DOE/EA-1796

FINAL ENVIRONMENTAL ASSESSMENT

DEPARTMENT OF ENERGY
LOAN GUARANTEE TO SEMPRA GENERATION FOR
CONSTRUCTION OF THE MESQUITE SOLAR ENERGY PROJECT
MARICOPA COUNTY, ARIZONA

US Department of Energy, Lead Agency
Loan Guarantee Program Office
Washington, DC 20585

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
μg/m³	micrograms per cubic meter
ADOT	Arizona Department of Transportation
AMA	Active Management Area
APE	Area of Potential Effects
ARS	Arizona Revised Statutes
AVSE	Arlington Valley Solar Energy
AZDA	Arizona Department of Agriculture
AZGFD	Arizona Game and Fish Department
CAA	Clean Air Act
CdTe	cadmium telluride
CEC	Certificate of Environmental Compatibility
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
Corps	US Army Corps of Engineers
CPA	Comprehensive Plan Amendment
dBA	A-weighted decibel
DOE	US Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMF	electric and magnetic field
EPA	US Environmental Protection Agency
EPAct 2005	Energy Policy Act of 2005
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FONSI	Finding of No Significant Impact
gen-tie	generation-tie
IPCC	Intergovernmental Panel on Climate Change
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MCDOT	Maricopa County Department of Transportation
MVA	Megavolt ampere
MW	Megawatt
MWh	Megawatt-hour

ACRONYMS AND ABBREVIATIONS

	Full Phrase
NAAQS	National Ambient Air Quality Standards
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIEHS	National Institute of Environmental Health Sciences
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
NRHP	National Register of Historic Places
O_3	ozone
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PM_{10}	particulate matter equal to or less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in aerodynamic diameter
ppb	parts per billion
ppm	parts per million
PV	photovoltaic
ROI	region of influence
Sempra	Sempra Generation
SHPO	State Historic Preservation Office
SPCC	Spill Prevention, Control, and Countermeasure
SO_2	sulfur dioxide
SR	Salvage Restricted
SUP	Special Use Permit
US	United States
USC	United States Code
USFWS	US Fish and Wildlife Service
V	volts
VOC	volatile organic compound
WHO	World Health Organization

EXECUTIVE SUMMARY

INTRODUCTION

The United States (US) Department of Energy (DOE) is proposing to issue a loan guarantee to Sempra Generation (Sempra) to develop the Mesquite Solar Energy project, a nominal 400-megawatt (MW) solar energy generating facility consisting of a solar field of ground-mounted photovoltaic (PV) panels, an electrical collection system that converts generated power from direct current to alternating current, a substation, and a generation-tie (gen-tie) power line to deliver the generated electricity from the project site to an existing off-site electrical switchyard. The facility would generate an estimated 889,665 megawatt-hours (MWh) of electricity per year.

DOE has prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) (42 USC § 4321, et. seq.), Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500-1508), and DOE NEPA regulations (10 CFR Part 1021). An EA is required under NEPA when a federal agency is proposing to fund a project that could have an impact on the environment. This EA examines the potential environmental effects associated with the proposed action and the no action alternative and determines whether the proposed action has the potential for significant environmental effects. The EA provides DOE with the information needed to consider the potential environmental effects of issuing a loan guarantee for the Mesquite Solar Energy project. If no significant impacts are identified during preparation of this EA, DOE would issue a Finding of No Significant Impact (FONSI). If potentially significant impacts are identified, DOE would prepare an environmental impact statement (EIS).

PURPOSE AND NEED

The purpose and need for agency action is to comply with DOE's mandate under the Energy Policy Act of 2005 (EPAct 2005), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, by selecting eligible projects that meet the goals of EPAct 2005. DOE is using the NEPA process to assist in determining whether to issue a loan guarantee to Sempra to support the proposed project.

EPAct 2005 established a federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of EPAct 2005 authorizes the Secretary of Energy to make loan guarantees for a variety of types of projects, including those that "(1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued" (42 USC § 16513). Title XVII identifies ten categories of technologies and projects potentially eligible for loan guarantees, including those for renewable energy technologies. The two principal goals of the loan guarantee program are to encourage commercial use in the US of new or significantly improved energy-related technologies and to achieve substantial environmental benefits. Once constructed and operating at full capacity, the Mesquite Solar Energy project would generate an estimated 889,665 MWh of electricity per year, which would be enough electricity to power approximately 150,000 homes and provide customers with solar-generated electricity. The Mesquite Solar Energy project would have the potential to reduce the need for electricity from conventional generation facilities, avoiding annual emissions of greenhouse gases and other air pollutants. Assuming electricity generated from the Mesquite Solar Energy project displaced energy produced by regional electric power markets, the proposed project would have annual emissions savings upon buildout as follows:

- 582,402 metric tons of carbon dioxide equivalents;
- 857 metric tons of nitrogen oxides; and
- 545 metric tons of sulfur dioxide (DOE 2009a).

Assuming electricity generated from the Mesquite Solar Energy project displaced energy produced by regional electric power markets, the proposed action would displace the equivalent amount of carbon dioxide emitted by 101,650 passenger vehicles annually (assuming an Environmental Protection Agency [EPA] average of 5.2 metric tons [5.73 tons] of carbon dioxide equivalent emissions per vehicle per year) (EPA 2005).

PROPOSED ACTION AND NO ACTION ALTERNATIVE

Proposed Action

DOE's proposed action is to issue a loan guarantee to Sempra to develop the nominal 400-MW Mesquite Solar Energy project. The project site consists of two adjacent parcels—a 2,480-acre parcel (Part 1), and a 1,280-acre parcel (Part 2); lands within both parcels are owned by Sempra or are controlled through an option to purchase. Project development would occur on approximately 1,530 acres of Part 1 and 980 acres of Part 2. Construction would begin in 2011, and the first 100 to 150 MW of production capacity would come online in late 2011.

The Mesquite Solar Energy project would use ground-mounted PV panel technology to collect solar radiation, which would be converted to electricity

that is sold to utilities on the wholesale market. The proposed project would consist of a solar field of ground-mounted PV panels, an electrical collection system that converts generated power from direct current to alternating current, a substation, and a gen-tie power line. Site infrastructure would include driveways, drainage channels, a landscape screening berm, and fencing.

The Mesquite Solar Energy project would interconnect to the regional transmission grid via the proposed gen-tie power line. The proposed 230-kilovolt (kV) gen-tie line would originate at the project site and terminate at the Mesquite Generating Station switchyard, an existing natural gas-fired generation facility owned and operated by Sempra and located approximately two miles east of the proposed project site. The gen-tie line length would be 4.5 miles long and would consist of two circuits on common structures. The monopole tubular steel transmission structures would be 150 feet high with spans between the structures of 500 to 1,000 feet.

Operation of the facility would be managed, remotely monitored, and controlled by the existing staff of the nearby existing Mesquite Generating Station. When fully developed, maintenance of the facility would require approximately seven additional employees.

No Action Alternative

DOE's regulations implementing NEPA require inclusion of a no action alternative. Under the no action alternative, DOE would not issue a loan guarantee to Sempra to develop the Mesquite Solar Energy project.

As Sempra owns or controls the land proposed for solar energy development, it would likely seek private sources of financing to develop the project. However, Sempra is not confident that it would be able to obtain debt financing on standard commercial terms for a project of this scale that utilizes the latest PV technology. If the DOE loan guarantee was not granted, Sempra would have to assess whether it would be viable to develop the Mesquite Solar Energy project at this time or at all. If Sempra were able to obtain private funding and the project was developed, the time it took to bring the project online would be increased, delaying renewable power from reaching the market. The DOE loan guarantee is likely the only viable option for obtaining project financing for a project of this scale utilizing the latest PV technology.

SUMMARY OF ENVIRONMENTAL EFFECTS

Table ES-1 provides a summary of the potential environmental effects that could result from implementing the proposed action and no action alternative.

Potential effects of the proposed action described in Table ES-1, below, relate primarily to construction, as operation of the facility would require few resources. Measures to minimize or avoid impacts have been built into the proposed action and include limiting the project development boundaries to avoid sensitive resources, such as Federal Emergency Management Agency

(FEMA)-designated floodplains and a potentially eligible cultural resource site, as well as implementing measures required by state and county agencies during permitting to minimize effects, such as design of a landscaped berm to shield the site from sensitive viewpoints, measures to control drainage as required by the county drainage administration, measures to address wildlife connectivity concerns, pre-construction surveys for sensitive species, and county dust control requirements. As described in Table ES-1 and throughout this EA, no major adverse impacts on the social or human environment were identified from implementing the proposed action.

Table ES-1
Summary of Environmental Effects

Resource	Proposed Action	No Action Alternative
Land Use	No adverse impacts that conflict with existing land use designations or planning documents. The project would not conflict with existing plans of state or local government or private entities for other development in the area. The project would not affect any lands considered to be prime or unique farmlands. The action would be consistent with the other electrical generating uses in this part of Maricopa County, including the natural gas-fired power plants, nuclear generating facility, and transmission infrastructure, and operation of the facility would have no adverse impact on nearby landowners. Construction of the facility would have minor temporary impacts on adjacent landowners from increased dust generation, noise, and traffic.	No land use impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. The Special Use Permit (SUP) granted for Part 1 of the project site would expire 40 years from its date of approval. If a SUP for Part 2 of the project site is not approved within three years of the date of approval of the Part 2 Comprehensive Plan Amendment (CPA), this portion of the project could revert to its former land use zoning designation of Rural Residential, subject to a public hearing by the Maricopa County Board of Supervisors. The changes to land use would be the same as those described for the proposed action if commercial funding was obtained and the facility was developed, though changes would likely occur over a longer development time.
Visual Resources	No major adverse visual resource impacts. While the development represents a substantial visual change, this change is viewed as acceptable given the altered state of the existing landscape, the limited number of sensitive receptors, the support the project has received from surrounding landowners during the public participation process for the CPAs, and an elevated berm and other measures built into the project description to minimize the visual effects of the project as viewed from Elliot Road and the rural residences to the north. There are no significant or unique visual resources or sensitive receptors along the gen-tie power line route.	No visual impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be little change to the visual environment over existing conditions. The changes to the visual environment would be the same as those described for the proposed action if commercial funding was obtained and the facility was developed, though changes would likely occur over a longer development time.

Table ES-1*(continued)*
Environmental Effects

Resource	Proposed Action	No Action Alternative
Air Quality	Construction would have short-term and temporary impacts from fugitive dust and equipment emissions. Emissions would not exceed Clean Air Act conformity thresholds of 100 tons per year for both volatile organic compounds and nitrogen oxides. Dust control measures would be implemented as required under Maricopa County Rule 310. Operation of the Mesquite Solar Energy project would result in no emissions of criteria air pollutants from operation of the solar generating equipment itself. Operation of the facility would result in minor air pollutant emissions from personal and maintenance vehicle use and limited equipment use, and fugitive dust emissions (primarily dust generated by vehicles on unpaved surfaces and windborne dust). Operation of the Mesquite Solar Energy project would have potential beneficial impacts on global climate change and air quality because it would generate electricity from emission-free solar PV panels.	No impact on air quality if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If the facility is not constructed, the potential beneficial impacts on global climate change and air quality described under the proposed action would not be realized. If commercial funding was obtained and development did occur, the facility would likely be constructed over a longer period of time. Under this scenario, construction emissions would likely be spread out over a longer time period, while operational emissions would be the same once the project was fully operational. The same potential beneficial impacts on global climate change and air quality would be realized, though with a longer development time this beneficial impact would not be realized as quickly.
Noise	Minor, temporary noise impacts would occur during project construction. Noise from construction vehicles and heavy equipment use would be discernable to off-site sensitive receptors, primarily during construction of the screening berm along Elliot Road. Noise impacts would lessen during subsequent development phases, as construction activities would move further south of residences and the screening berm would provide some level of noise buffering. Noise from maintenance activities would be intermittent and would have little to no effect on sensitive receptors north of Elliot Road. No noise impacts associated with corona effect would occur from the gen-tie power line. (Transmission lines can generate small amounts of noise through a phenomenon known as corona; standard conductor attachment hardware is typically adequate to control the corona effect.)	No noise impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be no change in existing noise conditions at the site. If commercial funding was obtained and development did occur, noise impacts would be the same as described for the proposed action, though construction noise would occur over a longer period of time.

Table ES-1*(continued)*
Environmental Effects

Resource	Proposed Action	No Action Alternative
Geology and Soils	Minor impacts on geology and soils during construction activities due to potential for increased erosion. Best management practices would be adapted to site conditions to avoid soil erosion and to prevent construction vehicles from tracking soils from the facility site during construction. Storm water drainage channels and retention basins would be the primary erosion-control features during project operations. Erosion associated with off-site flows would be minimized by perimeter drainage channels, which would divert off-site flows around the site. Erosion associated with on-site flows would be minimized by the development of interior drainage channels and retention basins. Construction and operation of the project would not expose people or structures to risks associated with earthquakes, fault ruptures, or other geologic events.	No impact on geology and soils if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be no change to geology and soils over existing conditions. Impacts on geology and soils would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.
Water Resources	No impact on groundwater. The proposed project would not affect wetlands, as none have been identified on the project site. The proposed project would not affect jurisdictional waters of the US, as drainages on Part 2 lands are swales or erosional features and do not demonstrate a significant nexus with any nearby traditionally navigable water. Minor impacts from construction. Site grading would incorporate provisions in the engineering design of the facility to address both on-site and off-site storm water management in accordance with floodplain regulations for Maricopa County. No construction would occur in the FEMA-designated floodway or flood fringe of Centennial Wash. Operation of the facility would have no adverse impact. Projected water use is expected to be less than the 500 acre-feet per year currently allocated to the project site, part of which is used for revegetation purposes, and would be obtained from the existing on-site groundwater wells. Water used for panel cleaning, if panel cleaning is needed, would be obtained from on-site water wells. No permanent source of potable water would be provided to the site.	No impact on water resources if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be no change to water resources over existing conditions. Effects on water resources would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.

Table ES-1*(continued)*
Environmental Effects

Resource	Proposed Action	No Action Alternative
Biological Resources	No effect on federally listed or candidate species under the Endangered Species Act, as none have been identified in the project area. Minor effects on vegetation from clearing and grading the project site. Minor impacts on wildlife from construction, including short-term avoidance of the area by wildlife due to noise generated by construction and low occurrence of crushing of wildlife due to heavy machinery use. Project site would be fenced to prevent wildlife access; wildlife connectivity would be maintained through measures developed in concert with the Arizona Game and Fish Department (AZGFD). Implementation of pre-construction survey requirements and conservation measures developed in concert with AZGFD for wildlife and Arizona Department of Agriculture for straw-top cholla would ensure that construction activities have no adverse impact on special status species and species of local concern. Migratory bird species regulated under the Migratory Bird Treaty Act (MBTA) may use vegetation communities in the project area. Direct impacts on these species would be avoided if construction occurred outside of the breeding season. If construction occurred during the breeding season, impacts would be avoided by conducting pre-construction surveys for occupied nests. Operation would have no impact on vegetation, wildlife, or special status species or species of local importance. Potential impacts on MBTA species would be avoided by following the Avian Power Line Interaction Committee and US Fish and Wildlife Service guidelines (USFWS) (2006) to avoid electrocution impacts on MBTA species.	No impact on biological resources if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be no change to biological resources over existing conditions. Impacts on biological resources would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.

Table ES-1*(continued)*
Environmental Effects

Resource	Proposed Action	No Action Alternative
Cultural Resources	Class III cultural surveys were performed for the entire site. One resource potentially eligible for listing was identified on the western portion (Part 2) of the project site. Sempra adjusted the project development boundary to avoid the 100-year floodplain, and no surface disturbance would occur within approximately 200 feet (60 meters) of the eastern edge of the potentially eligible resource. No eligible historic properties exist along the gen-tie route alignment. There is potential for encountering buried cultural resources during grading, excavation, or other ground-disturbing activities associated with the proposed action. If previously unidentified cultural resources were encountered during construction, all ground-disturbing activities would cease in the immediate vicinity of the discovery until the discovery is assessed by a qualified archeologist and the appropriate treatment is determined. DOE has determined that a finding of "no historic properties affected" is appropriate for the Mesquite Solar Energy project. The SHPO concurred with this determination in September 2010.	No cultural resources impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be no change to existing cultural resource conditions. Cultural resource impacts would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.
Socioeconomics	The proposed project would provide temporary socioeconomic benefits during construction. Operation of the project would not directly or indirectly induce population growth in the area, and impacts on local housing market, social services, and overall income and employment levels of the region of influence would be negligible. No jobs would be displaced by the development of the proposed action.	No socioeconomic impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, socioeconomic conditions would remain the same as baseline. Temporary socioeconomic benefits during construction would not be realized. The socioeconomic impacts would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.
Environmental Justice	No disproportionate high and adverse human health or environmental effects on minority or low-income populations and no impacts on children.	No environmental justice impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the project is not constructed. If development does not occur, environmental justice conditions would remain the same as baseline. The environmental justice impacts would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.

Table ES-1*(continued)*
Environmental Effects

Resource	Proposed Action	No Action Alternative
Public Health and Safety/ Hazardous Materials	Construction of the facility would generate limited amounts of hazardous and solid wastes. A Spill Prevention, Control, and Countermeasure Plan would be prepared and implemented to mitigate the risk of oil spills or releases. All construction activities would be performed by licensed, experienced contractors and would be carried out in compliance with Occupational Safety and Health Act and state of Arizona requirements to minimize the risk of construction-related accidents or injuries. Operation of the facility would present no public health risk, as no public access would be allowed and the entire project site would be fenced and monitored with security cameras. No adverse health effects are anticipated related to electric and magnetic fields (EMF). Management of hazardous materials would pose little risk of adverse environmental impacts. Only limited hazardous materials would be used or generated during operations. Transformers, which contain insulating mineral oil, and inverters, which contain cooling liquid, are the only facility equipment with the potential to introduce pollutants to the environment. This equipment would have full secondary containment to prevent the potential release of contaminants to the environment. The proposed facility would be operated remotely from the existing Mesquite Generating Station. On-site maintenance workers would receive health and safety training to minimize the risk of workplace health and safety risks.	No public health and safety impact if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the facility is not constructed. If development does not occur, there would be no change over existing conditions. Public health and safety and hazardous material impacts would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.
Transportation and Infrastructure	Traffic during peak construction could have minor but temporary effects on minor arterial streets in the immediate vicinity of the project site. Operation of the Mesquite Solar Energy project would have a negligible impact on area roadways given the low number of additional employees. No impact on infrastructure. The proposed project would not require new or additional public services.	No impact on transportation and infrastructure if DOE does not issue a loan guarantee for the Mesquite Solar Energy project and the project is not constructed. If development does not occur, there would be no change over existing conditions. The impacts on transportation and infrastructure would be the same as described for the proposed action if commercial funding was obtained and the facility was developed.

CHAPTER 1
PURPOSE AND NEED

The United States (US) Department of Energy (DOE) is proposing to issue a loan guarantee to Sempra Generation (Sempra) to develop the Mesquite Solar Energy project, a nominal 400-megawatt (MW) solar energy generating facility consisting of a solar field of ground-mounted photovoltaic (PV) panels, an electrical collection system that converts generated power from direct current to alternating current, a substation, and a 230-kilovolt (kV) generation-tie (gen-tie) power line to convey the generated electricity from the project site to an existing off-site electrical switchyard. The facility would generate an estimated 889,665 megawatt-hours (MWh) of electricity per year. This environmental assessment (EA) examines the socioeconomic and environmental effects from issuing the loan and from constructing and operating the Mesquite Solar Energy project.

1.1 PURPOSE OF AND NEED FOR ACTION

The Energy Policy Act of 2005 (EPAct 2005), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, established a federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII of EPAct 2005 authorizes the Secretary of Energy to make loan guarantees for a variety of types of projects, including those that "(1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued" (42 USC § 16513). Title XVII identifies ten categories of technologies and projects potentially eligible for loan guarantees, including those for renewable energy technologies. The two principal goals of the loan guarantee program are to encourage commercial use in the US of new or significantly improved energy-related technologies and to achieve substantial environmental benefits.

The purpose and need for agency action is to comply with DOE's mandate under EPAct 2005 by selecting eligible projects that meet the goals of the act. DOE is using the National Environmental Policy Act (NEPA) process to assist in determining whether to issue a loan guarantee to Sempra to support the proposed project.

Once constructed and operating at full capacity, the facility would generate an estimated 889,665 MWh of electricity per year, which would be enough electricity to power approximately 150,000 homes and provide customers with solar-generated electricity. The Mesquite Solar Energy project would have the potential to reduce the need for electricity from conventional generation facilities, avoiding annual emissions of greenhouse gases and other air pollutants. Assuming electricity generated from the Mesquite Solar Energy project displaced energy produced by regional electric power markets, the proposed project would have annual emissions savings upon buildout as follows:

- 582,402 metric tons of carbon dioxide equivalents;
- 857 metric tons of nitrogen oxides; and
- 545 metric tons of sulfur dioxide (DOE 2009a).

Assuming electricity generated from the Mesquite Solar Energy project displaced energy produced by regional electric power markets, the proposed action would displace the equivalent amount of carbon dioxide emitted by 101,650 passenger vehicles annually (assuming an US Environmental Protection Agency [EPA] average of 5.2 metric tons [5.73 tons] of carbon dioxide equivalent emissions per vehicle per year) (EPA 2005).

1.2 BACKGROUND

EPAct 2005 established a federal loan guarantee program for eligible energy projects that employ innovative technologies. Commercial use of these technologies sustain and promote economic growth, produce a more stable and secure energy supply and economy for the US, and improve the environment. DOE published a Final Rule that establishes the policies, procedures, and requirements for the loan guarantee program (10 CFR Part 609). In July 2009, DOE issued a solicitation announcement inviting interested parties to submit proposals for projects that employ energy efficiency, renewable energy, and advanced transmission and distribution technologies (DOE 2009b). Sempra submitted an application to DOE for a loan guarantee in September 2009.

1.3 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

This EA presents information on the potential impacts associated with guaranteeing a loan to Sempra. DOE has prepared this EA in accordance with NEPA, Council on Environmental Quality (CEQ) regulations implementing NEPA (40 CFR Parts 1500−1508), and DOE NEPA Implementing Procedures (10 CFR Part 1021). If no significant impacts are identified during preparation of this EA, DOE would issue a Finding of No Significant Impact (FONSI). If

potentially significant impacts are identified, DOE would prepare an environmental impact statement (EIS).

This EA: (1) describes the affected environment relevant to potential impacts of the proposed action and no action alternative; (2) analyzes potential environmental impacts that could result from the proposed action; (3) identifies and characterizes cumulative impacts that could result from the proposed action in relation to other ongoing or proposed activities within the surrounding area; and (4) provides DOE with environmental information for use in decision making to protect, preserve, and enhance the human environment and natural ecosystems.

1.4 PUBLIC PARTICIPATION

Under CEQ NEPA regulations, scoping is not formally required for the preparation of an EA (40 CFR Part 1501). However, Sempra implemented a public participation plan (Sempra 2008) as part of the Citizen Review Process required under state and local permitting processes for the proposed action. This public participation plan broadened efforts in place since 1999 for Sempra's existing power facility, the Mesquite Generating Station, an existing natural gas-fired generation facility owned and operated by Sempra and located approximately two miles east of the proposed project site. Stakeholders included government officials, business and community leaders, and local residents. The public involvement efforts for this action included distributing information to stakeholders notifying them about the proposed project, holding a community meeting on July 16, 2009, holding several informal neighborhood meetings, and holding informal meetings with community and business groups, schools, environmental organizations, and elected officials. Table 1-1 summarizes public outreach events, their attendees, and any issues or concerns expressed during these events. In addition to those actions listed in Table 1-1, Sempra held multiple meetings with the Community Advisory Committee that was formed during the permitting process for the Mesquite Generating Station and that includes six revolving members from the community, local school administrators, community activists, and local business leaders.

The project site includes two adjacent parcels—a 2,480-acre parcel (Part 1), and a 1,280-acre parcel (Part 2). The Comprehensive Plan Amendment (CPA) process and Special Use Permit (SUP) process for Part 1 have been completed. The CPA process for Part 2 has also been completed. The Maricopa County Board of Supervisors received five letters with no comment or concern from area municipalities during the CPA process for Part 1 of the project site (Maricopa County 2008), three letters of support and one letter of concern during the SUP process for Part 1 of the project area (Maricopa County 2009c), and seven letters with no comment or concern from area municipalities and no letters from the public during the CPA process for Part 2 of the project site (Maricopa County 2009a).

Table 1-1
Public Outreach Actions

Stakeholder	Names	Dates	Issues Identified	Next Steps/Resolution
Neighbors	Ginger & Tom Hammock, Jody Pierce	4/10/08	Visual impacts; construction and operation traffic; community outreach plans	Visual impacts addressed through provision of the landscaping berm along Elliot Road. Traffic concerns addressed by locating main entrance towards east side of site.
	Neighborhood Barbecue (Cody & Elise Marsh, Raul Rios, Martha Rios, Monica Jones, Bob Runner, Mike & Jody Pierce, Tom Hammock)	5/22/08	Operation traffic; location of high voltage lines; effect on property taxes, effect on property values	Traffic concerns addressed by locating main entrance towards east side of site; gen-tie-line would be routed south of Arlington Valley Energy Facility. Socioeconomic analysis discussed in Section 3.11.
	Mesquite Power Tour (Diana Workman, Ruben Jimenez, Doris Heisler, Heidi Vasiloff)	2/6/2009	No issues identified.	None required.
	Neighborhood Barbecue (Doris Heisler, Jackie A. Meck, Verlyn Meck, Heidi Vasiloff, Deanna Kupcik)	7/16/09	No issues identified.	None required.
Community and Business Groups	Mesquite Community Advisory Committee or "CAC" (Jackie Meck, Jan Hauk, Dianna Workman, Ruben Jimenez, Murray Johnson)	4/10/08 5/31/09 6/25/09	Community benefits; outreach efforts	CAC meetings are ongoing, as described in Section 1.4, above.
	Buckeye Valley Chamber of Commerce (CEO Deanna Kupcik)	5/22/08	Interest and enthusiasm expressed regarding a potential solar project.	None required.
Schools	Arlington School District (Supt. Chad Turner)	5/22/08	Interest and enthusiasm expressed regarding a potential solar project.	None required.
Environmental Organizations	Wildlife for Tomorrow Foundation (Executive Director and staff)	7/7/08	Excitement expressed for the potential of a solar project going forward.	None required.

Table 1-1 (*continued*)
Public Outreach Actions

Stakeholder	Names	Dates	Issues Identified	Next Steps/Resolution
Elected Officials	Supervisor Wilson (supervisor and senior staff)	3/26/08	Interest expressed regarding a potential solar project, and assistance offered.	None required.
	Supervisor Wilcox's office (chief of staff)	3/26/08	Sempra was encouraged to work with local residents and property owners.	Outreach efforts targeted at local residents and property owners were conducted during the CPA and SUP processes, as described above.
		11/18/09	Briefed Mary Rose on project status and commitment to hold a job fair in Buckeye for the solar project.	None required.
	Supervisor Kunasek	11/18/09	Discussed project scope, technology, timing, jobs created.	None required.
	Gov. Napolitano's Senior Policy Advisor for Natural Resources, Agriculture, and the Environment (Lori Faeth)	7/7/08	Sempra provided a briefing on the current CPA/SUP process, and expressed interest in ensuring the governor's understanding of a potential solar project.	None required.

The one letter of concern was from an adjacent landowner who expressed concern that the proposed action would affect her groundwater allocation. Information was provided to the concerned landowner that the groundwater requirements for the project would be fully met through existing water rights held by Sempra, and no off-site groundwater rights would be affected.

1.5 DOCUMENT ORGANIZATION

This EA has been organized into the following sections. A list of acronyms and abbreviations follows the Table of Contents.

Chapter 1, Purpose and Need, describes the purpose of and need for the proposed DOE action, background on the loan guarantee program, scope of analysis, and public participation. It also describes the organization of the EA.

Chapter 2, Proposed Action and No Action Alternative, describes the proposed action and no action alternative as well as alternatives eliminated from detailed consideration.

Chapter 3, Affected Environment and Environmental Effects, describes the existing baseline conditions of the resources that may be affected by implementing the proposed action, including land use, visual resources, air quality, noise, geology and soils, water resources, biological resources, tribal consultation and coordination, cultural resources, socioeconomics and environmental justice, public health and safety/hazardous materials, and transportation and infrastructure. Chapter 3 also describes potential impacts on each resource that would result from implementing the proposed action or the no action alternative. Further, a discussion of cumulative effects is provided.

Chapter 4, List of Preparers, provides a brief description of credentials for the preparers of the EA.

Chapter 5, List of Agencies Contacted, provides a list of agencies contacted regarding this EA.

Chapter 6, References, describes the sources of information used in preparing the EA.

CHAPTER 2
PROPOSED ACTION AND NO ACTION ALTERNATIVE

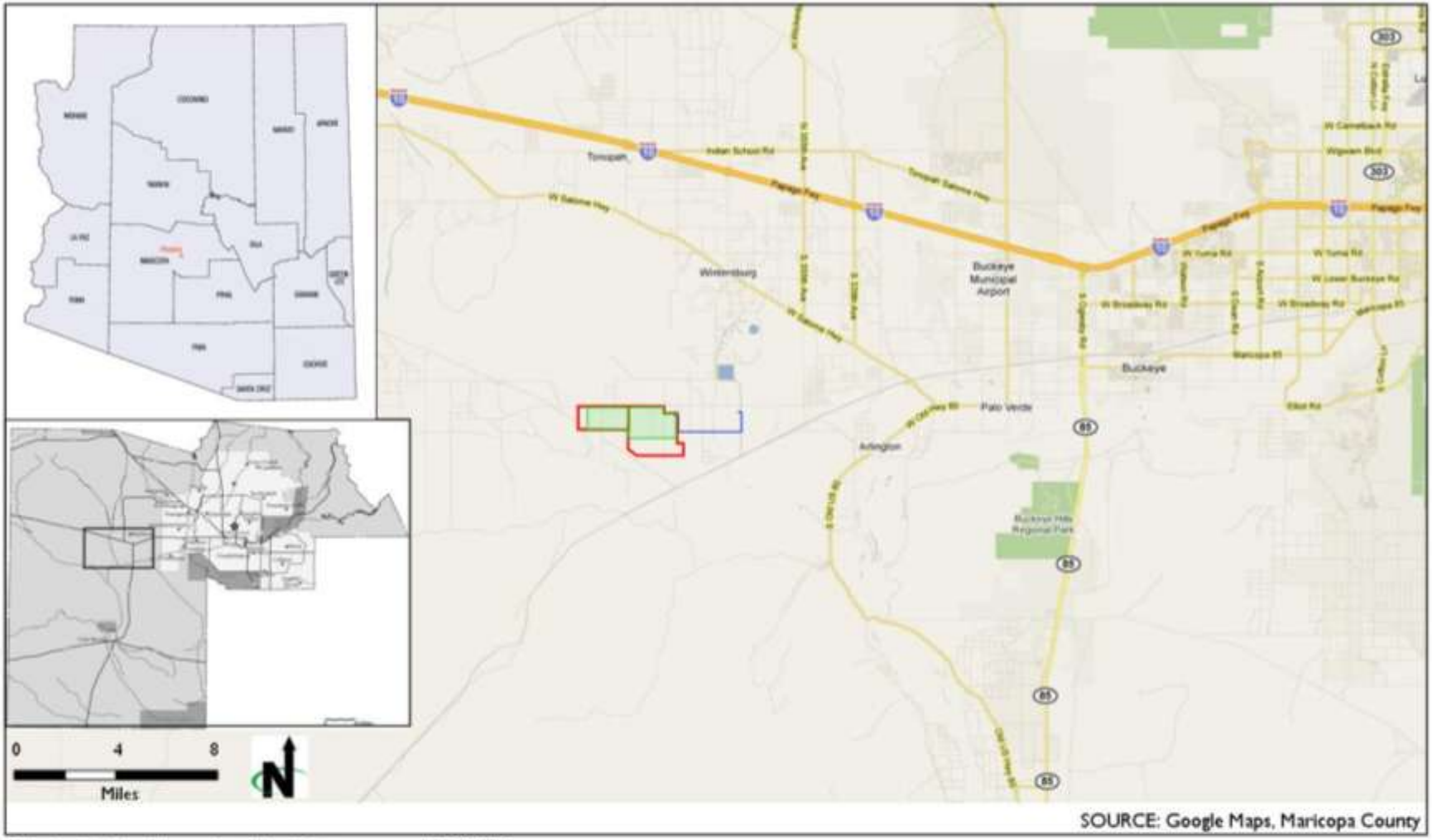
2.1 PROPOSED ACTION

DOE's proposed action is to issue a loan guarantee to Sempra to develop the Mesquite Solar Energy project, a nominal 400-MW PV energy generating facility. The proposed project is near Gillespie Arizona, approximately 50 miles west of Phoenix in Maricopa County (Figure 2-1). The project site includes portions of Sections 18, 19, and 20 of Township 1 South, Range 6 West, and portions of Sections 13, 14, 15, and 24 of Township 1 South, Range 7 West, in the Gila and Salt River Base and Meridian. The site is divided into two adjacent parcels—a 2,480-acre parcel (Part 1), and a 1,280-acre parcel (Part 2) (Figure 2-2). Sempra owns or controls (through options to purchase) these lands. Project development would occur on approximately 1,530 acres of Part 1 and 980 acres of Part 2.

