DOE/EA-1683

FINAL ENVIRONMENTAL ASSESSMENT

FOR

DEPARTMENT OF ENERGY LOAN GUARANTEE TO ABENGOA SOLAR INC. FOR THE SOLANA THERMAL ELECTRIC POWER PROJECT NEAR GILA BEND, ARIZONA

U.S. Department of Energy
Loan Guarantee Program Office
Washington, DC 20585

May 2010

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ACRONYMS AND ABBREVIATIONS

ADEQ	Arizona Department of Environmental Quality
AGFD	Arizona Game and Fish Department
APE	area of potential effects
ASLD	Arizona State Land Department
ASM	Arizona State Museum
BLM	U.S. Bureau of Land Management
BMPs	best management practices
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSP	concentrating solar power
dBA	A-weighted decibel
DOE	U.S. Department of Energy
EA	Environmental Assessment
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GBPP	Gila Bend Power Partners, LLC
IPCC	Intergovernmental Panel on Climate Change
LOS	level of service
MCAQD	Maricopa County Air Quality Department
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRCS	Natural Resources Conservation Service
PCSs	petroleum-contaminated soils
PIDD	Paloma Irrigation and Drainage District
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RECs	Recognized Environmental Conditions
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
TMDLs	total maximum daily loads

U.S.C.	United States Code
VOC	volatile organic compound
VRM	visual resource management

SUMMARY

The U.S. Department of Energy (DOE) is considering whether to issue Abengoa Solar, Inc. a loan guarantee for construction of a 280 megawatt gross output (250 megawatt nominal output) concentrating solar power (CSP) plant (Solana Generating Plant) and associated 230 kilovolt transmission line (Solana Gen-Tie) near Gila Bend, Arizona. The plant and associated transmission line are collectively called the Solana CSP Project.

DOE prepared the Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA; 42 United States Code [U.S.C.] 4321 *et seq.*), Council on Environmental Quality NEPA implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500−1508), and DOE NEPA implementing procedures (10 CFR 1021). The EA analyzes the potential environmental impacts of the Proposed Action and No-Action Alternative and determines whether the Proposed Action would have the potential to result in significant environmental impacts. The EA provides DOE with the environmental information to help decide whether to issue Abengoa Solar a loan guarantee for the Solana CSP Project.

Purpose and Need for Agency Action

The purpose and need for agency action is to comply with the DOE mandate under the Energy Policy Act of 2005 by selecting eligible projects that meet the goals of the act. DOE is using the NEPA process to assist in determining whether to issue a loan guarantee to Abengoa Solar to support the proposed Solana CSP Project.

The Energy Policy Act of 2005, as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, authorized DOE to issue loan guarantees for projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." Title XVII identified 10 categories of technologies and projects potentially eligible for loan guarantees, including those for renewable energy technologies. The two primary goals of the Title XVII loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits. As required by the Energy Policy Act, Solana would employ energy efficiency, reduce reliance on foreign sources of energy, and contribute to the avoidance and reduction of air pollutants and anthropogenic emissions of greenhouse gases. Once constructed and operating at full capacity, Solana would produce enough electricity to power approximately 70,000 Arizona homes and provide customers with solar-generated electricity. Solana would reduce the need for electricity from conventional generation facilities, and compared to a traditional natural-gas-fired facility, it would avoid annual emissions of greenhouse gases and other air pollutants.

Proposed Action and Alternatives

Proposed Action

The DOE Proposed Action is to issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project. Construction would begin at the end of 2010, and the plant would be expected to be operational by June 2013.

Solana would use CSP technology to capture heat generated by sunlight and turn that heat into electricity. CSP works by using parabolic trough systems to concentrate energy from the sun through long, curved mirrors. Approximately 2,700 trough collectors covering roughly 1,757 acres (3 square miles) would comprise the Solana "solar field." Each row of parabolic trough collectors would be approximately 25 feet wide, 500 feet long, and more than 20 feet tall.

The parabolic trough systems would be tilted toward the sun and focus sunlight on a pipe running down the center of the trough. Heat from sunlight would warm an organic synthetic oil, known as heat transfer fluid, which would flow through the pipe to the power island. The heat transfer fluid would serve as the working fluid of the collector field, and would provide a means for transferring the collected solar energy to the heat exchangers. The collected solar energy would be used to convert water to steam for use in a conventional steam turbine generator to produce electricity. Solana would employ molten salt storage tanks to retain and store up to 6 hours of heat, which could be dispatched as needed, and would allow Solana to produce electricity on cloudy days and after sunset.

The Solana Generating Plant would interconnect to the regional transmission grid via the proposed Solana Gen-Tie transmission line. The proposed 230 kilovolt single-circuit transmission line would originate at the Solana site and terminate at the existing Arizona Public Service Company Panda Substation, approximately 18.2 miles east of the Solana site. The Solana Gen-Tie would consist of transmission structures, single-circuit conductors (three wires), and two overhead ground wires, one of which would contain a fiber-optic cable to serve as a communications system for the Solana CSP Project. The transmission structures would be steel monopoles approximately 100 to 140 feet tall, depending on the span length required, with a maximum height of 190 feet above the ground surface. Typical 230 kilovolt span lengths would be approximately 800 to 1,000 feet. An access road might be required along limited portions of the corridor for construction of the Solana Gen-Tie transmission line.

No-Action Alternative

This EA also evaluates a No-Action Alternative, which assumes DOE would not issue Abengoa Solar a loan guarantee for the proposed Solana CSP Project and Abengoa Solar would not proceed with the project. Abengoa Solar has determined that timelines associated with pursuing alternative financing would be inconsistent with construction deadlines established to honor executed commercial agreements. Therefore, this EA does not evaluate alternative sites or methods of financing.

Summary of Environmental Impacts

DOE has determined that there would be no significant adverse impacts to the resources analyzed in this EA as a result of the Proposed Action.

The Proposed Action would result in direct and indirect beneficial impacts to socioeconomics through the creation of between 1,600 and 1,700 construction jobs and 85 permanent jobs. Additional beneficial economic impacts would include an estimated 300 to 400 million dollars in 30-year tax revenues and the addition of more than 1 billion dollars in gross state product to Arizona's economy.

Implementation of the Proposed Action would convert agricultural land to solar energy production, which would reduce current water usage by more than 75 percent, thereby reducing demand on Arizona's water supply. Conversely, taking agricultural land out of production would incrementally reduce the amount of available farmland in Maricopa County. However, the potential for redistributing the irrigation water made available by taking the Solana site out of crop production would enable adjacent farms to increase productivity through higher crop yield.

Under the Proposed Action, there would be beneficial impacts to global climate change and air quality. The Proposed Action would avoid annual emissions of carbon dioxide by more than 475,000 tons if an equivalent amount of electric power was produced using natural gas. Furthermore, compared to natural gas, the Solana CSP Project would avoid emissions of more than 520 tons of sulfur dioxide and more than 1,065 tons of nitrogen.

Under the No-Action Alternative, there would be no beneficial impacts of bringing additional renewable energy capacity to market. Not constructing the Solana CSP Project would decrease the potential for replacing energy sources that burn fossil fuels with renewable solar energy. The benefits of avoided emissions of greenhouse gases and other air pollutants by replacing fossil-fuel-fired electric generation would not occur. Under the No-Action Alternative, none of the beneficial economic impacts described for the Proposed Action would occur. Water demand to support continued agricultural production of the land would be greater under the No-Action Alternative.

1 PURPOSE AND NEED FOR AGENCY ACTION

The Energy Policy Act of 2005, as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, authorized the U.S. Department of Energy (DOE) to issue loan guarantees for projects that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." Title XVII identifies 10 categories of technologies and projects potentially eligible for loan guarantees, including those for renewable energy technologies. The two primary goals of the Title XVII loan guarantee program are to encourage commercial use in the United States of new or significantly improved energy-related technologies and to achieve substantial environmental benefits.

Abengoa Solar, Inc. submitted an application to DOE under the federal loan guarantee program pursuant to the Energy Policy Act to support construction of a 280 megawatt gross output (250 megawatt nominal output) concentrating solar power (CSP) plant.[1] The project would include 6 hours of thermal energy storage capability, which would allow energy to be dispatched as needed during cloudy periods and after sunset. This facility is referred to as the Solana Generating Plant or Solana.

The purpose and need for agency action is to comply with the DOE mandate under the Energy Policy Act by selecting eligible projects that meet the goals of the act. DOE is using the National Environmental Policy Act of 1969 (NEPA) process and this Environmental Assessment (EA) to help determine whether to issue Abengoa Solar a loan guarantee to support the proposed project.

Once constructed and operating at full capacity, Solana would produce enough electricity to power approximately 70,000 Arizona homes and provide customers with solar-generated electricity. Solana would employ energy efficiency, reduce reliance on foreign sources of energy, and contribute to the avoidance and reduction of air pollutants and anthropogenic emissions of greenhouse gases, as required by the Energy Policy Act. Solana would reduce the need for electricity from conventional generation facilities and, compared to a traditional natural-gas-fired facility, would avoid annual emissions of greenhouse gases and other air pollutants as follows: 475,000 tons of carbon dioxide, 520 tons of sulfur dioxide, and 1,065 tons of nitrogen.

1.1 Scope of the Environmental Assessment

This EA provides information about the potential impacts associated with issuing Abengoa Solar a loan guarantee and covers construction and operation of the Solana Generating Plant, the Solana Gen-Tie transmission line, and associated facilities. DOE prepared this EA in accordance with NEPA (42 United States Code [U.S.C.] 4321 *et seq.*), Council on Environmental Quality (CEQ) NEPA implementing regulations (40 Code of Federal Regulations [CFR] Parts 1500−1508), and DOE NEPA implementing procedures (10 CFR 1021). If it does not identify significant impacts during preparation of this EA, DOE will issue a Finding of No Significant

[1] The amount requested for the loan guarantee is not being disclosed at this time because it is business sensitive. Moreover, if DOE issued Abengoa Solar a loan guarantee, the amount could differ from the original request.

Impact. If it identifies potentially significant impacts, DOE will prepare an Environmental Impact Statement.

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 in the surrounding area; and (4) provides DOE with environmental information for use in decisionmaking to protect, preserve, and enhance the human environment and natural ecosystems.

1.2 Public Participation

Under CEQ NEPA regulations, scoping is not formally required for the preparation of an EA (40 CFR Part 1501). However, since February 2008, Abengoa Solar has conducted an extensive public participation program as part of its state and local permitting requirements. The public outreach efforts focused on distributing information and soliciting input from the public and interested stakeholders. Information-sharing opportunities included a project kick-off meeting, one-on-one briefings, stakeholder meetings, open houses, a project website, fact sheet, and telephone information line. Table 1-1 summarizes the public outreach efforts.

