miles northwest of the Project site. The first phase is proposed as a 50 MW project, with additional phases to generate up to 150 MW of electricity. The developer, Pacific Solar Investments, Inc., filed a right-of-way application requesting 7,500 acres. The actual acreage required for the final project footprint is unknown.

Since limited information is available for these two projects, the amount of construction and operation emissions that may be attributed from each project is unknown. However, given the acreage associated with each project, and agency requirements to mitigate fugitive dust and equipment emissions during construction, impacts from construction would be similar to the Proposed Action. Each of the projects will be required to undergo a separate environmental review process and address its own emissions and impacts. Cumulative impact potential depends if these projects were to be constructed on overlapping schedules so that peak emissions and impacts coincide. Given that the proposed Project is scheduled to begin construction in early 2011, and the Lathrop Wells Solar Project and Amargosa North Solar Project recently began their permitting process, it is unlikely that these project will have cumulative air quality impacts with the proposed Project.

During operation, as cited in Section 4.1, the proposed Project is predicted to have minor, mitigated impacts for all criteria pollutants. Due to the large geographic area these projects occupy and the minimal emissions expected from other operating renewable energy facility, each of these projects is expected to have minor impacts individually and cumulatively with the proposed Project during operations. Virtually all of the cumulative projects listed in Table 4-43 are renewable energy facilities and thus would displace electricity generation that otherwise likely would occur with higher-polluting fossil fuels.

Wet-Cooled Alternative

Implementation of the wet-cooled alternative would have similar cumulative construction impacts as the Proposed Action (dry-cooled alternative). During operations, air quality impacts are likely to be similar to the Proposed Action, with the difference being an increase in additional PM₁₀ and PM_{2.5} emissions from the cooling towers associated with the wet-cooled facility. Since limited data is available for the Lathrop Wells Solar Project and Amargosa North Solar Project, the amount of increased PM₁₀ and PM_{2.5} emissions in the cumulative impact area cannot be calculated. However, given that each facility must comply with NDEP regulations governing air quality protection, it is unlikely the concurrent operation of all three facilities would result in the exceedance of federal and state air quality regulations.

4.17.5.2 Geological & Mineral Resources

Impacts to geological and mineral resources are generally localized and do not result in regionally cumulative impacts. Geological and mineral resources vary according to the geological formations that they occur within. Geological formations may also vary over short distances, effectively limiting the geographic range of the impacts to geological and mineral resources. Incremental impacts to area geology and mineral resources resulting from the construction, operation, and maintenance of the proposed Project, alone or together with other present and reasonably foreseeable future projects will not have cumulative impacts.

4.17.5.3 Soil Resources

Proposed Action

The development of more than 100,000 acres of proposed renewable energy projects would cumulatively impact soil resources in Amargosa Valley. The development of these projects would reduce the amount of soils available to plant, animal, and human communities in Amargosa Valley. Future construction projects will be required to develop and comply with site-specific soil protection measures as required by their NPDES permit. Projects on federally managed land will be required to undergo a separate environmental review process and address project-specific impacts on soil resources.

In consideration of the two pending solar projects currently in the permitting phase (Lathrop Wells Solar project and Amargosa North Solar project), up to 10,000 acres of desert lands would have 100 percent clearance of vegetation for construction of the proposed Project and Lathrop

Wells Solar project, and up to 7,000 acres could be partially disturbed from the construction of the Amargosa North Solar project.

The removal or disturbance of vegetation and soil crusts would expose soil and increase the potential for wind- and water-driven erosion. Appropriate mitigation measures to minimize soil erosion and loss would be mandated by the BLM as part of their right-of-way grants.

Wet-Cooled Alternative

Implementation of the wet-cooled alternative would have similar cumulative construction and operational impacts as the Proposed Action (dry-cooled alternative).

4.17.5.4 Water Resources

Proposed Action

The cumulative effects area for water resources is the Amargosa Desert Hydrographic Basin. Under the Proposed Action, during the 39-month construction period, up to 600 acre-feet of groundwater will be used annually for construction water needs. During operations, up to 400 acre-feet will be used annual for Project operations and maintenance.

The majority of reasonably foreseeable future projects in the Amargosa Desert Hydrographic Basin are other solar energy developments on federal lands. Projects that advance into the permitting phase would be required to undergo a separate environmental review process and address project-specific impacts on water resources. For any project needing a stable water supply within the area subject to Order 1197, the developer would need to either lease or purchase water currently being pumped under an existing certified water right. Since the water user can only pump up to the authorized duty of the water right, there would be no net increase in groundwater pumping within the basin. However, since most wells in the Amargosa Valley are not metered, it is difficult to quantify the amount of water that may actually be pumped if all interrelated projects were to be approved. An indirect impact of conversion of agricultural water rights to industrial water rights would be a reduction of return flow (recharge) from irrigation.

As of September 2010, only two proposed solar projects, the Lathrop Wells Solar project and Amargosa North Solar project, have reached the federal permitting stage. Information about each project's water needs is limited. However, based on industry standards, it is anticipated the Lathrop Wells Solar project, a parabolic trough dry-cooled solar facility, will require 300 to 500 afy for construction and operations. The Amargosa North Solar project, a multi-phase photovoltaic project, will require substantially less water during construction and operation. Because a photovoltaic project does not require extensive land clearing during construction, and water is only needed for mirror washing and dust control during operations, it is anticipated that 5 to 10 afy will be required for this project, depending on the size of the final project. At this time, it is unknown where each developer will acquire their project water.

The water used for the construction and operation of the proposed Project, when added to the water requirements for the Lathrop Wells Solar project and Amargosa North Solar project, would

result in a conversion of over a 1,000 ac of existing water rights from their current permitted use (most likely agricultural, as these are the most senior rights in the basin), to industrial use.

To avoid individually and cumulatively significant impacts to water resources, it is likely the NPS, USFWS, and BLM would require other solar developers agree to water mitigation measures like those required for the proposed Project. This may result in additional groundwater being retired or held in abeyance until it could be proven that its use would not impact sensitive resources at Ash Meadows NWR or Devils Hole. No net increase (and a possible decrease) in water usage resulting from these restrictions would avoid significantly cumulative impacts to water resources and potential impacts to sensitive species. However, since water must be obtained from an existing water right holder, and there are limited senior water rights within the basin, implementation of such measures would result in less water being available for other uses, which might constrain other types of economic development in the regional area.

The Fortymile Wash drainage traverses the Project site. Two other solar energy projects are proposed immediately north of the Project site: Cogentrix Solar Services, LLC (NVN-083150), and the Lathrop Wells Solar project. Under the Proposed Action, the Proponent intends to protect the property from off-site flows by means of a continuous channel around the northern and western perimeter of the Project site. The channel will be designed to effectively intercept the 100-year storm event off-site runoff and convey the concentrated flow to the southwest corner of the property. The Lathrop Wells Solar project is in the preliminary design stage. Information about the proponent's plans for stormwater control or design features are unknown at this time. Since this project is also located within the Fortymile Wash drainage, upstream of the proposed Project, future stormwater design measures would need to be coordinated with downstream development, including the proposed Cogentrix solar development, and the proposed Project. They will also be required to consult with the USACE to determine how their project layout and design will impact any jurisdictional waters contained within and downstream of their site.

Hazardous material spills can occur during project construction and operation. All foreseeable projects, including the proposed Project, are required by law to implement a site-specific SWPPP and SPCC Plan to address how mitigation measure will be adopted and enforced to minimize or avoid these events. Given that depth to groundwater in the Project area is more than 135 feet below ground surface, it is highly unlikely that spills would reach and contaminate groundwater in the area.

Wet-Cooled Alternative

Construction of the wet-cooled alternative, would have similar cumulative construction impacts on water resources as the Proposed Action (dry-cooled alternative). The largest difference between the two alternatives is the amount of operational water to be obtained from existing water right holders, and the conversion of these waters from agriculture use, or their current use, to industrial. In addition, the amount of water the NPS, USFWS, and BLM will require for water mitigation under the wet-cooled alternative is likely to be substantial, which when added to other reasonably foreseeable project water needs, would result in less water being available for agriculture, industrial, or commercial use in the Amargosa Valley. However, reducing the amount of water pumped from the basin may result in less water-related impacts to sensitive species Ash Meadows NWR and water levels at Devils Hole.

4.17.5.5 Noise

Cumulative noise impacts from the construction and operation of solar energy facilities are generally localized. The mechanical equipment associated with each of the cumulative projects is unlikely to result in combined noise impacts to a given known sensitive receptor due to the distance between each project. However, due to the increase in traffic volumes along highways and local roads from the construction and operations of multiple solar projects, an increase to the community ambient noise levels may occur.

Due to the remoteness of the general area and the size of the individual projects, instances where there would be cumulative noise impacts occurring at any given sensitive receptor location during construction activities would be infrequent and would only occur if multiple projects are constructed at the same time or when the construction activities occur along the adjacent project boundaries where known sensitive receptors are located. Given that the proposed Project is scheduled to begin construction in early 2011, and the Lathrop Wells Solar project and Amargosa North Solar project recently began their permitting process, it is unlikely that these projects would have cumulative noise impacts with the proposed Project.

4.17.5.6 Vegetation

Proposed Action

The cumulative effects area for vegetation resources is the Amargosa Desert Hydrographic Basin. Any development that results in the clearing and grading of existing desert lands would have cumulative effects within the Basin. In consideration of the two pending solar projects currently in the permitting phase (Lathrop Wells Solar project and Amargosa North Solar project), if all three projects were to be approved and constructed, up to 10,000 acres of desert lands would 100 percent clearance of vegetation for construction of the proposed Project and Lathrop Wells Solar project, and up to 7,000 acres could be partially disturbed from the construction of the Amargosa North Solar project.

Other cumulative impacts may result if non-native invasive species are allowed to spread or be introduced in an area, eventually replacing naturally occurring communities. Native plants generally have a slow recovery rate, and generally cannot recover from severe disturbance.