The proposed project also includes a gen-tie power line (230-kV electrical line) between the project site and the existing Mesquite Generating Station, an existing natural gas-fired generation facility owned and operated by Sempra and located approximately two miles east of the proposed project site (Figure 2-3). The gen-tie line would originate and terminate on Sempra-owned land and would cross state lands and private property.

2.1.1 PV Solar Energy Technology

PV solar technology converts solar radiation from the sun into direct current electricity. When light shines on a PV cell, some of the light is absorbed. The energy of the absorbed light is transferred to electrons in the atoms of the PV cell. With their newfound energy, these electrons escape from their normal positions in the atoms of the semiconductor PV material and become part of the electrical flow, or current, in an electrical circuit. Figure 2-4 depicts how the proposed action would generate direct current electricity, convert it to alternating current, collect it, and transfer it to the grid to be sold to utilities on the wholesale market.

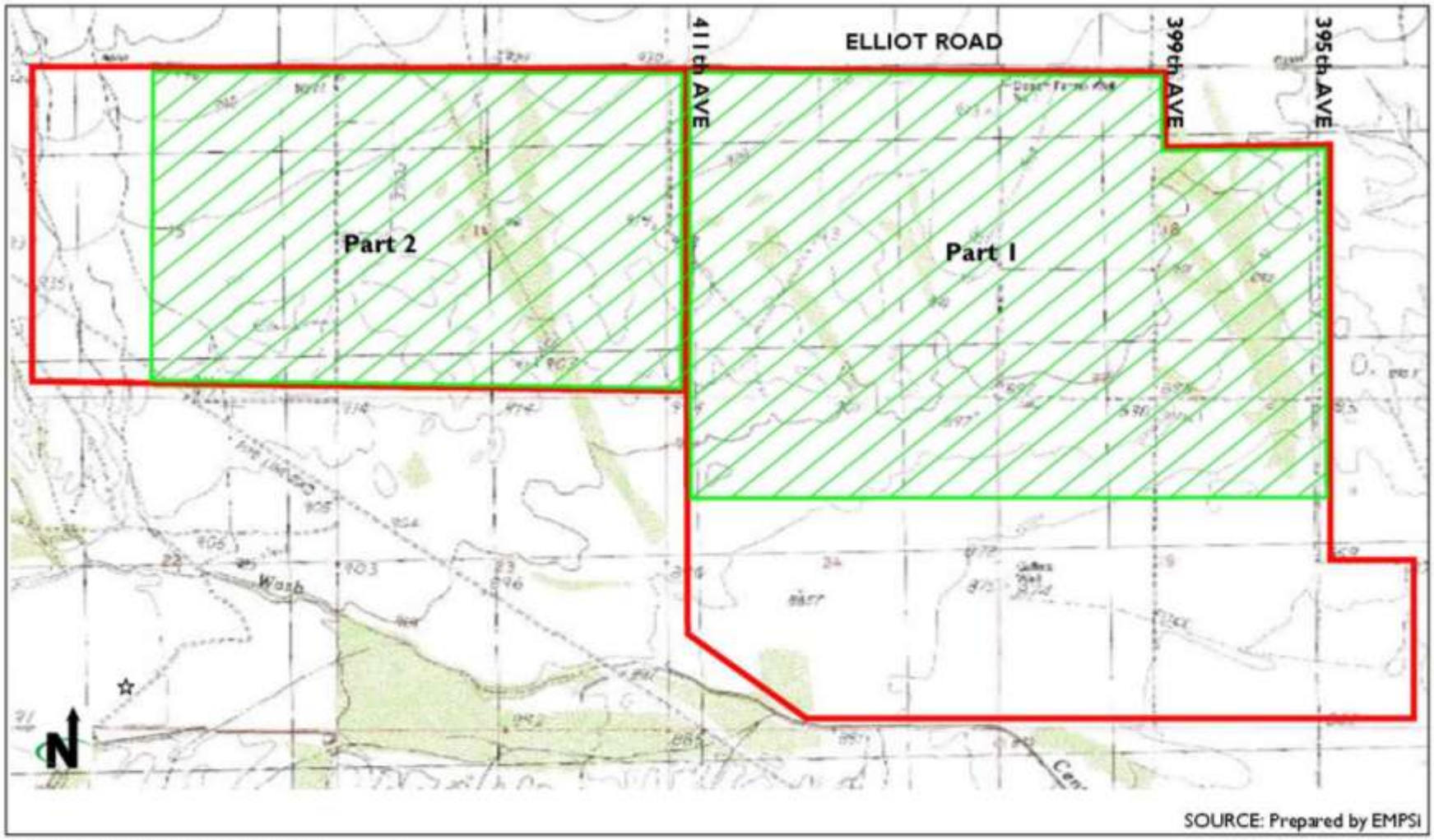


The project site is in western Maricopa County, approximately 50 miles west of downtown Phoenix.

LEGEND:

- Project Site Boundary
- Project Development Boundary
- Gen-Tie Route

Figure 2-1 Project Location Map



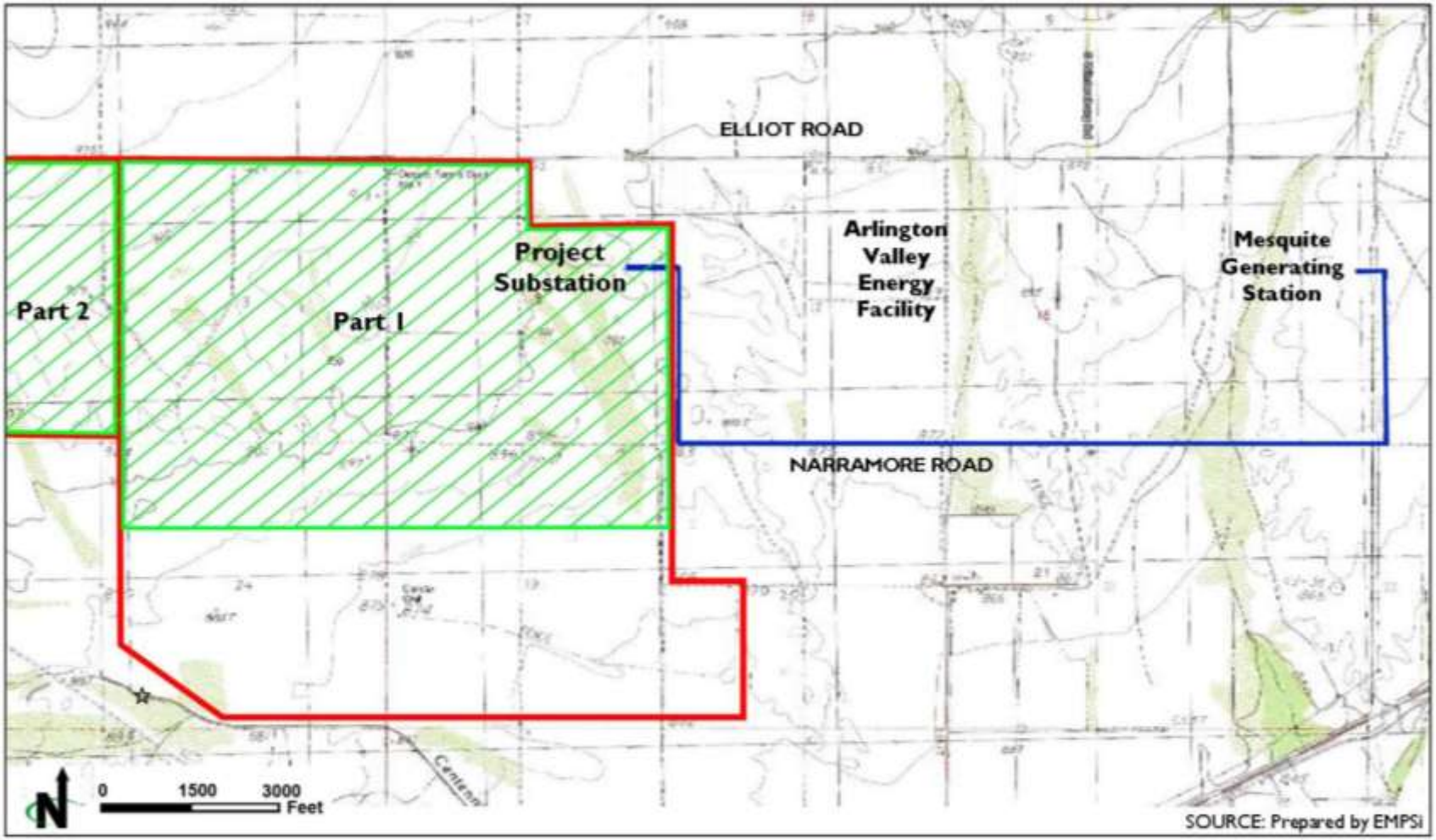
The lands in the two adjacent parcels owned or controlled by Sempra would be developed into a nominal 400-megawatt solar generation site. While the total project site encompasses 3,760 acres, only 2,510 acres are in the project development boundary.

LEGEND:

Project Site Boundary

Project Development Boundary

Figure 2-2 Project Map – Part 1 and Part 2

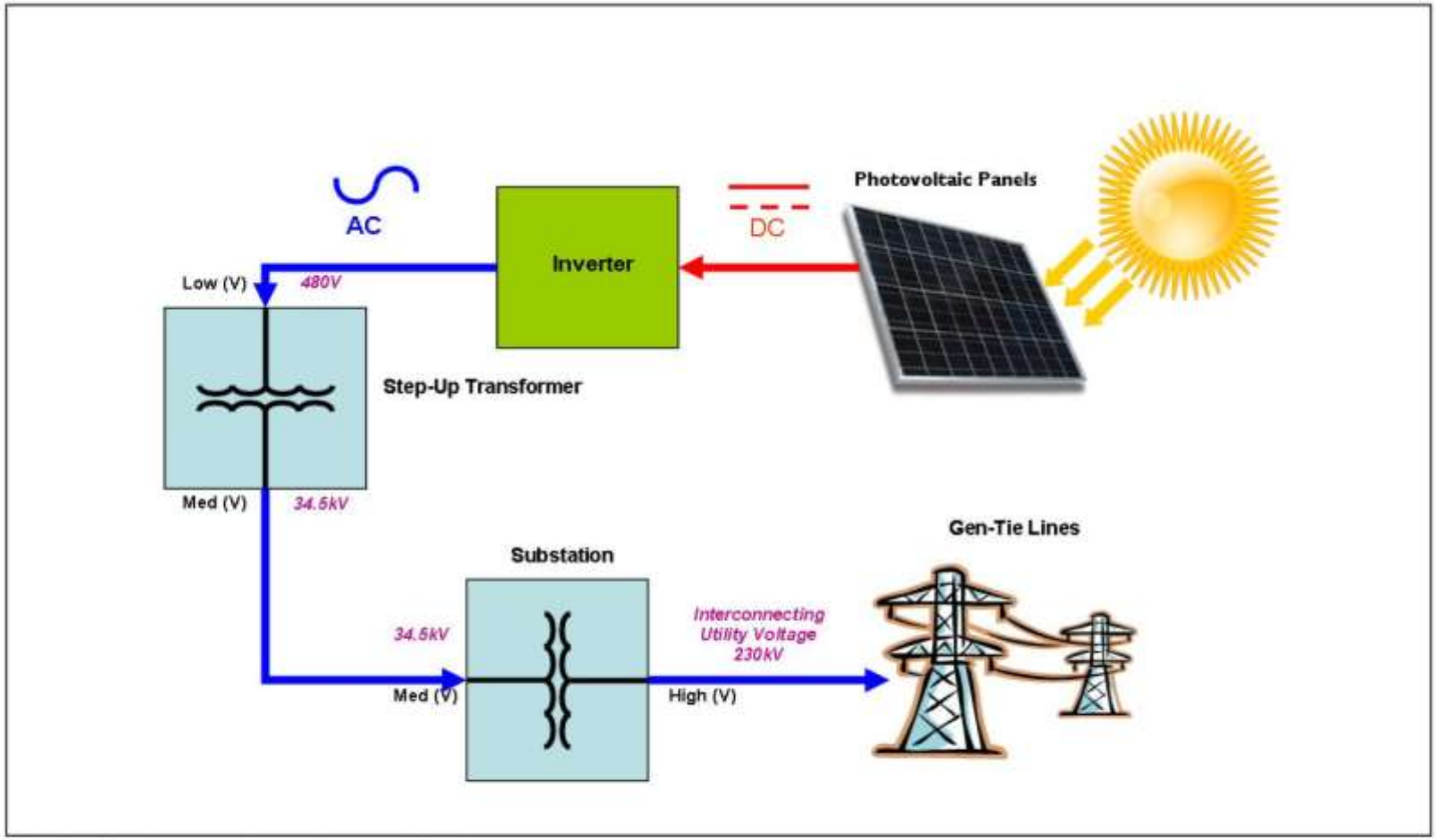


Electricity generated by the proposed Mesquite Solar Energy project would be conveyed to the existing Mesquite Generating Station electrical switchyard via a new gen-tie power line.

LEGEND:

- Gen-Tie Route
- Project Site Boundary
- Project Development Boundary

Figure 2-3 Project Map – Gen-Tie Power Line Route



PV solar technology converts solar radiation into direct current electricity. Inverters convert the DC current into AC current, and transformers step up the voltage for delivery to the project substation. Transformers are located in the solar field and at the project substation. A new gen-tie line would deliver the project-generated electricity to the Mesquite Generating Station for distribution through the grid.

Figure 2-4 PV Solar Technology

2.1.2 Mesquite Solar Energy Project Facilities

The proposed project would consist of a solar field of ground-mounted PV panels, an electrical collection system that converts generated power from direct current to alternating current, a substation, and a gen-tie power line. Site infrastructure would include driveways, drainage channels, a landscape screening berm, and fencing. These elements are described below.

Solar Field

The solar field, which would be developed on both Part 1 and Part 2 of the Sempra-owned or controlled property, would consist of PV panels mounted on fixed steel support structures. The panel technology that would be used is still under review by Sempra but would be either microcrystalline-type panels or cadmium telluride (CdTe)-based panels. The assembled PV panels would have a typical height of about 6 feet and a maximum height of 8 feet. The PV panels would be arranged in rows with center-to-center spacing of 12 to 22 feet. The rows would be aligned east to west, and the PV panels would be tilted to the south.

Typical Ground-Mount PV Panel Installation

Electrical Collection System

The PV panels would be organized into electrical groups, or blocks. Each block would consist of approximately eight acres of PV panels (producing about 1 MW) and associated electrical collection equipment, including inverters, switchgear, transformers, and conductors. The size of each block would depend on the capacity of the inverters associated with the block, which in turn would

depend on the type and size of inverters available for purchase and other electrical design considerations.

Conductors, hung under the PV panels and extending underground, would feed direct current to alternating current inverters and associated switchgear. Inverters and switchgear would have an associated transformer to step up the electricity voltage from the inverter output level of 480 volts to 34.5 kV. From each transformer, electricity would be conveyed via an underground circuit to 34.5-kV switchgear that gathers the output of up to 30 MW of PV panels. From there, electricity would be conveyed via an underground 34.5-kV collector circuit to a common 34.5-kV bus (an electrical connection between multiple electrical devices) within the substation on the project site (see Figure 2-4). All electrical collection equipment would be pad-mounted, and some equipment would be housed in individual cabinets. None of these equipment cabinets would be permanently occupied by site personnel.

Substation

The substation would be a central hub for the 34.5-kV collector circuits and would step up the electricity voltage from 34.5 kV to 230 kV. The substation site, which would include the switchyard, would be approximately 10 acres and would include, but would not be limited to, the following major components:

- 34.5-kV bus and associated switching devices;
- 230-kV bus and associated switching devices;
- 167 Megavolt ampere (MVA), 34.5/230-kV transformers;
- 34.5-kV capacitors;
- Tubular steel support structures up to 40 feet high;
- Grounding grid;
- Prefabricated modular control building; and
- Perimeter fence.

Gen-Tie Power Line

The 230-kV gen-tie power line would connect the Mesquite Solar Energy project to the existing Mesquite Generating Station switchyard located two miles east of the project site at the Mesquite Generating Station. The power line would consist of two circuits on common structures in a 120-foot-wide corridor. The common structures would be 150-foot-high tubular steel monopoles on drilled shaft foundations. The span between supporting structures would be between 500 and 1,000 feet. The photo below shows an example of a two-circuit monopole (the span length shown in the photo does not represent project span length).

Example two-circuit tubular steel monopole

The gen-tie line would originate at a new 230-kV switchyard on the project site (substation location) and would extend 4.5 miles, terminating at the existing 230-kV bus of the Mesquite Generating Station. The Mesquite Generating Station switchyard consists of a single 230-kV bus that connects the Mesquite Generating Station to the Hassayampa Switchyard. The Hassayampa Switchyard is a 500-kV switchyard located immediately east of the Mesquite Generating Station that collects electricity from area power plants and transfers this electricity to transmission lines serving urban areas of Arizona and California. The Hassayampa Switchyard is owned by six transmission distribution entities and managed by the Salt River Project. The Mesquite Generating Station 230-kV bus is being modified to add two additional 230-kV circuit breakers and associated switches as part of plant reliability upgrades and to accommodate the Mesquite Solar Energy project gen-tie power line. The gen-tie power line route received a Certificate of Environmental Compatibility (CEC) from the Arizona Corporation Commission (Arizona Corporation Commission 2009). This route is described below and was depicted on Figure 2-3.

The gen-tie route would be approximately 4.5 miles long. It would begin at the new 230-kV switchyard on the project site, proceed through state land for approximately 1.2 miles, private land for 0.5 mile, state land for 1 mile, and then enter the Mesquite Generating Station site for 1.8 miles, terminating at the existing Mesquite Generating Station switchyard. Rights-of-way are required

from the Arizona State Land Department for the segments on state lands, while an easement is required to cross the private land. The Arizona State Land Department approved the rights-of-way at its October 14, 2010 board meeting (Arizona State Land Department 2010b). The easement agreement for the segment on private land was executed in July 2010.

Driveways

Driveways on the site would consist of a main access driveway, a perimeter driveway, and a series of internal driveways. The site would have two access points. The main access driveway to the site from Elliot Road is already in place and extends along the 399th Avenue alignment to the southern edge of the site. (The road alignments described in this subsection are the extensions of the north-south-running numbered avenues onto the project site from Elliot Road). This existing main access driveway provides access to five water wells on the property and a distribution power line serving the well pumps (the water wells provide water for the Mesquite Generating Station, as well as providing a minimal amount of water for revegetation at the proposed project site). This main access driveway would be improved to 24 feet wide and paved from Elliot Road to the substation; this is the only pavement proposed at the site. The remainder of the main access driveway from the substation to the southern border of the property would consist of unpaved engineered construction. This surface would be completed with gravel or aggregate base, and its design would be based on engineering considerations, including native soil characteristics, traffic frequency and weight, drainage, and dust control.

The other access point is an emergency access at the 411th Avenue alignment; this driveway would be 24 feet wide and consist of unpaved engineered construction.

The perimeter driveway, which would surround the site, would also be 24 feet wide and consist of unpaved engineered construction. Four lateral driveways running east-west, perpendicular to the main access driveway, would provide access into the solar field for maintenance. These lateral driveways would be 12 feet wide and consist of unpaved engineered construction.

A third site entrance at the 395th Avenue alignment was proposed but eliminated at the request of the Arizona Game and Fish Department (AZGFD) to address wildlife connectivity concerns.

Drainage Infrastructure

Much of the project site was previously used for flood-irrigated agriculture, so the site is generally flat and dips slightly to the southeast at an approximately constant slope of 0.6 percent. Off-site storm water flows approach the site from the northwest and these flows, along with the flows generated on-site, flow to Centennial Wash to the south and southeast of the site. The project's drainage design would preserve the existing locations and characteristics of flows entering and exiting the site.

A system of new drainage channels and retention basins would be developed to mitigate the effects of storm water flows on the facility and to attenuate the increase in post development flows. Perimeter channels along the north, east, and west boundaries of the site would divert off-site flows around the site, into the Centennial Wash floodplain. Numerous small channels (running east-west along each lateral driveway) would intercept flows generated on-site and divert these flows to adjacent retention basins to prevent flows from accumulating across the entire site. The perimeter and interior channels would be sized for 100-year peak runoff flows, and the retention basins would be sized with a minimum cumulative volume of 190 acre-feet to ensure that there is no increase in the 100-year runoff flows exiting the site.

Screening Berm

A 6- to 8-foot-high screening berm would be constructed in the open space area between Elliot Road and the perimeter drainage channel to provide an aesthetic buffer between the proposed facility and Elliot Road and residences north of Elliot Road. The top and northern side of the berm, facing Elliot Road, would be contoured with horizontal meanders and height variations to simulate natural terrain. The southern side of the berm, facing the project site interior, would have a constant 3:1 slope angle and would be stabilized with a native seed mix and/or soil stabilizer. Native and drought-tolerant trees, shrubs, and ground cover would be included in the landscaping on the top and northern side of the berm to enhance the screening and to add visual interest. These plants would include native trees and evergreen shrubs with seasonal accent flowers to provide color. The intent of the design would be to imitate the native desert with organic and natural groupings. The landscaping would be irrigated with a drip system until the plants are established, which is expected to take three to five years. Once the plants are established, the irrigation would be gradually reduced until it is used only for occasional watering during extreme drought conditions.

Fencing

The project site would be enclosed by a 6-foot-high chain link fence topped with one foot of barbed wire. The fence posts would be at 10-foot intervals. The two site access points would be gated and would have swinging or rolling chain link gates. To provide an open presentation of the screening berm and associated landscaping as viewed from Elliot Road, the fence would be located on the project side of the berm. Because the project site would lack vegetation to sustain wildlife, project fencing would be designed to prevent wildlife from entering the project site and to direct wildlife instead toward Centennial Wash, which provides a wildlife habitat connectivity corridor adjacent to the project area.

Revegetation

The majority of the Part 1 lands are undergoing revegetation per the Comprehensive Land Management Plan that was approved in 2000 as part of the SUP for Sempra's Mesquite Generating Station. Revegetation efforts would continue until development of each phase begins. At the beginning of each phase, the portion of the project site undergoing solar development would be cleared of vegetation. Once this construction begins, Sempra is no longer bound by the vegetation requirements (Maricopa County 2008). Instead, a new county-imposed stipulation would go into effect allowing vegetation removal but requiring other measures be put in place to control noxious weeds and to control fugitive dust and wind erosion. Noxious weeds would be controlled with herbicides, while fugitive dust and wind erosion would be controlled by establishing and maintaining a crust on the soil surface (a crust binds soil particles on the surface together to reduce wind erosion), minimizing disturbance of this crust by vehicle or foot traffic, limiting maintenance vehicle speed, and watering during periodic maintenance operations. All revegetation around Centennial Wash has been completed per the requirements of the Comprehensive Land Management Plan described above for Sempra's Mesquite Generating Station. Revegetation that has occurred around Centennial Wash is outside the project development boundary and would not be disturbed.

2.1.3 Mesquite Solar Energy Project Construction

Mesquite Solar Energy Project Site

Construction of the new facility would occur in phases over five to eight years, depending upon market demand and rates of PV panel manufacturing. Part 1 would be built first, followed by Part 2. Construction on Part 1 would begin in 2011, and the first 100 to 150 MW of production capacity would come online in late 2011. At peak construction, approximately 300 construction workers would be employed.

The first phase of construction would include removal of an abandoned house and remnants of concrete irrigation ditches and stock tanks. During the initial phase of construction, approximately 300 acres of solar field along the northern border of Part 1, as well as driveways, fencing, drainage infrastructure, and the screening berm north of Part 1 along Elliot Road, would be developed. The substation and switchyard upgrades at the existing Mesquite Generating Station would also be completed during the first phase of construction.

Vegetation would be removed from the areas where site infrastructure and PV panels would be placed, as no vegetation is permissible among the PV panels to avoid shading and hazard from brush fire. Grading would occur between the lateral channels and would follow the existing topography. Grading would also include filling one small man-made earthen basin previously used for agricultural purposes. This basin lies just east of the 403rd Avenue alignment in the south-central portion of the Part 1 project development boundary. The grading plan would be designed to minimize the amount of earthwork performed at the site.

The subsequent phases of construction would include the development of additional solar field facilities, including vegetation removal, grading as necessary, and installation of PV panels and the electrical collection system.

Construction within each phase would be completed in 1-MW blocks, with approximately 50 to 100 MW coming online each year.

Gen-Tie Power Line Route

Construction of the gen-tie power line would begin in mid 2011. All construction vehicle access and materials staging would occur within the 120-foot-wide right-of-way corridor; no temporary or permanent access road outside of this area would be required. Support structure construction areas would be cleared of vegetation, as would access for maintenance vehicles beneath the gen-tie line. No revegetation of these areas would be required.

2.1.4 Mesquite Solar Energy Project Operation

The Mesquite Solar Energy project would be designed for a minimum 40-year lifespan. Operation of the facility would be managed, remotely monitored, and controlled by the existing staff of the Mesquite Generating Station. When fully developed, approximately seven additional employees would be hired for on-site maintenance of the facility.

The facility would require minimal material resources during operation. The PV panels are guaranteed for 25 years. After 25 years of operation, or when performance degradation warrants, panels would be replaced with the latest technology available. Panels removed from the site would be returned to the manufacturer for recycling if the manufacturer has a collection program for end-of-life panels or would be trucked off-site to an appropriate waste disposal facility. Maintenance activities on-site would include checking electrical performance parameters that are not gathered remotely, periodic inspections, maintenance of transformers and inverters, weed abatement, dust control, panel cleaning, and driveway maintenance.

No wastewater or potable water systems would be developed at the site. Water for periodic panel cleaning, irrigation, and dust control would be obtained from the existing on-site wells.. Up to 500 acre-feet of water would be required annually and would come from the water currently allocated for the revegetation activities on Part 1 of the site.

Transformers, which contain insulating mineral oil, and inverters, which could contain cooling liquid, are the only facility equipment that could present the potential for introducing pollutants to the environment. To eliminate such potential, each transformer would include secondary containment, and each inverter would drain to one of these secondary containment systems. Secondary containment would consist of a concrete basin having sufficient volume for 100 percent of the transformer and inverter liquid contents plus retention of the 24-hour volume from a 100-year storm event. These

containment specifications were developed in accordance with federal Oil Pollution Prevention regulations (40 CFR 112) and would be incorporated into the facility Spill Prevention, Control, and Countermeasure (SPCC) Plan.

The PV panels themselves would not have the potential for introducing pollutants into the environment during unplanned events such as breakage or fire, as the small amounts of individual chemicals or chemical compounds in the panels are not in a form that has the potential to leach into the environment. This is discussed in more detail in Section 3.13, Public Health and Safety/Hazardous Materials.

2.1.5 Decommissioning

Sempra would operate the Mesquite Solar Energy project for the foreseeable future; no future requirement to cease operations or close out the site is anticipated at this time. However, if the project were decommissioned, the PV panels, support structures, and electrical equipment would be removed and the site would be restored. No ground decontamination or remediation is expected to be required, as chemical compounds in the PV panels are encapsulated and are not in a form with the potential to leach into the surrounding environment. In addition, none of the other equipment is expected to have the potential for contamination. As discussed in Section 2.1.3, all panels removed from the site would be returned to the manufacturer or trucked off-site to an appropriate waste disposal facility. Facility closure would be consistent with laws, ordinances, regulations, and standards in effect at the time of closure.

2.1.6 Permits and Authorizations

The permits and authorizations listed in Table 2-1 have been or would need to be completed prior to the initiation of groundbreaking or construction activities on each area.

Table 2-1
Permits, Approvals, and Authorizations for the Mesquite Solar Energy Project

Required Permit	Issuing Agency	Date Filed *(or Expected to be Filed)*	Date Issued *(or Expected to be Issued)*	Purpose
Part 1				
Comprehensive Plan Amendment (Case: CPA 200807)	Maricopa County Board of Supervisors	June 2008	December 17, 2008	Rezoned land for industrial use
Minor Amendment of Special Use Permit Stipulations for Mesquite Generating Station (Case: Z2008066)	Maricopa County Board of Supervisors	June 2008	December 17, 2008	Modified revegetation requirement to allow solar installation
Variance from Maricopa County Drainage Retention Requirement	Maricopa County Board of Adjustment	July 2009	October 14, 2009	Drainage upgrades on Part 1 site
Special Use Permit (Case: Z2009022)	Maricopa County Planning and Zoning Department	March 2009	January 13, 2010	Installation of project on Part 1 site
Building/Grading Permit	Maricopa County Planning and Zoning Department	*Early 2011*	*Mid 2011*	Permit filed by construction contractor prior to construction
Dust Control Permit	Maricopa County Air Quality Department	*Mid 2011*	*Mid 2011*	Permit filed by construction contractor prior to construction
Floodway Use Permit	Maricopa County Flood Control District	*Early 2011*	*Mid 2011*	Permit filed as part of building permit process
General Storm Water Permit for Construction Activities	Arizona Department of Environmental Quality	*Mid 2011*	*Mid 2011*	File Notice of Intent at least 48 hours prior to start of construction
Part 2				
Comprehensive Plan Amendment (Case: 2009057)	Maricopa County Board of Supervisors	June 2009	December 16, 2009	Rezoned property for industrial use
Special Use Permit (major amendment)	Maricopa County Planning and Zoning Department	*Mid 2011*	*Late 2011*	Installation of project on Part 2 site
Variance from Maricopa County Drainage Retention Requirement	Maricopa County Board of Adjustment	*Early 2011*	*Mid 2011*	Drainage upgrades on Part 2 site

Table 2-1 *(continued)*
Permits, Approvals, and Authorizations for the Mesquite Solar Energy Project

Required Permit	Issuing Agency	Date Filed *(or Expected to be Filed)*	Date Issued *(or Expected to be Issued)*	Purpose
Building/Grading Permit	Maricopa County Planning and Zoning Department	*Late 2011*	*Early 2012*	Permit filed by construction contractor prior to construction
Dust Control Permit	Maricopa County Air Quality Department	*Early 2012*	*Early 2012*	Permit filed by construction contractor prior to construction
General Storm Water Permit for Construction Activities	Arizona Department of Environmental Quality	*Early 2012*	*Early 2012*	File Notice of Intent at least 48 hours prior to start of construction
Gen-Tie Power Line				
Certificate of Environmental Compliance (Docket No. L-00000KK-09-0299-00147, Case No. 147)	Arizona Corporation Commission	June 2009	October 20, 2009	Required to install gen-tie line
Minor Amendment to Mesquite Generating Station SUP	Maricopa County Planning and Zoning Department	September 2009 (initial) *Late 2010 (revised)*	*Early 2011*	Modifies SUP to allow gen-tie line across site

2.2 NO ACTION ALTERNATIVE

DOE's regulations implementing NEPA require inclusion of a no action alternative. Under the no action alternative, DOE would not issue a loan guarantee to Sempra to develop the Mesquite Solar Energy project.

Sempra owns or controls the land proposed for solar energy development, and it would likely seek private sources of financing to develop the project. However, Sempra is not confident that it would be able to obtain debt financing on standard commercial terms for a project of this scale that utilizes the latest PV technology. If the DOE loan guarantee was not granted, Sempra would have to assess whether it would be viable to develop the Mesquite Solar Energy project at this time or at all. If Sempra were able to obtain private funding and the project was developed, the time it took to bring the project online would be increased, delaying renewable power from reaching the market. The DOE loan guarantee is likely the only viable option for obtaining project financing for a project of this scale utilizing the latest PV technology.

The decision for DOE consideration covered by this NEPA review is whether DOE should approve the loan for the proposed Mesquite Solar Energy project. There are no unresolved conflicts concerning alternative uses of available resources associated with the project site that would suggest the need for other alternatives (40 CFR § 1508.9(b)). Therefore, this NEPA review considers only the proposed action and the no action alternative and does not consider alternative sites or methods of financing.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED

Sempra purchased the majority of the land described under the proposed action in 2000 for water rights to provide cooling water to the Mesquite Generating Station; additional lands that would be used by this project were purchased between 2008 and 2010. Because Sempra owns or controls the proposed action lands, and given the proximity of these lands to Sempra's existing Mesquite Generating Station and the absence of unresolved conflicts, no alternative sites were considered for developing the Mesquite Solar Energy project.