Table 1-1 Public Outreach Summary

Date	Venue/Location	Time	Notice	Attendance
February 21, 2008	Abengoa Solar and Arizona Public Service Company sponsored a Solana kick-off event at the Arizona Science Center	All day function	Media coverage: ABC 15, Arizona Family 3, CBS 5, Fox 10 News, Telemundo, and Arizona Republic	N/A
March 27, 2008	Stakeholder Meeting Desert Willow Conference Center, Phoenix	9:30 a.m. – 12:30 p.m.	Invitation mailer, courtesy calls	9
April 10, 2008	Open House Elks Lodge, Gila Bend	5:00 p.m. – 8:00 p.m.	Zip code mailing, local posters, Gila Bend Sun and Arizona Republic advertisements	114
June 5, 2008	Stakeholder Meeting Desert Willow Conference Center, Phoenix	9:30 a.m. – 12:30 p.m.	Invitation mailer, courtesy calls	27
June 19, 2008	Open House, Elks Lodge 1400 East Pima Street Gila Bend	4:30 p.m. – 7:30 p.m.	Zip code mailing, local posters, Gila Bend Sun and Arizona Republic advertisements	51
June 27, 2008	Citizen Notification Letter of Application – Comprehensive Plan Amendment	N/A	Letter mailed to property owners within 300 feet of the project boundary	N/A

Table 1-1 Public Outreach Summary

Date	Venue/Location	Time	Notice	Attendance
September 22 - 23, 2008	Certificate of Environmental Compatibility – Arizona Line Siting Hearings	9:30 a.m. – 5:00 p.m.	Arizona Republic advertisements, Notice of Hearing posted by the Arizona Corporation Commission Line Siting Committee	120
September 22 - 23, 2008	Certificate of Environmental Compatibility – AZ Line Siting Hearings Public Comment Period	6:00 p.m. – 7:00 p.m.	Arizona Republic advertisements, Notice of Hearing posted by the Arizona Corporation Commission Line Siting Committee	10
September 24, 2008	Certificate of Environmental Compatibility – Arizona Line Siting Hearings Public Tour of Facility	8:00 a.m.- 11:00 a.m.	Arizona Republic advertisements, Notice of Hearing posted by the Arizona Corporation Commission Line Siting Committee	4
October 14, 2008	Certificate of Environmental Compatibility – Arizona Line Siting Hearings	9:30 a.m. – 5:00 p.m.	Arizona Republic advertisements, Notice of Hearing posted by the Arizona Corporation Commission Line Siting Committee	35
November 5,2008	Comprehensive Plan Amendment Public Notice Commission and Board Hearings	N/A	Letter mailed to property owners within 300 feet of the project boundary	45
November 20, 2008	Planning Commission Hearing – Comprehensive Plan Amendment	8:00 a.m. – 12:00 p.m.	Letters and signs advertising	55
December 5, 2008	Certificate of Environmental Compatibility – Arizona Corporation Commission Open Meeting	9:00 a.m. – 7:00 p.m.	Notice provided by Arizona Corporation Commission	35
December 17, 2008	Comprehensive Plan Amendment – Maricopa County Board of Supervisors Meeting, Phoenix	8:00 a.m. – 12:00 p.m.	Letters and signs advertising	65
April 22, 2009	Stakeholder Meeting, Phoenix	11:30 a.m. – 1:30 p.m.	Invitation mailer, courtesy calls, and emails	23
October 19, 2009	Open House, Gila Bend	4:30 p.m.- 8:30 p.m.	Letter mailed to property owners within 300 feet of project boundary, courtesy calls, letter to stakeholders, and flyers posted locally	56

The Solana CSP Project has gained support from Sierra Club, Sonoran Institute, the Town of Gila Bend, Barry M. Goldwater Range,[2] Maricopa County (through the Comprehensive Plan Amendment process and other county-level permitting), and the State of Arizona (through environmental approval by the Arizona Corporation Commission) (see Appendix A). Issues and concerns were identified and addressed throughout the state and county processes, and have been carried forward into this EA. Table 1-2 summarizes the topics of concern and provides a brief response to each issue identified during the public participation effort. The informal setting of the open houses emphasized one-on-one exchanges, giving the public ample opportunity to ask questions and express their concerns.

Table 1-2 Summary of Issues and Concerns Identified During Public Outreach

Concern	Response
Exactly what property is included in the project?	Vicinity maps were included as a part of the various handouts available at the open house and stakeholder meetings, online, and via email or mail, if requested.
Will power line routes minimize the impacts on farming?	The transmission line would be comprised of monopole transmission structures, to reduce the structural footprint, thus minimizing impacts on farming.
How will noise impacts be controlled?	Noise sources would be located primarily in the center of the solar field within the power block, approximately one mile from the Solana site boundary. Noise produced within the power block would attenuate quickly and blend with existing background noise levels at the site boundary.
How will weeds be controlled?	Weed control would be addressed during construction activities as part of site grading. Once Solana is operational, weed control would be part of the facility's routine maintenance.
Is there any glare from mirrors?	The parabolic trough collectors focus energy onto receiver tubes located at the focal point. The receiver tubes are designed to maximize the collection of solar energy and do not produce glare. Given the proximity of the Barry M. Goldwater Range to the project, Abengoa Solar met with Luke Air Force Base representatives as part of the ongoing public outreach program. Abengoa Solar is committed to ensuring the Solana CSP Project is compatible with Barry M. Goldwater Range operations.
Will brine ponds be lined and monitored to prevent and detect leaks?	The brine ponds, or evaporation ponds, would be double-lined and have a leak detection system. In addition, Abengoa Solar is required to obtain an aquifer protection permit from the Arizona Department of Environmental Quality, which will address pond size, lining technology, and monitoring plans.
Will Gila Bend get the power that is supplied by Solana?	The power generated by the Solana Generating Station would be transmitted via transmission lines to the Arizona Public Service Company power grid which serves Gila Bend and other surrounding areas.

[2] The 56th Fighter Wing Range Management Office of Luke Air Force Base is responsible for all flight operations and environmental management activities associated with the eastern portion of the Barry M. Goldwater Range (closest to the Solana site); Marine Corps Air Station Yuma manages the western portion.

Table 1-2 Summary of Issues and Concerns Identified During Public Outreach

Concern	Response
What about impacts to surrounding communities? How do you propose to mitigate them?	The Solana CSP Project would not have negative impacts on surrounding communities, and therefore no mitigation has been developed. The project would result in direct and indirect beneficial impacts to the community through the creation of construction and permanent jobs. In addition, the Solana CSP Project would contribute to Gila Bend's local economy by its workforce spending at local businesses.
Will Solana keep holding open houses and public meetings to help keep the public informed?	Abengoa Solar will continue to update online information and meet with various stakeholders and interested parties as appropriate. As required by Maricopa County, Abengoa Solar will post additional signs as the special use permit moves forward through the public hearing process. Abengoa Solar will consider additional open houses, as appropriate.

1.3 Document Organization

This EA is organized as follows:

Chapter 1, Purpose and Need, describes the purpose of and need for the proposed DOE action and the scope of the analysis, and summarizes the public participation program for the Solana CSP Project. It also describes the organization of the EA.

Chapter 2, Proposed Action and Alternatives, describes the DOE Proposed Action, the project, alternative locations considered but eliminated, and the No-Action Alternative.

Chapter 3, Affected Environment and Environmental Consequences, describes the existing baseline conditions of the resources the Proposed Action could affect (including land use, visual resources, air quality and climate change, noise, geology and seismicity, water resources, biological resources, cultural resources, socioeconomics, environmental justice, public health and safety, and transportation) and the potential social, economic, and environmental effects associated with the Proposed Action and No-Action Alternative.

Chapter 4, Cumulative Effects, describes potential impacts to the environment from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.

Chapter 5, List of Preparers, identifies the persons who prepared the EA and provides a brief description of their credentials.

Chapter 6, Agencies and Native American Tribes Contacted, lists agencies and Native American tribes contacted regarding this EA.

Chapter 7, References, lists the sources of information used to prepare this EA.

Appendices A through F provide supporting information.

1.4 Availability of the Environmental Assessment

DOE distributed the draft EA to representatives of the state and county, including the Arizona Department of Environmental Quality and Maricopa County Planning and Development Department, and to interested tribes for review and comment for a period of 21 days. Concurrently, DOE made a complete copy of the draft EA available for public review in the reading room at the Gila Bend Public Library at 202 Euclid Avenue in Gila Bend, Arizona, and at the Gila Bend High School library at 308 North Martin Avenue in Gila Bend, Arizona. The Final EA is also available on the DOE Loan Guarantee Program Office NEPA documents webpage (located at http://www.lgprogram.energy.gov/NEPA-1.html).

2 PROPOSED ACTION AND ALTERNATIVES

This chapter describes the DOE Proposed Action and the Solana CSP Project, alternative locations considered but eliminated from analysis, and the No-Action Alternative.

2.1 Proposed Action

The DOE Proposed Action is to issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project. Solana would be a 280 megawatt gross output (250 megawatt nominal output) CSP electric generating plant on private land west of the Town of Gila Bend, Arizona. Comprised of approximately 3,107 acres, the Solana site is generally north of Interstate 8, west of Painted Rock Dam Road, south of Powerline Road, and east of U.S. Bureau of Land Management (BLM) land within unincorporated Maricopa County. Figure 2-1 shows the location of the Solana site.

Abengoa Solar owns most of the 3,107-acre Solana site. Approximately 100 acres within the Solana site boundary contain irrigation infrastructure currently owned, operated, and maintained by the Paloma Irrigation and Drainage District (PIDD). This infrastructure provides irrigation water delivery to existing agricultural operations adjacent to the site. As part of the Solana CSP Project design, this infrastructure would be relocated to maintain the integrity of the PIDD irrigation water delivery system. Abengoa Solar is negotiating with PIDD to purchase the interrelated land ownership. In addition to the 3,107-acre Solana site, the Abengoa Solar property includes a portion of an approximately 0.5-acre earthen-lined reservoir north of Powerline Road and adjacent to the Solana site. This reservoir is one of several features (such as canals, reservoirs, and relift pumps) north of Powerline Road, which PIDD created to support irrigation water delivery to farms adjacent to the Solana site.

Solana would use CSP technology to capture heat generated by sunlight and turn that heat into electricity. CSP works by using parabolic trough systems to concentrate energy from the sun through long, curved mirrors. Approximately 2,700 trough collectors covering roughly 1,757 acres (3 square miles) would comprise the Solana "solar field." Each row of parabolic trough collectors would be approximately 25 feet wide, 500 feet long, and more than 20 feet tall.