To avoid individually and cumulatively significant impacts to sensitive resources at Ash Meadows NWR and Devils Hole, it is likely the NPS, USFWS, and BLM would require future solar developers agree to water mitigation measures like those required for the proposed Project. No net increase (and a possible decrease) in water usage resulting from these restrictions would avoid significantly cumulative impacts to vegetation resources.

Each project on federally managed land will be required to undergo a separate environmental review process and address project-specific impacts on vegetation resources.

Wet-Cooled Alternative

Construction of the wet-cooled alternative would have similar cumulative construction impacts on vegetation as the Proposed Action (dry-cooled alternative). The largest difference between the two alternatives is the amount of operational water to be obtained from existing water right holders and the conversion of these waters from agriculture use, or their current use, to industrial. In addition, the amount of water the NPS, USFWS, and BLM will require for water mitigation under the wet-cooled alternative is likely to be substantial, which when added to other reasonably foreseeable project water needs, would result in less water being available for agriculture, industrial, or commercial use in the Amargosa Valley. However, reducing the amount of water pumped from the basin may result in less water-related impacts to sensitive plant species at Ash Meadows NWR and water levels at Devils Hole.

4.17.5.7 Wildlife

Proposed Action

The development of over 100,000 acres of proposed renewable energy projects would cumulatively impact wildlife and wildlife habitat occupying Mojave desert scrub. The development of these projects would reduce the available habitat for wildlife (diverse group of reptiles, mammals, and birds), federally listed species (e.g., Mojave Desert Tortoise), and other special status species (e.g., Le Conte's Thrasher, Burrowing Owl). Cumulative impacts would contribute to the loss, fragmentation, and degradation of Mojave desert scrub, which would result in impacts to habitat connectivity, genetic integrity of wildlife populations, wildlife movement corridors, fragmentation of species populations, significant alteration of natural riparian habitat and function, and loss of occupied habitat for a variety of animals. Cumulative impacts, if not mitigated, could also encourage the proliferation of non-native invasive species, thereby eliminating or degrading natural plant communities upon which wildlife depend.

The Desert Tortoise inhabits the area in extremely low densities. The 2009 surveys of the Project area detected four old burrows and no additional signs of recent inhabitation by tortoises. The quality of the habitat in the Amargosa Valley has been found to be of low quality due to lack of annuals and other suitable forage for Desert Tortoises. According to NNHP data (2009), there are 10 known locations of Desert Tortoises found within the areas of the proposed projects. The majority of the Desert Tortoise locations in the vicinity are to the north of US 95 or south and east of Ash Meadows NWR.

The interrelated projects and activities with potential effects on groundwater resources include the possible, but unlikely construction and operation of all renewable energy projects, development of other projects (e.g., transmission upgrades), and continued groundwater pumping for agricultural, industrial, and domestic use in the Amargosa Valley. Cumulative indirect effects from groundwater pumping in the regional flow system may result in decline in local and regional groundwater levels, including the Ash Meadows area, and the special status wildlife species which occur there, and flows at downgradient locations.

Based on the location of the proposed Project and the results of the biological resources study that was conducted, the potential for cumulative impacts to wildlife as a result of the construction

of this Project is moderate. The elimination of vegetation (described above) or habitat directly affects local wildlife ecology and would contribute to changing trends in wildlife populations, movement and breeding of wildlife, and alter the interrelationships with other species occupying different ecosystems. Wildlife species occupying small, isolated patches of habitat – a possible result of multiple renewable energy or other projects being built in the region – are more susceptible to disturbance than species that are more widely distributed over the landscape in concentrated and well-connected habitat. Species' susceptibility to disturbance and other adverse effects may increase due to changes from the global climate change. Because the region consists mostly of federal land managed by the BLM, future projects will be required to identify wildlife, including federally protected species and other sensitive species that would be affected by those projects and to avoid or mitigate those effects through sensible project placement, project redesign, acquisition of mitigation lands, and other measures. Any potential adverse effects to wildlife or wildlife habitat that are identified will be avoided or, where avoidance is not possible, mitigated. BLM's Solar Programmatic EIS also will evaluate and address potential cumulative impacts to wildlife and other resources from solar energy development on BLM-managed lands, including those in the region.

Wet-Cooled Alternative

Construction of the wet-cooled alternative, would have similar cumulative construction impacts on wildlife as the Proposed Action (dry-cooled alternative). The largest difference between the two alternatives is the amount of operational water to be obtained from existing water right holders, and the conversion of these waters from agriculture use, or their current use, to industrial. In addition, the amount of water the NPS, USFWS, and BLM will require for water mitigation under the wet-cooled alternative is likely to be substantial, which when added to other reasonably foreseeable project water needs, would result in less water being available for agriculture, industrial, or commercial use in the Amargosa Valley. However, reducing the amount of water pumped from the basin may result in less water-related impacts to sensitive wildlife species at Ash Meadows NWR and water levels at Devils Hole.

4.17.5.8 Cultural Resources

Over time, cultural resources are subject to slow degradation as cultures change, and archaeological and historical sites weather and erode. Prior development of various types of projects has degraded and destroyed cultural resources as well. Indirect impacts on cultural resources can result from degrading the setting of a historic property and incidental damage to cultural sites as a result of increased public access to previously inaccessible areas.

Based on the location of the proposed Project and the results of the cultural resource study that was conducted, the potential for cumulative impacts to archaeological and historic sites as a result of the construction of this Project is considered low. The Project is located in an area with low site density which is currently accessible by the public and only one prehistoric site has been deemed significant. A potential increase in personnel living in the Amargosa Valley, as a result of the proposed Project may have an effect on currently undiscovered historic properties in nearby areas if those personnel engaged in recreational pursuits in the region. Because the region consists mostly of federal land managed by the BLM, any future projects will be required to

identify any historic properties that would be affected, and any adverse effects to cultural resources identified would be mitigated.

4.17.5.9 Paleontological Resources

Impacts to paleontological resources are generally localized and do not result in regionally cumulative impacts. Paleontological resources vary according to the geological formations that contain them. Geological formations may also vary over short distances, effectively limiting the geographic range of impacts to paleontological resources.

The impacts of the Proposed Action to paleontological resources will be localized within the Project area. The suggested mitigation measures will ensure that the potential for adverse impacts to paleontological resources are minor. There is, however, the potential for future projects in the vicinity to disturb areas that may contain known or unknown paleontological resources. Future projects with potentially significant impacts to paleontological resources would be required to comply with federal and state regulations and ordinances protecting paleontological resources through implementation of similar mitigation measures as proposed here. Therefore, the potential construction impacts of the Proposed Action in combination with other projects in the area would not contribute to a cumulatively significant impact to paleontological resources.

4.17.5.10 Socioeconomic Resources

Proposed Action

There is the potential for substantial renewable energy development not only in the Amargosa Valley, but throughout the desert Southwest. If all of these projects were to be built, they would have a significant cumulative impact on socioeconomic resources. Most of these projects are located in sparsely populated areas which if approved and built, would contribute to changes in the rural character of the area. These changes would result in both beneficial (e.g. increased employment opportunities, and direct and indirect business and tax revenues) and potentially adverse effects (e.g. removal of large tracts of desert ecosystems, visual impacts, increased traffic and noise, and increased burden on public services such as law enforcement, firefighting, and other emergency services providers).

For this analysis, the geographic extent of cumulative impacts related to socioeconomics includes the Amargosa Valley, and larger cities within 2 hours of the Project area, including the Town of Pahrump, Las Vegas, and surrounding communities. 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 areas.

The cumulative influx in laborers commuting from surrounding communities to the Amargosa Valley would increase regional traffic loads along US 95, if commuting from the north Las Vegas area, and along US 160 if commuting from the southern end of the Las Vegas valley and

Pahrump. As it is expected that many construction workers would opt to commute long distances to their work sites, temporary adverse impacts would result from the construction of multiple, large projects in the area. Depending on the level of vehicle traffic along these roadways, the potential for increased traffic violations and accidents may increase; thereby taxing the local public safety and emergency responders current workload. If the proposed Project and PSI's proposed Amargosa North and South projects were to be constructed during the same period, there would be significant impacts to Valley View Boulevard and portions of US 95 in that area. As part of the Development Agreement between Nye County and the Proponent, the Proponent is required to conduct a Master Traffic Impact Analysis prior to commencement of construction. The traffic study must be submitted and approved by Nye County. The Proponent will improve Valley View Boulevard in accordance with the approved Master Traffic Impact Analysis.

Implementation of the proposed renewable projects would create job stimulus within the local area that could increase population in the Amargosa Valley and other Nye County communities, including Beatty and Pahrump. This influx of workers would mean an increase in economic activity from workers spending in local businesses, and the projects themselves for construction materials and supplies. The increase in commercial activity to meet the demand of a new commuter population would potentially have indirect positive (economic) and adverse (increased traffic) impacts to the Project area.

In addition, the long-term payment of taxes and fees and distribution of payroll dollars is expected to have a significant cumulative benefit to both Nye and Clark counties 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 projects.

Affected groups such as immediate neighbors, health and safety providers, outdoor recreationists, environmental groups and stewards, and federal, state, and local agencies would have varying attitudes regarding the development of reasonably, foreseeable future projects in the cumulative effects area. The removal of large tracts of desert ecosystems for the development of energy development projects (e.g. solar, wind, and associated transmission), would be viewed negatively by those individuals and entities concerned about the loss or fragmentation of desert habitat. However, commercial and industrial developers, along with those individuals and entities seeking economic benefits of these projects may have differing views regarding the tradeoffs between economic development and land and resource preservation.

Federal, state, and local agencies with jurisdiction over lands and resources within the area will face increased challenges in meeting federal and state mandates to increase renewable energy production, while addressing differing views concerning the development of federal lands and use of sensitive resources such as water and undisturbed desert lands, and impacts to viewsheds, recreational opportunities, and increased traffic, noise, and growth inducing impacts to local communities. Cumulative impacts to land use, recreation and transportation and access is described in Section 4.17.5.12. Cumulative impacts to visual resources is described in Section 4.17.5.13.