The only alternatives considered for the solar generating facility were solar technologies. Sempra investigated both solar thermal and PV technologies and decided to proceed with PV technology because (1) solar thermal requires water for the electricity generation process, and water is a scarce resource in the desert; (2) PV technology can be constructed quickly and in phases, bringing electricity to the grid much more quickly than solar thermal technology; and (3) PV technology is evolving, and future gains in efficiency can be incorporated into future phases of the project compared with solar thermal technology, whose infrastructure would not allow for continual incorporation of advances in technology.

Sempra also evaluated alternate routes for the gen-tie power line should it not be possible to be developed using the preferred route analyzed in this EA. Alternate routes were ultimately eliminated once the preferred route became permitted and an easement on private land and rights-of-way on state lands were executed or approved, respectively.

CHAPTER 3
AFFECTED ENVIRONMENT AND ENVIRONMENTAL EFFECTS

3.1 INTRODUCTION

This chapter describes the existing social, economic, and environmental conditions of the project area and the potential environmental effects that could result from implementing the proposed action or no action alternative described in Chapter 2. Resources evaluated include land use, visual resources, air quality, noise, geology and soils, water resources, biological resources, tribal consultation and coordination, cultural resources, socioeconomics and environmental justice, public health and safety/hazardous materials, and transportation and infrastructure. A discussion of potential cumulative effects is also provided.

3.2 LAND USE

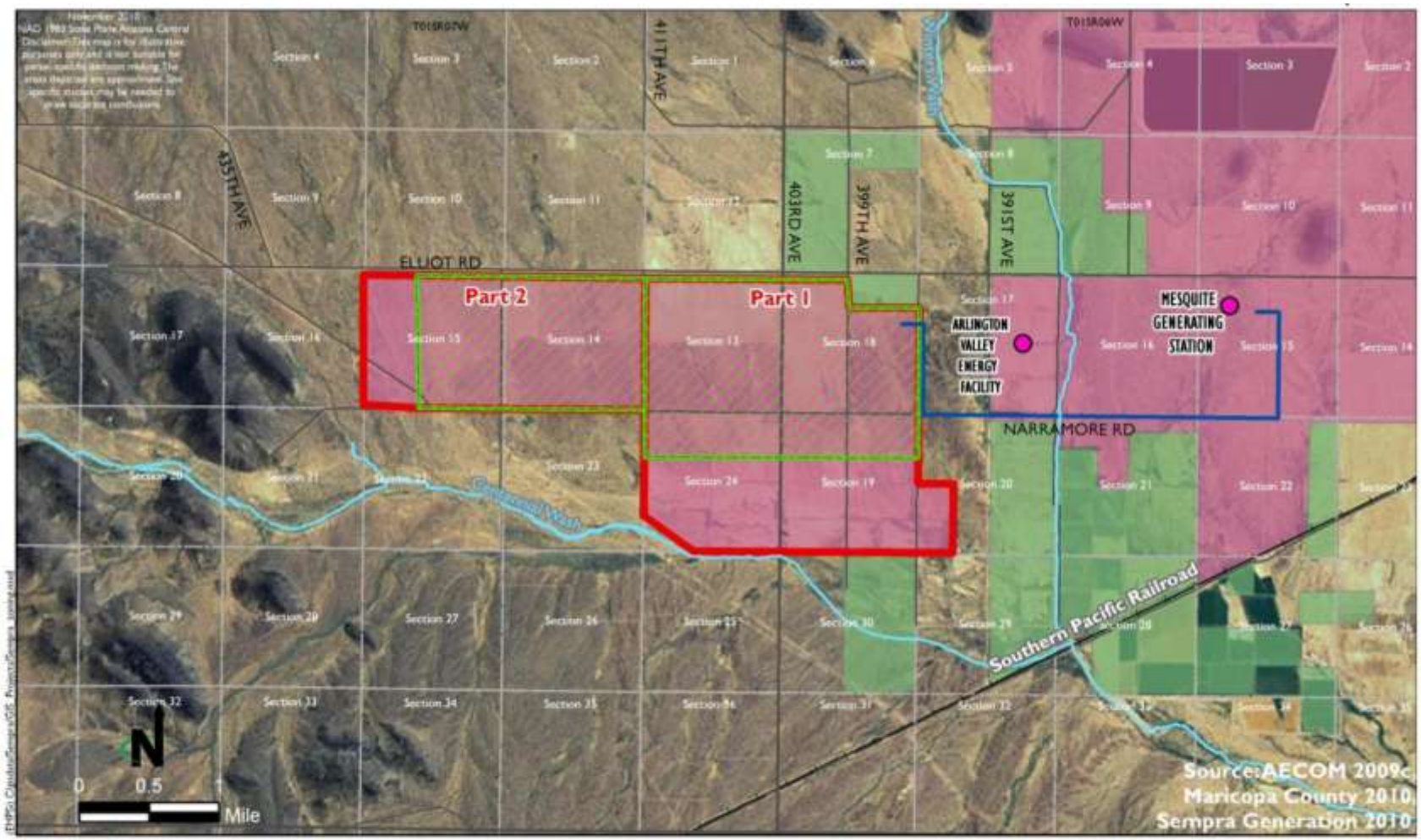
3.2.1 Affected Environment

Existing Land Uses

The proposed action is in Maricopa County, Arizona, approximately 50 miles west of Phoenix. The project site includes Part 1 and Part 2 lands, on which the Mesquite Solar Energy project would be developed, and the gen-tie power line route, which would convey the solar-generated power from the project site to the existing Mesquite Generating Station located two miles east of the project site. Figure 3-1 shows land use status, and Figure 3-2 shows land ownership status for the project area.

Part 1 and Part 2 Lands

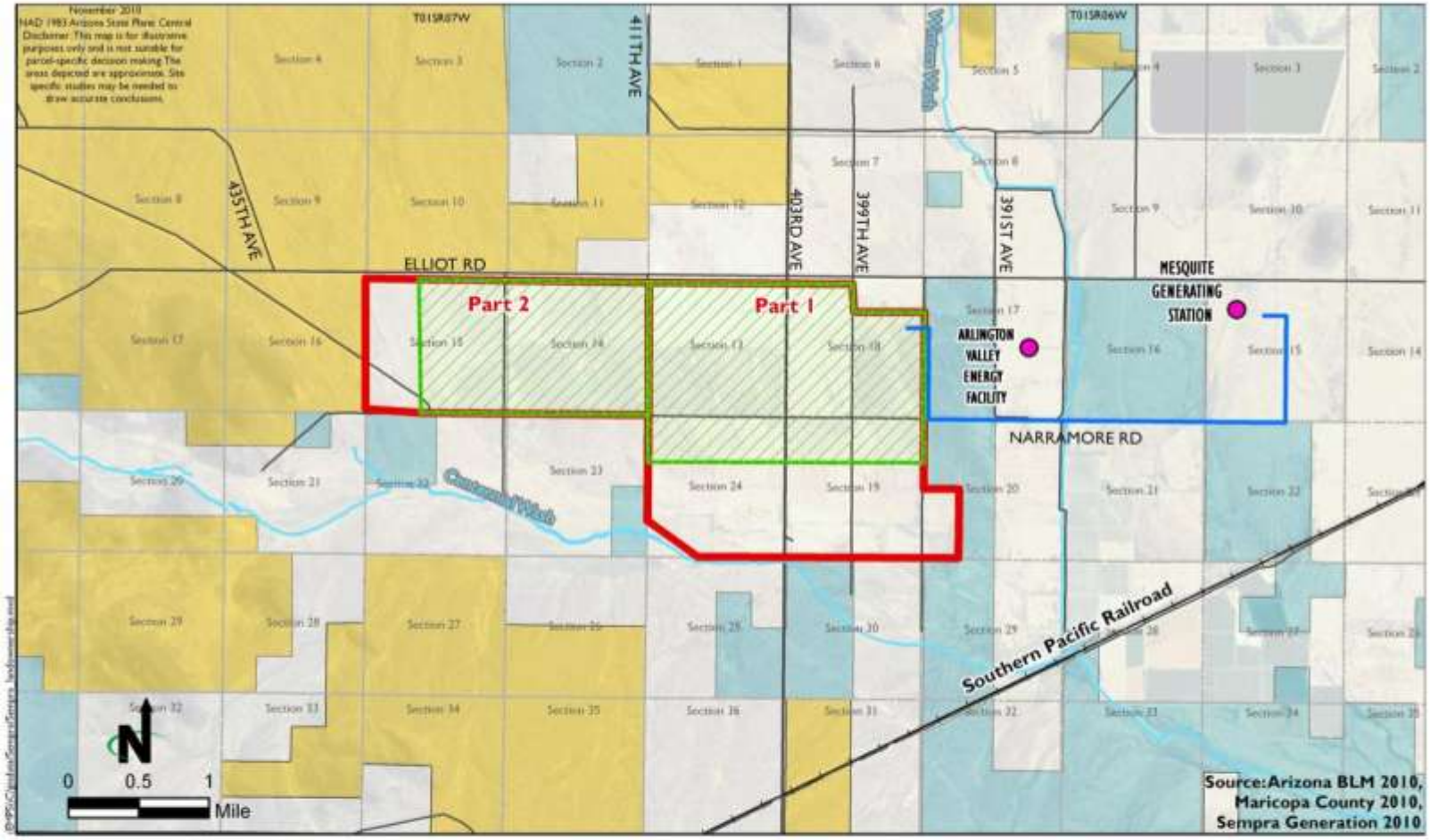
Part 1 and Part 2 lands are located within an unincorporated portion of Maricopa County and are owned or controlled by Sempra (Sempra owns all land except for a 160-acre parcel on the Part 2 lands, which it has an option to



The Maricopa County Board of Supervisors rezoned Part 1 and 2 lands as Industrial to allow for the development of the proposed Mesquite Solar Energy project.

Dedicated Open Space
Industrial
Other Open Space
Gen-Tie Route
Project Development Boundary
Project Site Boundary
Generating Facility

Figure 3-1 Land Use Status



The gen-tie route would cross state and private lands. The Arizona State Land Department approved the right-of-way for the segments on state lands in October 2010. An easement agreement to cross private lands was executed in July 2010.

Bureau of Land Management
Private
State Trust Land
Gen-Tie Route
Project Development Boundary
Project Site Boundary
Generating Facility

Figure 3-2 Land Ownership Status

purchase. The purchase of this property is expected to be completed by the end of 2010). The Maricopa County Board of Supervisors rezoned these lands Industrial to allow for the development of the proposed Mesquite Solar Energy project (Maricopa County 2008, 2009b). A small corridor of land immediately south of Elliot Road and running the length of the northern project site boundary was rezoned Dedicated Open Space; this area would be developed with a screening berm and landscaping to minimize the visual effects of the solar panel fields from Elliot Road and from the scattered rural residences to the north. The Dedicated Open Space designation denotes areas best suited for open space and recreation and includes uses such as parks, recreation and scenic areas, and drainage (Maricopa County 2007).

Phase I Environmental Site Assessments were conducted by Dominion Environmental Consultants, Inc. (2008, 2009) for all of the parcels comprising the Part 1 and Part 2 project site. The site assessments revealed that the existing project site consists of undeveloped desert lands and former agricultural lands. There is evidence of past grazing by cattle, although none were observed during the site visit. On-site land improvements are limited to five active groundwater wells that serve the Mesquite Generating Station, several inactive capped groundwater wells associated with past agricultural or domestic use that will be closed in accordance with Arizona Department of Water Resources regulations, old irrigation ditches, two vacant rural residences, one large concrete stock tank, a second dirt tank in the southeast portion of Part 2 near an existing groundwater well that would be removed as part of the proposed action, and an El Paso natural gas pipeline that traverses the southwestern portion of Part 2 of the project area in a northwest-southeast alignment that would remain in place (Dominion Environmental Consultants, Inc. 2008, 2009).

Gen-Tie Power Line Route

The gen-tie power line route would follow existing roads and transmission line routes where possible, traversing a flat desert landscape typical of the area. The route would originate in the northeastern corner of Part 1 and terminate at the existing Mesquite Generating Station. Both of these sites are owned by Sempra and appropriately zoned for this use. The gen-tie route would cross lands zoned by Maricopa County as Rural Densities, Dedicated Open Space, and Industrial (Maricopa County 2007). The gen-tie line would be an allowable use under these zoning designations.

The 4.5-mile route would exit Sempra property, turn south and parallel 395th Avenue approximately 500 feet east of the road, turn east and run adjacent to Narramore Road, and then turn north onto the Mesquite Generating Station site. This route would cross state lands, then private lands owned by LS Power and associated with the Arlington Valley Energy Facility, and then state lands again before entering Sempra-owned property (see Figure 3-2). Rights-of-way were required from the Arizona State Land Department for the segments on

state lands, while an easement is required to cross the LS Power lands. The Arizona State Land Department approved the rights-of-way at its October 14, 2010 board meeting (Arizona State Land Department 2010b). The easement agreement with LS Power was executed in July 2010.

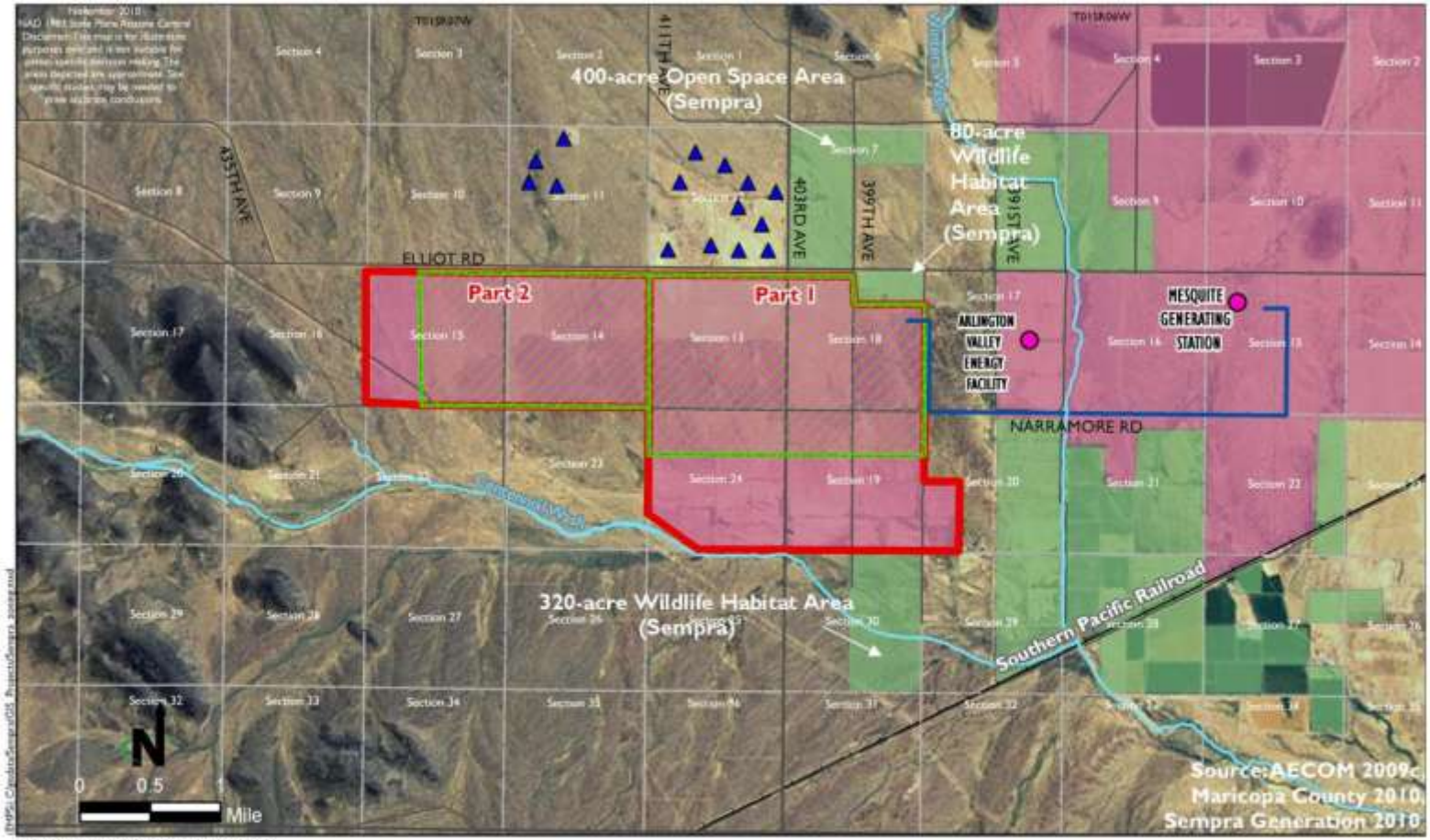
Surrounding Land Uses

Surrounding land uses include vacant desert and grazing land to the east, south, and west; Centennial Wash and a 320-acre wildlife habitat area to the south; Elliot Road, rural single-family residences across Elliot Road, and a 400-acre open space area to the north; and an 80-acre wildlife habitat area to the northeast (Figure 3-3). The open space and wildlife areas are owned and managed by Sempra pursuant to a Comprehensive Land Management Plan approved by Maricopa County; these areas would not be affected by the proposed action. The project vicinity does not provide recreational opportunities for the public.

Vacant desert and grazing lands continue to the north, west, and south of the project site, while the eastern lands are more industrially developed with energy-related land uses. These land uses include the Arlington Valley Energy Facility, approximately one-half mile east of the project site; the Mesquite Generating Station, approximately two miles east of the project site; and the Palo Verde Nuclear Generating Station, approximately two miles northeast of the project site. The Arlington Valley Energy Facility and Mesquite Generating Station are gas-fired power plants, and the Palo Verde Nuclear Generating Station is a nuclear power plant. Associated roads and power lines are also found in this area, and a Southern Pacific rail line runs in a northeast-southwest alignment south of this area.

Land Use Regulations

The Maricopa County 2020 Comprehensive Plan (Maricopa County 2002) establishes a long-range vision for county-wide zoning and allowable land uses, guides development of the unincorporated areas of the county, and provides a framework for future planning and decision making. Goal One of the land use element of the plan is to "Promote efficient land development that is compatible with adjacent land uses, is well integrated with the transportation system, and is sensitive to the natural environment." Objective L8 of Goal One is to "Support innovative technological operations and facilities to encourage an appropriate balance of automobile use, and to encourage energy efficiency and the use of renewable resources." This goal and objective emphasizes the county's support of innovative technological operations and facilities to encourage energy efficiency and the use of renewable resources (Maricopa County 2002). The project site is within the area governed by the Old US Highway 80 Area Plan (Maricopa County 2007).



Surrounding land uses include open space areas, wildlife habitat areas, and scattered rural residences. Dedicated Open Space lands are all privately owned; those owned by Sempra are described in the figure.

Dedicated Open Space
Industrial
Other Open Space
Residence
Gen-Tie Route
Project Development Boundary
Project Site Boundary
Generating Facility

Figure 3-3 Surrounding Land Uses

To meet state and local planning requirements, Sempra filed a Comprehensive Plan Amendment (CPA) for Part 1 of the project site with Maricopa County in June 2008 for approval to amend an existing land use designation from Rural Residential to Industrial and Designated Open Space. Maricopa County approved the amendment on December 17, 2008. Sempra filed a CPA for Part 2 of the project site in June 2009 for approval to amend an existing land use designation from Rural Residential to Industrial and Designated Open Space. Maricopa County approved this amendment on December 16, 2009.

Sempra submitted an SUP for Part 1 lands in March 2009. This permit was approved on January 13, 2010. Sempra plans to apply for an SUP for Part 2 lands in summer 2011 and anticipates approval of this permit in winter 2011.

3.2.2 Environmental Effects

Proposed Action

The proposed Mesquite Solar Energy project would be consistent with existing land use designations and land use planning documents. Maricopa County has approved CPAs for developing the Mesquite Solar Energy project on Part 1 and Part 2 of the project site. It has also approved the SUP for Part 1 and is expected to approve the SUP for Part 2.

The proposed gen-tie line would also be consistent with existing land use designations and land use planning documents. The gen-tie route is an allowable use under current zoning designations of Rural Densities, Dedicated Open Space, and Industrial. Sempra submitted a right-of-way application to the Arizona State Land Department in February 2009 for the portions of the gen-tie line that would cross state lands; this right-of-way was approved in October 2010. Sempra executed an easement agreement with LS Power for the portion of the line that would cross the Arlington Valley Energy Project in July 2010. In addition, the gen-tie line route received a Certificate of Environmental Compliance (CEC) from the Arizona Corporation Commission in August 2009 (Arizona Corporation Commission 2009).

The proposed action would not conflict with existing plans of state government, local government, or private entities for other development in the area. There are no known existing state or local government plans for other developments at or in the vicinity of the project site.

The proposed project would not affect any lands considered to be prime or unique farmlands.

The proposed action would be consistent with the other generating uses in this part of the county, and operation of the facility would have no adverse impact on nearby landowners. Construction of the facility would have minor temporary impacts on adjacent landowners from increased dust generation, noise, and

traffic, which are discussed in further detail in Sections 3.3, 3.4, and 3.14, respectively.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project. If the facility is not constructed, no impacts on land use would occur. The SUP granted for Part 1 of the project site would expire 40 years from its date of approval. If an SUP for Part 2 of the project site is not approved within three years of the date of approval for the Part 2 CPA, this portion of the project could revert to its former land use zoning designation, subject to a public hearing by the Maricopa County Board of Supervisors.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding is obtained and the facility is developed, land use impacts under this alternative would be similar to those described for the proposed action but likely would occur over a longer development time.

3.3 Visual Resources

3.3.1 Affected Environment

The Mesquite Solar Energy project site is in the southwestern portion of Maricopa County. Much of the unincorporated area in this part of the county is undeveloped though not pristine desert, with mountainous scenes dominating southern and western views. Vegetation consists mainly of Lower Colorado River Sonoran Desert scrub, with creosote community vegetation found in the valleys and more arid areas. Larger trees, shrubs, and cacti are absent except along the small- to medium-sized washes that are found throughout the area (Maricopa County 2007).

Views of the area surrounding the Mesquite Solar Energy project site include undeveloped desert to the south and west; undeveloped desert and scattered large-lot rural residences to the north, and undeveloped desert and power facilities to the east and northeast. Dominant visual features in the project area include Saddle Mountain, which is six miles northwest of the project site, and the Palo Verde Nuclear Generating Station, which is two miles northeast of the project site. Background views include the Eagletail Mountains to the west and the Gila Bend Mountains to the south. Area roads cross the project area, mainly in a north-south and east-west configuration. There are no principal arterial streets in the project area; minor arterial streets include Elliot Road, Narramore Road, Wintersburg Road, 399th Avenue, and 411th Avenue. Local streets include 395th Avenue, which borders the project site to the east. These roads, especially Elliot Road, provide the primary points of observation of the project site and proposed gen-tie route. Residences north of Elliot Road also have views of the project site.

The Mesquite Solar Energy project site itself consists primarily of rural undeveloped desert, much of which was formerly used for agriculture. The project site is relatively flat, allowing views of the site from all directions. Vegetation includes sparse desert grasses, shrubs, and scattered desert trees. Most of the vegetation is in narrow strips interspersed with broad areas of bare ground resulting from recent drip irrigation revegetation efforts. Part 1 and Part 2 of the project site each include one vacant residence that would be removed prior to construction.

The landscape surrounding the gen-tie route is similar to that found throughout the project area. The route would cross undeveloped, sparsely vegetated desert or run alongside existing roads or transmission lines. Views of the gen-tie route would be available from area roadways; no rural residences or recreation areas are near the gen-tie line route.

3.3.2 Environmental Effects

Proposed Action

The proposed action would alter the visual character of the landscape by introducing approximately four square miles of solar panels and associated infrastructure in a currently undeveloped area and a new gen-tie line in both developed and undeveloped areas. The effects of these changes on the visual environment are described below.

Part 1 and Part 2 Lands

The primary viewpoints of the proposed Mesquite Solar Energy project would be from residences across Elliot Road (four residences are approximately 0.1 mile north of the Part 1 site boundary) and vehicles traveling along Elliot Road (which borders the project site to the north) and 395th Avenue (which borders the project site to the east). There are no recreational use areas or other sensitive areas in the vicinity of the project site from which the project would be viewed.

Localized impacts on the visual character of the area around the project site would occur from the development of the PV panel fields, substation, and perimeter fencing in a formerly undeveloped area. The solar field would consist of 8-foot-high glass PV panels mounted on steel structures and would be enclosed by 6-foot-high chain link fencing. The 10-acre substation would include a number of components, including a modular building and 40-foot-high steel support structures. While these developments represent a substantial visual change over existing undeveloped conditions, this change is viewed as acceptable given the altered state of the existing landscape, the limited number of sensitive receptors, the support the project has received from surrounding landowners during the public participation process for the CPAs, and the measures built into the project description to minimize the visual effects of the project as viewed from Elliot Road and the rural residences to the north.

The measures to avoid visual impacts on residents north of Elliot Road include the following:

- Constructing a 60-foot-wide open space buffer along the entire frontage of Elliot Road that includes a 6- to 8-foot-high elevated berm planted with desert landscaping;
- Siting the nearest PV panels nearly 200 feet from Elliot Road on the far side of the berm;
- Siting the substation over one-quarter mile from Elliot Road at the edge of the 80-acre wildlife habitat area; and
- Ensuring all outdoor lighting conforms to the Maricopa County Dark Sky Ordinance.

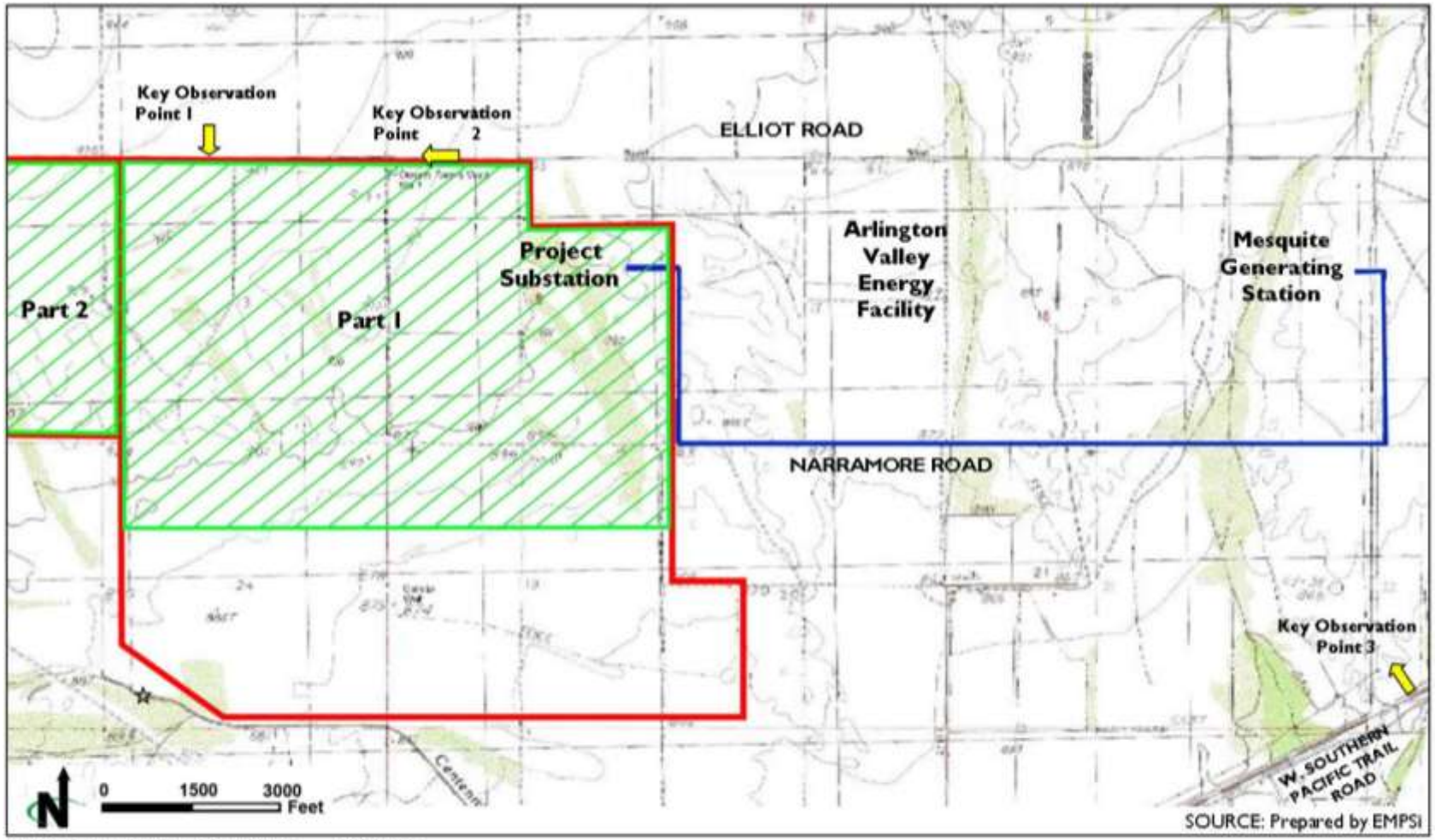
Figure 3-4 describes key observation points from which visual simulations have been developed. Figures 3-5 and 3-6 provide a visual simulation of the landscaping berm that would screen the project from residents north of Elliot Road as well as travelers along Elliot Road.

Gen-Tie Power Line Route

There are no significant or unique visual resources along the gen-tie line route. There are no sensitive receptors near the route.

The primary viewpoints of the gen-tie line along the route would be from vehicles traveling on 395th Avenue and on West Southern Pacific Trail Road, which parallels the Southern Pacific rail line to the south. Narramore Road, along which most of the route would run, is a dirt trail along much of the gen-tie route and does not provide a key observation point of the gen-tie line. Figure 3-7 provides a visual simulation of the gen-tie route as viewed from West Southern Pacific Trail Road.

Localized impacts on the visual character of the area would occur from development of the gen-tie line, which would consist of 150-foot-high tubular steel poles on drilled shaft foundations spaced every 500 to 1,000 feet. Under the 4.5-mile route, between 24 and 48 poles would be installed. The right-of-way corridor would be cleared of vegetation around the transmission poles and to allow maintenance vehicle access under the gen-tie line. The route would parallel existing roads and an existing transmission line upon entering Mesquite Generating Station property.



Existing and simulated views from key observation points are shown on Figures 3-5 through 3-7.

LEGEND:

- Gen-Tie Route
- Project Site Boundary
- Project Development Boundary

Figure 3-4 Key Observation Points

Figure 3-5 Key Observation Point 1 - View of landscape berm looking south across Elliot Road

Existing View.

View of proposed landscaping berm looking south across Elliot Road adjacent to project site.

Figure 3-6 Key Observation Point 2 – View driving west on Elliot Road adjacent to project site

Existing View.

View of proposed landscape berm along Elliot Road.

Figure 3-7 Key Observation Point 3 - View driving southwest along W. Southern Pacific Trail Road

Existing View.

View looking north towards Mesquite Generating Station and gen-tie route.

While transmission poles would be visible to travelers on area roadways, the route would be constructed in the more industrially developed portion of the project area where transmission lines and other infrastructure associated with power-generating facilities are already a part of the built environment. Given the altered state of the existing landscape and the lack of sensitive receptors along the route, the level of visual change imposed by the gen-tie line would be acceptable.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and no change to the existing visual environment would occur.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding is obtained and the facility is developed, the changes to the visual environment under this alternative would be the same as those described for the proposed action, though changes would likely be spread out over a longer development time.

3.4 Air Quality

3.4.1 Affected Environment

Ambient air quality is affected by the type and amount of air pollutants emitted into the atmosphere, the size and topography of the air basin, prevailing meteorological conditions, and the conversion of air pollutants and other species by a complex series of chemical and photochemical reactions in the atmosphere. The levels of air pollutants are generally expressed in terms of concentration, either in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The Clean Air Act (CAA) established the principal framework for national, state, and local efforts to protect air quality in the US (42 USC §§ 7401−7642). Under the CAA, the EPA has set time-averaged standards known as national ambient air quality standards (NAAQS) for six air pollutants considered to be key indicators of air quality: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter (particulate matter with an aerodynamic diameter of 10 microns or less [PM_{10}] and particulate matter with an aerodynamic diameter of 2.5 microns or less [$PM_{2.5}$]).

A NAAQS is composed of two parts - an allowable concentration of a criteria pollutant, and an averaging time over which the concentration is to be measured. Averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposure to a high concentration for a short time or to a relatively lower average concentration over a longer period. For some pollutants, there is more than one air quality standard, reflecting both

short-term and long-term effects. Primary standards set limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Averaging periods vary by pollutant based on potential health and welfare effects of each pollutant. Table 3-1 lists the NAAQS.