The parabolic trough systems would be tilted toward the sun and focus sunlight on a pipe running down the center of the trough (Figure 2-2). Heat from sunlight would warm an organic synthetic oil, known as heat transfer fluid, which would flow through the pipe to the power island.

The heat transfer fluid would serve as the working fluid of the collector field, and would provide a means for transferring the collected solar energy to the heat exchangers. At the power island, the heat transfer fluid would be used to convert water to steam for use in a conventional steam turbine generator to produce electricity. Solana would use two steam turbine generators to generate electricity (Figure 2-3). In addition, the heat transfer fluid would flow into molten salt storage tanks that retain and store up to 6 hours of heat that could be dispatched as needed (Figure 2-4). The molten salt heat storage tanks would allow Solana to produce electricity on cloudy days and after sunset.

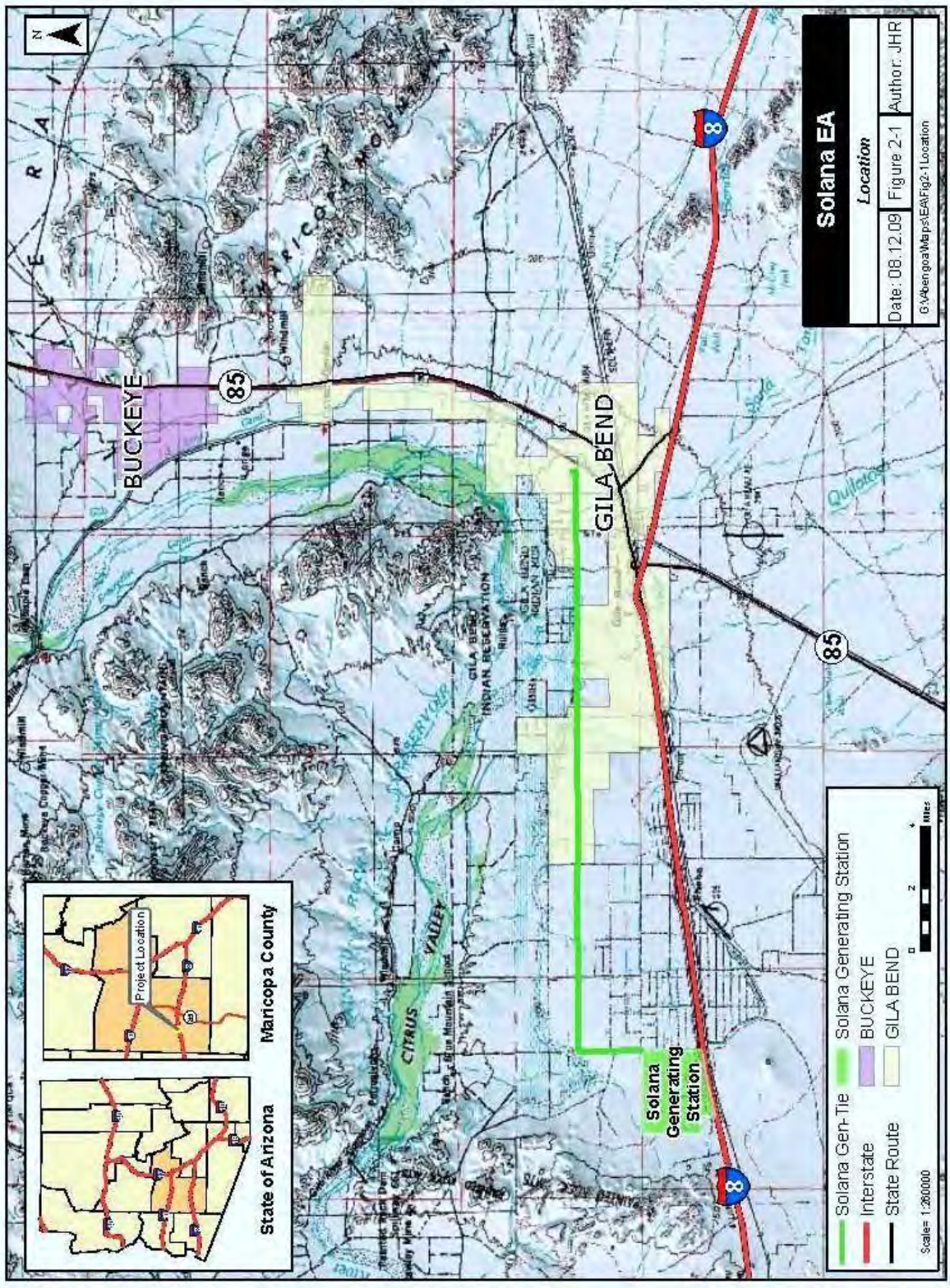

Figure 2-1 Solana Location Map

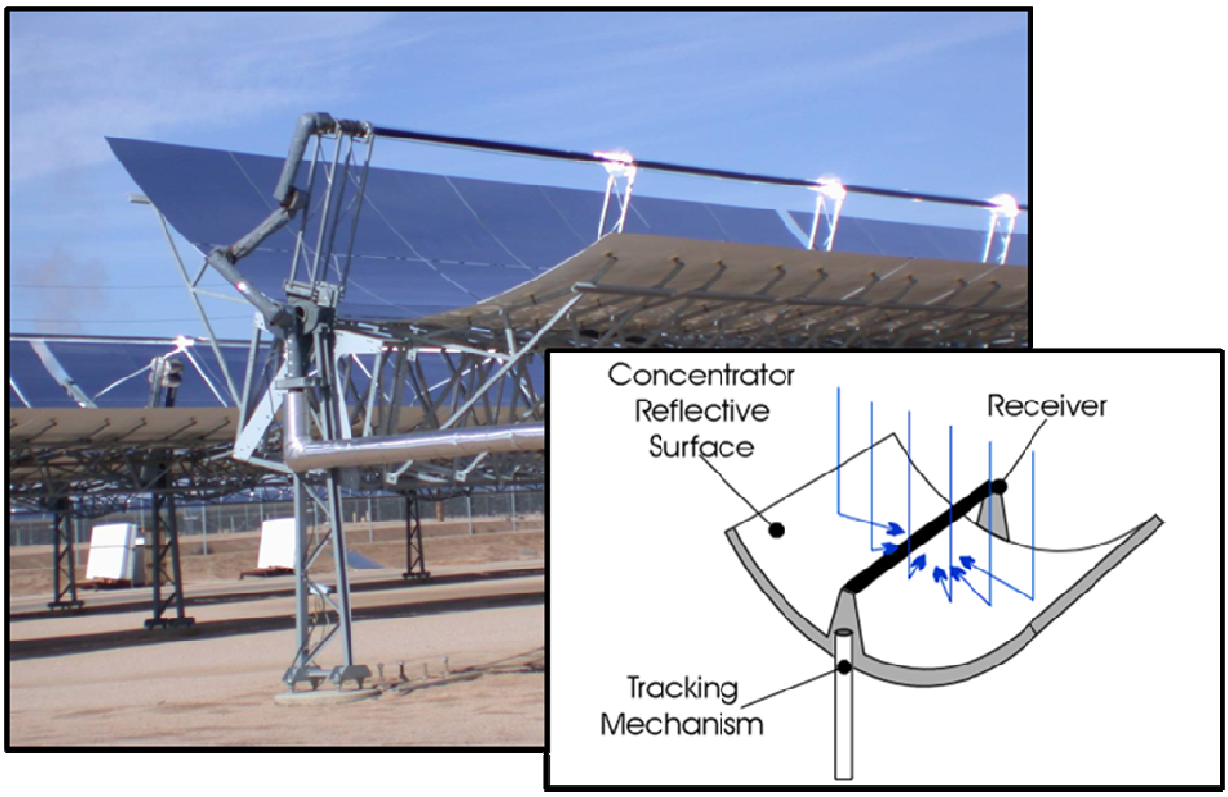

Figure 2-2 Parabolic Trough[3]

[3] Figure 2-2 shows a typical parabolic trough at the Solar Energy Generating Systems in California, and is intended as a representative illustration. The actual design of the parabolic troughs at Solana could vary from this depiction.