Concurrent construction and operation of other reasonably foreseeable future projects, such as the Lathrop Wells and Big Dunes North and South Solar Projects would have the potential to

place more demands on the local law enforcement, firefighting and other emergency services providers. The Proponent has entered into a Development Agreement with Nye County in which it has agreed to the following to help mitigate any increase in demand on local emergency services (Nye County 2010):

- Annually provide emergency and fire protection training for up to four individuals identified by Nye County, with priority given to individuals who serve in the Amargosa Valley Volunteer Fire Department. This training will be equivalent to the training provided to the Proponent's on-site personnel. Training will be compliant with the guidelines of the National Fire Protection Agency standards as it relates to structures, materials, and hazards present on-site and wildlands adjacent to the proposed Project site.
- Annually pay \$20,000 to the county for use in providing police services in the Town of Amargosa.
- Provide a water supply for the County's use in responding to fires within the Town of Amargosa.
- Annually pay \$20,000 for the County's use in providing staff and equipment for the Town of Amargosa medical clinic.

Similar to the proposed Project, it is assumed that other solar developers would incorporate project-specific fire protection plans into their project design and operations. All fire protection plans must consider NFPA and OSHA standards. Also, it is very likely that Nye County will request a similar Development Agreement be agreed to between the County and the Developer to help offset increase demands on local public services.

As described in the water mitigation measures agreed to by the Proponent, NPS, USFWS, and the the BLM, if it is determined that the use of groundwater for construction and operation of the proposed Project would have discountable or negligible impacts to sensitive resources at Ash Meadows NWR and Devils Hole, the water rights held in abeyance may be used by Nye County for economic development, pending approval by the Nevada State Engineer.

Wet-Cooled Alternative

With the exception of the amount of water that may be required to be retired or held in abeyance as water mitigation, implementation of the wet-cooled alternative would have similar cumulative construction and operational impacts on socioeconomic resources as the Proposed Action (dry-cooled alternative).

4.17.5.11 Environmental Justice

As discussed in Chapter 3.10, there are no EJ communities within the study area for the proposed Project. Therefore, cumulative impacts to EJ are not analyzed for the Proposed Action because the construction and operation of the proposed Project would not have a disproportionate effect on low-income or minority populations. There are no special issues, such as housing, transportation, access, or resource use in the Project area that would affect the EJ population disproportionately.

4.17.5.12 Land Use, Recreation, Transportation, and Access

Proposed Action

Over time, land use, transportation, access and recreation resources are impacted as land changes ownership, plans and facilities are developed, and demands for infrastructure increase or decrease. Prior activities including agriculture and mining in the Amargosa Valley have decreased available land, while simultaneously increasing access and transportation. Pending leases and rights-of-way on BLM land continuously impact land use in the area.

The potential for cumulative land use, recreation, and transportation impacts exists where there are multiple projects proposed in an area that could impact similar resources. Projects with large land use conversions similar to the proposed Project would collectively result in an adverse impact to the Valley's land use, recreation, and transportation resources by virtue of the nature of the acreage they occupy and the increase in employee traffic.

Overall, some short-term and long-term, adverse and non-adverse cumulative impacts to transportation and recreation could occur in Amargosa Valley as a result of constructing numerous energy projects. Given that the proposed Project is scheduled to begin construction in early 2011, and only other projects currently in the federal permitting process (Lathrop Wells Solar project and Amargosa North Solar project) recently began their permitting process, it is unlikely that these projects will have cumulative construction-related traffic impacts with the proposed Project.

Based on the available data on pending renewable energy applications with the BLM, more than 100,000 acres of primarily federal land use would be converted to industrial use if all of those projects were built. The most important adverse impact related to this development would be the loss of access to land due to BLM disposal. By leasing/selling to developers, the loss of available lands for other uses (i.e., water and mineral resource development) would result.

Additive impacts on land use would also result from numerous existing and proposed industrial developments within the Amargosa Valley area, including agriculture, mining, solar power plants, and transmission lines. Increased energy development would drive the demand for the use of new and existing right-of-way corridors for transmission lines, pipelines, distribution lines, and roads to support the construction of these planned facilities.

An increase in various energy developments would potentially modify the character of the Amargosa Valley area. As development occurs, the very rural environment would become increasingly industrial. Large industrial developments that require many employees would spur other commercial and residential growth within the region, resulting in increased need for improved transportation corridors and other infrastructure.

Although no direct impacts would occur in the Special Management Areas in the area, if populations increase as a result of industrial development, the use of designated and dispersed recreation areas within the Amargosa Valley area could also increase. Facilities would be stressed by the increased use, but could simultaneously benefit from the increased fee revenue.

The quality of the recreational setting could be reduced due to the cumulative increase in development (through loss of wilderness aesthetic, etc. [see Visual Impacts]).

The construction and operation of Abengoa's Lathrop Wells Solar Project and PSI's Big Dunes North and South Solar Project, in addition to the proposed Project, may potentially remove up to 24,000 acres of federal lands from multiple uses, including recreational opportunities such as OHV use and other dispersed recreational uses such as hiking and wildlife viewing on lands converted to industrial uses. If construction of the PSI Big Dunes North and South Solar Project were to occur concurrently with the proposed Project, construction activities may temporarily restrict access to the Big Dune Recreation Area along Valley View Road. As stipulated in the Nye County Development Agreement (Appendix F), prior to commencement of construction, the Proponent is required to submit a Master Traffic Impact Analysis for review and approval by the County. The analysis will assess the construction and operations traffic and the impacts, if any, of the transportation of employees and equipment to and from the Project site. If the study determines that improvements are required, the Proponent will provide improvements required in the approved Master Traffic Impact Analysis in order to mitigate the traffic impacts of the Project.

Wet-Cooled Alternative

With the exception of the amount of water that may be required to be retired or held in abeyance as water mitigation, and the following of lands tied to the water right, implementation of the wet-cooled alternative would have similar cumulative construction and operational impacts on socioeconomic resources as the Proposed Action (dry-cooled alternative).

4.17.5.13 Visual Resources

Proposed Action

The possible but unlikely development of over 100,000 acres of proposed solar projects would result in cumulative impacts to the viewsheds from public roadways, recreation areas, and residential areas. Viewsheds of the Project vicinity are extensive given the topography of the Amargosa Valley, lack of vegetative screening, and dispersed nature of sensitive viewers.

Potential cumulative visual impacts would result from the construction, operation, and maintenance of the proposed Project in the context of current and proposed projects within the Amargosa Valley. The majority of proposed projects are other solar generation projects and would have similar visual effects when compared to the proposed Project. Current and future projects would incrementally modify the setting in a similar manner, as compared to the proposed Project, which would result in an industrial landscape character. Nighttime lighting for future solar projects would be similar in nature to the proposed Project lighting, and would likewise incrementally modify the night sky. This change in landscape character in conjunction with potential viewer impacts would result in adverse cumulative impacts.

The proposed Project, along with the past, present, and reasonably foreseeable projects, could substantially alter the visual character of the areas within the Project vicinity. Many of the

proposed projects would have the potential to create new visual impacts within the viewsheds that could be affected by the proposed Project from public roadways, recreation areas, and residential areas. The increase in energy development would result in increased demand for the existing right-of-way as well as new corridors for transmission lines, pipelines and distribution lines that would incrementally increase visual impacts to sensitive viewers (e.g., residences and travel routes) and scenic quality.

Adding to the possible industrial nature of Amargosa Valley would be any future stipulation by federal agencies requiring other renewable energy developers obtain and retire existing water rights to offset potential impacts to sensitive resources in the Ash Meadows NWR, Devils Hole, and other downgradient locations. The retirement of agricultural water rights would result in decreased agricultural production, the fallowing of agricultural fields, thereby creating areas devoid of vegetation.

Wet-Cooled Alternative

Implementation of the wet-cooled alternative would have similar cumulative construction and operational impacts on visual resources as the Proposed Action (dry-cooled alternative).

4.17.5.14 Human Health and Safety/Hazardous Materials

Proposed Action

Proper facility design and the development and implementation of safe material handling programs for each Project would reduce the potential for cumulative impacts from release of hazardous materials on the environment. Each reasonably, foreseeable, future project would be required to comply independently with hazardous materials regulations, depending on their specific circumstances (e.g., nature and quantities of hazardous materials stored and used). Many of the cumulative projects (including the proposed Project), are separated by miles from any of the other projects so there is minimal risk of an accident at one project affecting another project. Solar projects also use less hazardous materials than do fossil fuel-fired power plants. In short, Project construction and operation activities would not cause or contribute substantially to significant cumulative impacts with respect to hazardous materials handling from either a local or regional perspective.

Wet-Cooled Alternative

Implementation of the wet-cooled alternative would have similar cumulative construction and operational impacts as the Proposed Action (dry-cooled alternative).

CHAPTER 5 - CONSULTATION AND COORDINATION

This chapter describes the consultation and coordination activities the BLM has carried out with interested agencies, organizations, Tribes, and individuals while preparing the Final EIS. The NEPA (42 USC §§ 4321-4347) and the regulations that implement it (43 CFR Part 46; 40 CFR §§ 1500-1508) require the public's involvement in the decision-making process as well as allowing for full environmental disclosure. Guidance for implementing public involvement also is outlined in Title 43 CFR, Part 1610.2.

During the early phases of the scoping process, the BLM determined that an EIS would be required to comply with NEPA prior to taking action on Solar Millennium's right-of-way application. An EIS is the most detailed and complex of NEPA documents, and it includes requirements for significant public coordination and involvement throughout its preparation and review. NEPA and CEQ require the BLM to identify and disclose any potential environmental impacts associated with the Proposed Action so that the BLM can make an informed decision when making its final decision.

5.1 PUBLIC INVOLVEMENT PROCESS

Public involvement in the EIS process includes the steps necessary to identify and address public concerns and needs. The public involvement process assists agencies in: (1) broadening the information base for decision-making, (2) informing the public about Proposed Actions, alternatives, and potential impacts that could result from implementation of the Proposed Action or alternatives, and (3) ensuring that public needs are understood by the agencies. Public participation in the EIS process is required by the NEPA at four specific points: (1) issue scoping, (2) review of the Draft EIS, (3) review of the Final EIS, and (4) receipt of the ROD.