Table 3-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Time	National Standards	
		Primary	Secondary
Ozone (O_3)	8 Hours	0.075 ppm	Same as Primary
Carbon Monoxide (CO)	1 Hour	35 ppm (40 mg/m^3)	None
	8 Hours	9 ppm (10 mg/m^3)	None
Nitrogen Dioxide (NO_2)	Annual (Arithmetic Mean)	0.053 ppm (100 µg/m^3)	Same as Primary
	1 Hour	0.100 ppm	None
Sulfur Dioxide (SO_2)	Annual (Arith. Ave.)	0.03 ppm	0.5 ppm
	3 Hours	--	0.5 ppm
	1 Hour	75 ppb	None
Inhalable Particulate Matter (PM_{10})	Annual (Arithmetic Mean)	--	Same as Primary
	24 Hours	150 µg/m^3	Same as Primary
Fine Particulate Matter ($PM_{2.5}$)	Annual (Arithmetic Mean)	15.0 µg/m^3	Same as Primary
	24 Hours	35 µg/m^3	Same as Primary
Lead	Quarterly Average	1.5 µg/m^3	Same as Primary
	Rolling 3-Month Average	0.15 µg/m^3	Same as Primary
	30 Days	--	Same as Primary

Sources: 40 CFR Parts 50, 53, and 58; EPA 2010

O_3 - 8-hour ozone standard adopted in 2008. EPA has proposed to strengthen the 8-hour primary ozone standard to a level within the range of 0.060 to 0.070 ppm. Comments on this proposal were accepted and are under consideration.

Regional Air Quality

Based on measured ambient criteria air pollutant concentrations, the EPA classifies areas of the US according to whether they meet the NAAQS. Areas that violate air quality standards are designated as nonattainment areas for the relevant criteria air pollutants. Nonattainment areas are sometimes further classified by degree (marginal, moderate, serious, severe-15, severe-17, and extreme for ozone, and moderate and serious for carbon monoxide and PM_{10}). Areas that comply with air quality standards are designated as attainment areas for the relevant criteria air pollutants. Areas that have been redesignated from nonattainment to attainment are considered maintenance areas[1]. Areas of

[1] A maintenance area is an area that has been redesignated from nonattainment to attainment. The state thereby submits to the EPA a plan for maintaining NAAQS in the maintenance area as a revision to the State Implementation Plan. The maintenance

uncertain status are generally designated as unclassifiable but are treated as attainment areas for regulatory purposes.

A portion of the project site, including the eastern half of Part 1 and the gen-tie power line route, is in a nonattainment area for the federal 8-hour ozone standard (Figure 3-8). The project area is attainment or unclassified for the remainder of the NAAQS.

Clean Air Act Conformity Guidelines

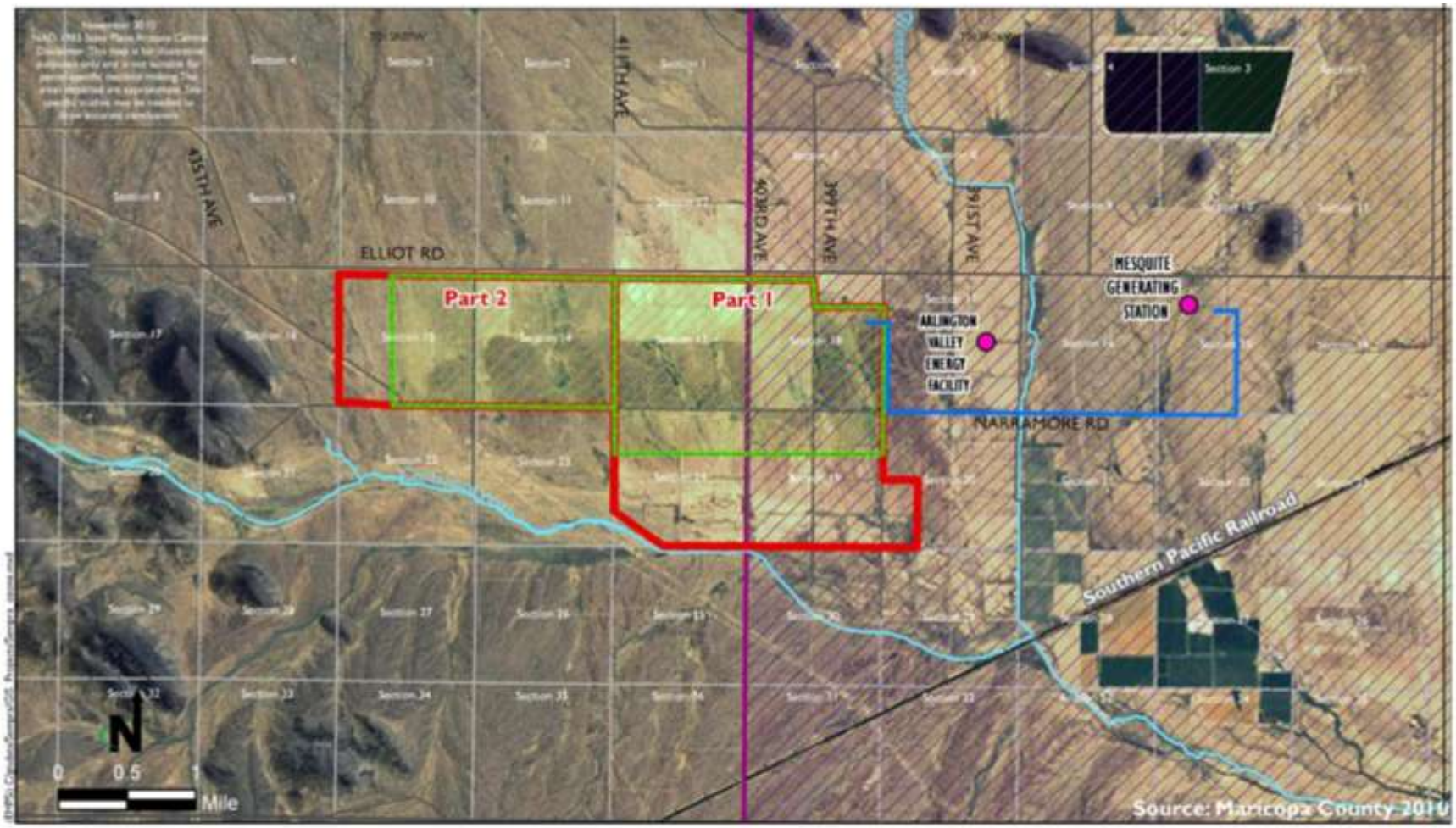
Section 176(c) of the CAA requires that federal actions conform to the appropriate State Implementation Plan. A State Implementation Plan is a plan developed at the state level that provides for the implementation, maintenance, and enforcement of NAAQS and is enforceable by the EPA. The EPA has promulgated rules establishing conformity analysis procedures for transportation-related actions and for other general federal agency actions (40 CFR Parts 6, 51, and 93). The EPA general conformity rule requires preparation of a formal conformity determination document for federal agency actions that are undertaken, approved, or funded in federal nonattainment or maintenance areas when the total net change in direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The State of Arizona adopted the general conformity rule in Arizona Revised Statutes 49-408 and codified the rule in Arizona Administrative Code R18-2-1438. Compliance with the general conformity rule is demonstrated if project emissions fall below certain threshold values. The current relevant thresholds for the nonattainment portion of the project area are 100 tons per year each of ozone precursors (volatile organic compounds [VOCs] and nitrogen oxides [NOx]) (40 CFR Part 51.853).

Greenhouse Gases and Climate Change

Greenhouse gases are chemical compounds in the Earth's atmosphere that allow incoming short-wave solar radiation but absorb long-wave infrared radiation re-emitted from the Earth's surface, trapping heat. Most studies indicate that the Earth's climate has warmed over the past century due to increased emissions of greenhouse gases, and that human activities affecting emissions to the atmosphere are likely an important contributing factor.

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide, methane, and nitrous oxide are examples of greenhouse gases that have both natural and manmade sources, while other greenhouse gases such as chlorofluorocarbons are exclusively manmade. In the

plan must show that the NAAQS will be maintained for at least 10 years after redesignation and must include contingency measures to address any violation of the NAAQS.



The eastern half of Part 1 and the gen-tie power line route are in a nonattainment area for the federal 8-hour ozone standard.

- Generating Facility
- Ozone 8-hour Nonattainment Area
- Gen-Tie Route
- Project Development Boundary
- Project Site Boundary

Figure 3-8 Ozone Nonattainment Boundary

US, most greenhouse gas emissions are attributed to energy use. Such emissions result from combustion of fossil fuels used for electricity generation, transportation, industry, heating, and other needs. Energy-related carbon dioxide emissions represent 82 percent of total manmade greenhouse gas emissions in the US (US Energy Information Administration 2009).

Computer-based modeling suggests that rising greenhouse gas concentrations generally produce an increase in the average temperature of the Earth, which may produce changes in sea levels, rainfall patterns, and intensity and frequency of extreme weather events. Collectively, these effects are referred to as "climate change." The Intergovernmental Panel on Climate Change (IPCC), in its Fourth Assessment Report, stated that warming of the earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change 2007).

The project site does not currently generate greenhouse gas emissions.

3.4.2 Environmental Effects

Proposed Action

Potential impacts on air quality would result from construction activities and from operation of the Mesquite Solar Energy project. These impacts are discussed below.

Construction

Construction would be the greatest source of emissions under the proposed action; these emissions would be short-term and temporary. The primary sources of air pollutant emissions would be criteria pollutants and carbon dioxide emissions from vehicles and construction equipment and fugitive dust emissions from vegetation clearing and site grading. The project would be constructed in phases over five to eight years, resulting in vehicle and equipment emissions that are below CAA conformity thresholds of 100 tons per year each of VOCs and NO_x. Construction activities would be staggered, such that different activities would occur on different areas of the project site over the five to eight years of construction. Part 1 of the project site would be developed first, beginning in 2011. Initial construction would include development of the substation; all Part 1 driveways, fencing, and drainage infrastructure; the screening berm north of Part 1 along Elliot Road; and approximately 300 acres of solar field along the northern border of Part 1. Subsequent phases of solar field construction would occur moving southward on the Part 1 area. Once Part 1 of the project site has been fully developed, development of Part 2 of the project site would commence. Part 2 development would follow the same pattern described for Part 1. Table 3-2 shows annual construction emissions for the year of greatest development (2011). Construction emissions in other years would be below the 2011 peak levels.

Table 3-2
Screening Level Analysis of Peak Year (2011) Annual Construction Emissions (tons per year)

	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2[6]
Commute Vehicle Emissions[1]	1.37	1.38	12.39	0.016	0.13	0.08	1,644
Heavy Duty Truck Trips[2]	0.23	2.87	0.90	0.003	0.14	0.12	315
Construction Equipment Emissions[3]	2.76	25.14	15.93	1.78	2.14	1.97	15,532
Fugitive Dust Emissions[4]	0	0	0	0	8.46	3.38	0
Total Peak Year Emissions	*4.36*	*29.39*	*29.22*	*1.799*	*10.87*	*5.55*	*17,491*
CAA Conformity Threshold[5]	100	100	--	--	--	--	--
Less Than CAA Conformity Threshold?	Yes	Yes	--	--	--	--	--

Notes:
Emissions calculated using URBEMIS emission estimation model (http://www.urbemis.com/)
[1] Assumes 300 workers, 2 trips per worker, 20-mile commute distance, 250 days per year.
[2] Assumes 12 truck trips per day, 50 miles per trip, 250 days per year
[3] Assumes a mix of construction equipment specific to this application operating 63,000 hours/yr.
[4] Assumes 10 acres disturbed per day, 250 days per year, 50% dust control efficiency.
Daily construction worker numbers (300 peak) and construction-related truck counts (10-12 per day) provided by Sempra.
[5] For portions of project site in the federal ozone nonattainment area (see Figure 3-8).
[6] CO_2 would be produced by construction equipment, delivery trucks, and commute traffic.

As described in Table 3-2, fugitive dust would be the primary source of particulate emissions during project construction; fugitive dust from unstable or disturbed surfaces is the largest man-made contributor of PM_{10} in the county (Maricopa County Air Quality Department 2010). The Maricopa County Air Quality Department requires all projects that would disturb more than one-tenth of an acre to obtain a dust control permit prior to construction. This dust control permit would include best management practices and other measures that must be implemented during construction to reduce fugitive dust emissions. These best management practices would be documented in a dust control plan that would be subject to approval by the Maricopa County Air Quality Department. Exact measures would be developed as part of a dust control plan, but examples of dust control measures that could be employed include the following:

- Phase work to minimize the amount of disturbed surface area at any one time;
- Apply water or dust suppressant to all active construction and site preparation work areas at least twice daily and more often during windy periods;
- Apply water or dust suppressants to demolition debris and surrounding area immediately following demolition activity;

- Suspend dust-generating operations during periods of excessive winds (60-minute average wind speed greater than 25 miles per hour);
- Cover all hauling trucks or maintain at least two feet of freeboard on all loads;
- Install trackout control devices at paved access points to control fugitive dust from leaving the project site via trucks and motor vehicles;
- Apply water or dust suppressants on all unpaved access roads and staging areas;
- Sweep paved access roads with water sweepers; and
- Enclose or securely cover exposed stockpiles.

Operation

Operation of the Mesquite Solar Energy project would result in no emissions of criteria air pollutants or greenhouse gases from operation of the solar generating equipment itself, including the solar PV panels, inverters, switchgear, transformers, gen-tie line, substation, and conductors. Operation of the facility would result in minor emissions of criteria air pollutants and carbon dioxide from personal and maintenance vehicle and limited equipment exhaust, as well as fugitive dust emissions from windborne dust and dust generated by vehicles on unpaved surfaces. Operation of the facility could begin as early as late 2011. Full buildout is expected in the 2016 to 2019 timeframe.

Table 3-3 presents full build-out emissions associated with the seven maintenance workers, on-site vehicle travel, panel cleaning, and fugitive dust from travel on unpaved roadways; annual vehicle emissions for operation of the project would be consistent throughout the life of the facility. As shown in Table 3-3, emissions from vehicle use would be well below the CAA conformity threshold of 100 tons per year each of VOCs and NO_x.

Fugitive dust would be minimized through measures outlined in the dust control plan; such measures could include but are not limited to the following:

- Establish and maintain a crust on the soil surface using water or dust palliative;
- Use engineered surfaces or gravel for on-site roadways;
- Avoid disturbance of the established crust by vehicle or foot traffic;
- Limit the speed of maintenance vehicles to under 15 miles per hour; and
- Use water during periodic maintenance operations.

Table 3-3
Screening Level Analysis of Annual Operational Emissions
(tons per year)

	VOC	NO_x	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Vehicle Emissions[1]	0.08	0.26	0.65	0.001	0.01	0.01	101.7
Water Truck Emissions[2]	0.00004	0.0005	0.0002	0.00	0.00005	0.00004	0.07
Fugitive Dust Emissions[3]	0	0	0	0	2.43	0.24	0
Total Annual Emissions	*0.08004*	*0.2605*	*0.6502*	*0.001*	*2.44005*	*0.25004*	*101.77*
CAA Conformity Threshold[4]	100	100	--	--	--	--	--
Less Than CAA Conformity Threshold?	Yes	Yes	--	--	--	--	--

Notes:
Emissions calculated using URBEMIS emission estimation model (http://www.urbemis.com/) unless otherwise specified.
[1] Assumes 7 commute workers, 2 trips per worker per day, 20-mile commute distance, 365 days per year; 50 miles per day of on-site vehicle use; and 2 delivery trucks traveling 50 round trip miles 250 days per year.
[2] Assumes panel cleaning once a year, with 25,000-gallon-capacity diesel water truck traveling 35 on-site miles per cleaning of a 400-MW solar facility.
[3] Assumes 40 miles per day of travel on engineered project roadway (90% dust control efficiency) and 10 miles per day on unpaved areas treated with dust palliative and controlled speeds (70% dust control efficiency). Emission factors from AP-42 Section 13.2.2. Actual fugitive dust emissions are expected to be less than this with all implemented dust control measures. [4] For portions of project site in the federal ozone nonattainment area (see Figure 3-8).

Greenhouse Gases and Climate Change

In its Fourth Assessment Report, the IPCC stated that warming of Earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gas concentrations (Intergovernmental Panel on Climate Change 2007). DOE is not aware of any methods to correlate exclusively the carbon dioxide emissions resulting from the proposed project to any specific impact on global warming; however, studies such as the IPCC report support the premise that carbon dioxide emissions from the project, together with global greenhouse gas emissions, would likely result in a cumulative impact on global warming. Greenhouse gas emissions from the project would be limited to temporary increases in carbon dioxide resulting from construction-related vehicles and equipment and from slight increases in vehicular travel by the projected seven maintenance workers. Operation of the PV panels and collection equipment would not generate direct greenhouse gas emissions.

Operation of the Mesquite Solar Energy project would represent a potential beneficial impact on greenhouse gas emissions from the generation of 889,665 MWh of electricity from solar PV panels annually. The facility would produce enough electricity to power 150,000 homes and would help meet Arizona's Renewable Portfolio Standard, which requires electricity providers to obtain a minimum percentage of their power from renewable energy sources. Assuming electricity generated from the Mesquite Solar Energy project displaced energy produced by regional electric power markets, the proposed project could potentially result in annual emissions savings upon buildout as follows:

- 582,402 metric tons of carbon dioxide equivalents;
- 857 metric tons of nitrogen oxides; and
- 545 metric tons of sulfur dioxide (DOE 2009a)[1].

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project and the facility would not be constructed. No change in existing air emissions would occur; however, potential beneficial impacts on global climate change and air quality described under the proposed action would not be realized.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding is obtained and the facility is developed, air quality emissions under the no action alternative would be similar to those described for the proposed action. Because the facility would likely be constructed over a longer development period, annual construction emissions would likely be spread out over a longer time period than those shown in Table 3-2, while operational emissions would be the same once the project was fully operational. Under this scenario, the no action alternative would realize the same potential beneficial impact on greenhouse gas emissions, though with a longer development time this beneficial impact would not be realized as quickly as under the proposed action.

[1]The life-cycle evaluation is based on direct, indirect, upstream and downstream GHG emissions and air pollutant emissions associated with the project. Emissions and avoided emission and loading levels are calculated by life cycle assessment (LCA) methods consistent with international ISO-14044 LCA methods.

Inputs for the life cycle modeling include, but are not limited to, major known emissions or known emission rates from upstream operations and use of the products of a project, production profiles (e.g., electric generation profiles), emission profiles and expected emission reduction profiles, and indirect emissions not otherwise accounted for. Projects are evaluated to determine the degree to which they can be expected to result in (a) net avoided NO_X and SO_X emissions associated with regional effects, and/or (b) net avoided GHG loadings.

ISO-14044 is the standard most widely used in the United States and throughout the world to ensure that lifecycle assessments are conducted in a manner which is based on sound scientific knowledge and accepted protocols that allow for comparisons between products and processes on a consistent basis. Consistent with ISO-14044 standards, the Loan Guarantee Program methodology includes: 1) a definition of the boundaries of the project including both direct and indirect emissions and significant emissions from upstream and downstream processes attributable to the project, 2) a comparison with a baseline defined as commercial technologies in service in the United States at the time it issues a loan guarantee, 3) for electric power processes the use of technology-specific time-dependent marginal emissions analysis where possible, 4) impact calculations for GHG gases based on accumulated loadings calculated from global warming potentials consistent with IPCC data for CO2, CH4, and N2O, 5) impact calculations for NO2 and SO2 based on emissions by mass, and 6) allocation of emissions burdens among multiple products preferably by system expansion or secondarily by mass.

3.5 Noise

3.5.1 Affected Environment

Noise levels in the project area are representative of a rural western environment. Noise sources in rural areas include natural sounds such as wind, weather, and wildlife; vehicles on area roadways; and agricultural equipment. Ambient sound levels typical of rural areas range between 30 and 40 dBA (dBA represents A-weighted decibels, which measure sound in a manner that emphasizes the response of the human ear) (EPA 1978).

Sensitive noise receptors are generally considered to be homes, hospitals, schools, libraries, parks, and recreational areas. The nearest sensitive receptors to the project site are residences north of Elliot Road. Approximately twelve residences are within one-half mile of the Part 1 site boundary. There are no sensitive noise receptors within one-half mile of the gen-tie route.

The Noise Control Act of 1972, as amended by the Quiet Communities Act of 1978 (42 USC §§ 4901-4918), delegates to the states the authority to regulate environmental noise. It also directs government agencies to comply with local community noise statutes and regulations, and to conduct their programs to promote an environment free of any noise that could jeopardize public health or welfare. Neither the Maricopa County Comprehensive Plan nor the Old US Highway 80 Area Plan contains community noise standards. However, the Maricopa County Noise Ordinance (P-23) prohibits excessive, unnecessary, and disruptive noises from all sources, while exempting any noise emanating from construction and repair equipment when used in compliance with existing Maricopa County rules and regulations, and any noise from power plant equipment during normal operations (Maricopa County 2006).

3.5.2 Environmental Effects

Proposed Action

Noise effects from construction and operation and corona effects (noise generated by electricity flowing through transmission lines) from operation are described below.

Construction

Sources of construction noise would include vehicle and heavy equipment use. The noises would be discernable to off-site sensitive receptors, primarily during construction of the screening berm along Elliot Road, representing a minor and temporary impact. Four residences are within 500 feet of the proposed screening berm. Noise impacts would also occur from vehicles on Elliot Road associated with construction worker commute traffic; these impacts would be greatest during the initial peak construction period. Table 3-4 lists noise levels associated with construction equipment that could be used during construction of the project.

As shown in Table 3-4, the nearest four residences, which are approximately 520 feet north of Part 1 of the project site across Elliot Road, would experience noise levels of up to 65 dBA during construction of the berm. Noise levels associated with development of the solar field and associated infrastructure would be less than the levels shown in Table 3-4 due to the increased distance from the sensitive receptors and the shielding effects of the berm.

All construction activities would be subject to the Maricopa County Hours of Construction Ordinance, which states that construction work occurring within 500 feet of rural or residential zones and within 1,500 feet of an occupied residence shall not begin prior to 5:00 AM and must stop by 7:00 PM each day. From October 16th to April 14th construction work shall not begin before 6:00 AM and must stop by 7:00 PM each day. Construction work on weekends and federal holidays shall not begin before 6:00 AM and must stop by 7:00 PM (Maricopa County 2004).

Table 3-4
Typical Construction Equipment Noise Levels

Equipment	Noise Level (dBA) 50 feet from Source[1]	Noise Level (dBA) 500 feet from Source[2]
Backhoe	80	60
Boring Jack Power Unit	80	60
Compressor (air)	80	60
Concrete Mixer Truck	85	65
Concrete Pump Truck	82	62
Crane	85	65
Dozer	85	65
Dump Truck	84	64
Excavator	85	65
Front End Loader	80	60
Generator	82	62
Grader	85	65
Jackhammer	85	65

Source: [1]US Federal Highway Administration 2006; [2] Increasing the distance from the noise source ten times drops the sound pressure to a tenth, or by 20 dBA (see http://www.sengpielaudio.com/calculator-distance.htm)

Operation

Mesquite Solar Energy Project. Noise from operation of the Mesquite Solar Energy project would be limited to vehicle use and occasional equipment use during maintenance activities. These maintenance activities would be intermittent and would have little to no noise effects on sensitive receptors north of Elliot Road. With only seven permanent employees, the proposed action would create no discernable increase in traffic along Elliot Road, and activities on the project site would be shielded by the screening berm.

Gen-Tie Power Line. Transmission lines can generate small amounts of noise through a phenomenon known as corona. Corona is caused by the ionization of the air, due to very high electric-field strength, at the surface of the energized conductor and suspension hardware. Corona is a function of voltage, the diameter of the conductor, the number of conductors per phase, and the condition of the conductor and suspension hardware. The electric field around an energized conductor is directly related to the line voltage and is greatest at the surface. The proposed 230-kV conductors for the Mesquite Solar Energy project gen-tie line would use two conductors per phase of sufficient diameter to control corona effects. With 230-kV overhead construction, standard conductor attachment hardware is typically adequate to control corona. Accordingly, noise associated with operation of the gen-tie line is not anticipated.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no change in existing noise conditions at the site.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding is obtained and the facility is developed, the noise-related effects under this alternative would be the same as those described for the proposed action.

3.6 Geology and Soils

3.6.1 Affected Environment

The project area lies within the Sonoran desert region of the Basin and Range geographic province. The region is characterized by alluvial fan, terrace, and basin floor deposits surrounded by rugged, low- to high-relief mountain ranges that include a wide variety of granitic and volcanic rocks (Maricopa County 2007).

Parts 1 and 2 lands are generally flat, with an approximately 0.6 percent downward slope to the southeast. Surface soils at the site are dominated by loam, which is a mixture of sand, silt, and clay. The dominant on-site soils are generally well drained, with slow to medium runoff and moderate permeability.

The gen-tie power line route would traverse soils that are also dominated by well-drained loam to sandy loam soils with slopes of 0 to 3 percent (US Department of Agriculture 2010).

The proposed project site and power line route are within one of the least seismically active areas of Arizona (US Geological Survey 2010).

3.6.2 Environmental Effects

Proposed Action

Under the proposed action, site clearing would maintain the existing grade of the project site, and impacts on soils during construction of both the Mesquite Solar Energy project and gen-tie power line would be mitigated through implementation of a Storm Water Pollution Prevention Plan. Best management practices would be adapted to site conditions to avoid soil erosion and to prevent construction vehicles from tracking soils from the facility site.

Storm water drainage channels and retention basins would be the primary erosion-control features during project operations. Erosion associated with off-site flows would be minimized by a drainage channel between Elliot Road and the screening berm and by perimeter drainage channels, which would divert off-site flows around the site. Erosion associated with on-site flows would be minimized by the development of interior drainage channels and retention basins.

Because the proposed action would occur in an area with a low probability of seismic activity, construction and operation of the Mesquite Solar Energy project would not expose people or structures to risks associated with earthquakes, fault ruptures, or other geologic events.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no change to geology and soils over existing conditions.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding is obtained and the facility is developed, impacts on geology and soils under this alternative would be the same as described for the proposed action.

3.7 Water Resources

3.7.1 Affected Environment

Surface Water

The project site is within the Centennial Wash watershed of the Lower Gila River Basin (Arizona Department of Water Resources 2010b). The project area is dominated by sheetflow conditions with few identifiable drainage features (Westland Resources, Inc. 2010). Centennial Wash, which borders the southern portion of Part 1 of the project site, is the only significant surface water feature in the area. Centennial Wash flows only during times of heavy precipitation and drains to the Gila River, several miles to the east. Smaller washes and drainages

cross the project site, primarily within the Part 2 area, and a few cross the gen-tie route alignment. When water does flow in desert washes, there can be high levels of suspended and dissolved solids, and the waters are not considered potable.

Waters of the US. Sempra reviewed US Geological Survey topographical maps for the presence of washes (ephemeral streams). Washes were identified on maps of Part 2 lands and along the gen-tie alignment, but none were identified on Part 1 lands. Based on this finding, Sempra commissioned a limited jurisdictional waters evaluation for Part 2 of the proposed project site (Westland Resources, Inc. 2010).

The evaluation, completed in June 2010, identified one unnamed, minor erosional drainage feature within the Part 2 project development boundary that exhibits characteristics of an ordinary high water mark (OHWM) as defined by regulation (33 CFR Part 328.3(e)). The OHWM characteristics are discontinuous and poorly developed, and disappear by the time the drainage reaches the south end of the project area, with flows dissolving to sheetflow. The feature is ephemeral, flowing only for brief periods immediately following storm events.

According to guidance issued in 2008 by the US Army Corps of Engineers (Corps) and EPA, drainage features, such as the unnamed, minor drainage located within Part 2, that can be characterized as swales and erosional features or ditches excavated wholly in and draining only uplands are not considered jurisdictional waters. Moreover, since this isolated feature is neither a traditional navigable water nor a relatively permanent water, under current guidance this drainage could only be jurisdictional if it was demonstrated to possess a "significant nexus" with a downstream traditional navigable water. The Corps and EPA have yet to issue clear guidance regarding "significant nexus." Westland Resources, Inc. evaluated the feature in Part 2 by comparing the conditions on Part 2 of the proposed project site to nearby sites subject to recently approved jurisdictional determinations. Westland Resources, Inc. concluded that the feature in Part 2 does not possess a likely significant nexus with a traditional navigable water; this drainage feature is geomorphically a swale, exhibits poor channel characteristics, and has a more tenuous connection (through Centennial Wash) to a downstream traditionally navigable water than other area projects that were determined to not have significant nexus (Westland Resources, Inc. 2010).

Wetlands. No wetlands or other special aquatic sites were identified within the Part 2 jurisdictional waters evaluation area (Westland Resources, Inc. 2010). No wetlands have been identified on Part 1 lands or on the gen-tie route alignment.

Groundwater

The project area is within the Hassayampa groundwater basin, which is one of seven groundwater basins within the Phoenix Active Management Area (AMA).

The Phoenix AMA is tasked by the state of Arizona Groundwater Management Act of 1980 to achieve safe-yield by 2025 through the increased use of renewable water supplies and decreased groundwater withdrawals in conjunction with efficient water use (Arizona Department of Water Resources 2010a).

Groundwater quantity is managed through water rights issued by the Arizona Department of Water Resources. Sempra has water rights totaling approximately 8,000 acre-feet per year from five existing wells that are within the boundary of Part 1 of the project site. Approximately 500 acre-feet per year of this water is allocated for use on the proposed project site, while the remainder is allocated for use at the existing Mesquite Generating Station. Groundwater depth at these wells ranges from 168 to 245 feet below ground surface (Arizona Department of Water Resources 2010b). These wells were used traditionally for flood irrigation; published water quality data are not available for the wells (Arizona Department of Water Resources 2010b).

Floodplains

The project site is on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 04013C2450G (dated September 30, 2005). As shown in Figure 3-9, the FIRM panel identifies the southern portion of Part 1 of the project area as being within the 100-year flood zone, which FEMA defines as having a one percent annual chance of flooding. The FIRM demarcates the flood zone with the label "AE," which indicates that the base flood elevation for the area has been determined. The flood zone is associated with Centennial Wash and is subdivided on the FIRM into the "floodway" and the "flood fringe." The floodway extends approximately 0.2 mile onto the project site from Centennial Wash, and the flood fringe extends a further 0.6 mile onto the project site.

In August 2006, FEMA published a Letter of Map Revision for tributaries of Centennial Wash (FEMA 2006). This revision included mapping the 100-year flood zone for two washes that cross Part 2 lands. Wash T1SR7WS22-1 crosses the southwestern corner of the parcel, while Wash T1SR7WS22-2 runs through the entire parcel (Figure 3-9). The map revision demarcates the flood zone of these washes with the label "Zone A," which indicates that the base flood elevation for the area has not been determined.

The Maricopa County Flood Control District is in the process of updating countywide floodplain maps to further delineate floodplains, including identifying floodplains in previously unstudied areas, determining base flood elevation in Zone A areas, and remapping areas that may have changed based on flood events or development. Approximate floodplain delineation studies are conducted in areas with limited or no development and generally do not establish base flood elevations (Maricopa County 2010). The Palo Verde Watershed Approximate Floodplain Delineation Study evaluated lands in unincorporated western Maricopa County. Based on this study, a portion of the Part 1 lands and gen-tie route were proposed by Maricopa County as Zone A

floodplains (see Figure 3-9). This study resulted in a Best Available Data letter from FEMA (Shelton 2010). While this study cannot be used to make official flood determinations for insurance purposes, it may be used by the county for regulatory purposes such as permitting (FEMA 2010).

The county is currently preparing the Palo Verde Watershed Detailed Floodplain Delineation Study, which will provide a more precise mapping of floodplains in the study area. Upon completion, this study would undergo county approval and then review and comment by FEMA. Map revisions, should they be accepted, would not be expected to be recorded by FEMA until the 2013-2014 timeframe (Shelton 2010).

Executive Order 11988, Floodplain Management and Protection (May 24, 1977), directs federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. Under DOE policy, a floodplain assessment is required for actions in a 100-year floodplain (10 CFR 1022). Because portions of Part 1 and the gen-tie route are within the county-designated floodplain, DOE has issued a Notice of Floodplain Involvement for the proposed action. This EA presents the floodplain assessment as required under 10 CFR 1022.