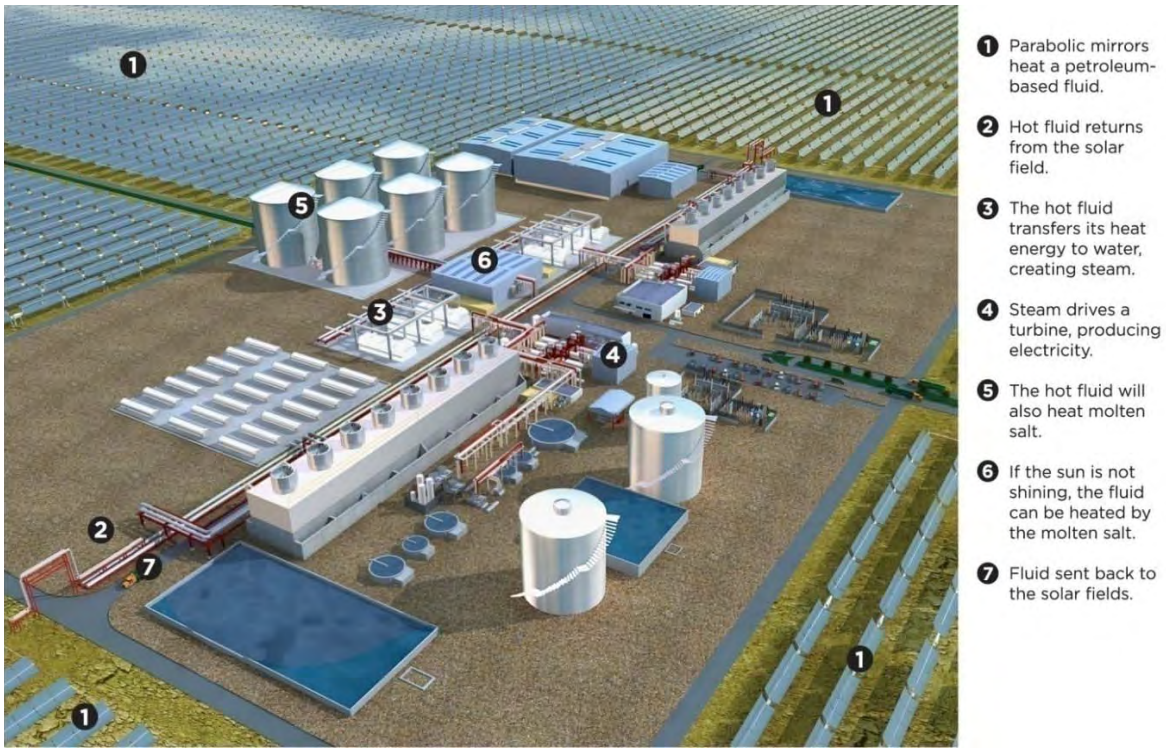

Figure 2-3 Solana Generating Station Diagram

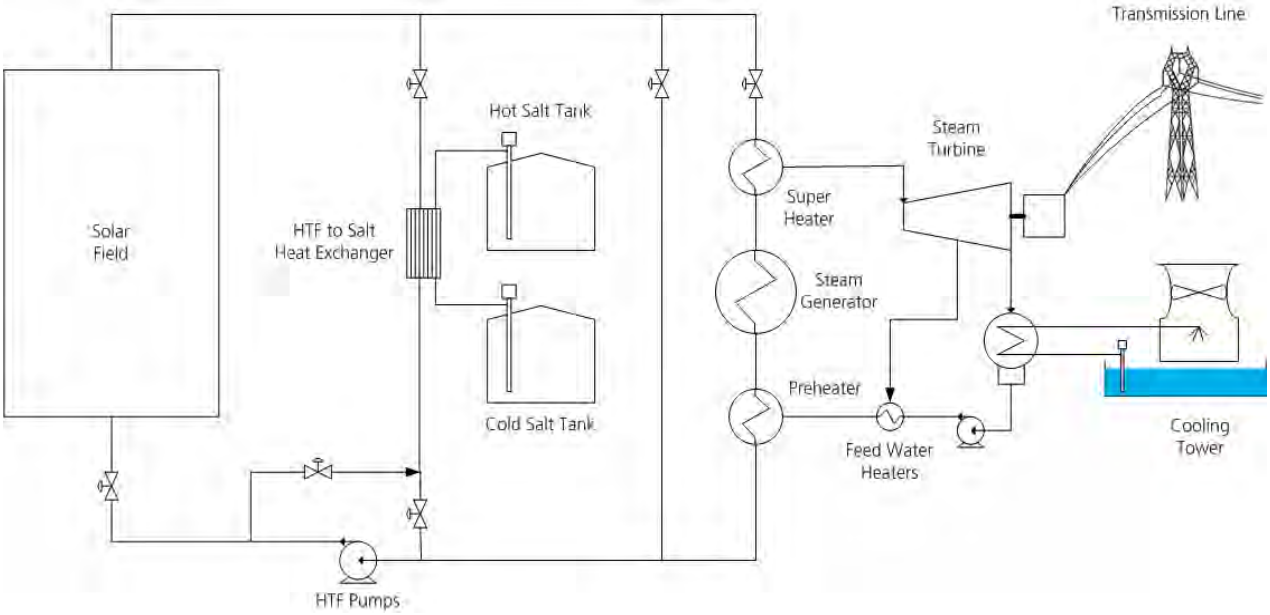

Figure 2-4 Thermal Energy Storage System

In addition to the facilities described above, Solana would include onsite supporting infrastructure, including an administration building, solar assembly area, an inlet air cooling system, water treatment and storage facilities, new access roads, evaporation ponds, and retention ponds.

The Solana site would include evaporation ponds to manage industrial wastewater generated during facility operations. The industrial wastewater generated during operations would primarily be from the cooling towers. As the steam leaves the turbines, it would enter the cooling towers, where it would be cooled through condensation. Through this process, approximately 1 to 2 percent of the circulating water would be lost through evaporation.

To minimize corrosion and the formation of mineral scale in the cooling towers, chemical inhibitors would be added to the circulating water. To maintain acceptable levels of total dissolved solids in the circulating water, a portion of the water would be removed and replaced with fresh water. The amount of water removed from circulation is referred to as blow-down.

Cooling tower blow-down would be piped to the evaporation ponds. The evaporation ponds would be double-lined and have a leak detection system. As preventive maintenance, the evaporation ponds could require cleaning every 3 to 5 years. The evaporation ponds would be designed for 100-percent redundancy; that is, the size of an individual pond or the total number of evaporation ponds considered necessary for Solana would be doubled to ensure adequate capacity. The evaporation pond requirements for Solana would be determined through further engineering and design, and designed in compliance with an aquifer protection permit.

Retention ponds would be constructed to manage storm water runoff from the site. Runoff from the Solana site would be routed to the retention ponds to remove pollutants and improve water quality before release. The retention ponds would be designed to allow for a controlled release over a 36-hour period. The size and location of the retention ponds would be determined during final engineering and design.

The power island, which would include the entire supporting infrastructure except for the retention ponds, would occupy an approximately 56.2-acre block within the 3,107-acre Solana site. Water consumption required for Solana operations is estimated to be 3,000 acre-feet per year.

Solana would interconnect to the regional transmission grid via the proposed Solana to Panda 230 kilovolt transmission line (Solana Gen-Tie). The proposed single-circuit transmission line would originate at the Solana site and terminate at the existing Arizona Public Service Company Panda Substation. The length of the Solana Gen-Tie route from the northeast corner of the Solana site to the interconnection point at Panda Substation is approximately 18.2 miles, of which 8.2 miles follow an existing transmission line corridor. An access road might be required along limited portions of the corridor for construction of the Solana Gen-Tie alignment. Figure 2-5 illustrates the Solana Gen-Tie alignment.

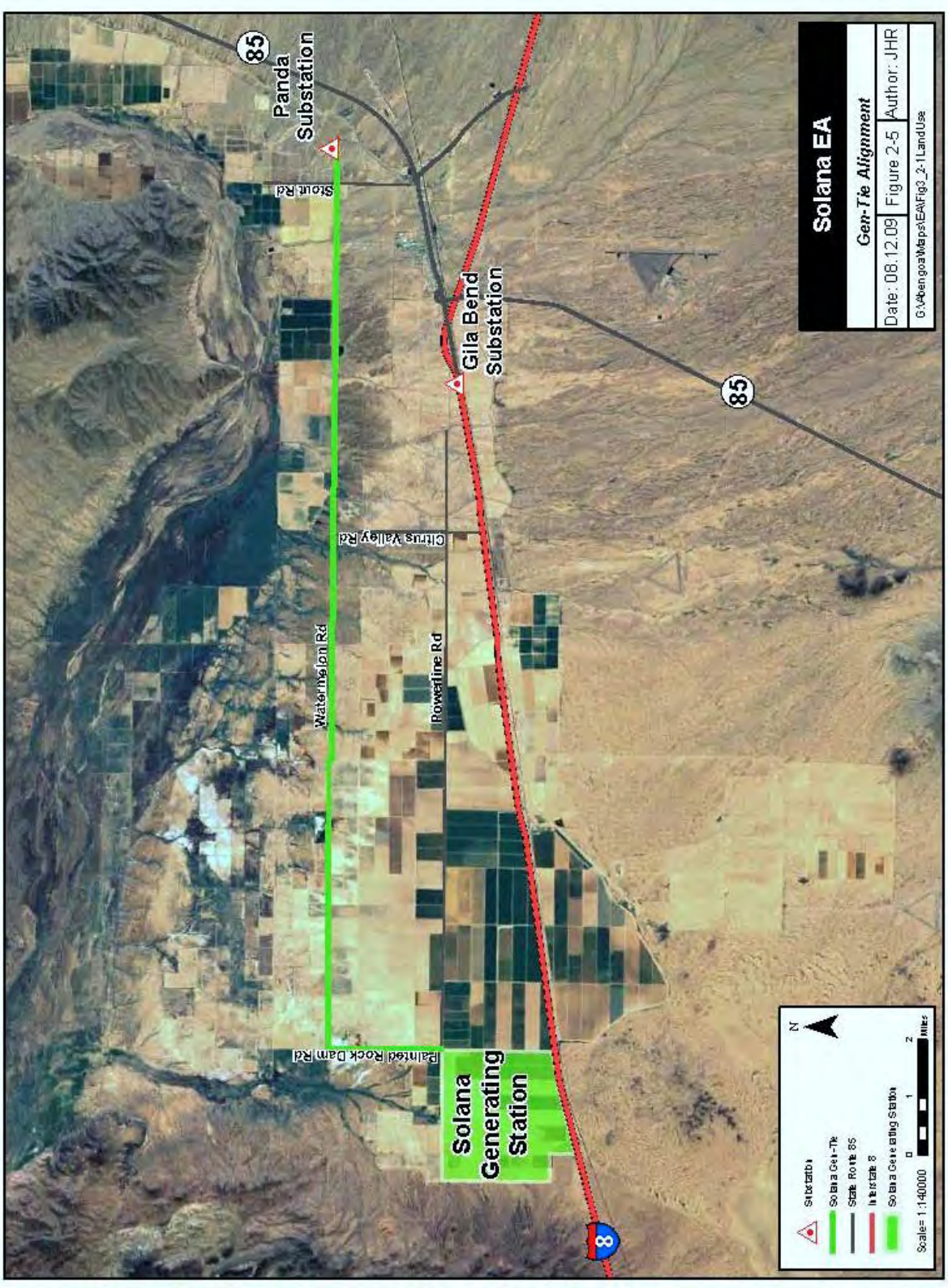

Figure 2-5 Solana Gen-Tie Alignment

The Solana Gen-Tie would require the installation of new single-pole transmission structures, new single-circuit conductors (three wires), and two overhead ground wires, one of which would contain a fiber-optic cable to serve as a communications system for the Solana CSP Project. The appearance of the proposed ground wire/fiber-optic cable would not be substantially different from a conventional ground wire without fiber-optic cables. The new fiber-optic system would be used for voice communications, protective relaying telemetering, supervisory control, data acquisition, and other purposes.

The transmission structures for the Solana Gen-Tie would be steel monopoles approximately 100 to 140 feet tall, depending on the span length required, with a maximum height of 190 feet above the ground surface. The length of spans would depend on several factors, including soil conditions, topography, and other engineering and environmental considerations. Typical 230 kilovolt span lengths would be approximately 800 to 1,000 feet.

2.2 Solana CSP Project Construction

Construction of the Solana CSP Project would require 1,600 to 1,700 construction workers and would occur over a 31-month period. The construction effort would occur in multiple phases, with partial overlap of phases. Therefore, construction of the second phase would occur after initiation of the first phase but before completion of the first phase. Therefore, the full range of construction personnel would not be present for the entire duration of construction; rather, there would be a "ramping up" of construction personnel as sequential phases were initiated and a subsequent decline of construction personnel as sequential phases were completed.