5.1.1 Scoping

Public scoping is an integral part of the NEPA planning process. It provides "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a Proposed Action" (40 CFR § 1501.7). Public and agency input is solicited in order to identify the range, or scope, of issues to be addressed during the environmental analysis and in the EIS. Initiation of the EIS process and the public scoping meetings for the proposed Project were announced through the Federal Register, BLM press releases, paid advertisements in the media, and postings on the BLM Project website. These activities are described below.

5.1.2 Federal Register Notice of Intent

The BLM Federal Register NOI, published on July 13, 2009 (Volume 74, Number 132, Page 33.458), marked the beginning of the public scoping period for the Project EIS. The scoping period, required to be a minimum of 30 days, was announced as ending on August 12, 2009. Public scoping meetings were not conducted within this time period; therefore, a second notice was published in the Federal Register on September 17, 2009 (Volume 74, Number 179,

Page 47820), reopening public scoping. This reopened scoping period was announced as ending on October 19, 2009. Four scoping meetings were held from August 17 through August 24, 2009, and one information meeting was held on September 22, 2009 (see below).

5.1.3 Media Notices

The BLM prepared a media release to introduce the proposed Project, announce the initial scoping meetings, and invite the public to provide input. The news release was issued on August 12, 2009 to local and regional newspapers, congressional offices, television stations, and radio stations. A second news release was issued on September 3, 2009, announcing the reopening of the scoping period.

In addition, paid advertisements were published in the following local newspapers:

- *Las Vegas Review-Journal* – legal ad published on July 31, 2009
- *Pahrump Valley Times* – display ads published on July 31, 2009 and September 18, 2009

5.1.4 Direct Mailings

A public scoping notice was prepared and mailed to inform the public about the scoping process for the preparation of the EIS and the scheduled scoping meetings. The public was invited to participate in the scoping process and to share any concerns or comments, submit information, and identify issues to be addressed during the EIS process.

The notice was mailed to federal, state, and local agencies; elected officials; Native American tribes; and special interest groups and organizations, during the week of August 3, 2009. The distribution list was compiled from a list of individuals, organizations, and agencies who had expressed interest in other BLM Pahrump Field Office projects. In addition, the notice was mailed to postal customers in the Amargosa Valley (zip code 89020).

A second notice was mailed to individuals and agencies/organizations on the mailing list and the members of the public who signed in at public scoping meetings held in August 2009 for the proposed Project. The second notice was to inform the public of the public information meeting to be held in Beatty on September 22, 2009. This meeting was an opportunity for the public to submit comments during the reopened scoping period.

5.1.5 Project Website

The BLM Southern Nevada District Office is hosting a website to inform the general public about the Proposed Action. Information on the website includes public meeting announcements, a Project description, and the EIS planning process. The website is available at: <http://www.blm.gov/nv/st/en/fo/lvfo.html>.

5.1.6 Public Scoping Meetings

The BLM held four public scoping meetings to identify issues and concerns regarding the Proposed Action. These scoping meetings provided an opportunity for the public to learn about the Proposed Action and to provide comments. Meeting locations, dates, and times are provided in Table 5-1. In addition to the public scoping meetings, one public information meeting was held during the reopened scoping period.

Location	Date	Time	Attendance*
Beatty, Nevada	August 17, 2009	6:00 – 8:00 p.m.	34
Amargosa Valley, Nevada	August 18, 2009	6:00 – 8:00 p.m.	112
Pahrump, Nevada	August 21, 2009	6:00 – 8:00 p.m.	26
Las Vegas, Nevada	August 24, 2009	6:00 – 8:00 p.m.	60
Beatty, Nevada**	September 22, 2009	6:00 – 8:00 p.m.	66
Total			298
*These counts reflect only those attendees who elected to sign in at the door			
**Public information meeting following reopened scoping period.			

5.1.7 Comment Methods

During the public scoping period (August 13 through October 19, 2009), a total of 151 comment documents were received. A comment document is defined as a method of response recorded as part of a public scoping transcript, email, fax, letter, or comment form. Because some documents had more than one comment, the total number of comments received is greater than the number of respondents or individuals who submitted comments. Table 5-2 presents the method of submittal of all responses.

Method of Submittal	Number Received
Comment Form	17
Email	36
Letter or Fax	19
Oral Comments Submitted at the Scoping Meetings (transcribed from the court reporter transcript)	–
Beatty scoping meeting	6

Method of Submittal	Number Received
Amargosa Valley scoping meeting	24
Pahrump scoping meeting	8
Las Vegas scoping meeting	22
Beatty information meeting	19
Total responses	151

5.2 SUBSTANTIVE ISSUES IDENTIFIED DURING SCOPING

Table 5-3 displays the relative interest of respondents who submitted comments on various topics. This breakdown does not show bias towards any issue; it simply indicates the level of interest on various issues. All issues are addressed equally in the EIS.

Comment Category	Number Received
NEPA and NEPA Process	101
Alternatives	87
Air Quality and Climate Change	59
Cultural Resources	8
Cumulative Impacts	39
EJ	4
Fish and Wildlife	45
Floodplains	20
Geology and Mineral Resources	3
Health and Safety	77
Invasive Species	4
Lands and Access	66
Migratory Birds	13
Native American Religious Concerns	5
Noise	7

Comment Category	Number Received
Recreation	5
Socioeconomic Resources	198
Soils	6
Special Management Areas	28
Threatened, Endangered, and Candidate Plant Species	18
Threatened, Endangered, and Candidate Wildlife Species	53
Transportation	48
Vegetation	37
Visual Resources	25
Waste (hazardous and solid)	40
Water Resources	164
Wetlands and Waters of the U.S.	15
Total	1,175

Table 5-4 summarizes the substantive issues and concerns derived from the scoping comments and indicate where each issue identified during scoping is addressed in the EIS. This summary is intended to reflect the comments received during the scoping phase equally and does not attempt to assign value to any input. Specific comments and context are not provided here, only issues represented in those comments that can be applied directly to preparation of the EIS. For example, some respondents provided their views on the value (negative or positive) of solar energy development; only the issue areas they raised in conjunction with their views are provided. Issue statements and questions to address the issues in the EIS can be found in the public scoping report. Copies of the individual comments received during the scoping period are available for review at the BLM Pahrump Field Office.

Table 5-4 Issues Raised During Scoping	
Issues	Section(s) of the EIS Where Addressed
NEPA Process	
The EIS should consider how NEPA goals will be incorporated into the BLM's decision and describe how the proposed Project would be consistent with other national policy considerations.	1.1 – Introduction 1.5 – Scope of Analysis
Requests that the proposed Project be put on hold until all permits and easements have been received and the proposed Project has been reviewed by other agencies (e.g., Nevada Engineers Office, FEMA).	1.7 – Agency Coordination
Alternatives	
A reasonable range of management alternatives meeting the purpose and need should include alternative sites, capacities, and technologies, and include those that may not be within the jurisdiction of the lead agency.	2.2 – Alternatives Description
The three different technologies should be analyzed in the EIS: dry-cooling, hybrid cooling, and wet-cooling	2.2 – Alternatives Description
The BLM should consider other locations for the proposed Project that would reduce potential use conflicts and meet the Project purpose and need, even if they are not located on public land.	2.2 – Alternatives Description
Consider use of different solar energy technology, including the use of hybrid or dry-cooled systems or replacing trough technology with photovoltaic.	2.2 – Alternatives Description
Air Quality	
Activities related to the construction and operation of the proposed Project has the potential to result in increased dust. Additionally, construction, operation, and mitigation of the solar generating facility could result in increased emissions.	4.1 – Air Quality
The EIS should identify the types of dust control to be used during construction and operation, and if water is to be used, the amount of water needed, and the source of the water.	4.1 – Air Quality
Air monitoring should be conducted before, during, and after facility construction and operation. Specific concerns were expressed regarding hazardous materials that may be present in airborne dust (e.g., uranium, radon, and other hazardous elements in surface soils).	4.1 – Air Quality 4.13 – Hazardous Materials and Solid Waste
The EIS should include a discussion of ambient air conditions, NAAQS, and criteria pollutant nonattainment areas in all areas considered for solar development, and that the analysis should specify (1) the emission sources by pollutant from mobile sources, stationary sources, and ground disturbance; (2) the timeframe for release of these emissions over the lifespan of the Project; (3) proposed mitigation measures to minimize these emissions.	4.1 – Air Quality

Table 5-4 Issues Raised During Scoping	
Issues	Section(s) of the EIS Where Addressed
The EIS should identify the need for an Equipment Emissions Mitigation Plan, to identify actions to reduce diesel particulate, CO, hydrocarbons, and NO _x associated with construction activities for equipment such as drilling equipment, generators, compressors, graders, bulldozers, and dump trucks.	4.1 – Air Quality 4.13 – Hazardous Materials and Solid Waste
Cultural Resources	
Ground disturbing activities resulting from construction and operation of a solar generating facility have the potential to discover/disturb cultural resources in the area, including the physical integrity of sacred sites. The EIS should evaluate potential impacts on archaeological, cultural, and historical resources in the vicinity of the Project, including Native American resources, burial sites and artifacts, and historical mining operations and related artifacts.	3.7 – Historic and Cultural Resources 4.7 – Historic and Cultural Resources
Cumulative Impacts	
A number of other solar generating power facilities are being considered in southern Nevada and may impact a variety of resource values and uses, including water supply, endangered species, visual resources, wildlife, and threatened and/or endangered species habitat.	4.17 – Cumulative Impacts
Environmental Justice	
EJ (minority and low income) populations may be affected by the construction and operation of the Project.	4.10 – Environmental Justice
Fish and Wildlife	
Concerns about wildlife habitat from depletion of water resources and impacts to wildlife from site development and facilities.	4.6 – Biological Resources
Concern that impacts may extend beyond the physical footprint of the Project area. Requests made that Project monitoring be conducted to evaluate Project impacts, and adoption of adaptive mitigation solutions be considered.	4.6 – Biological Resources
Construction and operation of the facility could result in impacts to wildlife in the area, including: <ul style="list-style-type: none"> • impacts as a result of an increase in shade, dust, and heat, and impacts to wildlife species • impacts as a result of exposure to contaminants in evaporation ponds and/or stormwater ponds if these water structures attract wildlife, particularly migratory waterfowl and bats 	4.6 – Biological Resources
Geology, Mineral Resources, and Soils	
The Project may have impacts to soil resources, and may cause soil erosion.	4.3 – Soils