3.7.2 Environmental Effects

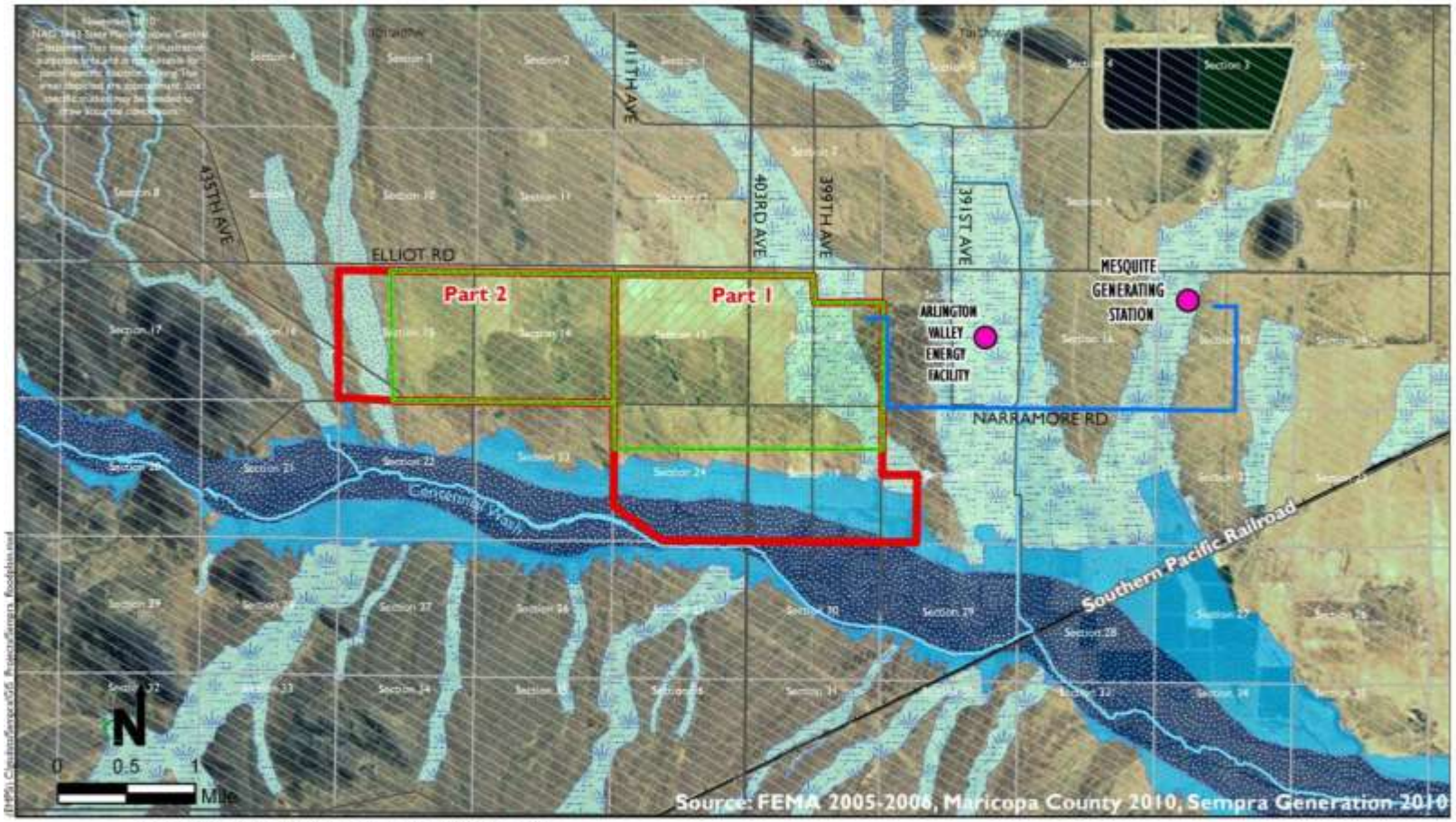
Proposed Action

The effects on water resources during construction and operation of the proposed Mesquite Solar Energy project are described below. Hazardous materials and their containment are discussed in Section 3.13, Public Health and Safety/Hazardous Materials. As described in Chapter 2, electrical transformers and inverters would have secondary containment to prevent contamination of surface or groundwater in the event of a release of oil or cooling liquid, respectively.

Construction

Surface Water. The proposed action would include clearing or grading of the majority of the Part 1 and Part 2 portions of the project site. Site grading would incorporate provisions in the engineering design of the facility to address both on-site and off-site storm water management in accordance with the floodplain regulations for Maricopa County.

Storm water that now flows onto the project site would be diverted around the site to the southern side of the project site. A drainage channel would be constructed between Elliot Road and the screening berm that directs flows into the perimeter drainage channel around the project site. Storm water drainage within the site would be collected to flow through a system of internal channels that would direct it into retention basins, as required by Maricopa County



Federal Emergency Management Agency Floodplain Zone

- Areas of 100-year flood (Floodway)
- Areas of 100-year flood; base flood elevations and flood hazard factors determined
- Areas of 100-year flood; base flood elevations and flood hazard factors not determined
- Areas between limits of the 100-year flood and 500-year flood

Maricopa County Flood Control District Floodplain Zone

- Areas of 100-year flood; base flood elevations and flood hazard factors not determined

- Gen-Tie Route
- Project Development Boundary
- Project Site Boundary
- Generating Facility

Figure 3-9 Floodplains in the Project Area

drainage regulations. The 10-acre substation would result in an increase in on-site impervious surfaces, which would decrease the amount of rainfall that can be absorbed by on-site soils and increase runoff. The collection of on-site storm water in the retention basins would capture not only the additional flows from the substation, but also all flows from the site.

The few washes that would be crossed by the gen-tie line route would not be impacted, as Sempra would avoid them when configuring the transmission pole locations.

Wetlands and Waters of the US. No wetlands have been identified on the project site. An evaluation of surface water features within Part 2 of the project site indicates that as to the one erosional drainage feature in the area that exhibits characteristics of an OHWM, the OHWM characteristics are discontinuous and poorly developed and disappear by the time the feature reaches the southern end of the project area, with flows dissolving to sheetflow. The feature is ephemeral, flowing only for brief periods immediately following storm events. According to 2008 Corps and EPA guidance, drainage features, such as this unnamed minor drainage located within Part 2, that can be characterized as swales and erosional features or ditches excavated wholly in and draining only uplands are not considered jurisdictional waters.

Groundwater. Water use during construction would be limited to dust control; projected water use would be less than the 500 acre-feet per year currently allocated to the project area and would be obtained from the existing on-site groundwater wells.

Operation

Water uses during project operation would be limited to occasional cleaning of PV panels, landscape irrigation until vegetation associated with the screening berm is established, and possible dust control during limited surface-disturbing maintenance activities. Projected water use would be much less than the 500 acre-feet per year currently allocated to the project area and would be obtained from the existing on-site groundwater wells and therefore would not affect other landowners' allocations. Water for panel cleaning would be obtained from existing on-site wells. No permanent source of potable water would be provided to the site.

Floodplain Assessment

Part 1 and Part 2 Lands

Federally Designated Floodplains. As discussed in Section 3.7.1 above, the southern portion of Part 1 lies within the FEMA-designated floodway and flood fringe of the Centennial Wash floodplain. No construction would occur in these areas, as the project development boundary is north of the FEMA-designated 100-year floodplain.

As also discussed in Section 3.7.1, the western portion of Part 2 of the project site is within the FEMA-designated 100-year floodplain of two tributaries to Centennial Wash. Project development would occur east of this area to avoid development in the FEMA-designated 100-year floodplain. The CPA for Part 2 of the project site included the following stipulation:

- The berm along Elliot Road would need to be designed to allow the flows from Wash T1SR7WS22-2 Reach 1 to enter the site unrestricted.

The proposed action would comply with this stipulation and would therefore have no impact on FEMA-designated floodplains.

County-Designated Floodplains. The proposed action would occur in an area for which Maricopa County prepared an approximate floodplain delineation study. Based on this study, approximately 378 acres of Part 1 of the project site would be located within the county-designated 100-year floodplain. While the information in this study has not been approved by FEMA or incorporated into the appropriate FIRM maps, the county uses this study for local regulatory purposes (see Section 3.7.1, above). As such, the proposed action is subject to county regulations, standards, and policies pertaining to development within a floodplain. A drainage report (Burns and McDonnell 2009) performed in support of Sempra's Part 1 SUP permitting process developed the drainage features described under Surface Water, above, to avoid floodplain-related impacts.

The entire area of county-designated floodplains on Part 1 lands would be cleared and developed as the solar field and associated infrastructure; the project substation would lie outside of the county-designated floodplain area. Site grading would incorporate provisions in the engineering design of the facility to address both on-site and off-site storm water management in accordance with the floodplain regulations for Maricopa County (Maricopa County Flood Control District 2006).

At this time, Sempra does not propose to construct any potentially occupied structures in FEMA- or county-designated floodplains. If any such structures were proposed, Sempra would be required to elevate any potentially occupied structures at or above flood elevation levels as part of the building permit process. Before starting construction, Sempra would obtain a floodplain use permit from the Floodplain Administrator, ensuring compliance with county regulations, standards, and policies pertaining to development within a floodplain.

No county-designated floodplains are located on Part 2 lands.

Gen-Tie Power Line Route

Federally Designated Floodplains. There are no FEMA-designated floodplains along the gen-tie power line route.

County-Designated Floodplains. Portions of the gen-tie power line route would cross county-designated floodplains (see Figure 3-9). The route would cross approximately 1.25 miles of county-designated floodplains. With a spacing of 500 to 1,000 feet between poles, between 6 and 13 poles would be located in the county-designated floodplain under the route.

Areas of permanent disturbance to county-designated floodplains would include the footprint of each pole structure. Assuming each pole required a 7-foot by 7-foot clearing, between 325 and 650 square feet would be disturbed under the route.

Article IV of the Floodplain Regulations for Maricopa County lists utility transmission lines as allowable uses within a floodplain (Maricopa County Flood Control District 2006). Before starting construction, Sempra would obtain a floodplain use permit from the Floodplain Administrator to ensure compliance with county floodplain regulations.

The Maricopa County Flood Control District issued a letter during the SUP process for Part 1 lands stating that the proposed use would not be in conflict with existing or proposed Flood Control District projects (Maricopa County Flood Control District 2009). At this time, no potentially occupied structures have been proposed on FEMA- or county-designated floodplains. If any such structures were proposed, Sempra would be required to elevate any potentially occupied structures at or above flood elevation levels as part of the building permit process. Before starting construction, Sempra would obtain a floodplain use permit from the Floodplain Administrator to ensure compliance with county floodplain regulations. Therefore, development on Part 1 lands would have no impact related to county-designated 100-year floodplains.

No actions are proposed within FEMA-designated floodplains on Part 2 lands; therefore, development on Part 2 would have no impact on the 100-year floodplains. There are no county-designated floodplains on Part 2 lands.

As discussed above, transmission facilities are an allowable use under Maricopa County floodplain regulations. Development of between 6 and 18 transmission poles would be unlikely to affect flood flows during flood events or cause a measurable difference compared with existing conditions. Therefore, development of the gen-tie line would have no impact related to county-designated 100-year floodplains.

Based on the analysis for this floodplain assessment, and pursuant to the DOE floodplain environmental review regulations at 10 CFR 1022, DOE has

determined that the proposed action would not affect the county-designated 100-year floodplain.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no change in water resource conditions at the site.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding is obtained and the facility is developed, the effects on water resources under this alternative would be the same as described for the proposed action.

3.8 Biological Resources

3.8.1 Affected Environment

Biological resources, as described in this section, include native or naturalized plants and animals and their habitats. Protected and sensitive biological resources include specific habitats and the plant and animal species listed as threatened or endangered by the US Fish and Wildlife Service (USFWS) or the AZGFD or are otherwise protected under federal or state law.

The principal relevant statutes pertaining to the protection of plants and animals are the following:

- Federal Endangered Species Act of 1973 (ESA), as amended, which requires protection of federally listed threatened and endangered species and their habitats. The ESA is administered by the USFWS.
- The Migratory Bird Treaty Act (MBTA) of 1918, which is the domestic law that affirms, or implements, the United States' commitment to four international conventions (with Canada, Japan, Mexico, and Russia) for the protection of a shared migratory bird resource. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, directs federal agencies to take certain actions to further implement the MBTA and to conserve migratory birds. The order prohibits the take of migratory birds or their eggs, feathers, or nests. To meet the requirements of Executive Order 13186, DOE entered into a Memorandum of Understanding with USFWS outlining measures the two parties would take to strengthen migratory bird conservation through enhanced collaboration between DOE and USFWS and in collaboration with state, tribal, and local governments (DOE and USFWS 2006).

- Arizona Native Plant Law of 2008 (Ariz. Rev. Stat. §§ 3-901 et seq.), which is administered by the Arizona Department of Agriculture (AZDA) and pertains to the use and harvest of native plants for commercial purposes. The Native Plant Law requires that a notice of intent be filed with the Department of Agriculture before clearing of native plants on private lands can occur (AZDA 2008). Under this law, the movement of a native plant species from its habitat is regulated based on four categories of protection: Highly Safeguarded Protected Native Plants (no collection allowed); Salvage Restricted Protected Native Plants (collection allowed only with permit); Salvage Assessed Protected Native Plants (permit required to remove live trees): and Harvest Restricted Protected Native Plants (permit required to remove plant by-products).

Ecoregions and Vegetation

The project area is within the Lower Colorado Desert subdivision of the Sonoran Desert Ecoregion. The Lower Colorado Desert subdivision is extremely arid, with average precipitation ranging from three to ten inches a year. The vegetation is dominated by creosote bush *(Larrea tridentafa)* and white bursage *(Ambrosia dumosa)*. The elevation of the project region ranges from 900 to 1,500 feet. The major land uses historically have been agriculture. Vegetation types and community characterizations were compiled based on aerial photograph interpretation and Southwest Regional Gap Analysis Project Land Cover descriptions (US Geological Survey 2004). Plant species names are consistent with the US Department of Agriculture Plants Database (Natural Resources Conservation Service 2009). Based on the Southwest Regional Gap Analysis Project, the project area contains two dominant vegetation communities, agriculture and desert scrub (AECOM 2009b).

The desert scrub community is composed primarily of three vegetation types. The majority of the desert scrub vegetation community in the project site is Sonoran-Mojave Creosote Bush-White Bursage Desert Scrub. Very small areas of the desert scrub portions of the project site are identified as Sonoran-Mojave Mixed Salt Desert Scrub and North American Warm Desert Riparian Mesquite Bosque. These vegetation types are described below.

The Sonoran-Mojave Creosote Bush-White Bursage Desert Scrub has a sparse to moderately dense layer of xeromorphic microphyllous (plants with small leaves adapted for arid conditions) and broad-leaved shrubs, with a sparse herbaceous layer. The dominant shrub species are usually creosote bush and white bursage. Other common species include fourwing saltbush (*Afriplex canescens*), desertholly (*Atriplex bymenelyfra*), brittlebush (*Encelia farinosa*), rough jointfir (*Ephedra nevadensis*), ocotillo (*Fouquieria splendens*), water jacket (*Lycium andersonio*), and beavertail pricklypear (*Opuntia basilaris*). The herbaceous layer may be composed of species such as sandmat species (*Cbamaesyce* spp.), desert trumpet (*Eriogonum inflatum*), low woollygrass (*Dasyocbloa pulcbella*), threeawn

(*Aristida* spp.), cryptantha species (*Cryptantha* spp.), fiddleleaf (*Nama* spp.), and phacelia species (*Pbacelia* spp.).

The Sonoran-Mojave Mixed Salt Desert Scrub is found in saline basins and around playas on fine-textured, saline soils. Vegetation communities consist of open-canopied shrublands usually composed of one or more saltbush species (e.g., *Atriplex canescens, Atriplex polycarpa*). Co-dominant species include halophytic (salt-tolerant) species such as allenrolfea species (*Allenrolfea* spp.), pickleweed species (*Salicornia* spp.), or seepweed (*Suaeda* spp.). Grass species may be present at varying densities.

The North American Warm Desert Riparian Mesquite Bosque is found along low-elevation intermittent streams. Vegetation in these riparian corridors consist of tree and shrub species such as honey mesquite (*Prosopis glandulosa),* velvet mesquite (*Prosopis velutina*), mule-fat (*Baccbaris salicifolia*), arrowweed (*Pluchea sericea*), and narrowleaf willow (*Salix exigua*) that are dependent on the annual rise in the groundwater table for growth and reproduction.

Most Part 1 lands were used for agriculture in the past and are thus highly disturbed. Most of these lands are undergoing or have undergone revegetation per the Comprehensive Land Management Plan that was approved in 2000 as part of the SUP for Sempra's Mesquite Generating Station. Revegetation efforts would continue until development of each phase begins. Once construction begins, Sempra is no longer bound by these vegetation requirements. Instead, a new stipulation would go into effect allowing vegetation removal but requiring other measures be put in place to control noxious weeds and to control fugitive dust and wind erosion. Revegetation around Centennial Wash has been completed, and the proposed project would not affect this area because Centennial Wash is outside of the project development boundary.

Wildlife

The project area may provide habitat for a variety of wildlife. Based on habitat types in the project area and vicinity and a biological analysis prepared as part of the SUP process for Part 1 lands (AECOM 2009b), species with the potential to occur in the project area have been identified and are listed in Table 3-5.

Table 3-5
Common Wildlife Species in Habitats within the Project Area

BIRDS		
American Crow	Gambel's Quail	Prairie Falcon
Brewer's Sparrow	Greater Roadrunner	Rufous-crowned Sparrow
Brown-headed Cowbird	Greattailed Grackle	Sharp-shinned Hawk
Cactus Ferruginous Pygmy-Owl	Hermit Thrush	Steller's Jay
Cactus Wren	Homed Lark	Swainson's Thrush
Cassin's Sparrow	House Wren	Turkey Vulture
Chestnut-collared Longspur	Lark Bunting Le Conte's Thrasher	Red-tailed Hawk
Chihuahuan Raven	Loggerhead Shrike	Warbling Vireo
Chipping Sparrow	Mourning Dove	Western Burrowing Owl
Common Ground-Dove	Northern Mockingbird	Western Meadowlark
Common Poorwill	Northern Roughwinged Swallow	Western Screech-Owl
Common Raven	Olive-sided Flycatcher	Western Scrub-Jay
Cooper's Hawk	Phainopepla	White-crowned Sparrow
Dark-eyed Junco		
MAMMALS		
American Badger	Desert Cottontail	Plains Harvest Mouse
Arizona Cotton Rat	Desert Kangaroo Rat	Rock Squirrel
Arizona Pocket Mouse	Desert Mule Deer	Round-tailed Ground Squirrel
Bailey's Pocket Mouse	Desert Woodrat	Sonoran Desert Pocket
Blacktailed Jackrabbit	Kit Fox	Mouse
Botta's Pocket Gopher	Lesser Longnosed Bat	Striped Skunk
California Myotis	Little Pocket Mouse	Western Harvest Mouse
Colorado River Cotton Rat	Pale Townsend's Big-eared Bat	Western Spotted Skunk
Coyote	Pallid Bat	
Desert Bighorn Sheep		
AMPHIBIANS/REPTILES		
Arizona Glossy Snake	Eastern Collared Lizard	Sonoran Whipsnake
Banded Gila Monster	Great Basin Collared Lizard	Tiger Whiptail
California Kingsnake	Long-tailed Brush Lizard	Tucson Banded Gecko
Chihuahuan Greater Earless Lizard	Mojave Fringetoed Lizard	Tucson Shovelnosed Snake
Common Chuckwalla	Northern Desert Iguana	Variable Sandsnake
Common Sideblotched Lizard	Ornate Tree Lizard	Western Diamond-backed
Desert Banded Gecko	Red Arizona (Sonoran) Coralsnake	Rattlesnake
Desert Horned Lizard	Sonoran Collared Lizard	Western Longnosed Snake
Desert Patchnosed Snake	Sonoran Desert Tortoise	Zebra-tailed Lizard
Desert Threadsnake	Sonoran Gophersnake	

Source: AECOM 2009b

Special Status Species and Species of Local Importance

As part of the SUP process for Part 1 lands, the USFWS, Arizona Natural Heritage Program, and AZDA species lists for Maricopa County were reviewed (USFWS 2010; AZGFD 2009a; AZDA 2009), the biological conditions of the project site were assessed (AECOM 2009b), and USFWS, AZFGD, and AZDA were consulted (Appendix A; AZGFD 2009c, d, and e). Twenty-eight species with potential to occur in the project area were identified during initial review; these species are listed in Table 3-5. Additionally, according to AZGFD consultation, the proposed project area falls within the Saddle Mountain—Gila Bend Mountains wildlife linkage identified in Arizona's Wildlife Linkages Assessment. While species in this corridor do not automatically have special status listing, they may be locally important species for the project area. Species within the corridor are identified in Table 3-6. In addition, all bird species identified as having potential to occur in the project area in Table 3-5, with the exception of the Gambel's Quail, receive protection under the MBTA.

No federally listed or candidate plant or animal species were identified by USFWS as being likely to occur on the project site. Coordination with AZGFD and AZDA identified species with potential to occur on the project site. Of these identified species, the following four wildlife species and one plant species were selected for further review:

- Kit fox *(Vulpes macrotis)*;
- Western burrowing owl (*Athene cunicularia hypugaea*);
- Le Conte's thrasher (*Toxostoma lecontei*);
- Sonoran desert tortoise (*Gopherus agassizii*); and
- Straw-top cholla (*Opuntia echinocarpa*).

Wildlife Species

The four wildlife species do not have federal protection status, and only Sonoran desert tortoise is an AZGFD species of concern. An assessment of the project site (AECOM 2009b) indicated that based on site characteristics and published studies, there is a strong likelihood of occurrence of Western burrowing owl, a lesser potential of occurrence of Le Conte's thrasher, and little potential of occurrence of Sonoran desert tortoise. Kit fox, if found on the project site, would likely pass through due to lack of breeding habitat on the project site.

Details for each of the wildlife species are included below.

Table 3-6
Special Status Species and Species of Local Importance with Potential to Occur within the Project Area

Common Name	Scientific Name	Status	Potential for Occurrence
BIRDS			
Cactus Ferruginous Pygmy-Owl	*Glaucidium brasilianum cactorum*	USFWS SC; AZ WSC	Low
Western Burrowing Owl	*Athene cunicularia hypugaea*	USFWS SC, L	Moderate
Common Black Hawk	*Buteogallus anthracinus*	AZ WSC	Low
Le Conte's Thrasher	*Toxostoma lecontei*	L	Moderate
MAMMALS			
Mountain Lion	*Puma concolor*	L	Low
Badger	*Taxidea taxus*	L	Low
Big-Freetailed Bat	*Nyctinomops macrotis*	L	Low
Desert Bighorn Sheep	*Ovis canadensis nelsoni*	L	Low
Bobcat	*Lynx rufus*	L	Low
Cave Myotis	*Myotis velifer*	USFWS SC, L	Low
Lesser Longnosed Bat	*Leptonycteris curasoae yerbabuenae*	USFWS E, AZ WSC	Low
Pale Townsend's Big-eared Bat	*Choeronvcteris mexicana*	USFWS SC, L	Low
Greater Western Bonneted Bat	*Eumops perotis californicus*	USFWS SC, L	Low
Greater Western Mastiff Bat	*Eumops perotis*	L	Low
Yuma Myotis	*Myotis Yumanenis*	USFWS SC, L	Low
California Leaf-Nosed Bat	*Macrotus californicus*	AZ WSC, L	Low
Western Red Bat	*Lasiurus blossevillii*	AZ WC	Low
Pocketed Free-tailed bat	*Nyctinomops femorosacca*	L	Low
Kit Fox	*Vulpes macrotis*	L	Moderate
AMPHIBIANS/REPTILES			
Sonoran Desert Tortoise	*Gopherus asassizii (Sonoran Population)*	USFWS SC; AZ WSC, L	Low
Mexican Garter Snake	*Thamnophis eques megalops*	USFWS C; AZ WSC	Low
Arizona Toad	*Bufo microscaphus*	USFWS SC	Low
Redback Whiptail	*Aspidoscelis xanthonota*	USFWS SC	Low
Mexican Rosy Boa	*Charina trivirgata trivirgata*	USFWS SC	Low
Desert Rosy Boa	*Charina triviruata uracia*	USFWS SC	Low
Arizona Chuckwalla	*Sauromalus ater (Arizona population)*	USFWS SC, L	Low

Table 3-6 *(continued)*
Special Status Species and Species of Local Importance with Potential to Occur within the Proposed Mesquite Solar Project Area

Common Name	Scientific Name	Status	Potential for Occurrence
Common Chuckwalla	*Sauromalus ater (Western population)*	USFWS SC	Low
Great Plains Narrow-mouthed Toad	*Chionactis palarostris organica*	AZ WSC	Low
Lowland Leopard Frog	*Lithobates vavapaiensis*	AZ WSC	Low
Lowland Burrowing Treefrog	*Ptenohyla fodiens*	AZ WSC	Low
PLANTS			
Tourney Agave	*Agave toumeyana var. bella*	AZ SR	Low
California Barrel Cactus	*Ferocactus cylindraceus var. cylindraceus*	AZ SR	Low
Golden Barrel Cactus	*Ferocactus cylindraceus var. eastwoodiae*	AZ SR	Low
Emory's Barrel Cactus	*Ferocactus emoryi*	AZ SR	Low
Straw-top Cholla	*Opuntia echinocarpa*	AZ SR	High
Tumamoc Globeberry	*Tumamoca macdousalii*	AZ SR	Low

Source: USFWS 2010; AZGFD 2009b; AZDA 2009

Potential for Occurrence:
Low: Species has not been documented within the vicinity of the site. The site and immediate vicinity do not provide suitable habitat or are outside of the species range.
Moderate: Species has not been documented within the vicinity of the site; however, the surrounding area may provide suitable habitat.
High: Species has been documented within the vicinity of the site.

Listing status:
USFWS E - US Fish and Wildlife Service Endangered
USFWS C- US Fish and Wildlife Service Candidate Species
USFWS SC - US Fish and Wildlife Service Species of Concern
AZ WSC - State of Arizona Wildlife Species of Concern
AZ SR - State of Arizona Salvage Restricted Protected Native Plants
L - Species of potential local importance, identified in the Saddle Mountain—Gila Bend Mountains wildlife linkage in Arizona's Wildlife Linkages Assessment

Western Burrowing Owl. Western burrowing owl inhabits open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands often associated with burrowing mammals. They sometimes occur in open areas such as vacant lots near human habitation, golf courses, or airports (AZGFD 2001). Burrowing owls sleep and roost in the mouth of nest burrows, satellite burrows, or depressions in the ground. Although they are most active from late afternoon until full dark, they can be observed at almost any time of the day. They commonly perch on fence posts or on top of mounds outside their burrows. High ambient temperatures seem to limit their daytime activities (AZGFD 2001). Burrowing owl's use of burrows makes them susceptible to impacts from ground-disturbing activities. Despite the fact that burrowing owls are active during the day and are adaptable to human presence, they can go unnoticed in an area due to their secretive nature. Over the past 50 years, most burrowing owl populations have experienced declines throughout their range in North America. Because of this decline, these owls are protected by various federal, state, and local laws. While this species is not considered an Arizona Wildlife Species of Concern, all owls in Arizona are protected by the MBTA and Arizona state law (Ariz. Rev. Stat. Title 17). Additionally, the species was identified in the Saddle Mountain—Gila Bend Mountains wildlife linkage in Arizona's Wildlife Linkages Assessment and therefore may be of local importance. There is a strong likelihood of occurrence of Western burrowing owl on the project site (AECOM 2009b).

Kit Fox. The kit fox is found in desert scrub and desert grassland habitats in much of southern Arizona, most commonly where soft, non-sandy soils support large populations of rodents. Young are born in an underground den with multiple entrances (3 or more); dens may be 3 to 6 meters long and reach 127 centimeters in depth (NatureServe 2010). There is a moderate to high likelihood of occurrence of this species in the project area. This species is fairly common throughout Arizona and occurs within habitat affected by the project site. The species was identified in the Saddle Mountain—Gila Bend Mountains wildlife linkage in Arizona's Wildlife Linkages Assessment. Occurrence would likely be limited to individuals passing through the project site. Some suitable breeding habitat exists on-site, but it is minimal due to past agricultural practices on the project site. The kit fox is ranked as *vulnerable conservation status rank* in Arizona (NatureServe 2010). NatureServe represents an international network of biological inventories, known as natural heritage programs or conservation data centers, operating in all 50 states, Canada, Latin America, and the Caribbean. NatureServe and its member Natural Heritage Programs, including Arizona's Natural Heritage Program, have developed a consistent method of evaluating the relative imperilment of both species and ecological communities based on the best available science. These assessments lead to the designation of a conservation status rank. The purpose of the conservation status rank is to assess the relative risk facing a species and does not imply that any specific action or legal status is needed to assure its survival (NatureServe 2010).

Le Conte's Thrasher. Habitat for the Le Conte's thrasher consists of sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills having a high proportion of one or more species of saltbush or shadscale (*Atriplex* spp.) and/or cylindrical cholla cactus (*Opuntia* spp.) that are 0.9 to 1.9 meters high (NatureServe 2010). Le Conte's thrasher occurs primarily in the creosote bush flats of the Barry M. Goldwater Range in southwestern Arizona.

Diet of the thrasher includes insects, spiders, scorpions, small fruits, and seeds, and sometimes lizards and small snakes; food may be obtained in the open or removed from leaf litter or dug from the ground under shrubs. Nests are usually in shaded locations in thick, dense, and thorny desert shrubs or small trees or cholla cactus, and sometimes in artificial sites. Breeding season is typically between February and June.

The species has a moderate range in the southwestern US and northwestern Mexico; population size is relatively large, but distribution is patchy. Threats to the species include ongoing habitat loss due to agriculture and urbanization (NatureServe 2010). While this species is not considered an Arizona Wildlife Species of Concern, the species has a vulnerable rank in the state of Arizona (NatureServe 2009) and was identified in the Saddle Mountain—Gila Bend Mountains wildlife linkage in Arizona's Wildlife Linkages Assessment. Le Conte's thrasher has a moderate potential of occurring on the project site.

Sonoran Desert Tortoise. The Sonoran desert tortoise inhabits rocky slopes in desert scrub to semidesert grassland, as well as along washes and extending into creosote bush flats. Burrows typically occur below rocks and boulders. Suitable habitat is minimal due to past agricultural practices within the project area.

The USFWS indicated that although unlikely, there is potential for desert tortoise on the project site. Any desert tortoise in this area would be part of the Sonoran population, which is not federally listed and has no regulatory status (USFWS 2010). Desert tortoise is considered a species of concern by the state of Arizona but does not have regulatory status under Arizona law (AZGFD 2009a). The species was identified in the Saddle Mountain—Gila Bend Mountains wildlife linkage in Arizona's Wildlife Linkages Assessment.

Plant Species

The straw-top cholla was the only plant species of concern identified in the project area. This species does not have special listing status under ESA or AZGFD, but it is a Salvage Restricted species under AZDA. There is a high likelihood of occurrence of this species on or around the project site.

Straw-top cholla is found in arid environments in Southern California, Nevada, Utah, western Arizona, and Sonoran and Baja California, Mexico (efloras 2008; Quinn 2001). It is most commonly found in the Mojave and Sonoran Deserts in creosote bush scrub, desert grasslands, juniper, and oak-juniper woodlands vegetative communities (NatureServe 2009; efloras 2008). It is typically located

on bajadas (shallow slopes that lie at the base of rocky hills where materials accumulate from the weathering of the rocks), canyons, benches, slopes, mesas, flats, and washes, usually at elevations ranging from 1,000 to 5,000 feet (NatureServe 2009; efloras 2008; Quinn 2001). Substrates usually consist of sandy loam, alluvium, and gravelly soils (NatureServe 2009; efloras 2008). Plants are shrubby and can grow from one to six feet tall. They are covered in dense spines that can be white or yellow and determine the color of the plant (Quinn 2001). The straw-top cholla blooms from March to June (efloras 2008).

The straw-top cholla is classified as imperiled in Arizona (NatureServe 2009). Its primary threat is collection of the species by horticulturists (NatureServe 2009).

Under the Arizona Native Plant Law, the movement of a native plant species from its habitat is regulated based on four categories of protection. The straw-top cholla is a Salvage Restricted species, which requires that a salvage permit be issued by AZDA before the plant may be removed from its native habitat for commercial purposes. According to the Arizona Native Plan Law, a notice of intent must be filed 60 days before the clearing of native vegetation on private lands can start. The filing of the notice of intent allows AZDA to determine whether there are any native plants on the site. If native plants are present, salvage operators can be notified, with the landowner's permission, and can examine the potential for salvage (AZDA 2008).

Consultation and Coordination Efforts

Appendix A contains information on consultation actions with USFWS during the county permitting process and development of this EA. Consultation efforts with state agencies during the county permitting processes are discussed below.

In a February 18, 2009 letter, AZGFD made six recommendations based on a preliminary understanding of the existing project site conditions to minimize potential impacts on wildlife habitat and populations from construction and operation of the proposed action (AZGFD 2009c). These recommendations included the following:

1) Surveys for western burrowing owl should be conducted;

2) If wildlife is encountered during construction, it should be moved outside the project area within one mile of its original location; a scientific collecting permit must be obtained for this activity;

3) Project analysis should include evaluating the potential impacts on wildlife resulting from the conversion of 2,480 acres of farmland to a solar generating plant (see Section 3.8.2 of this EA);

4) Project analysis should include a thorough evaluation of the anticipated impacts to water resources (Note: water resources are discussed in Section 3.7);

5) If implementing the proposed action involves any work within desert washes, rivers, or wetlands, the US Army Corps of Engineers should be contacted (Note: washes and wetlands are discussed in Section 3.7); and

6) Power line construction should prevent or minimize risk of electrocution, construction should not occur during the breeding season (May through late August, depending on the species), and plant salvage efforts should be coordinated with the Arizona Department of Agriculture.