To minimize construction traffic and trips, Abengoa Solar anticipates providing offsite locations in Gila Bend and Buckeye for construction workers to park and ride buses to the Solana site. During construction, truck traffic is expected at a rate of 37 to 90 trucks each day. All construction work would be completed before Solana operations begin.

As part of the construction effort, Abengoa Solar intends to remove a berm along the western extent of the Solana site. The previous landowner constructed the berm to redirect water runoff; the berm is partially on the Solana site and partially on BLM land. The BLM considers the portion of the berm on BLM land to be a trespass because it was constructed without proper authorization. Abengoa Solar intends to remove the entire berm and return the land to previous elevations. Earthen materials from the berm might be used as construction fill on the Solana site. Abengoa Solar has applied to the BLM for temporary access to remove the berm. According to the BLM, processing the application requires a Categorical Exclusion under NEPA, which the BLM would complete before construction at the Solana site.[4] Abengoa Solar would comply with all BLM stipulations for temporary access to remove the berm.

[4] In a meeting on May 1, 2009, among Kathleen Depukat (BLM), Jim Andersen (BLM), Sobia Naqvi (Abengoa Solar), Larry Killman (Tierra Environmental Consultants, LLC), and Jessica Wilton (Tierra Environmental Consultants), the BLM determined that an EA would not be required for removal of the berm. The BLM indicated, however, that Abengoa Solar would be required to submit Form 2920-1, Land Use Application and Permit, for BLM approval. Abengoa Solar submitted Form 2920-1 to the BLM on July 29, 2009. In a follow-up phone call to the BLM regarding approval of Form 2920-1, Jo Ann Goodlow (BLM) stated that a Categorical Exclusion is required to process the form, and will be completed by the BLM (Goodlow 2009). On February 22, 2010, Ms. Goodlow (BLM)

Before it commenced operations, Abengoa Solar would fence the perimeter of the Solana site for security. In addition, Abengoa Solar would provide landscaping along the eastern edge of the site adjacent to Painted Rock Dam Road, which would help screen the facility and minimize its visibility from view of the adjacent residence and passersby on Painted Rock Dam Road.

2.3 Solana CSP Project Operations

Commencement of commercial operations at Solana is targeted for June 2013.[5] Operation of Solana is anticipated to require 85 permanent employees. Approximately 40 employees are anticipated to be present during any one shift. Most workers would be at the Solana site from sunrise to 6 hours after sunset. This would require a split shift of workers, each working 9 hours. It is assumed that 80 employees would be working during a given day, 40 employees per shift, and that 5 employees would work the overnight shift.

2.4 Solana CSP Project Decommissioning

Although Solana is anticipated to operate for 30 years, it is possible that the facility could remain in operation for as many as 40 or more years. Possible reasons for closure could include, but would not be limited to, facility age, economic viability, cost of maintenance or upgrades, or damage considered beyond repair. Procedures for facility closure would largely depend on the circumstances and requirements at the time of decommissioning.

2.4.1 Facilities Closure

Solana is being designed for an operating life of 30 years. Depending on maintenance factors, at an appropriate point beyond the useful operating life, the project would cease operation and close. At that time, it would be necessary to ensure that closure occurs in a way that public health and safety and the environment are protected from adverse impacts.

Although the setting for this project does not appear to present any special or unusual closure circumstances, it is not possible to foresee what the situation would be in 30 years or more when the project ceases operation. Therefore, provisions would be made that provide the flexibility to address the circumstances at the time of closure. Facility closure would be consistent with laws, ordinances, regulations, and standards in effect at the time of closure.

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stated by phone that the rationale for the Categorical Exclusion would be "Issuance of short-term (3 years or less) rights-of-way or land use authorizations for such uses as storage sites, apiary sites, and construction sites where the proposal includes rehabilitation to restore the land to its natural or original condition" (Goodlow 2010). Email correspondence between Ms. Goodlow and Ms. Wilton on February 22, 2010 confirms the rationale for the Categorical Exclusion. In a letter dated March 2, 2010, Abengoa Solar received the cost recovery agreement and fee decision from BLM confirming that a Categorical Exclusion is required to process Form 2920-1. BLM has assigned serial number AZA-35161 to Abengoa Solar's application (see Appendix B).

[5] The targeted commercial operation date has changed from a previously planned date in 2012 because of delay in closing of the project's financing, due in turn to domestic and global market conditions. The actual commercial operation date could change in accordance with the actual date of financial closing, expected in the first quarter of 2010.

Temporary closure is a cessation of facility operations for a period greater than would be required for routine maintenance, overhaul, or replacement of major plant equipment. Temporary closure could be initiated by damage to the facility resulting from events such as earthquakes, fires, or other natural occurrences, or due to short-term economic considerations.

Permanent closure is a cessation of facility operations with no intent to restart. Permanent closure could result from a combination of facility age and economic considerations, from damage considered beyond repair, or for other reasons. Sections 2.4.1.1 and 2.4.1.2 describe temporary and permanent closures in more detail.

2.4.1.1 Temporary Closure

In the case of a temporary closure, Abengoa Solar would maintain round-the-clock security for the facilities and would notify the Arizona Department of Environmental Quality (ADEQ) and other jurisdictional agencies. Depending on whether hazardous materials were released, a specific course of action would be followed, as outlined below.

A Risk Management and Mitigation Plan would be developed before operations began and would be implemented for the temporary halting of facility operations if there is no actual or threatened release of hazardous materials. The plan would ensure compliance with all applicable laws, ordinances, regulations, and standards and appropriate protection of public health, safety, and the environment. The plan could include draining and proper disposal of chemicals from storage tanks and other facility equipment, the safe shutdown of all plant equipment, and various other measures to protect equipment, onsite workers, the public, and the environment. Specific measures would depend on the expected duration and nature of the temporary closure.

If the temporary closure did involve an actual or threatened release of hazardous materials to the environment, procedures would be developed and implemented, as provided for in a Hazardous Materials Business Plan. Procedures would include, but not be limited to, the following:

- Measures to control and ultimately prevent the continued release of hazardous materials
- Emergency response procedures to address the unique operating environment consistent with the nature of the temporary closure
- Training requirements for project personnel in hazardous material release response and control
- Requirements for notifying appropriate agencies and the public

All notifications and related actions would be conducted in accordance with the Emergency Planning and Community Right-To-Know Act. After the hazardous material release was resolved, temporary closure would proceed, corrective actions would be identified, and the Risk Management and Mitigation Plan would be followed.

2.4.1.2 Permanent Closure

If Solana remained economically viable, it could operate for 40 or more years, which would defer environmental impacts associated with closure and with the development of replacement

power generating facilities. However, if the facility was no longer economically viable before useful life of equipment had expired, permanent closure could occur sooner.

A decommissioning plan outlining closure procedures would be developed and implemented, regardless of when permanent closure occurred. The decommissioning plan would be provided to the ADEQ and other jurisdictional agencies for review before permanent closure. The decommissioning plan would include procedures designed to ensure public health and safety, environmental protection, and compliance with applicable laws, ordinances, regulations, and standards. Abengoa Solar would maintain round-the-clock security for Solana during permanent closure activities until the facilities were determined safe without security.

Closure measures could range from extensive "mothballing" to the complete removal of equipment and other structures, depending on conditions at the time of closure. The decommissioning plan for Solana would address the following:

- Proposed decommissioning measures for all facilities constructed as part of the project
- Activities necessary for site restoration, if removal of all equipment and appurtenances was needed
- Provisions for recycling facility components, collection and disposal of hazardous wastes, and resale of unused chemicals back to suppliers or other parties
- Decommissioning alternatives other than full restoration of the site
- Costs associated with the proposed decommissioning activities and the source of funds to implement these activities
- Conformance with applicable laws, ordinances, regulations, standards, and local/regional plans

2.5 Permits, Approvals, and Authorizations

Several permits, approvals, and authorizations would have to be completed before commencement of construction or other ground-disturbing activities for the Solana CSP Project. Table 2-1 lists the permits, approvals, and authorizations Abengoa Solar would have to secure; the issuing federal, state or local regulating agency; and the current status of the permits, approvals, and authorizations.

2.6 Alternative Locations Considered but Eliminated

In 2006, Abengoa Solar conducted a site selection analysis to identify the appropriate location for the Solana CSP Project in Arizona. Abengoa Solar considered the following criteria during site selection: (1) incoming solar radiation (insolation) value commensurate with a CSP project; (2) minimal slope; (3) proximity to transportation corridors; (4) water availability; (5) previously disturbed land; and (6) proximity to the electric transmission grid. Based on these criteria, Abengoa Solar determined that the Gila Bend, Arizona, area would be an ideal location for the Solana CSP Project and researched the ability to purchase a large parcel of contiguous land. As part of the due diligence process, Abengoa Solar conducted a preliminary screening of three sites

Table 2-1 Permits, Approvals, and Authorizations for the Solana CSP Project

Agency	Permit/ Approval	Description	Status
Federal			
DOE	Loan Guarantee	Financing for construction of the Solana CSP Project	In progress
U.S. Fish and Wildlife Service	Endangered Species Act Compliance	Protection of special status species	FWS Concurrence, April 12, 2010
U.S. Army Corps of Engineers	Jurisdictional Determination/ Section 404 Permit & Section 401 Water Quality Certification	Required for the discharge of dredged or fill material into waters of the United States. The Section 401 Water Quality Certification will be approved concurrently with the Section 404 permit.	Preliminary Jurisdictional Determination March 17, 2010; project activities covered under Nationwide Permit No. 12
State			
Arizona Corporation Commission	Certificate of Environmental Compatibility	Permit issued by the state to authorize construction of the power plant and transmission line	Approved December 11, 2008
Arizona Department of Environmental Quality	Aquifer Protection Permit	Required for facilities that have the potential to discharge a pollutant directly to an aquifer, land surface, or vadose zone for the protection of aquifer water quality.	To be completed
Arizona Department of Environmental Quality	Non-Title V Air Permit	Air quality protection and compliance	Application filed July 2008, anticipated completion in 2010
State Historic Preservation Officer	Concurrence	Section 106 consultation	SHPO Concurrence, April 22, 2010
Local			
Maricopa County	Comprehensive Plan Amendment	Amends land use designation in county land use plan	Approved December 17, 2008
Maricopa County	Special Use Permit	Allows project type within zoning category	In progress
Maricopa County	Public Water System Permit	Allows for creation of a new public water system to provide potable water	In progress
Maricopa County	Construction Permits	Ensures project construction complies with all county regulations and ordinances	To be completed
Flood Control District of Maricopa County	Floodplain Use Permit	Regulates construction in floodplains to minimize upstream or downstream impacts	To be completed

in the Gila Bend area. While each of the sites was similar based on environmental considerations, the Solana site was the only one with optimal proportion (length of property compared to width of property) for development of the CSP project. Through this site-selection process, Abengoa Solar eliminated general areas and individual sites from further consideration and identified the Solana site as the optimal location for the CSP project.