Table 5-4 Issues Raised During Scoping	
Issues	Section(s) of the EIS Where Addressed
Health and Safety	
Primary concerns were related to safety measures to be used during both construction and operation of the facility, and the proximity of the proposed Project to occupied residential areas (especially to residents living along Sandy Lane), and other built areas, including the Amargosa Elementary School and senior center.	4.9 – Socioeconomic Resources
Concerns regarding the potential for fire and explosions to occur at the site during operations.	4.9 – Socioeconomic Resources 4.13 – Hazardous Materials and Solid Waste
Lands and Realty	
Several right-of-way applications have been filed with the BLM for proposed solar generation facilities. One of the applications is for a proposed site immediately north of the Project and farther away from existing land uses.	2.2 – Alternatives Description
The EIS should describe the reasonably foreseeable future land use and associated impacts resulting from additional power supply in Amargosa Valley.	4.11 – Land Use, Recreation, Transportation and Access
The proposed Project area is located adjacent to existing residential and other community center uses (e.g., church, fire station, senior center).	4.11 – Land Use, Recreation, Transportation and Access
Native American Religious Concerns	
The EIS should address the existence of Indian sacred sites in the Project area and discuss how the BLM would avoid adversely affecting the physical integrity of sacred sites, if they exist.	3.7 – Historic and Cultural Resources 4.7 – Historic and Cultural Resources
The EIS should address EO 13007 and distinguish it from Section 106 of the NHPA.	3.7 – Historic and Cultural Resources
Noise	
The noise of construction and operation of a solar generating facility may be heard from residential areas near the proposed Project.	4.5 – Noise
Recreation	
No designated recreational uses occur on public lands in the Project area; however, recreational use occurs in the nearby Big Dune Special Recreation Area.	4.11 – Land Use, Recreation, Transportation and Access
Socioeconomic Resources	
Comments about the operation of the proposed facility indicate an interest in the opportunities for employment this Project would generate.	4.9 – Socioeconomic Resources

Table 5-4 Issues Raised During Scoping	
Issues	Section(s) of the EIS Where Addressed
The proposed Project may impact public services, including potential population influx and increased service needs (e.g., water supply, school attendance, police and fire protection, etc.).	4.9 – Socioeconomic Resources
Tax benefits may be available to local communities as a result of the proposed Project, including benefits to local tax payers and utility companies and lower property taxes.	4.9 – Socioeconomic Resources
Special Management Areas	
The Project area is not within or adjacent to any special management area. However, nearby special management areas may be sensitive to the uses proposed by the generation facility.	4.6 – Biological Resources 4.12 – Visual Resources
Threatened, Endangered, and Candidate Plant and Wildlife Species	
There may be threatened, endangered, and special status species and habitat in the Project area. What effect would construction and operation of a solar power generating facility and associated facilities have on local population of ESA listed or candidate species or other special status species and suitable habitats?	4.6 – Biological Resources
Transportation	
The existing Amargosa Farm Road is proposed to be rerouted to accommodate the proposed Project and may affect local transportation.	4.11 – Land Use, Recreation, Transportation and Access
Project-related travel may result in increased traffic on Amargosa Farm Road through the local community.	4.11 – Land Use, Recreation, Transportation and Access
Visual Resources	
Construction and operation of a solar facility would introduce multiple structures and modifications to the landscape. The Project area is adjacent to residential areas and community infrastructure (e.g., senior center, fire station school).	4.12 – Visual Resources
The proposed Project may have impacts on scenic quality and scenic vistas of the surrounding desert landscape.	4.12 – Visual Resources
What effects will the proposed Project have on viewers traveling to and from Death Valley National Park?	4.12 – Visual Resources
What effects will safety/night lighting have on the dark skies and stargazing opportunities?	4.12 – Visual Resources
What effects will a 0.25-mile landscape buffer have in mitigation or shielding views? Are there any design techniques that could blend the Project with the natural environment from a visual perspective?	4.12 – Visual Resources
Waste (Hazardous and Solid)	
The solar generating facility has the potential to produce hazardous waste and concentrated de-watered waste from evaporation ponds.	4.13 – Hazardous Materials and Solid Waste

Table 5-4 Issues Raised During Scoping	
Issues	Section(s) of the EIS Where Addressed
Water Resources	
Construction and operation of the solar generation facility could result in impacts to the quantity of water, including groundwater and surface water sources. Project activities also have the potential to affect the quality of surface and groundwater as a result of Project discharges (i.e., stormwater, evaporation pond water, effluent).	4.4 – Water Resources
Operation of the proposed solar generating facility would require up to 4,000 acre-feet of water per year. Alternative sources of water should be considered to provide this needed supply. Additionally, other solar generating technologies are available, including photovoltaic, dry-cooling, and hybrid systems.	2.2 – Alternatives Description 4.4 – Water Resources
The EIS should disclose the specific locations, amounts, and well completions of existing water rights, which may be purchased or leased for this Project to facilitate a meaningful analysis of impacts; evaluate the extent to which these water rights have been fully utilized in the past (determine any increases in actual pumping, which may occur as a result of the full utilization of the rights); evaluate the impacts and cumulative impacts of the full utilization of these and other existing rights in the basin; and evaluate the impacts of any changes in consumptive use due to the change to solar energy production.	3.4 – Water Resources 4.4 – Water Resources
Wetlands/Waters of the U.S.	
The Project area is located in portions of the Fortymile Wash Modification of the landscape for construction of the facility could result in alteration of the Fortymile Wash natural drainage patterns in the Project area.	4.4 – Water Resources

5.2.1 Draft EIS Review

The 45-day comment period for public review of the Draft EIS began with the publication of the Notice of Availability in the Federal Register on Friday March 19, 2010. The BLM distributed press releases announcing the dates, locations, and times of the public meetings to local and regional print and broadcast media. The Draft EIS was posted on the BLM Southern Nevada District Office website at: http://www.blm.gov/nv/st/en/fo/lvfo/blm_programs/energy/proposed_solar_millennium.html, and distributed to agencies and individual who have requested copies.

Four public meetings were held during the public comment period (from March 19, 2010 – May 3, 2010) to receive comments on the Draft EIS. Dates and locations of these meetings, and the number of attendees are as follows:

Beatty, NV – 10 attendees

Date: April 6, 2010

Time: 6pm – 8pm

Location: Beatty Community Center Hall, 100 S. A Avenue, Beatty

Amargosa Valley, NV – 63 attendees

Date: April 7, 2010

Time: 6pm – 8pm

Location: Amargosa Valley Community Center, 821 E. Amargosa Farm Road, Amargosa Valley

Pahrump, NV – 24 attendees

Date: April 13, 2010

Time: 6pm – 8pm

Location: Pahrump Library, 701 East Street, Pahrump

Las Vegas, NV – 19 attendees

Date: April 14, 2010

Time: 6pm – 8pm

Location: Centennial Hills YMCA, 6601 North Buffalo Drive, Las Vegas

During the 45-day comment period, the BLM received 37 comment documents (e.g., letters, emails, faxes, etc.) from individuals, private companies, interest groups, and federal and state agencies commenting on the Draft EIS. A list of comment documents received, the content of each letter, and BLM's responses to comments are contained in Appendix G of the Final EIS. Each comment letter was assigned a reference number and each comment was identified with a number. Where appropriate, changes and additions are reflected in the Final EIS to respond to comments.

This Final EIS has been distributed with the publication of the Notice of Availability in the Federal Register.

5.2.2 Final EIS

After the public comment period for the Draft EIS, this Final EIS was prepared. This document and Appendix G will include descriptions of public comments and indicates how they have been addressed in the Final EIS. A Notice of Availability accompanied this Final EIS. Per 40 CFR § 1506.10, a 30-day waiting period is required between the publication of the Final EIS and issuance of the ROD.

5.3 FORMAL CONSULTATION WITH INTERESTED AGENCIES AND TRIBAL GOVERNMENT

Federal and state agencies were contacted individually to gather input for the EIS. Other resource management agencies were consulted at the federal and state levels to identify common concerns related to the Proposed Action or Alternatives. Cooperating agencies on this EIS include the U.S. DOD, DOE, NPS, USACE, NDOW, and Nye County.

A BA is being prepared for the Proposed Action and will be submitted to the USFWS as required by Section 7 of the ESA (1973). A species list was requested from the USFWS at the beginning of EIS development. The species list identified any plant and wildlife species listed as threatened, endangered or candidate species within the Project area. At the request of the USFWS, detailed rare plant, sensitive wildlife species, and desert tortoise surveys have been conducted within the Project area. The BLM will continue to coordinate with the USFWS throughout the EIS environmental review and decision-making process.

Nye County has negotiated a Development Agreement with Solar Millennium to mitigate direct impacts to roads, emergency services, and other visual and socioeconomic aspects of the Project. The Development Agreement is available in Appendix F.

The BLM consulted with Native American Tribes that have ancestral ties to, or traditional culture use of, Project area lands. On June 17, 2009, the BLM mailed formal letters to the following tribal groups:

- Pahrump Paiute Tribe
- Las Vegas Paiute Tribe
- Chemehuevi Indian Tribe
- Colorado River Indian Tribes
- Timbisha Shoshone Tribe

The consultation letter, with attachments that explained each proposal in more detail, described the Proposed Action, in addition to five other renewable energy projects being proposed in the Pahrump and Amargosa Valleys of Nye County, Nevada. The BLM requested (1) tribal input regarding any concerns about traditional cultural practices or other issues that might be affected by the Proposed Action, (2) information on how they would like to be involved in the planning process, and (3) names of other individuals that should be notified or consulted about the Project.