In a May 11, 2009 letter, AZGFD refined these recommendations to include survey requirements for Kit fox, LeConte's thrasher, Sonoran desert tortoise, and Western burrowing owl; a recommendation to evaluate wildlife connectivity; and a request to maintain the hydrology of the project site (Note: hydrology is discussed in Section 3.7) (AZGFD 2009d).

Sempra met with AZGFD on July 1, 2009, to discuss AZGFD's recommendations and to further explain the current use of the project site and the type of technology being proposed. The results of this meeting were recorded in a July 28, 2009 letter from AZGFD to the Maricopa County Department of Planning and Development (AZGFD 2009e) outlining the design revisions Sempra agreed upon to minimize project impacts on wildlife. These design revisions, which included the following, have been incorporated into the proposed action described in Section 2.1 and evaluated in this EA:

- To address wildlife connectivity concerns, the proposed site entrance at the 395th Avenue alignment was eliminated;
- Because the project site would lack vegetation to sustain wildlife, project fencing would be designed to prevent wildlife from entering the project site and to direct wildlife toward Centennial Wash, which provides a wildlife habitat connectivity corridor adjacent to the project area; and
- The area owned by Sempra adjacent to Centennial Wash would remain undisturbed, except for the proposed retention basins and drainage channels. Revegetation efforts in this portion of the project area were completed per the Mesquite Generating Station SUP (Z2000071).

In addition, AZGFD and Sempra agreed on which species of concern should be surveyed and the survey protocols that would be used (AZGFD 2009e); these are discussed in Section 3.8.2, below.

3.8.2 Environmental Effects

Proposed Action

The proposed action would not affect any federally listed or candidate species under the ESA, as none have been identified in the project area. Potential impacts from construction and operation of the Mesquite Solar Energy project on other biological resources are described below.

Construction

Vegetation. The proposed action would have minor effects on vegetation from clearing and grading the Mesquite Solar Energy project site for infrastructure development and PV panel installation. Much of the site consists of bare ground and poor quality vegetation. While some loss of native vegetation may occur, given the past use of the site for agriculture, the presence of native vegetation is thought to be low.

As discussed in Section 3.8.1, above, the majority of Part 1 lands are undergoing revegetation per the Comprehensive Land Management Plan that was approved in 2000 as part of the SUP for Sempra's Mesquite Generating Station. Once construction of each phase of the proposed action begins, Sempra is no longer bound by these vegetation requirements. Instead, a new county-imposed stipulation would go into effect allowing vegetation removal but requiring other measures be put in place to control noxious weeds and to control fugitive dust and wind erosion. Noxious weeds would be controlled using herbicides, which would be used in accordance with all applicable requirements and delivered to the site as needed; no herbicides would be stored on-site. (Dust control measures are discussed in Section 3.4.2.) Revegetated areas of Sempra-owned lands around Centennial Wash would not be affected, as these lands are outside of the project development boundary. Straw-top cholla, an AZDA Salvage Restricted species with the potential to occur on the project site, would be handled in accordance with the Arizona Native Plant Law. Compliance with these stipulations would minimize adverse vegetation-related effects.

The proposed construction of the gen-tie line through the project area may result in permanent removal of an unknown amount of native vegetation. This impact would be minor given the relatively small construction footprint for the gen-tie pole structures and maintenance vehicle access under the line. The Certificate of Environmental Compliance granted for the gen-tie line requires Sempra to minimize the destruction of native plants to the extent practicable and feasible. Specific methods to minimize impacts on native plants would be detailed in the construction mitigation and restoration plan prepared prior to gen-tie construction and filed with the Arizona Corporation Commission (Arizona Corporation Commission 2009). All plant salvage and revegetation efforts would be coordinated with the AZDA, in accordance with the Arizona Native Plant Law, per the conditions of approval in the Certificate of Environmental Compliance and as recommended by AZGFD (AZGFD 2009c).

Wildlife. The proposed action would have minor impacts on wildlife from construction of the Mesquite Solar Energy project, including short-term avoidance of the area by wildlife due to noise generated by construction activities and low occurrence of crushing due to heavy machinery use.

Project lands would be cleared of vegetation and fenced, which would generally prevent wildlife from entering the site. Given the poor condition of the current vegetation on the project site, loss of Part 1 and Part 2 lands to wildlife use would not impact wildlife habitat in the area. Pursuant to consultation with AZGFD, Sempra altered its original project plan to avoid impacts on wildlife by (1) fencing the site to direct wildlife to Centennial Wash, thus encouraging a wildlife connectivity corridor, (2) eliminating one site entrance to further address wildlife connectivity concerns, and (3) leaving the area adjacent to Centennial Wash undisturbed.

Construction of the proposed gen-tie line would have minor impacts on wildlife. Construction may result in some minimal direct impact on wildlife from crushing of wildlife by construction vehicles or equipment. This impact would be minor given the relatively small construction footprint.

A variety of migratory bird species regulated under the MBTA, including both songbirds and raptors, may use the vegetation communities within the project area. Direct impacts on these species and the possibility of a violation of the MBTA would be avoided if construction were to occur outside of the breeding season, generally May 1 through August 31 in Arizona. If project timing was such that construction needed to occur during the breeding season, a pre-construction survey of occupied nests would be conducted. Any discovered occupied nests would have no-construction buffers around them until such time that either the young have fledged the nests or the nests have been abandoned. These measures would prevent impacts on MBTA species and are in accordance with best management practices.

Special Status Species and Species of Local Importance. Consultation with state departments regarding plant and wildlife species has been ongoing (AZGFD 2009c, d, and e). Based on these consultation efforts, AZGFD and AZDA have identified construction survey requirements and conservation measures for species likely to occur on Part 1 of the project site. Implementation of these survey requirements and measures, which are assumed to also apply to Part 2 lands, would ensure that construction activities have no major adverse impact on special status species and species of local concern. These survey requirements and conservation measures are described below.

Within 30 days of construction of each development phase, a certified biologist would survey the area to be disturbed for Western burrowing owl, following AZGFD survey methodology, and for Le Conte's thrasher. Should surveys identify breeding populations during the nesting season (March 1 through July 15 for owl, February through June for thrasher), a buffer area would be staked and

flagged, and heavy machinery and foot traffic within the buffer would be prohibited until the conservation is determined to be complete. The biologist would also note any sightings of kit fox and Sonoran desert tortoise observed during the survey. If these latter two species are encountered during construction of the facility, they would be moved outside the project area within one mile of their original location. A scientific collecting permit would be obtained for this activity if determined necessary.

Straw-top cholla, an AZDA Salvage Restricted species, has the potential to occur on the project site. In accordance with the Arizona Native Plant Law, Sempra would file the proper notification 60 days prior to site clearing, allowing AZDA to determine whether there are any native plants on the site.

Construction and operation of the gen-tie route could result in impacts on the sensitive species identified by AZFGD above. The Certificate of Environmental Compliance includes requirements to conduct pre-construction surveys for Le Conte's thrasher and Western burrowing owl, to follow AZGFD guidelines for handling Sonoran desert tortoises, and to make reasonable efforts to avoid impacting kit fox, if encountered during construction of the gen-tie line.

Operation

Operation of the proposed action would have no impact on vegetation, wildlife, or special status species or species of local importance. Potential impacts related to MBTA species are discussed below.

Placement of the Mesquite Solar gen-tie may provide raptor perching locations that would result in adverse impacts on the prey base. This impact would be mitigated with the use of perch diverters. The transmission lines may also pose a collision and electrocution threat for birds. The transmission line would be constructed following the Avian Power Line Interaction Committee and USFWS guidelines (2006) to avoid electrocution impacts on MBTA species. These measures would address AZGFD recommendations related to power line construction (AZGFD 2009c, d).

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no impacts on biological resources. Revegetation per the original terms of the Mesquite Generating Station SUP would continue on Part 1 lands.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding was obtained and the facility was developed, the effects on biological resources under this alternative would be the same as described for the proposed action.

3.9 Tribal Consultation and Coordination

As the federal lead agency for the NEPA process and for the National Historic Preservation Act (NHPA) Section 106, DOE initiated government-to-government consultation with Native American tribes to identify locations of traditional or cultural importance in the vicinity of the Mesquite Solar Energy project. DOE sent letters describing the proposed action to the following tribes:

- Ak-Chin Indian Community;
- Gila River Indian Community;
- Hia C'ed Alliance;
- Hopi Tribe;
- Salt River Pima-Maricopa Indian Community; and
- Tohono O'odham Nation.

Two responses were received during the tribal consultation process; the Hopi Tribe indicated that it had no concerns related to the proposed action, and the Ak-Chin Indian Community deferred consultation to the Gila River Indian Community (see Appendix B).

3.10 Cultural Resources

3.10.1 Affected Environment

Regulatory Framework

Cultural resources include prehistoric and historic archaeological sites, buildings, districts, structures, locations, or objects considered important to a culture or community for scientific, traditional, religious, or other reasons. Cultural resources deemed significant for their contribution to broad patterns of history, prehistory, architecture, engineering, and culture are listed on the National Register of Historic Places (NRHP, or National Register) and are afforded certain protections under the NHPA, as amended (16 USC § 470 et seq.). Regardless of age, cultural resources listed on or eligible for listing on the NRHP are termed historic properties.

Because the proposed action would be funded through a DOE loan guarantee, it is subject to compliance with Section 106 of the NHPA. Section 106 requires federal agencies to consider the effects of their actions on historic properties and to consult with the State Historic Preservation Office (SHPO).

To be eligible for listing on the National Register, a property must be significant under one or more of the following four evaluation criteria:

- Criterion A: Associated with events that have made a significant contribution to the broad patterns of our history

- Criterion B: Associated with the lives of persons significant in our past
- Criterion C: Embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components might lack individual distinction
- Criterion D: Yielded, or may be likely to yield, information important in prehistory or history

A property must also be able to convey its significance through the retention of specific aspects of integrity, such as location, design, setting, materials, workmanship, feeling, and association. In general, properties less than 50 years of age, unless of exceptional importance, are not eligible for listing on the National Register.

Area of Potential Effects

The area of potential effects (APE) is defined in 36 CFR 800.16(d) as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking. The APE for the Mesquite Solar Energy project is the 2,480-acre Part 1 lands, the 1,280-acre Part 2 lands, and the 4.5-mile gen-tie route.

Cultural Setting and Surveys

Three cultural resource surveys have been prepared for the project site and gen-tie line route: A Class I survey of Part 1 lands, one potential gen-tie route, and a one-mile buffer around these areas (PaleoWest 2009a); a Class III survey of Parts 1 and 2 (PaleoWest 2010); and a Class III survey of four potential gen-tie route alignments (PaleoWest 2009b). A description of the cultural setting of the project area is included as Appendix B of this EA, and the findings of the surveys are summarized below.

Class I

In 2009, a Class I survey was performed for Part 1 lands, one gen-tie route, and a one-mile buffer around these lands (PaleoWest 2009a). The one-mile buffer included the eastern half of Part 2 of the project site. No archaeological sites had been previously recorded on Part 1 or on the eastern half of Part 2. One site, a historic road segment, had been previously recorded as crossing the proposed gen-tie power line route (PaleoWest 2009b). Fourteen archaeological sites had been recorded in the buffer areas. Because of the presence of recorded archeological sites in the buffer areas, a Class III survey was recommended.

Class III

Two Class III cultural surveys have been conducted for the proposed project: one covering potential gen-tie routes and one covering Parts 1 and 2 of the Mesquite Solar Energy project site. The results of these surveys are described below.

The Class III survey that included the gen-tie power line route was conducted in March 2009 (PaleoWest 2009b). The previously mentioned historic road segment and five isolated trail segments were found along the proposed gen-tie route being analyzed in this EA. No sites were determined to be eligible for inclusion on the National Register by the SHPO.

The Class III survey of Parts 1 and 2 was conducted in February 2010 (PaleoWest 2010). The survey recorded five new archaeological sites (three historic and two prehistoric) and also documented the recorded historic road segment. Table 3-7 summarizes the survey findings.

Table 3-7
Mesquite Solar Energy Project Class III Survey Results

Site Number	Description	NRHP Eligibility Recommendation
AZ T:9:63 (ASM)	Historic road segment (previously recorded)	Ineligible
AZ T:9:118 (ASM)	Small prehistoric artifact scatter	Ineligible
AZ T:9:119 (ASM)	Historic trash dumps	Ineligible
AZ T:9:120 (ASM)	Historic well	Ineligible
AZ T:9:121 (ASM)	Historic well	Ineligible
AZ T:9:122 (ASM)	Prehistoric artifact scatter	Eligible, Criterion D

Source: PaleoWest 2010

The information potential of four of the sites is considered to have been exhausted through data collection and documentation during the Class III fieldwork. Therefore, those sites were recommended as ineligible for listing on the National Register (pending SHPO concurrence), and no further treatment of these resources is warranted. The previously recorded historic road segment has already been determined to be not eligible by the SHPO.

Because AZ T:9:122 (ASM) may yield new or significant information on the local or regional prehistory of the area, this site was recommended as eligible for the National Register under Criterion D, pending SHPO concurrence.

3.10.2 Environmental Effects

Proposed Action

The Class III survey of the Mesquite Solar Energy project site identified six cultural resources, five of which are not considered eligible for listing on the National Register (PaleoWest 2010). One resource potentially eligible for listing

was identified on the western portion of the Part 2 lands. This site is a prehistoric artifact scatter, measuring approximately 117 meters by 50 meters. Because Sempra adjusted its development plans to avoid the 100-year floodplain, no surface disturbance would occur within approximately 200 feet (60 meters) of the eastern edge of the potentially eligible resource. If the SHPO concurs that this resource is eligible for listing on the National Register, the proposed action would have no adverse effect on this resource.

The Class III survey of the potential gen-tie line route revealed one previously recorded cultural resource near the termination of the gen-tie power line route (PaleoWest 2009b). This previously recorded resource, a road segment, was determined by SHPO to be ineligible for listing on the National Register. As there are no eligible cultural properties along the gen-tie route alignment, development of the gen-tie route would have no effect on historic properties.

There is the potential for encountering buried cultural resources during grading, excavation, or other ground-disturbing activities associated with the proposed action. If previously unidentified cultural resources were encountered during construction, all ground-disturbing activities would cease in the immediate vicinity of the discovery until the discovery is assessed by a qualified archeologist and the appropriate treatment is determined.

DOE has determined that a finding of "no historic properties affected" is appropriate for the Mesquite Solar Energy project. The SHPO concurred with this determination in September 2010; the letter of concurrence is included in Appendix B of this EA.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no impact on cultural resources.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding was obtained and the facility was developed, the effects on cultural resources under this alternative would be the same as described for the proposed action.

3.11 Socioeconomics

3.11.1 Affected Environment

The socioeconomic resources that influence the quality of the human environment include demographic information on population and housing and economic figures such as employment and income. Population is the number of residents in the area and the recent change in population growth. Housing includes numbers of units, ownership, and vacancy rate. Employment data

include labor sectors, labor force, and statistics on unemployment. Income information is provided as per capita income. The present-day socioeconomic setting is described using the most recently available US Census Bureau data from 2008, unless otherwise noted.

The region of influence (ROI) for the proposed action is Maricopa County, Arizona. Selected socioeconomic indicators for the ROI and comparative data for the state are presented in Table 3-8.

Table 3-8
Selected Socioeconomic Indicators for the Region of Influence and State of Arizona[1]

Geographic Area	Population (2008)	Population (2000)	Labor Force	Housing Units	Owner-Occupied Housing Units (percent)	Housing Vacancy Rate (percent)	Median Home Price
Maricopa County	3,954,598	3,072,172	1,932,773	1,536,471	68.1	12.9	$ 263,600
Arizona	6,500,180	5,130,607	3,050,473	2,667,820	68.3	15.7	$ 234,600

Source: US Census Bureau 2000, 2008
[1] 2008 data unless otherwise noted

The population of Maricopa County was 3,954,598 in 2008, which was a 28.7-percent increase from 2000, when the population was 3,072,172. Population growth within Maricopa County between 2000 and 2008 was two percent higher than the population growth within the state of Arizona.

There were 1,536,471 housing units in Maricopa County, with a 12.9 percent vacancy rate (about 3 percent less than the state average). Of these, 68.1 percent were owner-occupied, comparable to 68.3 percent in Arizona. The median value of a home in Maricopa County was $263,600, which was more 12 percent higher than the state average of $234,600.

The average per capita income in Maricopa County was $27,745 in 2008. The primary employment sectors include retail, administrative and waste services, construction, heath care and social services, and government (US Bureau of Economic Analysis 2007). Unemployment in the ROI averaged 4.8 percent in 2009 (US Bureau of Labor Statistics 2009).

There are no full-time jobs associated with the project site.

3.11.2 Environmental Effects

Proposed Action

Sempra would construct the Mesquite solar field in Maricopa County, Arizona, approximately 50 miles west of Phoenix and away from the area's population

center. The gen-tie power line route would convey the solar-generated power from the project site to the existing Mesquite Generating Station located two miles east of the project site.

The proposed action would have a direct beneficial impact on the local and regional economy during construction. Sempra estimates that project construction would create approximately 300 construction jobs during peak construction periods. The worker pool is expected to draw from western Maricopa County. Short-term employment due to construction activities is not expected to result in permanent relocations due to the nature of construction-type jobs. Given the 12.9 percent vacancy rate in the county, there is a surplus of housing to accommodate any incremental increase in short-term or long-term housing needs for construction workers or permanent employees.

No permanent jobs would be displaced as a result of the proposed action, as the project site does not currently support a workforce. Operation of the proposed solar facility would be managed by the existing staff of the Mesquite Generating Station. It is anticipated that when fully developed, approximately seven additional employees would be hired for on-site maintenance of the facility, representing a negligible percentage of total employment in the ROI.

The addition of seven permanent jobs associated with the operation of the Mesquite Solar Energy project would not represent a significant population increase. Because the potential long-term employment is relatively limited, the proposed action is not expected to directly or indirectly impact local housing market, schools, social services, or overall income and employment levels.

The Mesquite Solar Energy project would have limited demand for public services; therefore, it would not strain existing police, fire, or other emergency services. Operation of the facility would not increase the demand for public utilities, as none are proposed on the project site, and the addition of seven full-time employees would not place an increased demand on the transportation infrastructure in the project area.

The Mesquite Solar Energy project would contribute to the local, regional, and statewide economy. Beneficial economic impacts on Arizona's economy resulting from the project would include an estimated 50 to 60 million dollars in sales, property, and income tax revenues over a 40-year period.

In the long term, decommissioning would have a minor adverse impact on employment in the area due to the elimination of jobs.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no socioeconomic impacts. Temporary socioeconomic benefits from construction would not be realized.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding was obtained and the facility was developed, the socioeconomic effects under this alternative would be the same as described for the proposed action.

3.12 Environmental Justice

3.12.1 Affected Environment

In February 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations. This order requires that "each federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (Executive Order 12898, 59 Fed. Reg. 7629).

Executive Order 12898 created an Interagency Working Group on Environmental Justice comprised of the heads of federal departments for the purpose of providing guidance to federal agencies on the criteria for identifying disproportionately high and adverse human health or environmental effects on minority and low-income populations. Under Executive Order 12898, each federal agency was also charged with developing an agency-wide environmental justice strategy to (1) promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations; (2) ensure greater public participation; (3) improve research and data collection relating to the health and environment of minority populations and low-income populations; and (4) identify differential patterns of consumption of natural resources among minority populations and low-income populations. In accordance with Executive Order 12898, DOE has promulgated an updated Environmental Justice Strategy, which outlines four goals for developing and maintaining an integrated approach to environmental justice activities (DOE 2008).

CEQ has issued guidance to federal agencies to assist them with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. DOE guidance recommends that DOE consider pathways or uses of resources that are unique to a minority or low-income community before determining that there are no disproportionately high and adverse impacts on the minority or low-income population (DOE 2004).

Demographics

Racial and ethnic data for the geographic areas in which the proposed project is located, along with comparative data for Maricopa County and Arizona are presented in Table 3-9. The project site is in census tracts 506.2 and 506.3; the majority of the project site lies within census tract 506.3. Census tract 506.3 includes a large portion of western Maricopa County and is bounded by La Paz and Yuma Counties to the west, Gila River to the south, and census tracts 405.09 and 506.2 to the north and east. Census tract 506.2 includes areas west of the Phoenix suburbs.

Table 3-9
Total Percentage of Population by Race/Ethnicity[1]

Geographic Area	White	Black, African American	Native American, Alaskan, Aleut	Asian, Pacific Islander	Some Other Race[2]	Latino, Hispanic, Any Race
Census Tract 506.2	81.5	1.3	1.4	0.5	11.8	24.3
Census Tract 506.3	74.7	1.9	1.8	0.1	19.0	32.4
Maricopa County	77.4	3.7	1.8	2.3	11.9	24.8
Arizona	75.5	3.1	5.0	1.9	11.6	25.3

Source: US Census Bureau 2000
[1] Total percentages may be greater than 100 percent because more than one race category may be selected.
[2] Some Other Race category includes all other responses not included in the race categories included above. Census respondents providing write-in entries such as multiracial, mixed, interracial, or a Hispanic/Latino group (e.g., Mexican, Puerto Rican, or Cuban) are included here.

In 2000, the White population formed the dominant ethnic group in census tract 506.2 (81.5 percent) and census tract 506.3 (74.7 percent). Maricopa County had a White population of 77.4 percent, which was slightly higher than the state population of 75.5 percent. The largest minority group in Maricopa County included persons of Hispanic or Latino origin, which comprised 24.8 percent of the population. Black/African American persons made up 3.7 percent of the population, while Asian and Pacific Islander persons made up 2.3 percent and American Indian and Alaska Native persons made up 1.8 percent. When compared to the county and state percentages, census tract 506.2 included statistically lower numbers of minority populations and a higher number of the White population, while census tract 506.3 had statistically higher number of minority populations and a lower number of the White population.

Income and Poverty Level

Income statistics for geographic areas within the ROI and comparative data for the county and the state are presented in Table 3-10.

Table 3-10
Income and Poverty Level

Geographic Area	Median Household Income (2000 inflation-adjusted dollars)	Per Capita Income (2000 inflation-adjusted dollars)	Percentage of Individuals Living in Poverty (2008) [1]	Percentage of Individuals Living in Poverty (2000)
Census Tract 506.2	46,020	17,231	--	12.3
Census Tract 506.3	29,779	12,508	--	25.9
Maricopa County	45,358	22,251	13.0	11.7
Arizona	40,558	20,275	14.3	13.9

Source: US Census Bureau 2000, 2008
[1]2008 data for census tracts is not yet available

Low-income populations have been identified in communities closest to the project site. In 2000, median household income for census tract 506.2 ($46,020) was comparable to the county average ($45,358) and more than 13 percent higher than the state average ($40,558). However, the median income in census tract 506.3 ($29,779) was more than 35 percent lower than the county and the state averages. The per capital income for Arizona and Maricopa County were comparable ($20,275 and $22,251, respectively), while the per capita income for census tracts 506.3 ($12,251) and 506.2 ($17,231) were markedly lower. In 2009, the unemployment rate for the county was 4.8 percent, which was nearly half of that of the state's unemployment rate (US Bureau of Labor Statistics 2009).

In 2000, the population within census tract 506.2 that was living in poverty (12.3 percent) was consistent with county (11.7 percent) and state (13.9 percent) values. Census tract 506.3 represented a low-income population with a poverty rate of 25.9 percent, which was more than 14 percent higher than the county and state levels. By 2008, the percentage of the population living in poverty within the county grew to 13 percent but remained lower than that of the state (14.3 percent).

Protection of Children

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (Executive Order 13045, 62 Federal Register 19885), states that each federal agency shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children and ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks. Environmental health risks and safety risks mean risks to health or

safety that are attributable to products or substances that children are likely to come into contact with or to ingest.

In Maricopa County, 27.4 percent of the population was younger than 18. This percentage was only slightly higher than the state level (26.3 percent). There are no public schools near the proposed project.

3.12.2 Environmental Effects

Proposed Action

Low-income and minority populations have been identified in the surrounding community. Census tract 506.3, which contains a major portion of the project area, includes Hispanic or Latino populations that are statistically higher than those in Maricopa County and Arizona. In addition, communities in the vicinity of the Mesquite Solar Energy project contain higher numbers of individuals living in poverty compared to the rest of the county and the state, and populations whose median household and per capita incomes are lower than countywide and statewide figures. This EA evaluates any potential effects on residents in the immediate project area, including residences north of Elliot Road. Given the very low population density in the census tract, low-income and minority populations within the census tract may not accurately represent the affected populations in the immediate project area.

While minority or low-income residents may be present in the project area, measures to reduce project impacts would reduce or avoid impacts on these populations. Public outreach was conducted to receive and address any concerns the neighboring communities may have pertaining to the proposed action. Details of public participation and outreach are discussed in Section 1.4, Public Participation, and Table 1-1, Public Outreach Actions.

No pathways or uses of resources that are unique to a minority or low-income community have been identified, nor have any disproportionate high and adverse impacts on low-income and minority populations been identified. The project site would be fenced, preventing access to the site by the public, and operation of the site would not involve the use or release of harmful substances or create a public health and safety risk to these populations. The landscaping berm would alleviate any visual impacts to the residents immediately north of the project site. Construction impacts from air emissions and noise would be minimized through compliance with the Maricopa County dust control regulations and Maricopa County Hours of Construction Ordinance, resulting in no impact on minority or low-income populations in the project area. Lack of public access to the site would prevent disproportionate environmental risks and health risks to children.

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no impacts on any populations, including minority and low-income populations.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding was obtained and the facility was developed, the environmental justice effects under this alternative would be the same as described for the proposed action.

3.13 Public Health and Safety/Hazardous Materials

3.13.1 Affected Environment

Public Health and Safety

The Maricopa County Sheriff Department provides police protection to the area. The proposed project is in the District II patrol area. The Buckeye Valley Fire Department provides fire and emergency medical services for the project area.

Hazardous Materials

The Arizona Department of Environmental Quality reports no landfills, material recovery facilities, superfund sites, underground storage tanks, hazardous waste generators, or Declaration of Environmental Use Restriction sites on or adjacent to any portions of the project site that would experience surface disturbance by any of the project components, including the gen-tie route alignment. No contamination is recorded in any of these areas (Arizona Department of Environmental Quality 2010). No hazardous materials are currently used on the project site.

A Phase I Environmental Site Assessment was conducted by Dominion Environmental Consultants, Inc. for each parcel comprising the Part 1 and Part 2 project area. The assessments evaluated each parcel for recognized environmental conditions that could impinge upon the use of the site, including conditions resulting from past and present land uses on the project site and on adjoining properties. The following recognized environmental conditions were identified:

- El Paso Natural Gas Pipeline located along the southwestern portion of Part 2;
- A partially buried 55-gallon drum within the northwestern portion of Part 2;

- Existing, abandoned, and potentially removed groundwater wells located in Part 2, including an existing registered well in north central portion along Elliot Road; two wells of unknown abandonment status in the southeastern portion; and multiple existing and/or removed wells in the central portion;
- A pile of improperly disposed tires in the west-central portion of Part 1; and
- Septic systems associated with residences within Part 2 that are considered to provide a direct path to the subsurface.

The assessments revealed no record of spills or hazardous materials in any of the properties. Dominion's historical research indicated that the site has been primarily undeveloped or used for agricultural purposes since 1949. Surrounding lands may have been cultivated for agricultural use in the 1980s; therefore, residues of agricultural chemicals may be present in surface soils. Historical data gaps were identified but not considered significant due to the lack of previous development in the area (Dominion Environmental Consultants, Inc. 2008, 2009).

Electric and Magnetic Fields

Electric and magnetic fields (EMFs) are invisible lines of force associated with the production, transmission, and use of electric power. Most electric power such as those associated with high-voltage transmission lines operates at a frequency of 50 or 60 cycles per second, or hertz. Sources of EMF in the project area include existing transmission lines associated with the Palo Verde Nuclear Generating Station, the Mesquite Generating Station, and the Arlington Valley Energy Facility. In addition, electrical wiring and common household appliances generate low levels of EMF.

3.13.2 Environmental Effects

Proposed Action

Construction

Public health and safety concerns associated with construction of the proposed project are related to hazardous materials management and worker safety.

Hazardous Materials Management. Construction of the Mesquite Solar Energy project would generate limited amounts of hazardous wastes. Generated wastes would be managed and disposed in accordance with all applicable federal and state regulations. A Spill Prevention, Control, and Countermeasure (SPCC) Plan would be prepared and implemented to mitigate the risk of oil spills or releases. The SPCC plan would address fuels, lubricants, and hydraulic fluids expected to be used for construction equipment. Such equipment would be properly maintained to minimize leaks, and all vehicle maintenance would be performed off-site at an appropriate facility.

No contamination was identified during the Phase I environmental site assessments. However, if any contaminants were encountered during construction, soils would be tested and, if necessary, removed and disposed at a facility approved to accept contaminated soils.

Worker Safety. All construction activities would be performed by licensed, experienced contractors and would be carried out in compliance with Occupational Safety and Health Administration (OSHA) and Arizona Department of Occupational Safety and Health standards to minimize the risk of construction-related accidents or injuries. Possible scenarios that have the potential to expose personnel to injury during construction include, but are not limited to, electrocution, falls into open excavations, the movement of construction vehicles, equipment, and materials, and accidents (such as slips, trips, or falls). The risk of construction-related injury would be minimized through careful safety planning, regular safety training, and use of appropriate safety equipment.

Operation

Public health and safety concerns associated with operation of the proposed project are related to electric and magnetic fields, hazardous materials management, and employee safety. No public access would be allowed; the entire project site would be fenced, and security cameras would be used to monitor the site. Given the low number of additional employees that would be employed as a result from the proposed action, this action would not increase the demand placed on local emergency service providers.

Electric and Magnetic Fields. Since the late 1970s, questions have been raised about whether exposure to these extremely low frequency electric and magnetic fields produces adverse health consequences. Studies conducted in the 1980s showed a possible link between magnetic field strength and the risk of childhood leukemia.

A number of studies on the effects of EMF have been published since that time, including the landmark National Institute of Environmental Health Sciences (NIEHS) Report on Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields (1999), a review of more than two decades of research in this area. This report concluded that the overall pattern of results suggests a weak association between increasing exposure to EMF and an increased risk of childhood leukemia. The few studies that have been conducted on adult exposures show no evidence of a link between residential EMF exposure and adult cancers. Because virtually everyone in the US uses electricity and therefore is routinely exposed to EMF, NIEHS recommends reducing exposures where feasible. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern (NIEHS 1999).

In 2007, the World Health Organization (WHO) published a report on the health implications of extremely low frequency electric and magnetic fields (WHO 2007). According to WHO's report, epidemiological studies suggest that everyday, low-intensity exposure to EMF poses a possible increased risk of childhood leukemia. However, the evidence is not strong enough to be considered causal. The evidence for other studied effects, including other types of cancers in both children and adults, depression, suicide, reproductive dysfunction, developmental disorders, immunological modifications, neurological disease and cardiovascular disease are even less conclusive.

Both the electric and magnetic fields decrease rapidly with distance from the source. Given the above limited concern related to health effects and the lack of residences or other public use facilities within 500 feet of the proposed Mesquite Solar Energy project or the right-of-way for the gen-tie line route, no adverse health effects are anticipated related to EMF.

Hazardous Materials Management. Management of hazardous materials during project operations would pose little risk of adverse environmental effects. Transformers, which will be located in the Part 1 and Part 2 solar fields, contain insulating mineral oil, and inverters, which may contain cooling liquid, are the only facility equipment with the potential to introduce pollutants to storm water. Each transformer would have full secondary containment to prevent the potential release of oil to the ground, and each inverter would drain to one of these secondary containment systems. The SPCC Plan would address the mineral oil contained in each transformer and cooling liquid contained in each inverter; this plan would be updated as necessary to reflect practices employed during facility operation. Only limited quantities of hazardous materials associated with maintenance vehicles and equipment would be used or generated during operations, including gasoline, diesel fuel, oil, lubricants, and solvents. Dust palliative, if used, and herbicides would be transported to the site for immediate application and would not be stored on-site.

A PV panel manufacturer has not yet been selected for the proposed action. PV panels that may be used at the site include microcrystalline panels and CdTe panels. These panels are discussed below.