2.7 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for the proposed Solana CSP Project. Abengoa Solar has determined that timelines associated with pursuing financing through commercial debt markets would be inconsistent with construction deadlines established to honor executed commercial agreements. In addition, factors associated with financing through commercial debt markets would preclude the economic viability of the project. Therefore, under the No-Action Alternative, Abengoa Solar would not proceed with the Solana CSP Project. If Abengoa Solar did not proceed with the project, the environmental effects described in Chapter 3 would not occur.

The decision for DOE consideration covered by this NEPA review is whether to issue Abengoa Solar a loan guarantee for the proposed project. As detailed above, alternative financing timelines and factors would render the project unviable, and locations for the proposed project have been explored and eliminated because they did not meet the project requirements. Therefore, this NEPA review considers only the Proposed Action and the No-Action Alternative and does not consider alternative sites or methods of financing.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing natural, physical, social, and economic conditions in the area of the Solana CSP Project, and describes the potential impacts under the Proposed Action and No-Action Alternative.

3.1 Land Use

3.1.1 Regulatory Framework

The proposed Solana site is in an unincorporated area within the boundaries of Maricopa County; the proposed Solana Gen-Tie alignment is partially within unincorporated Maricopa County and partially within the Town of Gila Bend (Figure 3-1). Both Maricopa County and the Town of Gila Bend have jurisdictional interests in the project. Several land use plans, policies, and regulations apply to the proposed Solana CSP Project. The Federal Farmland Protection Policy Act (FPPA) requires federal agencies to identify and take into account the impacts of their actions on prime or unique farmland. DOE uses the National Resources Conservation Service's (NRCS) Farmland Conversion Impact Rating to analyze these impacts. The following paragraphs describe this regulatory framework.

Maricopa County Comprehensive Plan and Amendment

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 decisionmaking. One of the goals of the land use element of the Comprehensive Plan is to promote efficient land development that is compatible with adjacent land uses and sensitive to the natural environment. Under this goal, Objective L8 (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) of the land use element emphasizes the county's support of innovative technological operations and facilities to encourage energy efficiency and the use of renewable resources (Maricopa County 2002).

To meet state and local planning requirements, Abengoa Solar filed a Comprehensive Plan Amendment with Maricopa County on May 30, 2008, for approval to amend an existing land use designation from Rural Development Area to Industrial. Maricopa County approved the amendment on December 17, 2008.

Town of Gila Bend General Plan

The Town of Gila Bend General Plan (Gila Bend 2006) provides a roadmap for growth and development within the incorporated and planning area boundaries of Gila Bend. The goals, objectives, and policies of the General Plan outline the town's implementation strategy, and serve as a guide for ensuring the close coordination of infrastructure, land use, and other development decisions. The land use policies of the general plan are closely linked to economic development; therefore, many of the goals and objectives of the general plan promote controlled development of commercial, industrial, and public facilities as a means of improving the community and creating employment opportunities.

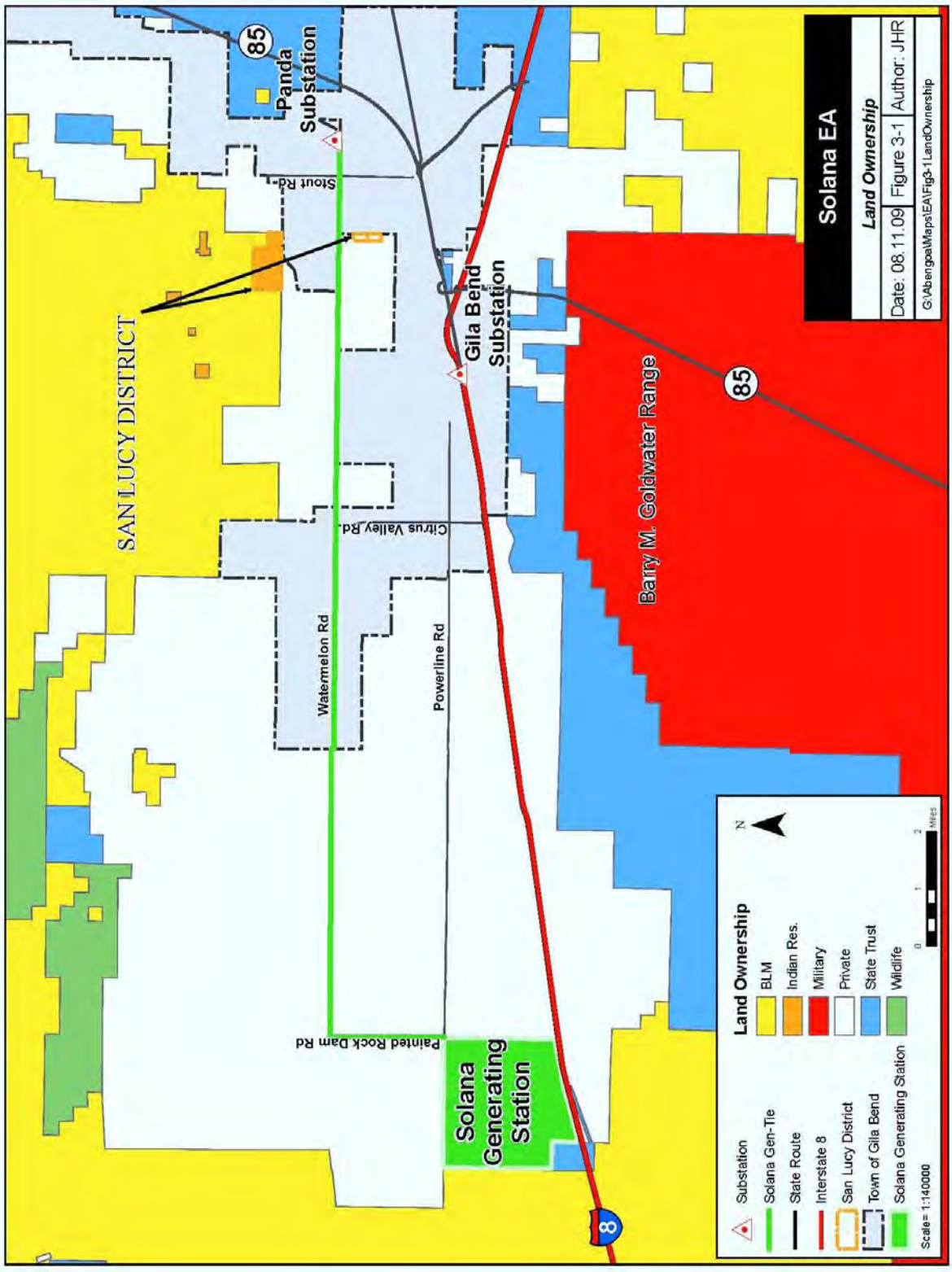

Figure 3-1 Land Ownership

In particular, the following goals of the General Plan demonstrate the interconnected relationship of land use planning and economic development in Gila Bend and its planning sphere:

- Goal 3: Encourage industrial development in Gila Bend that provides quality employment and other benefits to the community.
- Goal 8: Actively promote quality industries and business which will contribute to investment and development in the Town.

Farmland Protection Policy Act

Congress passed the FPPA in 1981 in response to a substantial decrease in the amount of open farmland (7 U.S.C. 4201 *et seq.*).[6] Under the FPPA, the Secretary of Agriculture established criteria for use by federal agencies to consider effects to farmland. As stipulated by the FPPA, federal agencies are to: (1) use the criteria to identify and account for the adverse effects of their programs on the preservation of farmland, (2) consider alternative actions, as appropriate, that could lessen adverse effects, and (3) ensure that their programs, to the extent practicable, are compatible with state, units of local government, and private programs and policies to protect farmland (7 U.S.C. 658.1). Federal agencies comply with the FPPA by completing a Farmland Conversion Impact Rating Form for submittal to the U.S. Department of Agriculture NRCS.

3.1.2 Affected Environment

The proposed Solana site is in unincorporated Maricopa County on private land. Nearby lands are under the jurisdiction of the Town of Gila Bend, the BLM, and the Arizona State Land Department (ASLD) (see Figure 3-1). The Barry M. Goldwater Range is approximately 8 miles south of the Solana site and south of Interstate 8. Military training flight patterns cross much of the region, but in particular, one of the training routes extends north-northwest from Auxiliary

[6] The purpose of the FPPA is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses, and to ensure that federal programs are administered in a manner that, to the extent practicable, are compatible with state, local government, and private programs and policies to protect farmland (7 U.S.C. 4201(b)). Under the FPPA, "farmland" is defined as:

Prime Farmland: land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion, as determined by the Secretary of Agriculture. Prime farmland includes land that possesses the above characteristics but is being used currently to produce livestock and timber. It does not include land already in or committed to urban development or water storage (7 U.S.C. 4201(c)(1)(A)).

Unique Farmland: land other than prime farmland that is used for production of specific high-value food and fiber crops, as determined by the Secretary of Agriculture. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. Examples of such crops include citrus, tree nuts, olives, cranberries, fruits, and vegetables (7 U.S.C. 4201(c)(1)(B)).

Farmland of Statewide or Local Importance: farmland, other than prime or unique farmland, that is of statewide or local importance for the production of food, feed, fiber, forage, or oilseed crops, as determined by the appropriate state or local government agency or agencies, and that the Secretary of Agriculture determines should be considered as farmland (7 U.S.C. 4201(c)(1)(C)).

Field #11 across the Solana site and the western portion of the Solana Gen-Tie alignment. The minimum height at which air traffic can operate on this route is 300 feet above ground level.

Features within and adjacent to the Solana site include the PIDD Canal, relift pumps, reservoirs, and associated canals; the Gila Bend Canal; Painted Rock Dam Road, Powerline Road, and Interstate 8; a communications tower; and a commercial dairy adjacent to the eastern boundary of the site.

Portions of the proposed Solana Gen-Tie are in unincorporated Maricopa County and the Town of Gila Bend. Existing land uses in the proposed Solana CSP Project area are primarily irrigated agricultural lands. Additional land designations include residential, commercial, industrial, utility, and transportation uses. Figure 3-2 shows land uses in the Solana CSP Project area. Residential uses in and adjacent to the area are sparse and are associated with farm and dairy operations. Commercial uses include three dairy operations east of the Solana site along Powerline Road.