On August 5, 2009, the same tribes were e-mailed information about the Project's scoping meetings if they wanted to attend and make comments. A field trip with a representative of the Timbisha Shoshone into the Project area was conducted on September 17, 2009. At this time, no tribal verbal or written religious or cultural concerns have been expressed concerning the proposed Project or Project area.

5.4 LIST OF AGENCIES, ORGANIZATIONS, AND PERSONS TO WHOM COPIES OF THE EIS WERE SENT

This section lists the agencies, officials, and other interested parties who requested copies of the Final EIS. The BLM filed copies with the EPA, who publishes a Notice of Availability of the Final EIS in the Federal Register. The BLM also distributed paper and electronic (on CD-ROM) copies to federal agencies, key state agencies, elected officials, local libraries, and other requesting parties. The BLM will provide copies to other interested organizations or individuals on request.

5.4.1 Federal Government

USACE
U.S. DOD
U.S. DOE
U.S. EPA
U.S. DOI – NPS
U.S. DOI – USFWS

5.4.2 State Government

Nevada State Clearinghouse – The Nevada State Clearinghouse distribute copies of government documents to various State Offices for comment.

5.4.3 Local Governments

Nye County

5.4.4 Tribal Governments

Pahrump Paiute Tribe
Las Vegas Paiute Tribe
Chemehuevi Indian Tribe
Colorado River Indian Tribes
Timbisha Shoshone Tribe

5.4.5 Other Organizations

Amargosa Conservancy
Center for Biological Diversity
Defenders of Wildlife
Desert Tortoise Council
International Brotherhood of Electrical Workers, Local 357
Ironworkers, Local 433

Las Vegas Valley Water District
League of Women Voters
Los Angeles and Salt Lake Railroad Company
Nevada Conservation League
Nevada Outdoor Recreation Association
Off-Road Business Association
Plumbers and Pipefitters, Local 525
Red Rock Audubon Society
Southern Nevada Building and Construction Trades Council
Southern Nevada Water Authority
Southwest Gas Company Right-of-Way Department
Toiyabe Chapter of the Sierra Club
Valley Electric Association, Inc.
Western Lands Project

5.4.6 Elected Government Officials

Jim Gibbons, State of Nevada Governor
Ed Goedhart, Nevada Assembly
Mike McGinness, Nevada Senate
Shelley Berkley, Nevada 1st District, U.S. House of Representatives
Dean Heller, Nevada 2nd District, U.S. House of Representatives
Dina Titus, Nevada 3rd District, U.S. House of Representatives
John Ensign, U.S. Senate
Harry M. Reid, U.S. Senate

5.4.7 Availability

Copies of the Amargosa Farm Road Solar Energy Project EIS are available for public inspection at the following public libraries and BLM offices.

Amargosa Valley Library
829 E. Farm Rd.
Amargosa Valley, NV 89020

Beatty Library
400 North Fourth St.
Beatty, NV 89003

Pahrump Community Library
701 East St.
Pahrump, NV 89048

BLM, Nevada State Office
1340 Financial Blvd.
Reno, NV 89502

BLM, Southern Nevada District Office
4701 N. Torrey Pines Dr.
Las Vegas, NV 89130

5.5 LIST OF PREPARERS

5.5.1 BLM Core Interdisciplinary Team and Technical Specialty

5.5.1.1 BLM – Nevada State Office

- Ron Wenker – State Director
- Amy Leuders – Associate State Director
- JoLynn Worley – Public Affairs
- Erin Eastvedt – Renewable Energy Project Coordinator

5.5.1.2 BLM – Pahrump and Las Vegas Field Offices

- Mary Jo Rugwell – District Manager
- Patrick Putnam – Field Manager
- Gregory Helseth – Renewable Energy Project Manager
- Mark Chandler – Realty Specialist
- Gayle Marrs-Smith – Acting Pahrump Field Manager
- Hillerie Patton – Public Affairs Specialist
- Jayson Barangan – Natural Resource Specialist
- Michele Bilodeau – Environmental Coordinator
- Lisa Christianson – Environmental Protection Specialist
- Fred Edwards – Botanist
- Dave Fanning – Geologist
- Susan Farkas – Planning and Environmental Coordinator
- Krystal Johnson – Burro Specialist

- Amanda Hamlin – Administrative Professional
- Sarah Peterson – Hydrologist
- Meghan Magill – Hydrologist
- Marc Sanchez – Recreation Planner
- Kathleen Sprowl – Archaeologist/Paleontologist
- Jeff Steinmetz – Lead Planning and Environmental Coordinator

5.6 EIS CONTRACTOR AND SUBCONTRACTORS

Name	Degree(s)	Professional Discipline/Expertise	Years of Experience
Karen Anderson	BA	Document Production, Quality Assurance/Quality Control	26
Emily Belts	BA	Land Use, Recreation, Transportation	4
Garlyn Bergdale	MLA, BS	Senior NEPA Reviewer	33
Glenn Darrington	PhD, MA, BA	Historic and Cultural Resources	22
Avril Fabian	MLA, BS	Land Use, Recreation, Transportation, Special Management Areas	5
Sandra Fairchild	BS, AA	NEPA Project Manager, Water Resources	26
Kristi Gardner		Document Production, Quality Assurance/Quality Control	12
Barbara Garrison	BS	Biological Resources	27
Rebecca Halbmaier	MSC, BA	Historic and Cultural Resources	8
Mathew Hamilton	MS, BS	EJ, Socioeconomic Resources	12
Chris Harris	B.S.	Visual Resources	5
Amy Jerome	MBA, BS	Senior NEPA Reviewer	12
Michael Kirby	PhD, MS, BS	Geologic Hazards and Mineral Resources, Soils, Paleontological Resources	20
N. Conrad Langley	MLA, BFA	Visual Resources	12
Diana Nickels	AA	Document Production/Graphics	21
Alison Pruet	MS, BS	Biological Resources	3
Ashley Rosia	BA	Air Quality, Hazardous Materials	1
Michael Burrill – LFR	BA	Environmental Land Use Noise Compatibility	20
Kevin Fowler – LFR	BA	Environmental Noise Control	4

Chapter 5 - Consultation and Coordination

Name	Degree(s)	Professional Discipline/Expertise	Years of Experience
Guy Roemer – GeoTrans	BS, MS	Water Resources, Groundwater Modeling	13
Matt Sauter	MS, BA	Geologic Hazards and Mineral Resources, Soils	2
Marc Schwartz	MLA, BS	Visual Resources	10
Mickey Siegel	MCRP, BS	Management	30
E. Linwood Smith	PhD, MS, BA	Biological Resources	35
Paul Trenter	BSLA	Management	23
Buddy Borden University of Nevada, Reno	MS	Community Economic Development	20
Mariah Evans University of Nevada, Reno	PhD	Sociology (Social Impact Assessment)	27

CHAPTER 6 - REFERENCES

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CHAPTER 7 - GLOSSARY

ACEC: A BLM designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards

Acre-foot: A unit commonly used for measuring the volume of water; equal to the quantity of water required to cover one acre (43,560 square feet or 4,047 square meters) to a depth of 1 foot (0.30 meter) and equal to 43,560 cubic feet (1,234 cubic meters), or 325,851 gallons.

Action: In the context of the NEPA, describes actions proposed to meet a specific purpose and need and that may have effects on the environment, which are potentially subject to Federal control and responsibility. Federal actions generally fall into the categories of adoption of official policy, formal plans, and programs; or approval of specific projects. For this document, the term action applies to a specific project.

Affected environment: Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.

Air quality: A measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.

Air Quality Standards: The level of pollutants prescribed by regulation that may not be exceeded during a specified time in a defined area.

Ambient: The surrounding natural conditions (or environment) in a given place and time.

Alluvium: A general term for clay, silt, sand, gravel, or similar consolidated material deposited during comparatively recent geologic time by a stream or other body of running water in the bed of the stream, river, or floodplain, or as a cone or fan at the base of a mountain slope.

Alternative: Any one of a number of options for a project.

Ambient: Of the environment surrounding a body, encompassing on all sides. Most commonly applied to air quality and noise.

American Indian tribe (or tribe): Any American Indian group in the conterminous United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Annual (ecology): A plant that completes its development in one year or one season and then dies.

Aquatic: Growing or living in or near the water.

Aquifer: A water-bearing rock unit (unconsolidated or bedrock) that will yield water in a usable quantity to a well or spring.

Archaeological site: A discrete location that provides physical evidence of past human use.

Archaeology: The scientific study of the life and culture of past, especially ancient, peoples, as by excavation of ancient cities, relics, artifacts, etc.

Area of Critical Environmental Concern (ACEC): A Bureau of Land Management (BLM) designation pertaining to areas where specific management attention is needed to protect and prevent irreparable damage to important historical, cultural, and scenic values, fish or wildlife resources, or other natural systems or processes, or to protect human life and safety from natural hazards.

Artifact: Any object showing human workmanship or modification, especially from a prehistoric or historic culture.

Assessment: The act of evaluating and interpreting data and information for a defined purpose.

A-Weighted Sound Levels: Decibels (referenced to 20 micro-Pascals) as measured with an A-weighting network of a standard sound level meter, abbreviated dB(A).

Backfill: The fill, often mine waste or rock, that replaces the void left from where a rock or ore has been removed. Also, the material used to fill in a trench in the groundbed (i.e., pipeline trench). The composition of the backfill varies based on the soil type being used and the component being covered.

Background (visual): That portion of the visual landscape lying from the outer limit of the middleground to infinity. Color and texture are subdued in this area, and visual sensitivity analysis here is primarily concerned with the two-dimensional shape of landforms against the sky.

Baseline: The existing conditions against which impacts of the proposed action and its alternatives can be compared.

Basin: A depressed area having no surface outlet (topographic basin); a physiographic feature or subsurface structure that is capable of collecting, storing, or discharging water by reason of its shape and the characteristics of its confining material (water); a depression in the earth's surface, the lowest part often filled by a lake or pond (lake basin); a part of a river or canal widened (drainage, river, stream basin).

Best management practices: A suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes and help to protect the environmental resources by avoiding or minimizing impacts of an action.