Microcrystalline PV Panels. Microcrystalline PV panels may include small amounts of solid materials that are considered to be hazardous. Because such materials are in a solid and non-leachable state, broken microcrystalline PV panels would not be a source of pollution to storm water. Microcrystalline panels removed from the site would be returned to the manufacturer for recycling, if such a program was offered by the manufacturer, or disposed at an appropriate waste disposal facility.

Cadmium Telluride PV Panels. In PV modules using CdTe technology, the cadmium is in the environmentally stable form of a compound rather than the leachable form of a metal. The CdTe compound is encapsulated in the PV module with

the PV module containing very little cadmium, less than 0.1 percent cadmium by weight. An 8-square-foot area of a CdTe panel contains less cadmium than one size-C nickel-cadmium flashlight battery (National Renewable Energy Laboratory http://www.nrel.gov/pv/cdte/).

Several peer-reviewed studies have evaluated the environmental, health, and safety aspects of CdTe PV panels. These studies have consistently concluded that during normal operations, CdTe PV panels do not present an environmental risk. Specifically, it has been demonstrated that there are no cadmium emissions to air, water, or soil during standard operation of CdTe PV systems (French MEEDAT 2009).

CdTe releases are unlikely to occur during accidental breakage (Fthenakis 2004). Furthermore, studies have been conducted of the panels when the stability of the encapsulation is jeopardized, such as if a broken panel was exposed to fire. These studies indicate that even these events result in negligible cadmium emissions, most likely because CdTe has a very high melting temperature of 1041 degrees Celsius (Brookhaven National Laboratory 2005).

Disposal risks of cadmium are minimized because of the encapsulation within the panel and because the cadmium can be effectively recycled at the end of the panel's 25- to 30-year life. CdTe panels removed from the site would be returned to the manufacturer for recycling. The PV module manufacturer for this type of PV panel has a prefunded module collection and recycling program that is designed to maximize the recovery of valuable materials for use in new modules or other new products and minimize the environmental impacts associated with PV system production. Approximately 90 percent of each collected PV module would be recycled. Current CdTe PV modules pass federal leaching criteria for non-hazardous waste (Fthenakis 2002), which means they would not pose a risk for cadmium leaching if placed in a landfill.

Worker Safety. The proposed facility would be operated remotely from the existing Mesquite Generating Station. Staff at the generating station are trained for emergency management and response under the existing Mesquite Generating Station Integrated Contingency Plan, and such training would be provided to new employees. In addition, Sempra has prepared an Emergency Response Plan for the Mesquite Solar Energy project.

Approximately seven maintenance employees would be on the Mesquite Solar Energy project site at buildout. Similar to construction, health and safety procedures would be implemented in accordance with OSHA and Arizona Department of Occupational Safety and Health standards to minimize the risk of accidents or injuries from electrocution, equipment use, and accidents.

Both the Mesquite Generating Station and the Mesquite Solar Energy project site are within the 10-mile Plume Exposure Pathway Emergency Planning Zone for the Palo Verde Nuclear Generating Station. This zone has been established

to address the potential for radioactive contamination in the event of a major emergency. In the event of such an emergency, the staff of the Mesquite Generating Station and Mesquite Solar Energy project site would implement the applicable evacuation plan specified in the Mesquite Generating Station Integrated Contingency Plan.

Intentionally Destructive Acts. The proposed action has a low potential for intentionally destructive acts. The entire project site would be off limits to public access and protected by fencing and security cameras. These preventative measures would further reduce any risk for intentionally destructive acts.

As discussed under Hazardous Materials Management, hazardous materials in the PV panels under consideration would be in a solid state and would not leach or dissipate if the protective casing was broken. Secondary containment for the mineral oil in the transformers and cooling liquid in inverters would be provided, preventing any potential for release to the environment

Because PV panels continue to produce electricity when disconnected from the inverters and associated equipment, electrical shock is a concern for emergency personnel responding to a daytime fire. Inhalation exposure during a fire is minimal; gaseous compounds (e.g., phosphorous and boron) in PV panels at the Mesquite Solar Energy Project would not pose significant hazards to public health or the environment because of the extremely small quantities present. Best management practices and recommended safety procedures have been developed to protect firefighters from any risk associated with fire at solar energy generating sites (Fire Protection Research Foundation 2010).

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no public health and safety or hazardous materials-related impacts.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding was obtained and the facility was developed, the effects on public health and safety and the environment from hazardous material use and EMF would be the same as described for the proposed action.

3.14 Transportation and Infrastructure

3.14.1 Affected Environment

Transportation

Interstate 10 is approximately nine miles north of the project site. From Interstate 10, Wintersburg Road provides access to the project site via Elliot Road. There are no principal arterial streets in the project area; minor arterial streets include Elliot Road, Narramore Road, Wintersburg Road, 399th Avenue, and 411th Avenue. Local streets include 395th Avenue, which borders the project site to the east (Maricopa County 2007).

In support of Sempra's application for an SUP, the Traffic Engineering Department of the Maricopa County Department of Transportation (MCDOT) was contacted to discuss the proposed Mesquite Solar Energy project and traffic impact analysis requirements (AECOM 2009a). Based on the proposed use of the site, the anticipated low number of employees, and anticipated low volume of site traffic, a full traffic impact analysis report was not required, and a brief technical memorandum was agreed to (AECOM 2009a). The proposed project at that time included only Part 1 of the project site; however, the addition of Part 2 represents an increase in employees from three to seven. Arizona Department of Transportation (ADOT) was consulted during the processing of the Comprehensive Plan Amendment for Part 2 and will be involved when the Special Use Permit is amended to add the Part 2 area.

In support of the technical memorandum, historical traffic data were obtained from the ADOT and MCDOT. The ADOT reported average annual daily traffic in 2007 on Interstate 10 at the Wintersburg Road exit as 25,400 vehicles per day. The MCDOT reported a 2007 average annual daily traffic at Wintersburg Road/383rd Avenue and Elliot Road as 932 vehicles per day along Elliot Road and 635 vehicles per day along Wintersburg Road/383rd Avenue (AECOM 2009a).

Infrastructure

The project site is not served by utilities except for an electrical distribution line providing power to well pumps associated with the five existing groundwater wells.

3.14.2 Environmental Effects

Proposed Action

Potential impacts on transportation and infrastructure from construction and operation of the Mesquite Solar Energy project are described below.

Construction

Transportation. Construction of the Mesquite Solar Energy project is projected to take between 5 and 8 years. During peak construction periods, primarily at project startup, up to 300 workers could access the site daily. In addition, 10 to

12 trucks would access the site daily. Traffic during peak construction would have minor effects on area roadways, particularly Wintersburg Road/383rd Avenue and Elliot Road. While peak construction traffic levels would represent a large increase in traffic on Wintersburg Road/383rd Avenue and Elliot Road compared to existing conditions, these traffic levels would be within the carrying capacity of these roadways.

Infrastructure. Construction of the Mesquite Solar Energy project would use the five existing groundwater wells to meet all non-potable water needs (up to the 500 acre-feet per day allotted for the site's use). Drinking water would be carried onto the site, and sanitary waste would be managed using portable toilets located at reasonably accessible on-site locations (Maricopa County 2009c).

Operation

Transportation. Operation of the Mesquite Solar Energy project would generate approximately 28 vehicle trips per day (7 employees x 4 trips per employee). These numbers would represent a 0.1 percent increase at the Interstate 10/Wintersburg Road exit, a 4 percent increase along Wintersburg Road/383rd Avenue, and a 3 percent increase along Elliot Road. This low increase in daily traffic levels would have a negligible impact on area roadways.

Infrastructure. The proposed project would not require the development of new utility infrastructure at the project site. The five existing groundwater wells would provide all non-potable water needs during operation; projected use is up to 500 acre-feet per day (Maricopa County 2009c). During operation of the facility, sanitary waste would be managed using portable toilets located at reasonably accessible on-site locations (Maricopa County 2009c).

No Action Alternative

Under the no action alternative, DOE would not issue a loan guarantee to Sempra for development of the Mesquite Solar Energy project, the facility would not be constructed, and there would be no change to traffic or infrastructure.

If the loan guarantee was not approved, Sempra could proceed with its plans to develop the Mesquite Solar Energy project using commercial funding instead of DOE loan guarantee funding, if such funding could be obtained. If commercial funding was obtained and the facility was developed, the effects on transportation and infrastructure under this alternative would be the same as described for the proposed action.

3.15 Cumulative Impacts

Cumulative impacts are those that may result from the incremental impacts of an action when added to the impacts of other past, present, and reasonably foreseeable future actions. Cumulative impacts are considered regardless of the agency or person undertaking the other actions and can result from the

combined effects of actions that are minor when considered individually over a period of time.

Spatial Boundary of Evaluation. The spatial boundary is the physical area that comprises the region of influence for the cumulative effects analysis. The spatial boundary evaluated in this cumulative effects analysis is defined as that area contained in a five-mile radius of the Mesquite Solar Energy Project site. This spatial boundary was chosen to encompass land uses with the potential to affect similar resources as the proposed action. The spatial boundary was defined by land uses rather than by geographic features because of the rural, undeveloped nature of this portion of Maricopa County. The spatial boundary would be the same for the resources evaluated in detail.

Temporal Boundary of Evaluation. A temporal boundary is the timeframe over which the cumulative analysis occurs. The temporal parameters for this cumulative effects analysis follow the anticipated lifespan of the proposed project, beginning in late 2011 with initial energy production and extending out at least 25 years, which is the minimum expected project life of the proposed action.

Cumulative actions considered in this analysis are described in Table 3-11. These actions focus on energy development, as this is a continuing development trend in the project area. No other actions or facilities have been constructed or proposed in the project area apart from the facilities shown in Table 3-11. The cumulative actions with the potential to affect the same resources as the proposed Mesquite Solar Energy project include the prior development of the Palo Verde Nuclear Generating Station, the Arlington Valley Energy Facility, the Mesquite Generating Station, and the Red Hawk Generating Station (located one mile east of the Mesquite Generating Station) and their associated infrastructure; the proposed Mesquite Solar Energy project; and the reasonably foreseeable Arlington Valley Solar Energy projects (AVSE and AVSE II) located immediately south of the Arlington Valley Energy Facility (see Figure 3-10).

Past uses of the project area included irrigated agriculture, grazing, and open space. Irrigated agricultural uses have generally ceased in the project area, while limited grazing still occurs. Other land uses in the project area include the energy developments described in Table 3-11, limited rural residences, and open space.

This cumulative effects analysis addresses the cumulative effects on land use, visual resources, air quality, noise, water quality, biological resources, socioeconomics, and transportation that the proposed action would have in conjunction with other past, present, and reasonably foreseeable actions in the project area. The proposed action would not impact the remainder of the resources evaluated in Chapter 3, and these resources are therefore not included in the cumulative analysis.

Table 3-11
Cumulative Projects in Addition to Proposed Action

Project Name	Size (acres)	Description	Status
Palo Verde Nuclear Generating Station	4,000	3,810 MW nuclear power generating facility	Operational in 1986
Arlington Valley Energy Facility	320	572 MW natural gas combined-cycle power generating facility	Operational in 2002
Mesquite Generating Station	400	1,250 MW natural gas combined-cycle power generating facility	Operational in 2003
Red Hawk Generating Station	460	1,060 MW natural gas combined-cycle power generating facility	Operational in 2002
Arlington Valley Solar Energy (AVSE) Project	1,433	125 MW solar power electric generating facility	Buildout in 2013
Arlington Valley Solar Energy II (AVSE II) Project	1,160	125 MW solar power electric generating facility	Buildout in 2013

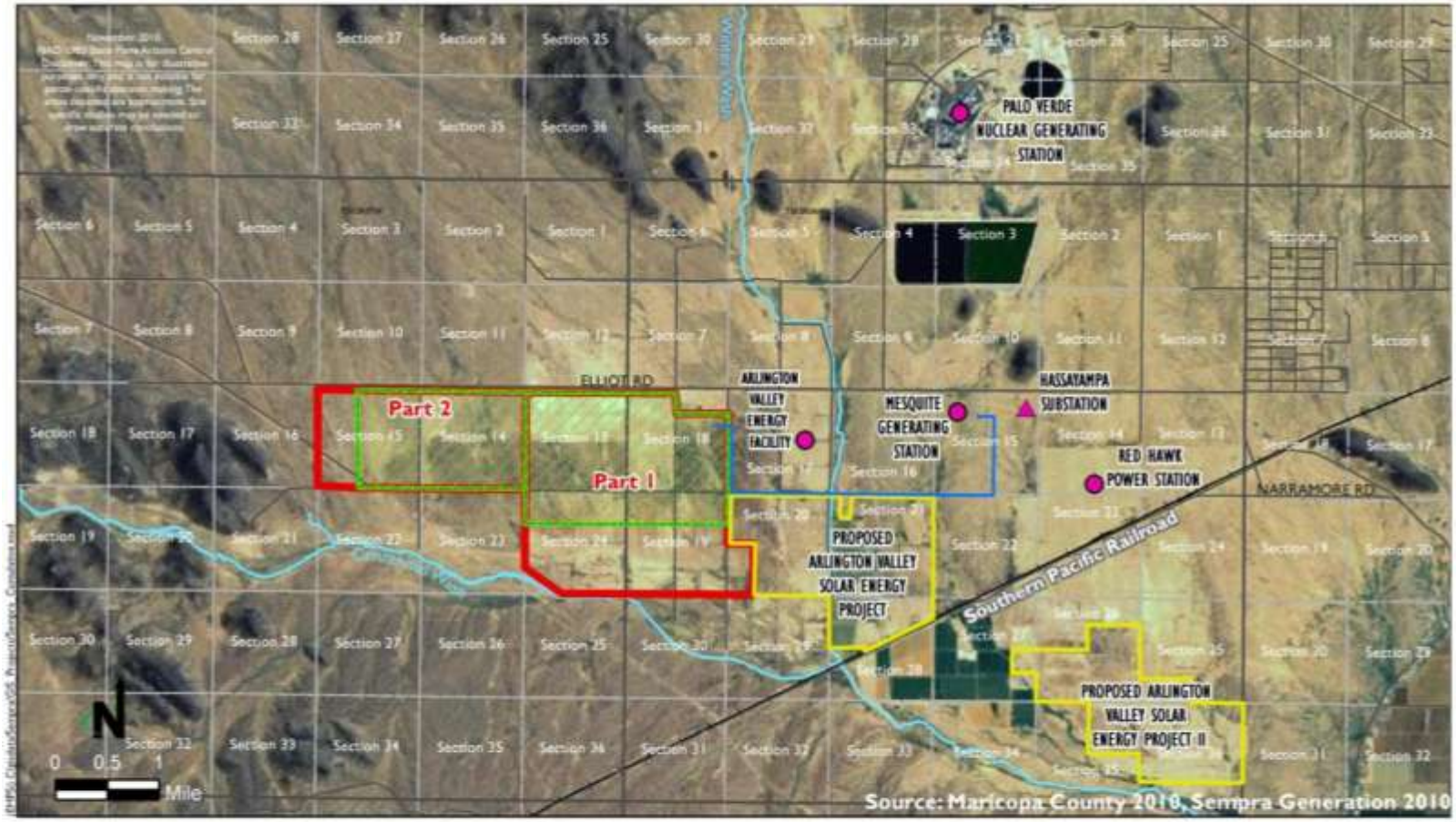
Source: Acreages of existing facilities from Table 8, Maricopa County 2007

Land Use

Development of the existing cumulative projects listed in Table 3-11 has resulted in the conversion of 5,180 acres of county lands from open space to energy production use (10 percent of the defined spatial boundary). Development of the Mesquite Solar Energy project would be the fifth energy generation use in the area, and the AVSE projects would be the sixth and seventh. Development of these projects would convert an additional 6,373 acres of land from open space (former farmland) to energy production (additional 12.5 percent of defined spatial boundary). Each of these developments has or would also require rights-of-way or easements for associated infrastructure such as power lines. None of the proposed and reasonably foreseeable projects would affect irrigated farmland.

Each new industrial proposal, as well as any other future proposed projects over 40 acres, requires an amendment to the Maricopa County Comprehensive Plan as well as an SUP. These processes provide opportunities for review and comment by the public and by neighboring towns and municipalities, as well as detailed review by county and state agencies regarding issues such as compatibility with surrounding land uses.

Because the proposed action and reasonably foreseeable future projects would be required to comply with adopted land use plans and zoning requirements, these projects would be consistent with the overall land use policies of Maricopa County and would not result in any cumulative effects that would be incompatible with existing or long-term land use patterns.



Only two new projects apart from the proposed action are being proposed in the project area: the Arlington Valley Solar Energy (AVSE) Project and the Arlington Valley Solar Energy II Project (AVSE II).

- Substation
- Generating Facility
- Proposed AVSE-Arlington Valley Solar Energy
- Preferred Gen-Tie Route
- Project Development Boundary
- Project Site Boundary

Figure 3-10 Cumulative Projects

Visual Resources

Development of the Mesquite Solar Energy Project and the two reasonably foreseeable solar facilities would result in a change to the existing visual landscape through the introduction of solar generating equipment and associated transmission infrastructure. The cumulative projects described in this analysis have already changed the visual character of the area from rural, open space to a more developed, industrial feel both at the generating facilities and along transmission line routes; the proposed action would add to this change (Figure 3-11), as would the future proposed AVSE and AVSE II.

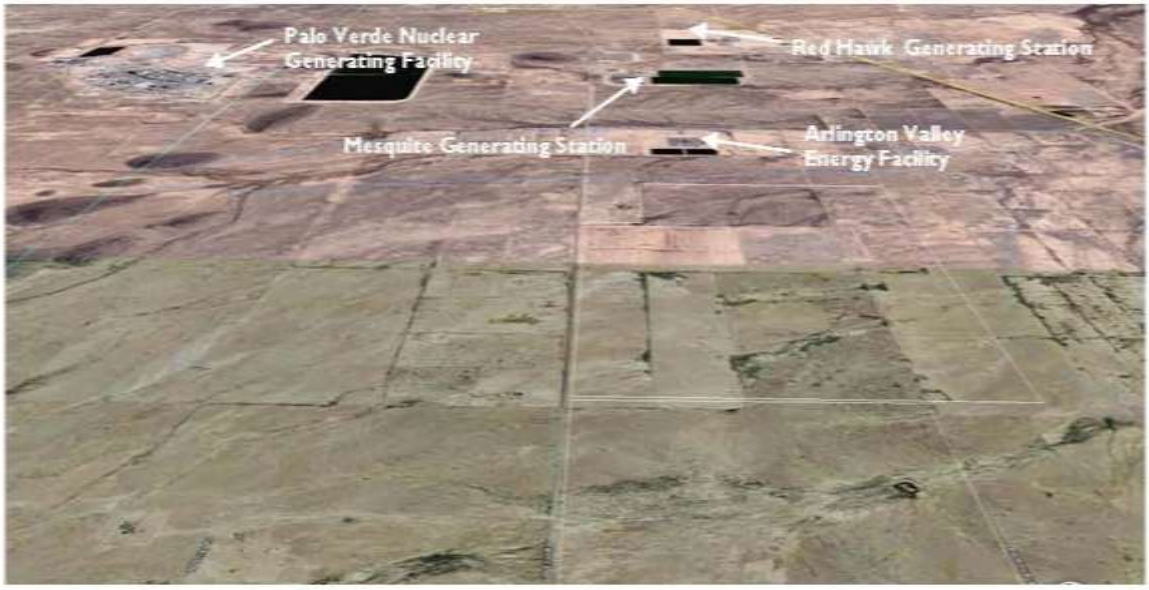
While the proposed action would alter the visual character of the project area, the cumulative adverse effect would be minor because the project would be screened from the only sensitive visual receptors (residents north of Elliot Road) and viewpoints (Elliot Road) near the project site. There would be an incremental effect of the project in conjunction with the proposed AVSE and AVSE II solar facilities. However, these facilities would be farther removed from sensitive viewers and viewpoints than the proposed action. AVSE would be adjacent to the eastern boundary of the proposed Mesquite Solar Energy project and the southern boundary of the Arlington Valley Energy Facility, approximately one mile south of Elliot Road. AVSE II would be southeast of AVSE. Planning for these projects would include measures to mitigate adverse visual effects if any are identified during the county CPA and SUP permitting processes. Therefore, cumulative visual effects would be minor.

There are no recreational areas, cultural sites, or other sensitive public uses in the project area. Given the low viewer sensitivity, the proposed action together with other past, present, and reasonably foreseeable future actions would have only minor adverse impacts. Siting energy facilities in close proximity to one another would have the benefit of consolidating transmission and roadway infrastructure, thereby avoiding the visual impact of siting the facilities and associated transmission lines in less developed or more sensitive areas.

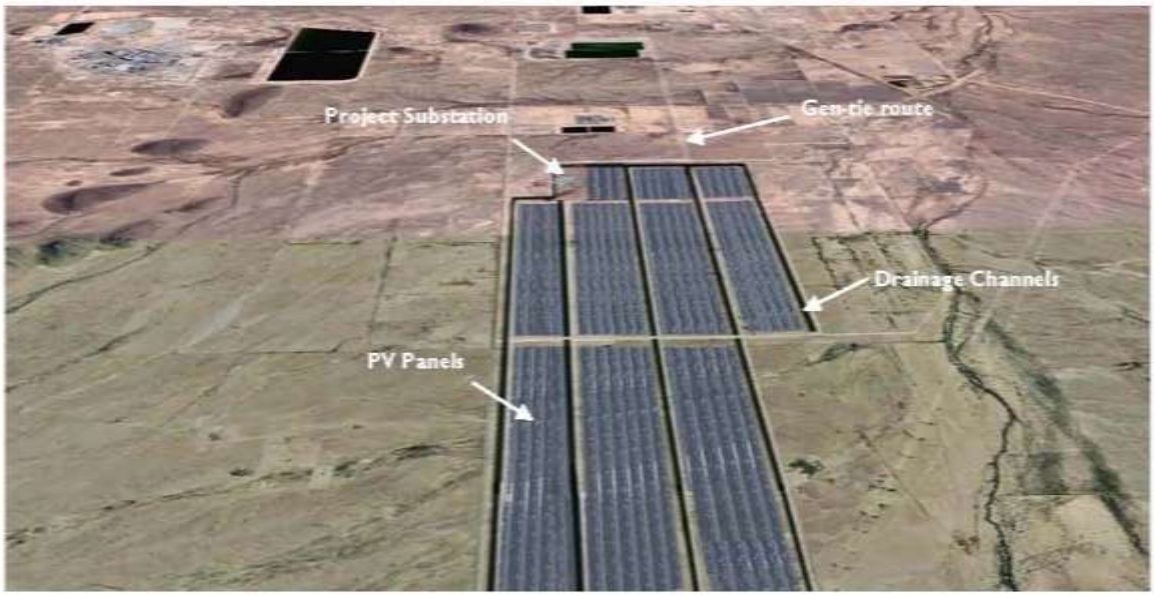
Air Quality

The eastern half of Part 1 of the project site, the proposed gen-tie line, the proposed AVSE and AVSE II solar facilities, and the existing energy facilities are in a nonattainment area for the federal 8-hour ozone standard. The construction periods for the proposed project and the AVSE and AVSE II facilities would overlap, resulting in a short-term adverse cumulative impact on air quality from production of ozone precursor emissions, fugitive dust, and greenhouse gas emissions during construction. Operation of the proposed solar facilities would have a cumulative beneficial impact on air quality from the potential reduction in emissions from more intensive electricity generation facilities. By potentially displacing the use of natural gas and other fossil fuels to produce electricity, the proposed project could contribute to long-term beneficial cumulative effects on air resources, specifically the reduced generation of CO_2 and other greenhouse gasses.

Figure 3-11 Aerial view looking east down Elliot Road



Existing View.



View of proposed project and preferred gen-tie route. (Note that there are no observation points in the project area from which this view would be observed except by air. Elliot Road is the primary arterial in the immediate project area, and views from this road would be of the screening berm and not the solar fields.)

Noise

The proposed action in combination with the proposed AVSE and AVSE II solar facilities would result in a cumulative increase in noise during overlapping construction periods, particularly along roadways carrying delivery truck traffic for both developments, including Elliot Road, Wintersburg Road, and West Narramore Road. On-site construction noise sources would not have a cumulative adverse effect given the distance of the facilities from sensitive noise receptors and county-imposed limitations on construction times. Operation of the facilities would not generate noise and would therefore not cause an increase in background noise conditions.

Water Resources

The proposed action, as well as the proposed AVSE and AVSE II facilities, are within FEMA- and county-designated floodplains. While the proposed action would avoid construction within the FEMA-designated floodplain, development of the AVSE and AVSE II projects may occur within this floodplain. During construction and operation, the proposed action and the other projects in the area would be required to comply with Maricopa County Floodplain Regulations to avoid raising the base flood elevation of Centennial Wash.

Hazardous materials used during construction and operation of both projects have the potential to affect water quality in the project area from the introduction of contaminants to surface and groundwater resources. Storm Water Pollution Prevention Plans would be required for each project, minimizing cumulative adverse effects.

The proposed action and the proposed AVSE and AVSE II facilities would require groundwater for dust control during overlapping construction periods, resulting in a potential adverse impact on groundwater resources. While the proposed action would require only minimal amounts of water during project operation, the AVSE and AVSE II projects may require greater amounts of water depending upon the type of solar technology that was utilized, potentially affecting groundwater pumping or water use in the area. Water requirements for these projects would be satisfied through existing water rights, reducing the cumulative effects of these actions.

Biological Resources

Vegetation within the project area has been disturbed for decades from grazing and agricultural operations, affecting both native vegetation and wildlife. As discussed under land use, energy development has converted 5,180 acres of county lands from open space to energy production use, and the proposed Mesquite and AVSE projects would affect an additional 6,373 acres, resulting in a minor long-term adverse impact on biological resources in the project area. Implementation of measures developed in consultation with AZGFD and other agencies to salvage state-listed native plants, protect sensitive species, and preserve wildlife connectivity would reduce the cumulative adverse effects on sensitive biological resources.

Socioeconomics

The proposed action, in combination with the proposed AVSE and AVSE II facilities, would have a short-term beneficial cumulative effect from the creation of construction jobs during the overlapping construction periods. Operation of the proposed facilities would have a minor beneficial cumulative effect if the number of jobs created exceeded the number of jobs lost due to conversion of the lands to solar facilities.

Transportation and Infrastructure

The proposed action in combination with the proposed AVSE and AVSE II solar facilities would result in a cumulative increase in traffic on area roadways, resulting in a potential cumulative adverse impact during the overlapping construction period. Operational traffic impacts would be low given the small number of permanent jobs that would be created by these proposed facilities.

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This section identifies the agencies that were contacted during the preparation of this EA.

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5.3 STATE AGENCIES

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CHAPTER 6
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Appendix A
Correspondence

Department of Energy
Washington, DC 20585

JUN 18 2010

Mr. Henry Darwin
Counsel
Arizona Department of Environmental Quality
1110 West Washington Street
Phoenix, Arizona 85007

SUBJECT: Intent to Prepare an Environmental Assessment (EA) for a proposed Federal loan guarantee for Sempra Generation's Mesquite Solar Energy facility near Gillespie, AZ

Dear Mr. Darwin:

Under Title XVII of the Energy Policy Act of 2005 (EPAct 05), the U.S. Department of Energy (DOE) is proposing to provide a Federal loan guarantee to Sempra Generation for the construction and startup of its 400 megawatt (MW) photovoltaic solar power plant located 10 miles northwest of Gillespie, AZ, and 50 miles west of Phoenix. The decision to prepare an EA was made in accordance with the requirements of the National Environmental Policy Act (NEPA), the Council on Environmental Quality regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500-1508), and DOE's implementing procedures for compliance with NEPA (10 CFR Part 1021).

The purpose of DOE's action is to encourage early commercial use in the United States of a new or significantly improved energy technology and expedite the deployment of a new energy technology into commercial use in the U.S. pursuant to Title XVII of the EPAct 05, as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (Recovery Act). This action is needed to fulfill DOE's mandate under EPAct 05 to issue loan guarantees to eligible projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases" and "employ new or significantly improved technologies as compared to technologies in service in the United States at the time the guarantee is issued," as well the Recovery Act's mandate to promote "job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and State and local fiscal stabilization." The proposed facility would offset the need for fossil-fueled generation that would otherwise produce 582,000 tons per year of carbon dioxide equivalent emissions. Sempra would employ innovative thin film amorphous silicon/microcrystalline and polycrystalline emitter rear localized (PERL) panel technologies, which would improve efficiencies and overall power outputs as compared to existing technologies.

The DOE NEPA regulations provide for notifying host states tribes of NEPA determinations and for the opportunity for host states and tribes to review EAs prior to DOE approval. This process is intended to improve coordination and to facilitate early

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and open communication. DOE will provide the Draft EA to Arizona and Maricopa County and will request that comments be provided within a three-week review period. If you or your staff would like to receive further information concerning this project or DOE's NEPA process for Federal energy loan guarantees, please contact Mr. Joseph Marhamati in the DOE Loan Guarantee Program Office at 202-586-8198 or email Joseph.Marhamati@hq.doe.gov.

Sincerely,

Jonathan Silver
Executive Director
Office of Loan Programs

cc: Matt Holm
Maricopa County Planning and Development Department
501 North 44th Street, Suite 100
Phoenix, Arizona 85008

Department of Energy
Washington, DC 20585

AUG 09 2010

Steven L. Spangle, Field Supervisor
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951

Subject: No Effect Determination on Threatened, Endangered, or Candidate Species for the Mesquite Solar Energy Project in Maricopa County, Arizona

Dear Mr. Spangle:

The Department of Energy (DOE) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act for a Federal energy loan guarantee to Sempra Generation, Inc. (Sempra) to support construction of the 400-megawatt Mesquite Solar Energy Project in Maricopa County, Arizona. The site is 10 miles northwest of Gillespie, Arizona, and 50 miles west of Phoenix (map attached). As part of the review process for this facility, DOE has determined that the proposed project will have no effect on federally listed threatened, endangered, or candidate species.

The USFWS has published a list of proposed, candidate, threatened, and endangered species occurring by county in Arizona (http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm). This list was used to identify threatened or endangered species within Maricopa County, Arizona that have the potential for occurring in the project vicinity. As described below, DOE has determined that there is no potential for the twelve federally listed species and three candidate species for listing to occur on the Mesquite Solar Energy project site.

The Arizona cliffrose (*Purshia subintegra*) is a listed endangered species. This species is found in white limestone soils derived from tertiary lakebed deposits. It is known to occur only in central Arizona at Horseshoe Lake, in the Burro Creek drainage, and near Cottonwood in the Verde Valley. The project area does not contain suitable soils and is outside of the species' range. The nearest population is found at Horseshoe Lake, over 70 miles away at the boundary of Maricopa and Yavapi Counties. Therefore, the Mesquite Solar Energy project would have no effect on this species.

Desert-nesting populations of the bald eagle (*Haliaeetus leucocephalus*) are listed as threatened. Preferred habitat includes large trees or cliffs adjacent to rivers, streams, or reservoirs with abundant prey. There is no suitable habitat within or adjacent to the project area, as no permanent water sources or large trees or cliffs are present in the

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immediate area. Therefore, the Mesquite Solar Energy project would have no effect on this species.