Existing industrial development consists of the 446-acre Panda Gila River Power Generating Facility, approximately 0.25 mile north of the proposed Solana Gen-Tie alignment and the Arizona Public Service Company's Gila Bend Substation, approximately 2 miles south of the proposed Solana Gen-Tie alignment. In addition, the Arizona Public Service Company owns and operates one 69 kilovolt single-circuit line and one 230 kilovolt single-circuit line. The Arizona Public Service Company also owns and operates various 12 kilovolt distribution lines in the vicinity of the Solana CSP Project. Planned electric transmission facilities in the vicinity include the Gila Bend Power Partners, LLC (GBPP), certificated 500 kilovolt transmission line and power generating facility. This line will originate at the planned GBPP Gila Bend generating station and follow an easterly alignment for approximately 9 miles, terminating at the GBPP proposed Watermelon Switchyard. The 500 kilovolt transmission line will parallel and be adjacent to the south side of Watermelon Road for approximately 7.5 miles. The remaining 1.5 miles will extend in an easterly direction from the point where Watermelon Road terminates at Old U.S. Highway 80.

Major transportation corridors in the area include Interstate 8, State Route 85, and the Union Pacific Railroad. The local road network consists of paved roads (Painted Rock Dam Road, Citrus Valley Road, and portions of Watermelon Road) and unpaved roads (Powerline Road and portions of section line alignments).

As described above, Maricopa County approved a Comprehensive Plan Amendment on December 17, 2008, that changed the land use category for the Solana site from Rural Development Area to Industrial.

The Solana Gen-Tie alignment would extend through the Gila Bend Planning Area and the Town of Gila Bend municipal boundaries (Figure 3-3). Land use designations traversed by, or immediately adjacent to, the proposed Solana Gen-Tie route in areas administered by the Town of Gila Bend include Rural Residential, Very Low Density Residential, Low Density Residential

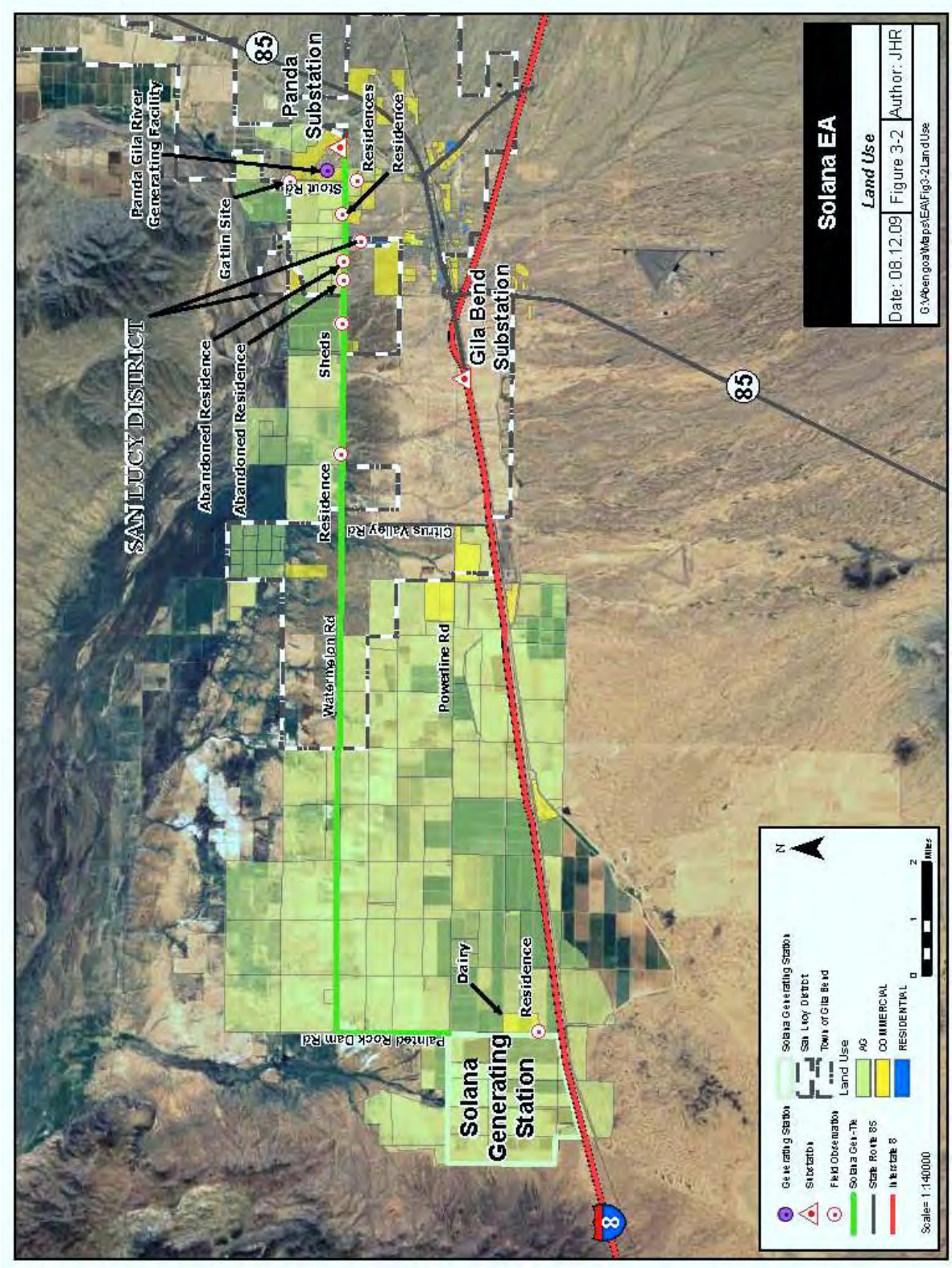

Figure 3-2 Existing Land Use

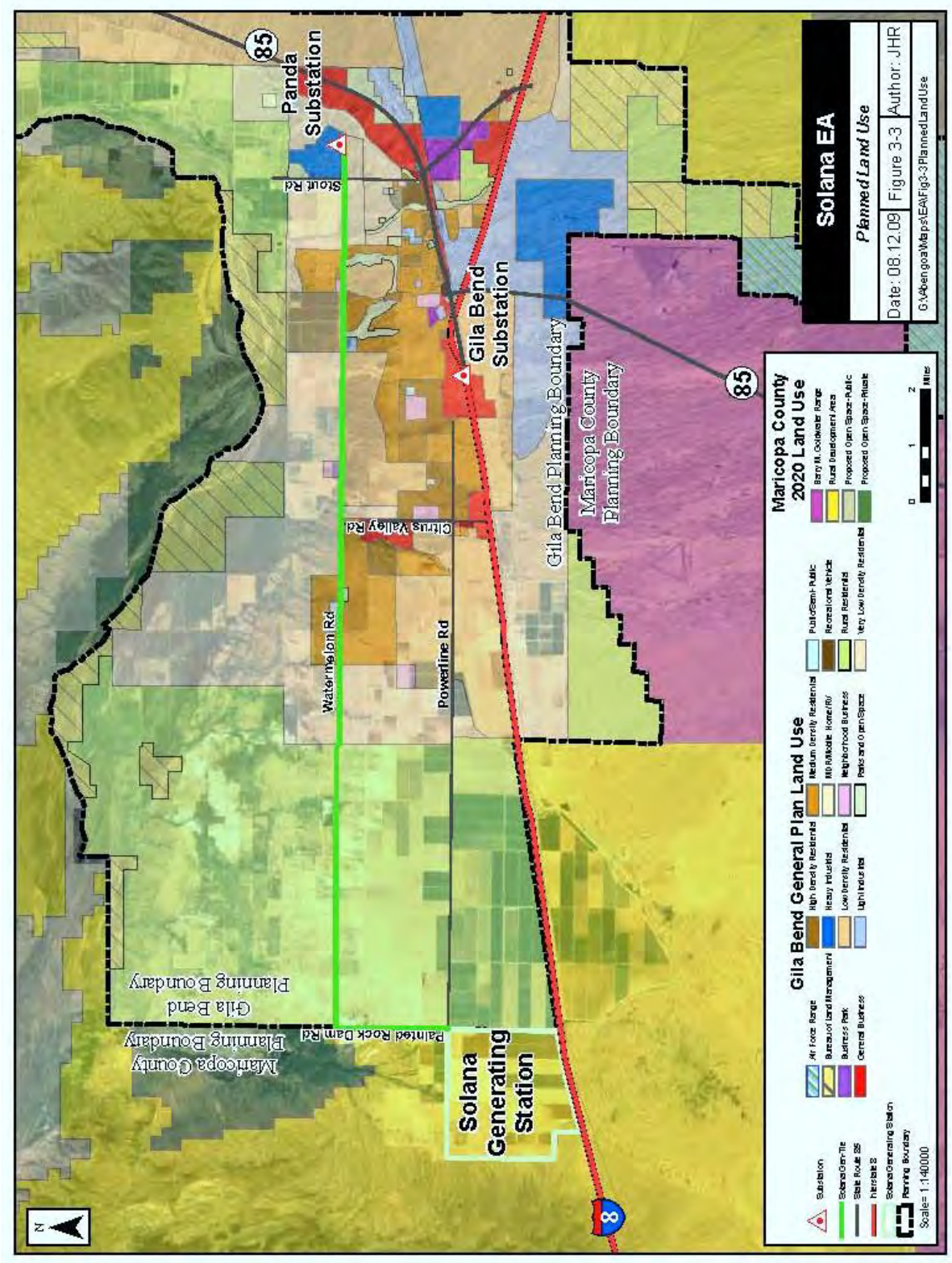

Figure 3-3 Planned Land Use

Medium Density Residential, High Density Residential, Parks and Open Space, Light Industrial, Heavy Industrial, and Neighborhood Business (Figure 3-3).[7]

3.1.3 Environmental Consequences

3.1.3.1 Proposed Action

The Solana site is currently vacant farmland because farming operations ceased in August 2009. Once constructed, the Solana site would contain the following components: a power island, solar field, solar assembly area, evaporation ponds, retention ponds, and paved and unpaved roads. Table 3-1 lists the approximate acreages and corresponding percentage of the land area of each of the Solana site components. Exact acreages are subject to change pending completion of final design and engineering. Unused lands would be available for future use. Current plans are to use the unused portions for construction staging or additional drainage elements.

[7] *Rural Residential:* Development in this category includes both farm and non-farm residential uses, farms, and recreational and institutional uses. This category provides for areas of large-lot residential development. This residential category allows for densities of up to 1.0 dwelling unit per acre. Residences in this category are characterized by single-family detached homes on large lots of 1 or more acre.

Very Low Density Residential: This category provides for areas of large-lot residential development. This residential category allows for densities of up to 1.0 dwelling unit per acre. Residences in this category are characterized by single-family detached homes on large lots of one acre or more.