Big game: Large species of wildlife that are hunted (such as elk, deer, pronghorn antelope).

Biological assessment: Information prepared by, or under the direction of, a Federal agency to determine whether a proposed action is likely to (1) adversely affect listed species or designated critical habitat; (2) jeopardize the continued existence of species that are proposed for listing; or (3) adversely modify proposed critical habitat.

Biological opinion: A document that is the product of formal consultation, stating the opinion of the U.S. Fish and Wildlife Service on whether or not a Federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Butte: A steep hill standing alone in a plain.

Candidate species: A plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the U.S. Fish and Wildlife Service.

Clean Air Act of 1990: Federal legislation governing air pollution. The Clean Air Act established NAAQS for CO, NO_x, O₃, PM, SO₂, and Pb. PSD classifications define the allowable increased levels of air quality deterioration above legally established levels and include the following:

Class I – minimal additional deterioration in air quality (certain national parks and wilderness areas)

Class II – moderate additional deterioration in air quality (most lands)

Class III – greater deterioration for planned maximum growth (industrial areas)

Clean Water Act of 1987: National environmental law enforced by the U.S. EPA that regulates water pollution.

Cooperating Agency: Assists the lead Federal agency in developing an environmental assessment or EIS. The CEQ regulations implementing NEPA define a cooperating agency as any agency that has jurisdiction by law or special expertise for proposals covered by NEPA (40 CFR 1501.6). Any Federal, state, or local government jurisdiction with such qualification may become a cooperating agency by agreement with the lead agency.

Council on Environmental Quality: An advisory council to the President established by the NEPA. It reviews Federal programs for their effort on environmental studies, and advises the President on environmental matters.

Criteria: Standards on which a judgment or decision can be based.

Cultural resources: Remains of human activity, occupation, or endeavor as reflected in districts, sites, buildings, objects, artifacts, ruins, works of art, architecture, and natural features important in human events.

Cumulative effect (or impact): The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable

actions. Cumulative impacts are evaluated as part of the EIS, and may include consideration of additive or interactive effects regardless of what agency or person undertakes the other actions.

Daytime: The period from 7:00 a.m. to 10:00 p.m.

Decibel: A unit for expressing the relative intensity of sounds on a logarithmic scale from zero for the average least perceptible sound to about 130 for the average level at which sound causes pain to humans. For traffic and industrial noise measurements, the dBA, a frequency-weighted noise unit, is widely used. The dBA scale corresponds approximately to the frequency response of the human ear and thus correlates well with loudness.

Degradation: The wearing down or away, and general lowering or reducing, of the earth's surface by the processes of weathering and erosion.

Discharge: Outflow of surface water in a stream or canal (water). Discharge from an industrial facility that may contain pollutants harmful to fish or animals if it is released into nearby water bodies usually requires a permit issued by the U.S. EPA and is monitored.

Distance zone: A visibility threshold distance where visual perception changes. They usually are defined as foreground, middleground, and background.

Diversion: A channel, embankment, or other manmade structure constructed to divert water from one area to another; the process of using these structures to move water.

Drainage: The natural or artificial removal of surface water and groundwater from a given area. Many agricultural soils need drainage to improve production or to manage water supplies.

Drawdown: The decrease in elevation of the water surface in a well, the local water table or the pressure head on an artesian well due to extraction of groundwater or decrease in recharge to the aquifer.

Easement: A right afforded a person, agency, or organization to make limited use of another's real property for access or other purposes.

Ecology: The relationship between living organisms and their environment.

Effect (or impact): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An effect may be direct, indirect, or cumulative. The terms effect and impact are synonymous under the NEPA. A direct effect is caused by an action and occurs at the same time and same place (40 CFR 1508.8(a)). An indirect effect is caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

Emission: Effluent discharged into the atmosphere, usually specified by mass per unit time, and considered when analyzing air quality.

Endangered species: A plant or animal that is in danger of extinction throughout all or a significant portion of its range. Endangered species are rarely identified by the Secretary of the Interior in accordance with the ESA of 1973.

Endangered Species Act of 1973: Provides a means whereby the ecosystems upon which threatened and endangered species depend may be conserved and to provide a program for the conservation of such threatened and endangered species. The ESA requires all Federal agencies to seek to conserve threatened and endangered species, use applicable authorities in furtherance of the purposes of the ESA, and avoid jeopardizing the continued existence of any species that is listed or proposed for listing as threatened and endangered or destroying or adversely modifying its designated or proposed critical habitat. The U.S. Fish and Wildlife Service is responsible for administration of this act.

Energy conservation: A means of saving energy.

Environment: The surrounding conditions, influences, or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.

Environmental Impact Statement: A document prepared to analyze the impacts on the environment of a proposed action and released to the public for review and comment. An EIS must meet the requirements of NEPA, CEQ, and the directives of the agency responsible for the proposed action.

Environmental justice: The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people including racial, ethnic, or socioeconomic group should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, local, and tribal programs and policies (see EO 12898).

Ephemeral wash or stream: A stream that flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and has a channel bottom that is always above the local water table.

Erosion: The wearing away of the land surface by running water, wind, ice, or other geologic agents and by such processes as “gravitation creep.”

Federal Register: Published by the Office of the Federal Register, National Archives and Records Administration, the Federal Register is the official daily publication for rules, proposed rules, and notices of Federal agencies and organizations, as well as EOs and other presidential documents.

Floodplain: That portion of a river or stream valley, adjacent to a river channel, that is built of sediments and is inundated with water when the stream overflows its banks.

Foreground: The visible area from a viewpoint or use area out to a distance of 0.5 mile. The ability to perceive detail in a landscape is greatest in this zone.

Fossil: Any remains, trace, or imprint of a plant or animal that has been preserved by natural process in the earth's crust since some past geologic time.

Geographic information system: A system of computer hardware, software, data, people and applications that capture, store, edit, analyze, and graphically display a potentially wide array of geospatial information.

Geology: The science that relates to the earth, the rocks of which it is composed, and the changes that the earth has undergone or is undergoing.

Geothermal resource: Heat found in rocks and fluids at various depths that can be extracted by drilling or pumping for use as an energy source. This heat may be residual heat, friction heat, or a result of radioactive decay.

Global warming: An increase in the average temperature of the earth's atmosphere and oceans. The term also is used to describe the theory that increasing temperatures are the result of a strengthening greenhouse effect caused primarily by manmade increases in CO₂ and other greenhouse gases.

Groundwater: Subsurface water that fills available openings in rock or soil materials to the extent that they are considered water saturated.

Habitat: A specific set of physical conditions in a geographic area(s) that surrounds a single species, group of species, or large community. In wildlife management, the major components of habitat are food, water, cover, and living space.

Hydrology: The study of the movement, distribution, and quality of water throughout the earth, addresses both the hydrologic cycle and water resources.

Impact (or effect): A modification of the existing environment as it presently exists, caused by an action (such as construction or operation of facilities). An impact may be direct, indirect, or cumulative. The terms effect and impact are synonymous under NEPA.

Indirect effect (or impact): Secondary effects that occur in locations other than the initial action or later in time, but that are caused by the proposed action.

Industrial area: A land use zoning term used to describe or designate areas in which heavy industry is concentrated or allowed.

Infrastructure: The facilities, services, and equipment needed for a community or facility to function, such as and including roads, sewers, water lines, and electric lines.

Intermittent: A river or stream that flows for a period of time, usually seasonally during rainy periods, and stops during dry periods. In arid regions, dry periods may be interrupted by occasional flash floods from brief but intense rain storms.

Invasive species: Describes a large number of nonnative plant species whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Issue: Describes the relationship between actions (proposed, connected, cumulative, similar) and environmental (natural, cultural, and socioeconomic) resources. Issues may be questions, concerns, problems, or other relationships, including beneficial ones. Issues do not predict the degree or intensity of harm the action might cause, but simply alert the reader as to what the environmental problems might be. The NEPA document should address issues identified through interaction with agencies and/or the public, and/or through resource studies.

Labor force: All persons 16 years of age or over who are either employed or unemployed and actively looking for a job.

Land use plan: A plan or document developed by a government entity, which outlines specific functions, uses, or management-related activities of an area, and may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the use.

Landform: A term used to describe the many land surfaces that exist as a result of geologic activity and weathering (e.g., plateaus, mountains, plains, and valleys).

Landscape: An area composed of interacting ecosystems that are repeated because of geology, landform, soils, climate, biota, and human influences throughout the area. Landscapes are generally of a size, shape, and pattern, which are determined by interacting ecosystems.

Ldn: Day/Night Sound Level: A 24-hour average, where sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting, but no added weighting on the evening hours, abbreviated as DNL or L_{DN}.

Lease: An authorization or contract by which one party (lessor) conveys the use of property to another (lessee) in return for rental payments. In cases of resource production, lessees pay royalties to the lessor in addition to rental payments.

L_{EQ}: The equivalent sound level, or the time-integrated continuous sound level, that represents the same sound energy as the varying sound levels, over a specified monitoring period.

Megawatt: A unit for measuring power equal to one million watts. The productive capacity of electrical generators is measured in MW.

Mesa: An isolated, nearly level land mass, formed on nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.

Mineral resources: Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.

Minimal (impact): Unless otherwise specified, “minimal” shall mean non-deleterious impacts that are measurable on the short term, but not significant (see definition herein).

Mitigation: The abatement or reduction of an impact on the environment by (1) avoiding a certain action or parts of an action, (2) employing certain construction measures to limit the

degree of impact, (3) restoring an area to preconstruction conditions, (4) preserving or maintaining an area throughout the life of a project, (5) replacing or providing substitute resources to the environment, or (6) gathering data (e.g., archaeological or paleontological) prior to disturbance.

Multi-Use: Land use where a combination of use types can be found in close proximity together: commercial, residential, public, industrial, etc.

National Ambient Air Quality Standards: The allowable concentrations of air pollutants in the air specified by the Federal government. The air quality standards are divided into primary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public health) and secondary standards (based on the air quality criteria and allowing an adequate margin of safety and requisite to protect the public welfare) from any unknown or expected adverse effects of air pollutants.