California least tern (*Sterna antillarum browni*) is a listed endangered species. Its habitat includes open, bare, or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems. Breeding is occasionally documented in Arizona, though migrants may occur more frequently. This species feeds primarily on fish in shallow waters and secondarily on invertebrates. There is no suitable habitat within or adjacent to the project area, and this species has not been recorded within or adjacent to the site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The desert pupfish (*Cyprinodon macularius*) is a listed endangered species and is found in shallow springs, small streams, and marshes. This species tolerates saline and warm water. There are no aquatic habitats or marshes on or near the site, and this species has not been recorded within or adjacent to the site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*) is a small, guppy-like fish found in small streams, springs, and cienegas-vegetated shallows. There are no aquatic habitats on or near the site, and this species has not been recorded within or adjacent to the project site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The razorback sucker (*Xyrauchen texanus*) is listed as endangered and occurs below 6,000 feet. It prefers riverine and lacustrine areas and may use backwaters. This species does not generally inhabit fast-moving water. There are no aquatic habitats on or near the site, and this species has not been recorded within or adjacent to the site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) is listed as endangered. This bat species occurs in Arizona from April to September. Its habitat consists of desert scrub with agave and columnar cacti present as food plants. Long-nosed bats are important pollinators to the saguaro cactus, as they feed on nectar, pollen, and fruit of these cacti. Day roosts can be in caves and abandoned tunnels. These habitat types do not occur on the site, and no occurrence of this species has been recorded in or adjacent to the project site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The Mexican spotted owl (*Strix occidentalis lucida*) is listed as threatened. This species is found at elevations of 4,000 to 9,000 feet in canyons and dense forests with multilayered foliage structure. These habitat types do not occur on the project site, and at 900 to 1,500 feet, the project site is outside of the typical elevation range of the species. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The Sonoran pronghorn (*Antilocapra americana sonoriensis*) is listed as endangered. This species prefers broad, intermountain alluvial valleys with creosote-bursage and Palo

Verde-mixed cacti associations. Bajadas are commonly used as fawning areas, and sandy dune habitats can provide suitable grazing habitat. Pronghorn are not known to occur within or adjacent to the site. The current range begins approximately 30 miles from the project site, about three miles southwest of Gila Bend, south of Interstate 8 (Cabeza Prieta National Wildlife Refuge) and continues south into Mexico. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The Southwestern willow flycatcher (*Empidonax trailli extimus*) is listed as endangered. It breeds only in dense riparian vegetation near surface water or saturated soil. Nests are generally located in thickets of shrubs or trees with dense foliage from ground level up to approximately 13 feet. Habitat for the southwestern willow flycatcher includes riparian areas along rivers, streams, or other wetlands with dense growth of willows (*Salix* spp.), arrowweed (*Pluchea sevicea*), and tamarisk (*Tamarix* spp.). Other common plant species associated with nesting habitat include cottonwoods (*Populus* spp.), seepwillow (*Baccharis* spp.), boxelder (*Acer negundo*), stinging nettle (*Urtica* spp.), blackberry (*Rubus* spp.), and Russian olive (*Eleagnus angustifolia*). These habitat types do not occur on the project site, and no occurrence of this species has been recorded within or adjacent to site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The woundfin (*Plagopterus argentissimus*) is a listed endangered species. This species is a small silver minnow with fairly large fins and a sharp dorsal fin spine. It inhabits shallow, warm, turbid, fast-flowing water and tolerates high salinity. Native populations are found only in the Virgin River. Experimental nonessential populations are found in portions of the Verde, Gila, San Francisco, and Hassayampa Rivers and Tonto Creek. There are no aquatic habitats on or near the project site, and this species has not been recorded within or adjacent to the site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The Yuma clapper rail (*Rallus longirostris yumanensis*) is listed as endangered. It is a marsh bird that inhabits freshwater or brackish streamsides and marshlands. The species is associated with heavy riparian and marsh vegetation and requires a wet substrate, such as a mudflat, sandbar, or slough bottom, that must be covered by dense, mature, herbaceous or woody vegetation that exceeds 15 inches in height. Historically, the Yuma clapper rail may have occurred in the marshes of the Lower Colorado River and its tributaries in Mexico and the United States. Currently, the Yuma clapper rail occurs along the Colorado River, from Lake Mead to Mexico; on the Gila and Salt Rivers upstream to the area of the Verde confluence; in the lower Bill Williams drainage; around the Salton Sea; and at Picacho Reservoir. Preferred habitat type does not occur within or adjacent to the project site, and the site is outside the species' known and historic habitat. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The round tailed chub (*Gila robusta*) is a federal candidate for listing as threatened or endangered for the Little Colorado, Bill Williams, and Gila River basin populations. This member of the minnow family Cyprinidae is found in cool to warm waters of rivers and streams; the chub often occupies the deepest pools and eddies of large streams. The

historical range of roundtail chub included both the upper and lower Colorado River basins. There are no aquatic habitats on or near the site, and no occurrence of this species has been recorded within or adjacent to site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

The Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*) is a federal candidate for listing as threatened or endangered. This species is associated with soft, sandy soils having sparse gravel. It is typically found in creosote-mesquite floodplain environments. This species is historically known to occur from south-central Arizona in portions of northern Pima County (Avra and Santa Cruz Valleys), northern and southwestern Pinal County, and southeastern Maricopa County. Current habitat is believed to exist only in the tip of southern Pinal County. The project area in central Maricopa County is outside of the species' current and historic range; therefore, the Mesquite Solar Energy project would have no effect on this species.

The yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a federal candidate for listing as threatened or endangered west of the Rocky Mountains. The historic breeding range of the yellow-billed cuckoo included most of North America from southern Canada to Mexico but presently is restricted to scattered areas where suitable habitat is present. This species breeds in large blocks of riparian habitats, particularly woodlands with cottonwoods, willows, and dense understory foliage. The species' preferred habitat type does not occur within or adjacent to the project site, and no occurrence of this species has been recorded within or adjacent to site. Therefore, the Mesquite Solar Energy project would have no effect on this species.

If you have any questions or require additional information, please contact me by telephone at 202-286-8198 or by email at joseph.marhamati@hq.doe.gov. You may also contact me at U.S. Department of Energy, 1000 Independence Ave., SW, LP-10, Washington, DC 20585.

Respectfully,

Joseph Marhamati
Environmental Protection Specialist
DOE Office of Loan Programs

MAR-02-2009 10:37 From: To:970 493 0213 P.3/3

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
22410-2009-SL-0190

March 2, 2009

Ms. Jessica Rubado
AECOM Environment
1601 Prospect Parkway
Fort Collins, Colorado 80525

RE: Construction and Operation of Sempra Generation Photovoltaic Solar Energy Generation Facility Near the Mesquite Generating Station in Maricopa County, Arizona

Dear Ms. Rubado:

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may occur in your project area. The Arizona Ecological Service Field Office has posted lists of the endangered, threatened, proposed, and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: **http://www.fws.gov/southwest/es/arizona**

If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find County Species Lists on the main page. Then click on the county of interest. The arrows on the left will guide you through information on species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, all counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the "Cactus" icon to view the desired document.

Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Under the General Species Information, citations for the Federal Register (FR) are included for each listed and proposed species. The FR is available at most Federal depository libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate or conservation agreement species. Candidate species are those for which there is sufficient information to support a proposal for listing; conservation agreement species are those for which we have entered into an agreement to protect the species and its habitat. Although candidate and conservation agreement species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

For additional communications regarding this project, please refer to consultation number 22410-2009-SL-0190. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Brenda Smith (928) 226-0614 (x101) for projects in Northern Arizona, Debra Bills (602) 242-0210 (x239) for projects in central Arizona and along the Lower Colorado River, and Sherry Barrett (520) 670-6150 (x223) for projects in southern Arizona.

Sincerely,

Debra T. Bills

for Steven L. Spangle
Field Supervisor

cc: Josh Avey, Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

Appendix B
Section 106 Consultation, Related Correspondence, and Cultural Setting

Department of Energy
Washington, DC 20585

AUG 2 6 2010

Dr. David Jacobs
Compliance Specialist/Archeologist
State Historic Preservation Office
Arizona State Parks
1300 West Washington Street
Phoenix, Arizona 85007

RE: Section 106 Consultation "No Historic Properties Affected" Determination
Mesquite Solar Energy Project and Generation-Tie Line

Dear Dr. Jacobs:

The U.S. Department of Energy (DOE) is evaluating the application of Sempra Generation (Sempra) for a federal loan guarantee to construct a nominal 400-megawatt (MW) photovoltaic solar energy generating facility and associated 230-kilovolt (kV) generation-tie (gen-tie) power line to convey the generated electricity from the project site to an existing off-site electrical switchyard. The facility would generate an estimated 889,665 megawatt hours (MWh) of electricity per year. Funding through DOE's Loan Guarantee Program constitutes an undertaking subject to compliance with Section 106 of the National Historic Preservation Act and its implementing regulations (36 CFR Part 800). In addition to your office, consulting parties for the project include the Ak-Chin Indian Community, Gila River Indian Community, Hia C'ed Alliance, Hopi Tribe, Salt River Pima-Maricopa Indian Community, and Tohono O'odham Nation. Each tribe was sent a project description and an invitation to provide any concerns related to the project, however DOE received no comments.

Project Description
The photovoltaic generating facility and the associated 230-kV gen-tie line are collectively termed the "Mesquite Solar Energy project." The facility would be located 10 miles northeast of Gillespie and 50 miles west of Phoenix (Figure 1). The project site includes portions of Sections 18, 19, and 20 of Township 1 South, Range 6 West, and portions of Sections 13, 14, 15, and 24 of Township 1 South, Range 7 West, Gila and Salt River base and meridian. The site is divided into two adjacent parcels—a 2,480-acre parcel (Part 1), and a 1,280-acre parcel (Part 2). These lands are owned or controlled by Sempra. To avoid Federal Emergency Management Agency (FEMA)-designated 100-year floodplains, project development would occur on approximately 1,529 acres of Part 1 and 980 acres of Part 2 for a total project development boundary of 2,509 acres (Figure 2). The project site consists of undeveloped desert lands and former agricultural lands;

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there are two vacant rural residences on the project site that would be removed as part of the proposed action. The land use designation for the site is Industrial and the site is located within a zoning district that permits farm and non-farm residential and institutional uses. Existing land uses surrounding the project site consist of vacant desert and grazing lands.

The proposed project would consist of a solar field of ground-mounted thin film amorphous silicon/microcrystalline solar panels, an electrical collection system that converts generated power from direct current to alternating current, a substation, and a gen-tie power line. Site infrastructure would include driveways, drainage channels, a landscape screening berm, and fencing.

The 230-kV gen-tie power line would connect the Mesquite Solar Energy project to the existing Mesquite Generating Station switchyard located approximately 2.5 miles east of the project site. The power line would consist of two circuits on common structures in a 120-foot-wide corridor. The common structures would be 150-foot-high tubular steel monopoles on drilled shaft foundations. The span between supporting structures would be between 500 and 1,000 feet. The gen-tie line would originate at a new 230-kV switchyard on the project site (substation location) and would extend either 4.5 miles (preferred route) or 5.1 miles (alternate route) off-site, terminating at the existing 230-kV bus of the Mesquite Generating Station. The preferred and alternate gen-tie routes would cross private and state lands zoned by Maricopa County as Rural Densities, Dedicated Open Space, and Industrial. The gen-tie line would be an allowable use under these zoning designations.

Area of Potential Effects

The area of potential effects (APE) for the Mesquite Solar Energy project includes the 2,480-acre Part 1 lands, the 1,280-acre Part 2 lands, and the 4.5-mile preferred and 5.1-mile alternate gen-tie routes.

Identification of Historic Properties

Efforts to identify historic properties within the APE included three cultural resource surveys: 1) a Class I survey of Part 1 lands, one potential gen-tie route, and a one-mile buffer around these areas; 2) a Class III survey of the potential gen-tie route alignments; and 3) a Class III survey of Parts 1 and 2. These surveys are described below.

Class I Survey

In 2009, Sempra contracted PaleoWest to perform a Class I survey for Part 1 lands, one gen-tie route, and a one-mile buffer around these lands. The one-mile buffer included the eastern half of Part 2 of the project site. The results of this survey were reported in *A Class I Cultural Resources Study for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona*, dated February 17, 2009. No archaeological sites had been previously recorded on Part 1 or on the eastern half of Part 2. Site AZ T:9:63 (ASM), a historic road segment, had been previously recorded as crossing the proposed gen-tie power line route; this site has been determined to be ineligible for inclusion on the National Register of Historic Places. Fourteen archaeological sites had been recorded in

the buffer areas. Because of the presence of recorded archeological sites in the buffer areas, a Class III survey was recommended.

Class III Survey – Gen-Tie Routes

A Class III survey of State Land crossed by four potential gen-tie power line routes was conducted by PaleoWest in March 2009 (two of these routes have since been eliminated from consideration). The results of this survey were reported in *A Class III Cultural Resources Survey of Transmission Line Corridors on State Land for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona*, dated April 10, 2009. The survey identified the historic road segment described in the Class I survey, 17 isolated trail segments, and 5 other isolated occurrences. The survey determined that due to the absence of significant cultural resources within the study area, development of the gen-tie route would have no effect on historic properties. The State Historic Preservation Office concurred with the findings of this survey in a letter to Mr. John Foreman of the Arizona Power Plant and Transmission Line Siting Committee dated July 16, 2009.

Class III Survey – Parts 1 and 2

A Class III survey of Parts 1 and 2 was conducted by PaleoWest in February 2010. The results of this survey are reported in *A Class III Cultural Resources Survey of Approximately 3,760 Acres of Private Land for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona*, dated March 10, 2010. The survey recorded five new archaeological sites (three historic and two prehistoric) and also documented the recorded historic road segment. These sites are described in the table below.

Site Number	Description	NRHP Eligibility Recommendation
AZ T:9:63 (ASM)	Historic road segment (previously recorded)	Ineligible
AZ T:9:118 (ASM)	Small prehistoric artifact scatter	Ineligible
AZ T:9:119 (ASM)	Historic trash dumps	Ineligible
AZ T:9:120 (ASM)	Historic well	Ineligible
AZ T:9:121 (ASM)	Historic well	Ineligible
AZ T:9:122 (ASM)	Prehistoric artifact scatter	Eligible, Criterion D

As described above, the previously recorded historic road segment has been determined to be ineligible. The information potential of four of the other five sites is considered to have been exhausted through data collection and documentation during the Class III fieldwork. Therefore, these sites are recommended as ineligible for listing on the National Register, and no further treatment of these resources is warranted.

The fifth site, Site AZ T:9:122 (ASM), is a prehistoric artifact scatter measuring approximately 117 meters by 50 meters. This site, located 60 meters from the western boundary of the Part 2 parcel, may yield new or significant information on the local or regional prehistory of the area. Therefore, this site is recommended as eligible for the National Register under Criterion D. Site AZ T:9:122 (ASM) is outside of the project development boundary for the Mesquite Solar Energy project, and no surface disturbance

would occur within approximately 200 feet (60 meters) of the eastern edge of this potentially eligible resource.
The two vacant rural residences located on the project site were not found to be eligible for the National Register; the historic property inventory forms for these two structures have been included as enclosures to this correspondence.

Determination of Project Effect
By avoiding the one potentially eligible resource identified during the Class III survey of Part 1 and 2 lands, development of the Mesquite Solar Energy project would not adversely affect any historic properties within the APE. According, DOE has determined that a finding of "no historic properties affected" is appropriate for the Mesquite Solar Energy project.

DOE requests your concurrence with our conclusions of effect, and specifically on the "no historic properties affected" determination. Should you require additional information to facilitate your response, please contact me via email at joseph.marhamati@hq.doe.gov or via surface mail at the following address: U.S. Department of Energy, CF-1.3, 1000 Independence Ave. SW, Washington, DC 20585. I can also be reached by telephone at (202) 586-8198.

Respectfully,

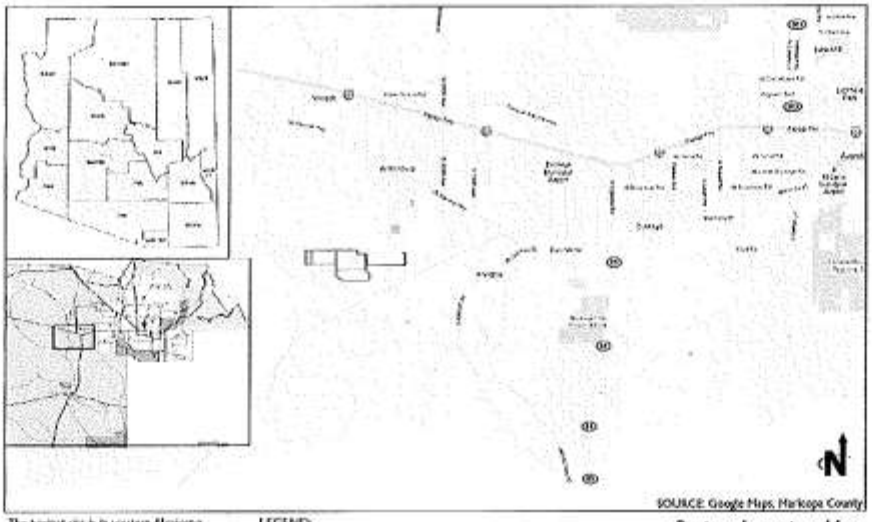
Joe Marhamati
Environmental Protection Specialist
DOE Loan Programs Office

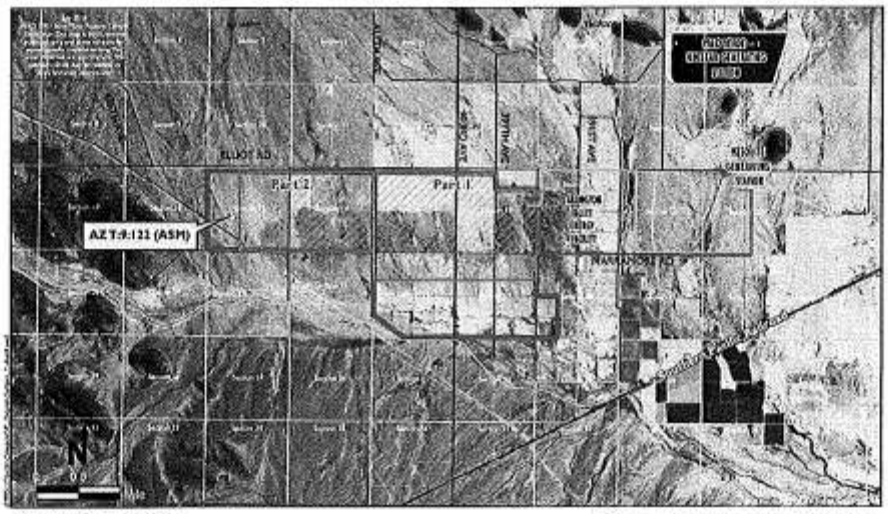
Enclosures:

Final Class III Cultural Resources Survey of Approximately 3,760 Acres of Private Land for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona, March 10, 2010.

Final Class III Cultural Resources Survey of Transmission Line Corridors on State Land for the Proposed Mesquite Solar Generation Project, Maricopa County, Arizona

State of Arizona Historic Property Inventory Forms


SOURCE: Google Maps, Maricopa County
The project site is in western Maricopa County, approximately 50 miles west of downtown Phoenix.
0 2 4
Miles
LEGEND:
Project Site Boundary
Project Development Boundary
Preferred Gen-Tie Route
Alternate Gen-Tie Route
Project Location Map
Mesquite Solar Energy Project
Figure 1


ELIOT RD
Part 2
Part 1
AZ T:9:121 (ASM)
Project development would occur outside of the FEMA 100-year floodplains. Project development acreage would be 1,529 acres on Part 1 lands and 980 acres on Part 2 lands.
Potentially Eligible Cultural Resource
Alternate Gen-Tie Route
Preferred Gen-Tie Route
Project Development Boundary
Project Site Boundary
Project Development Boundary
Mesquite Solar Energy Project
Figure 2

Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Louis J. Manuel Jr.
Chairman
Ak Chin Indian Community of the Marcopa
42507 W. Peters & Nall Road
Maricopa, AZ 85239

Re: Sempra Mesquite Solar Energy facility

Dear Chairman Manuel,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

Our records show that your Tribe has expressed an historical interest in Maricopa County. I am writing this letter to extend an opportunity to you to engage DOE in government to government consultation on the proposed Sempra project. Consideration of any comments or concerns you provide, particularly with regard to sites of religious and cultural significance, will help ensure that DOE complies with its NEPA and NHPA Section 106 responsibilities.

The proposed project would affect approximately 2,509 acres of land, which is currently fallow farmland. The site is in a rural area approximately 10 miles northeast of Gillespie and 50 miles west of Phoenix. Sempra would grade the site for construction; however, given the relatively level existing site slope, grading activities would be minimized. Our review of the project, which includes a Class III cultural resources survey, has not identified any historic or archeological resources, or sites of religious and cultural significance on the project site where Sempra plans to construct their solar field; however, we want to give you the opportunity to raise any issues or concerns you may have regarding the site. To assist you, a more detailed description of the proposed project and a map showing the site and its location are enclosed.

We would greatly appreciate receiving any comments or concerns you may have by July 28, 2010. Please send written comments to me at the following address: U.S. Department of Energy, 1000 Independence Ave., SW, CF-1.3, Washington, DC 20585. I can also be reached by telephone at 202-586-7248, or by email at matthew.mcmillen@hq.doe.gov.

Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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cc: Ms. Caroline Antone
Cultural Resource Manager
Ak-Chin Indian Community
47685 N. Eco Museum Road
Maricopa, AZ 85239

Project Maps

Project Description

The proposed action is the construction by Sempra Generation (Sempra) of a 400 megawatt (MW) photovoltaic solar power plant 10 miles northeast of Gillespie and 50 miles west of Phoenix. The proposed 2,509 acre site is currently fallow farmland. The facility will utilize thin film amorphous silicon/microcrystalline solar panels to convert sunlight into electricity. The electricity will be transferred by a four-mile transmission line to a substation, which will each be built by Sempra. The facility's panels will be grouped into 1 MW blocks, with one inverter and transformer station per block.

Sempra intends to grade the site to create a level surface for installation of the solar power blocks, however because of the level nature of the existing site these activities will be minimal. Construction of an access road and driveway will be necessary as well drainage and storm water controls.

The project site is predominantly previously irrigated agricultural land with limited undeveloped desert. The land use designation for the site is Industrial and the site is located within a zoning district that permits farm and non-farm residential and institutional uses. Existing land uses surrounding the project site consist of vacant desert and grazing lands.

According to information presented in a Class III Survey performed for the Project, all known Tribal and cultural resources can be avoided. This will help to ensure that the Project does not adversely affect sensitive Tribal or cultural resources eligible for listing on the National Register of Historic Places.

Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable William Rhodes
Governor
Gila River Indian Community
P.O. Box 97
Sacaton, AZ 85147

Re: Sempra Mesquite Solar Energy facility

Dear Governor Rhodes,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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cc: Mr. J. Andrew Darling
Coordinator, Cultural Resource Management Program
Gila River Indian Community
P.O. Box 2140, Sacaton, AZ 85147

Mr. Barnaby Lewis
Tribal Historic Preservation Officer
Gila River Indian Community
P.O. Box 2140, Sacaton, AZ 85147

Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Diane Enos
President
Salt River Pima-Maricopa Indian Community
Route 1, Box 216, 10005 E. Osborn Road
Scottsdale, AZ 85256

Re: Sempra Mesquite Solar Energy facility

Dear President Enos,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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cc: Ms. Wechoni Schurz
Cultural Resources Technician
Salt River Pima-Maricopa Indian Community
Cultural Resources Department
10005 E. Osborn Road, Scottsdale, AZ 85256

Ms. Angela Garcia
NAGPRA Coordinator
Salt River Pima-Maricopa Indian Community
Cultural Preservation Office
10005 E. Osborn Road, Scottsdale, AZ 85256

Mr. Shane Anton
Acting Cultural Programs Supervisor
Salt River Pima-Maricopa Indian Community
Cultural Preservation Office
10005 E. Osborn Road, Scottsdale, AZ 85256

Ms. Kelly Washington
Director, Cultural Resources Department
Salt River Pima-Maricopa Indian Community
Cultural Preservation Office
10005 E. Osborn Road, Scottsdale, AZ 85256

Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Leigh Kuwanwisiwma
Director, Cultural Preservation Office
Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Re: Sempra Mesquite Solar Energy facility

Dear Mr. Kuwanwisiwma,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Lorraine Eiler
Chairwoman
Hia C'ed Alliance
320 Estrella Ave.
Ajo, AZ 85321

Re: Sempra Mesquite Solar Energy facility

Dear Chairwoman Eiler,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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Department of Energy
Washington, DC 20585

JUN 28 2010

Mr. Peter Steere
Tribal Historic Preservation Officer
Tohono O'odham Nation
Cultural Affairs Office, P.O. Box 837
Sells, AZ 85634

Re: Sempra Mesquite Solar Energy facility

Dear Mr. Steere,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Delma Garcia
Chairwoman
Tohono O'odham Nation, Hickiwan District
HCO3 Box 873
Ajo, AZ 85321

Re: Sempra Mesquite Solar Energy facility

Dear Chairwoman Garcia,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Geneva S. Ramon
Chairwoman
Tohono O'odham Nation, Gu Vo District
P.O. Box 880
Ajo, AZ 85321

Re: Sempra Mesquite Solar Energy facility

Dear Chairwoman Ramon,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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Department of Energy
Washington, DC 20585

JUN 28 2010

Honorable Albert Manuel
Chairman
Tohono O'odham Nation, San Lucy District
1216 N. 307th Ave, P.O. Box GG
Gila Bend, AZ 85337

Re: Sempra Mesquite Solar Energy facility

Dear Chairman Manuel,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Sempra Generation (Sempra) for a Federal loan guarantee to construct a solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona. DOE will be performing an environmental review of the Sempra project in compliance with the National Environmental Policy Act (NEPA), and carrying out an historic resources review in compliance with Section 106 of the National Historic Preservation Act (NHPA).

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure

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AK-CHIN INDIAN COMMUNITY

Community Government

42507 W. Peters & Nall Road • Maricopa, Arizona 85138 • Telephone: (520) 568-1000 • Fax: (520) 568-1001

July 27, 2010

Mr. Matthew McMillen, Director
Environmental Compliance
DOE Loan Guarantee Program Office
U.S. Department of Energy
1000 Independence Ave., SW, CF-1.3
Washington, DC 20585

Re: Sempra Mesquite Solar Energy facility.

Dear Mr. McMillen:

The Ak-Chin Indian Community did receive your letter requesting for comments on the site of proposed solar photovoltaic power plant near the Town of Gillespie, Maricopa County, Arizona by Sempra Generation currently being evaluated by DOE Loan Guarantee Program Office.

The Ak-Chin Indian Community based on the location of the project, will defer consultation to the Gila River Indian Community, Historic Preservation Office, Sacaton, AZ.

If you should have any questions, please contact Mrs. Caroline Antone, Cultural Resources Manager at (520) 568-1372 or Mr. Gary Gilbert, Technician II at (520) 568-1369.

Sincerely,

Louis J. Manuel Jr., Chairman
Ak-Chin Indian Community

cc: Cultural Resources

CULTURAL SETTING

The cultural setting of the project site was documented in three cultural resource surveys prepared by PaleoWest under contract to Sempra—a Class I survey of Part 1, one potential gen-tie route, and a one-mile buffer around these areas (2009a); a Class III survey of Parts 1 and 2 (2010); and a Class III survey of the potential gen-tie routes (2009b). This setting has been extracted and is presented below.

Archaic Period

The earliest evidence of human occupation known for this area dates to the Middle Archaic period, approximately 5,000 years ago. Middle Archaic use of the area appears to have been on a temporary basis by residentially mobile hunter-gatherers. Habitation structures are generally absent or, if present, they are ephemeral in construction (Cordell 1997).

By 2,000 years ago, pit houses, ceramics, and intensively used ground stone assemblages signify the beginnings of sedentism in the Santa Cruz Valley (Huckell 1995). Groups living in this area are believed to have adopted maize and other cultigens by at least 2,000 years ago. Between 2,000 and 1,600 years ago, there is evidence that Late Archaic period groups across southern Arizona developed into the Hohokam culture.

Hohokam

The earliest Hohokam manifestation is a time when people subsisted on wild resources and agricultural products. Around A.D. 400, canal irrigation appeared along the Salt River (Ackerly and Henderson 1989). Domestic architecture was characterized by square and rectangular pit houses of various sizes (Ciolek-Torrello et al. 2000). The late Pioneer period, A.D. 650–750, saw the appearance of Hohokam decorated pottery (Estrella, Sweetwater, and Snaketown Red-on-buff) (Abbott 2001; Haury 1976; Wallace 2001). House types (moderate-sized pit structures with square or rectangular floor plans and formal, plastered hearths) associated with the late Pioneer period varied greatly.

During the Gila Butte and Santa Cruz phases of the Colonial period (A.D. 750–950) the Hohokam achieved their highest level of sophistication in the production of arts and crafts (particularly ceramics and shell). Ballcourts, which were first built in the early A.D. 800s, became the dominant form of public architecture in southern Arizona (Wallace 2001). The construction, expansion, and maintenance of irrigation systems of the Salt and Gila River valleys had a significant impact on Hohokam social and political organization (e.g., Abbott 2000).

The Sedentary period (Sacaton phase—A.D. 950–1150) saw a general decline in the quality of Hohokam material culture. By the end of the period, few ballcourts were being built and the construction of capped mounds or platform mounds became more common. Platform mounds were built near village centers around plazas surrounded by domestic features. Houses, which exhibited significant variability in form, were more closely packed and organized in courtyard groups or village segments (Wilcox, McGuire, and Sternberg 1981).

The Classic period is divided into the Soho (A.D. 1150–1300) and the Civano (A.D. 1300–1450) phases. Differences in ceramic decoration and architectural styles differentiate these two phases, with the introduction of long-necked jars marking a break with earlier ceramic styles. Structures with post-reinforced adobe walls and surface structures are common during the Soho phase. These were replaced by solid, adobe-walled surface rooms in the Civano phase, although the use of some pit houses

continued. The apex of Hohokam public architecture was achieved during the Civano phase with the building of "big houses."

The Classic period Hohokam subsisted increasingly upon domesticates, although agave and cholla continued to be commonly used (e.g., Miller 1994), and canal irrigation continued to be very important. Redwares and the disappearance of buffwares mark the Civano phase, although plainwares continue to dominate the total ceramic assemblage. Gila and Tonto Polychrome and local imitations are present after A.D. 1320 (Reid and Whittlesey 1992).

By the late Civano phase, the success the Hohokam had enjoyed had vanished. High population densities, depletion of food resources, decline in agricultural productivity, disease and malnutrition, flooding, drought, and the collapse of many irrigation systems are cited as reasons for the collapse of the Hohokam (e.g., Bayman 2001; Van Gerven and Sheridan 1994).

The post-Classic period (Polvorón phase—A.D. 1450–1540) in the Phoenix Basin is defined by jacal structures, polychrome ceramics, and an abundance of obsidian.

Prehistoric Yuman (Patayan)

The Prehistoric Yuman (Patayan) people occupied the desert territory in the southwestern part of Arizona. From an archaeological perspective, the Patayan is one of the most poorly known prehistoric cultures of the Southwest (Reid and Whittlesey 1997:111).

According to Waters (1982), Patayan I (A.D. 700–1000) begins in the A.D. 700s with the expansion of Patayan peoples out of southern California. Patayan I peoples were apparently highly mobile and actively engaged in trade. In southwestern Arizona, these early Patayan came into contact with the Hohokam, while to the north they were influenced by interaction with the Anasazi (Rogers 1945). Patayan I is defined by the presence of four major ceramic types: Black Mesa Buff, Colorado Beige, Colorado Red, Colorado Red-on-beige (Waters 1982).

Patayan I ceramics were made from the fine-textured, buff-colored clays deposited by the Colorado River. Sites with Patayan I ceramics extend from near El Centro, California, eastward to the vicinity of Gila Bend, Arizona, with Parker, Arizona, being the point of their most northern distribution and the Sierra Pinacate, Sonora the southern extent (McGuire 1982; Waters 1982). McGuire (1982:219) noted that the distribution of Patayan II and III ceramics does not differ significantly.

Little is known of Patayan II society and its socioeconomic and political organization. Sites are common in the Lower Colorado River valley, in the Gila River valley, and along the shore of Lake Cahuilla. There was increased interaction with the Hohokam in the western desert area of Arizona and it appears that a group of Patayan occupied a residential area within the large Hohokam site of Las Colinas in the Phoenix Basin (Reid and Whittlesey 1997:123).

The Patayan III period (A.D. 1500–1850) represents a significant shift in settlement, with movement away from the Salton Trough (although some occupation continued there). It is during this time that Lower Colorado Buffwares reach their maximum distribution; from the Pacific coast eastward to Phoenix, from southern Nevada southward to the Colorado River delta (Waters 1982:291–293). This expansion of Patayan populations is likely associated with the desiccation of Lake Cahuilla (Rogers 1945).

The co-occurrence of Patayan and Hohokam materials over a broad expanse of territory suggests a long history of trade and interaction, and even co-residence, as at the site of Las Colinas in Phoenix (Reid and Whittlesey 1997:122–126). The history of interaction between Hohokam and Patayan groups started as early as A.D. 900, when Patayan ceramics first appear at Hohokam sites in the Gila Bend area. This area is seen as an important locus for the interaction and intermixture of these two cultural groups; however, many of the Patayan sites in these areas were small, specialized procurement loci. After the demise of the Hohokam, prehistoric Patayan populations are believed to have spread east along the Gila River until they reached the distribution observed by Spanish explorers in the eighteenth century (McGuire 1982:219; Reid and Whittlesey 1997:124).

Historic Period

The Historic period began with the first Spanish explorations into Arizona in the late 1600s. Permanent Euroamerican settlements in the Salt River Valley and nearby environs began in the late 1860s. In the immediate region around the project area, historic uses reflect its marginal setting relative to important historical locations such as Phoenix and Prescott. The Santa Fe, Prescott, and Phoenix Railroad was constructed through the area in 1895, linking Phoenix with the mining communities in Yavapai County and the main Santa Fe transcontinental railroad across northern Arizona. The Southern Pacific Railroad (SPRR) was established further to the south and that corridor, later known as the Gila Trail and which eventually became the Butterfield Stage Overland Route, has a long history.

Much of the influx of people into the area can be traced to mining, and subsequent homesteading. Though homesteading, mining, and farming were all tried in the area through the early part of the 20th century, the economy and population of the region grew only a small amount until recent master planned residential developments began attracting residents.

References (from PaleoWest 2010)

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