National Environmental Policy Act of 1969: Our nation's basic charter for protection of the environment. It establishes policy, sets goals, and provides means for carrying out the policy. In accordance with NEPA, all Federal agencies must prepare a written statement on the environmental impacts of a proposed action. The provisions to ensure that Federal agencies act according to the letter and spirit of NEPA are in the CEQ regulations for implementing NEPA (43 CFR 1500-1508).

National Register of Historic Places: A listing, maintained by the Secretary of the Interior, of districts, sites, buildings, structures, and objects worthy of preservation. To be eligible a property must normally be at least 50 years old, unless it has exceptional significance, and have national, State, or local significance in American history, architecture, archaeology, engineering, or culture; and possess integrity of location, design, setting, material, workmanship, feeling, and association; and (a) be associated with events that have made a significant contribution to the broad patterns of history, (b) be associated with the lives of persons significant in our past, or (c) embody the distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic values; or represent a significant and distinguishable entity whose components may lack individual distinction; or (d) have yielded, or may be likely to yield, information important to prehistory or history.

Negligible (impact): Unless otherwise specified, "negligible" shall mean impacts of such a small scale such as to be non-measurable.

Nighttime: Periods other than daytime (as defined above), including legal holidays.

Noise: Loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human a

Noise Emission: The industry standard format of sound power level, which is the total acoustic power radiated from a given sound source as relates to a reference power level of 10 picowatts. Sound power level differs from sound pressure level, which quantifies the fluctuations in air pressure caused by acoustic energy.

Noise Level Measurements: Unless otherwise indicated, the use of A-weighted and "slow" response of a noise monitoring instrument complying with at least Type 2 requirements as defined by the latest revision of American National Standard Institute S1.4 Specification for Sound Level Meters.

Nonattainment area: An air quality control region (or portion thereof) in which the U.S. EPA has determined that ambient air concentrations exceed NAAQS for one or more criteria pollutants.

Noxious weed: Nonnative plant species that negatively impact crops, native plant communities, and/or management of natural or agricultural systems. Noxious weeds are officially designated by a number of states (including Nevada) and Federal agencies.

Particulates: Minute, separate particles, such as dust or other air pollutants.

Perennial stream: A stream or that part of a stream that flows continuously during all of the calendar year as a result of groundwater discharge or surface runoff.

Perennial yield: The amount of usable water from a groundwater aquifer that can be withdrawn economically and consumed each year for an indefinite period of time. It cannot exceed the natural recharge to that aquifer and ultimately is limited to maximum amount of discharge that can be used for beneficial use.

Pipeline: A continuous pipe conduit for transporting fluids such as natural gas and/or supplemental gaseous fuels, oil, or water from one point to another, usually from a point in or beyond the producing field or processing plant to another pipeline or to points of use.

Playa: The shallow central lake basin of a desert plain, in which water gathers after a rain and is evaporated.

Prime farmland: A special category of highly productive cropland that is recognized and described by the U.S. Department of Agriculture's Soil Conservation Service and receives special protection under the Surface Mining Law of 1977.

Project area: Footprint of the project.

Public land: Land or interest in land owned by the United States and administered through the Secretary of the Interior through the BLM without regard to how the United States acquired ownership, except lands on the Outer Continental Shelf, and land held in trust for the benefit of American Indians, Aleuts, and Eskimos.

Range: A large, open area of land over which livestock can wander and graze.

Raptor: A bird of prey.

Rare: A plant or animal restricted in distribution. May be locally abundant in a limited area or few in number over a wide area.

Recharge: Replenishment of a groundwater reservoir (aquifer) by the addition of water, through either natural or artificial means.

Reclamation: Restoration of land disturbed by natural or human activity (e.g., mining, pipeline construction) to original contour, use, or condition. Also describes the return of land to alternative uses that may, under certain circumstances, be different from those prior to disturbance.

Recontouring: Return a surface to or near to its original form through some type of action such as grading.

Record of Decision: A document separate from, but associated with, an EIS that publicly and officially discloses the responsible official's decision on a proposed action.

Region of Influence: Area which is impacted by activities related to the project. Varies by species and activity, however, for this project it has been defined as the hydrographic unit.

Reservation: Land set aside to achieve a particular land use or conservation objective. For the purposes of this document, reservation refers to those lands managed by an American Indian tribe under the U.S. Department of the Interior's Bureau of Indian Affairs. The reservation land is Federal territory held in trust for tribes. The American Indian tribes have limited national sovereignty.

Revegetation: The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.

Reverse osmosis: A separation process that uses pressure to force a solvent through a membrane that retains the solute on one side and allows the pure solvent to pass to the other side. More formally, it is the process of forcing a solvent from a region of high solute concentration through a membrane to a region of low solute concentration by applying a pressure in excess of the osmotic pressure.

Revised Statute 2477: the right of way for the construction of highways across public lands not otherwise reserved for public purposes." That right-of-way is a legitimate property right (most often of the counties and states), and, consequently, carries with it a bundle of associated rights, including the right to maintain the roads and upgrade them under certain circumstances. Roads can be federally designated 'RS 2477'.

Right-of-way: Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project, such as a road or utility.

Riparian: Referring or relating to areas adjacent to water or influenced by free water associated with streams or rivers on geologic surfaces occupying the lowest position of a watershed. Pertaining to, living or situated on banks of rivers, streams, or other body of water. Normally used to refer to the plants of all types that grow along, around, or in wet areas.

Rural: Sparsely settled places away from the influence of large cities and towns. Such areas are distinct from more intensively settled urban and suburban areas, and also from unsettled lands

such as outback or wilderness. People tend to live in villages, on farms, and in other isolated houses on large plots of land.

Scoping: The process open to the public early in the preparation of an EIS for determining the scope of issues related to a proposed action and identifying significant issues to be addressed in an EIS.

Screen: An initial assessment performed with few data and many assumptions to identify alternatives that should be evaluated more carefully.

Sediment: Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.

Sedimentation: The result when soil or mineral is transported by moving water, wind, gravity, or glaciers and deposited in streams or other bodies of water, or on land. Also, letting solids settle out of wastewater by gravity during treatment.

Sensitive receptor: In terms of noise, people or animals that may hear a noise or be sensitive to increased noise levels within their range of hearing.

Sensitive Receptor Location: A location of regulatory compliance where particular sensitivities to noise exist, such as residential areas, institutions, hospitals, parks, or other environmentally sensitive areas.

Sound Pressure Level (SPL): The observable effect of acoustic energy radiation, quantifying the sound level as perceivable by the receiver. When Sound Pressure is used to describe a noise source, the distance between source and receiver must be known in order to yield useful information about the power rating of the source.

Sensitivity: The state of being readily affected by the actions of external influence.

Significant (impact): Unless otherwise specified, “significant” has been used in this document to describe any impact that would cause an impact that is irreversible and/or irretrievable without human intervention (i.e., mitigation/restoration)

Special Development Area: sets aside public or private areas of special interest that would be subject to a specific POD or a Development Agreement in accordance with Nye County Code Title 16.32. SDA is a mixed-use designation and a variety of land uses might be proposed for approval, such as the Yucca Mountain Project Gateway Area Concept Plan, and projects under review by the Bureau of Land Management, such as the Solar Energy Facilities. A property owner/developer must provide a specific POD for the subject property and obtain recommendations from the Planning Committee and the Town Advisory Board prior to Nye County Commission approval.

Special status species: Wildlife and plant species either federally listed or proposed for listing as endangered or threatened; state-listed; or priority species of concern to Federal agencies or tribes.

Sound power Level (PWL): A specialized analytical metric used to fully quantify the acoustic energy emitted by a source which is considered a complete value without the accompanying information on the position of measurement relative to the source. It may be used to calculate the sound pressure level at any desired distance away from the source.

Surface water: All bodies of water on the surface of the earth and open to the atmosphere such as rivers, lakes, reservoirs, ponds, seas, and estuaries.

Surfactant: Any substance that when dissolved in water or an aqueous solution reduces its surface tension or the interfacial tension between it and another liquid.

Terrain: Used to describe the geophysiographic characteristics of land in terms of elevation, slope, and orientation.

Threatened or Endangered Species: Animal or plant species that are listed under the Federal ESA of 1973, as amended (federally listed), or under similar state laws (state-listed).

Total dissolved solids: A term that describes the quantity of dissolved material in a sample of water.

Traditional cultural places: These named places (landscape features) comprise the cultural landscape that provides the context for evaluating specific traditional cultural properties.

Transition zone: The area between two discrete environmental areas, and thus containing elements of each. For example, the transition zone between an upland piñon forest and a lowland desert scrub environment.

Transmissivity: The rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient.

Tribe: Any Indian tribe, band, group, or community having a governing body recognized by the Secretary of Interior.

Undertaking: A project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval of a Federal agency.

Urban: An area where there is an increased density of human-created structures in comparison to the areas surrounding it. Urban areas are frequently referred to as cities or towns. The U.S. Census Bureau defines an urbanized area as: “Core census block groups or blocks that have a population density of at least 1,000 people per square mile and (386 per square kilometer) and surrounding census blocks that have an overall density of at least 500 people per square mile (193 per square kilometer).”

Vegetation communities: Species of plants that commonly live together in the same region or ecotone.

Visibility: The distance to which an observer can distinguish objects from their background. The determinants of visibility include the characteristics of the target object (shape, size, color, pattern), the angle and intensity of sunlight, the observer's eyesight, and any screening present between the viewer and the object (i.e., vegetation, landform, even pollution such as regional haze).

Visual resource management classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes, each of which has an objective that prescribes the amount of change allowed in the characteristic landscape.

Waters of the United States: All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce including adjacent wetlands and tributaries to water of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.

Watershed: All land and water within the confines of a drainage divide.

Well field: Area containing one or more wells that produce usable amounts of water or oil.

Wetlands: Areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Examples of wetlands include marshes, shallow swamps, lakeshores, bogs, muskegs, wet meadows, estuaries, and riparian areas.

Wilderness: An area formally designated by Congress as part of the National Wilderness Preservation System.

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