Low Density Residential: This category provides for areas where low density residential development is desired. This residential category allows for densities between 1.0 and 5.0 dwelling units per acre with lot sizes in excess of 7,000 square feet. Residences in this category are generally characterized by one- to two-story single-family detached homes on large and medium sized lots. Single-family homes in this category may include modular and manufactured homes on lots larger than 7,000 square feet.

Medium Density Residential: This category provides for areas of the community where higher residential densities are desired. This residential category allows for a range of densities from 5.0 to 10.0 dwelling units per acre. Housing types in this category could include those typically included in low density residential developments, and townhouses, patio homes, and two- and four-unit buildings.

High Density Residential: This category provides for areas of multi-family residential development. This residential category allows for densities of up to 18.0 dwelling units per acre and is characterized by apartments and condominiums.

Parks and Open Space: This category denotes regional park and open space facilities that will be within the incorporated area.

Light Industrial: This category provides for employment uses such as warehousing, assembly, and storage. Assembly of products should occur in an enclosed building from parts manufactured offsite. Warehouse distribution and sale of products assembled onsite would be allowed.

Heavy Industrial: This category provides for the development of areas where businesses, because of the nature of their manufacturing or storage operations (such as highly volatile substances), appearance, traffic generation, or other conditions might not be compatible with residential or retail, commercial, or business park land uses, or do not require visibility from arterial streets.

Neighborhood Business: This commercial category provides for the development of smaller scale commercial areas serving adjacent neighborhoods. These uses provide for the sale of convenience goods and personal and business services for the day-to-day needs of the residents in the immediate neighborhood.

Table 3-1 Solana Site Components

Solana Site Component	Acres	Percent of Total Site
Power Island	56.20[a]	1.80
Solar Field	1756.70[b]	56.54
Solar Assembly Area	33.05	1.06
Evaporation Ponds	28.00	0.90
Retention Ponds	91.80	2.95
Unused land	1,141.25	36.73
Totals[c]	3,107.00	100.00

a. The power island acreage includes 6.40 acres of paved area, which represents the parking lot and roads surrounding the steam generation and turbine areas.
b. The solar field acreage includes the dirt access roads required for maintenance (506.10 acres) and the paved main entrance road from Painted Rock Dam Road to the power island (2.80 acres).
c. Totals might not equal sums of values due to rounding.

Abengoa Solar has applied to Maricopa County for a special use permit for the development of Solana. Maricopa County approval of the Comprehensive Plan Amendment and issuance of the special use permit would ensure that the Solana CSP Project is compatible with applicable land planning documents and current land use designations.

The proposed Solana Gen-Tie would be consistent with existing land use designations. The extent of right-of-way to be acquired for the Solana Gen-Tie alignment would be limited to a width of 200 feet to minimize impacts to existing land use along the corridor; current farming activities would likely continue within portions of the right-of-way. Areas of permanent disturbance along the Solana Gen-Tie alignment would be limited to the footprint of the steel monopole transmission structures and associated concrete footings, which are anticipated to be approximately 7 feet by 7 feet (or 49 square feet) per structure. Based on typical span lengths of 800 to 1,000 feet for 230 kilovolt transmission lines, the number of transmission structures required for the Solana Gen-Tie would range between 105 and 150 poles. Therefore, the total area of permanent disturbance resulting from the Solana Gen-Tie would range between 5,145 square feet (0.12 acre) and 7,350 square feet (0.17 acre), depending on the required number of transmission structures.

The Solana CSP Project would not affect or conflict with existing plans of state government, local governments, or private entities for other developments in the vicinity of the proposed project. Because the minimum height of aircraft flight operations would be more than 100 feet above the transmission structures (190 feet maximum), the Solana CSP Project would not interfere with operations at Barry M. Goldwater Range.

Abengoa Solar provided the NRCS a Farmland Conversion Impact Rating Form, maps, and project data. NRCS responded in a letter dated September 14, 2009 (Appendix C), and acknowledged that irrigation water to the existing farm had been discontinued before the proposed federal action (that is, the DOE decision whether to issue Abengoa Solar a loan guarantee). Because the conversion of farmland (through discontinuation of irrigation) had commenced before federal involvement, the NRCS stated that the land would no longer be considered farmland as defined by the FPPA, and therefore would not be subject to further

analysis. The NRCS confirmed that if irrigation were to resume, however, the land would be considered Prime and Unique Farmland. In the interest of a thorough environmental analysis, the Farmland Conversion Impact Rating process was completed for the proposed Solana CSP Project. The results of this analysis are described below. Appendix C provides the completed Farmland Conversion Impact Rating Form and a summary of how each scoring decision was derived.

The NRCS determined that with irrigation the proposed Solana site would contain Prime and Unique Farmland.[8] Federal agencies must consider 12 site assessment criteria to evaluate the suitability of a site for protection as farmland. The maximum number of points varies for each of the 12 site assessment criteria. Scoring decisions are made by examining the site, the surrounding area, and the programs and policies of the state or local unit of government in which the site is located. The 12 site assessment criteria were evaluated for the Solana site, and generated a score of 89 out of a possible 160 points. The land evaluation and site assessment scores were added together, which produced a total score of 162 points out of a possible 260 points. Table 3-2 summarizes the scoring for the Solana site.

Table 3-2 Farmland Conversion Impact Rating Scores for the Solana Site

Criterion	Maximum Points	Assigned Points
Land Evaluation	100	73
Site Assessment	160	89
Area in Non-Urban Use	15	15
Perimeter in Non-Urban Use	10	10
Percent of Site Being Farmed	20	20
Protection Provided by State and Local Government	20	0
Distance from Urban Built-Up Area	15	15
Distance to Urban Support Services	15	10
Size of Present Farm Unit Compared to Average	10	10
Creation of Non-Farmable Farmland	10	0
Availability of Farm Support Services	5	4
On-Farm Investments	20	4
Effects of Conversion on Farm Support Services	10	1
Compatibility with Existing Agricultural Use	10	0
Totals	260	162

As stated at 7 U.S.C. 658.4(c) of the FPPA, the Department of Agriculture recommends that:

(1) Sites with the highest combined scores are regarded as most suitable for protection and sites with the lowest scores as least suitable.

[8] This land evaluation criterion is based on information from several sources, including soil surveys, NRCS field office technical guides, soil potential ratings or soil productivity ratings, and land capability classifications. Based on these sources, NRCS assigned a score of 73 out of a possible 100 points to the proposed Solana site, which represents the relative value of the farmland to be converted by the project.

(2) Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional alternatives need to be evaluated.

(3) Sites receiving scores totaling 160 or more are given increasingly higher levels of consideration for protection.

(4) When making decisions on proposed actions for sites receiving scores totaling 160 or more, federal agency personnel consider:

   i. Use of land that is not farmland or use of existing structures

   ii. Alternative sites, locations and designs that would serve the proposed purpose but convert either fewer acres of farmland or other farmland that has a lower relative value

   iii. Special siting requirements of the proposed project and the extent to which an alternative site fails to satisfy the special requirements as well as the originally selected site.

Although the conversion of farmland (through discontinuation of irrigation) had commenced before federal involvement, DOE has reviewed the Farmland Conversion Impact Rating Form, maps, and project data provided by Abengoa Solar in the interest of a thorough environmental evaluation. Further, DOE considered the three factors listed under recommendation (4) above.

First, DOE determined that in planning for the project before applying for a DOE loan guarantee, Abengoa Solar thoroughly considered alternative sites as it evaluated the special siting requirements for the facility. As described in Section 2.6, Abengoa Solar screened sites for the Solana CSP Project to identify opportunities and constraints for siting. Site-selection screening considered solar potential, slope, proximity to existing electrical infrastructure, proximity to transportation infrastructure (rail and highway), water availability, compatibility with adjacent land uses, and previously disturbed private property (to avoid potential impacts to native desert). Based on these criteria, Abengoa Solar identified three sites for further evaluation; all three are north of Interstate 8 and in the vicinity of Painted Rock Dam Road. Of the three sites, only the proposed Solana site meets the special siting requirements – that is, optimal proportions (the length and width of the site are nearly equal) – for placement of solar facilities. Therefore, Abengoa Solar selected the Solana site for the proposed Solana CSP Project.

Second, DOE considered that according to the NRCS, the removal of approximately 3,000 acres (excluding the 100 acres of irrigation infrastructure) of farmland from agricultural production for the proposed Solana Generating Station would represent 1.6 percent of the total available farmland, as defined by the FPPA, within Maricopa County. In addition, the NRCS land evaluation indicates that 60 percent of farmland in Maricopa County has the same or higher relative value based on soil characteristics. Therefore, even with the conversion of 3,000 acres, adequate farmland remains in Maricopa County to support regional and statewide agricultural needs.

Due to PIDD's lack of capacity to deliver enough water during summer, the farm adjacent to the Solana site east of Painted Rock Dam Road is unable to keep all of its land in production. During summer, the adjacent farm must fallow 640 acres to meet the irrigation demand of the remaining portion of the farm (Brown 2009). Therefore, a net reduction of 1.6 percent of farmland would not be considered significant, because the potential for redistributing the

irrigation water made available by taking the Solana site out of crop production would enable adjacent farms to increase productivity through higher crop yield.

Third, DOE considered that under the decommissioning scenarios described in Section 2.4, the Solana site could be returned to agricultural uses if the facilities were removed and irrigation resumed. Therefore, the proposed Solana CSP Project would not constitute an irretrievable or irreversible commitment of a resource.

In addition, DOE considered that existing agricultural land use would continue around the Solana site and along the Solana Gen-Tie right-of-way; therefore, agricultural impacts to the farms adjacent to the transmission line corridor would be limited. Areas of permanent disturbance in agricultural fields along the Solana Gen-Tie would be limited to the footprint of the steel monopole transmission structures and associated concrete footings. The total area of permanent disturbance in the agricultural fields would range between 1,372 square feet (0.03 acre) and 1,715 square feet (0.04 acre), depending on the required number of transmission structures.

For these reasons, converting the Solana site from an agricultural use to an industrial use is compatible with state, local, and private programs to protect farmland and would not result in a significant impact to Maricopa County's agricultural economy.

There would be no adverse impacts to existing land uses from Solana construction or operations. The project would be consistent with the goals and objectives of the Maricopa County Comprehensive Plan, which specifically encourages energy efficiency and the use of renewable resources. The Solana CSP Project also would support the goals and objectives of the Town of Gila Bend General Plan, which promotes industrial facilities as a means for creating employment opportunities and improving the economic conditions of the area. There would be no adverse impacts to farmland.

3.1.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project and Abengoa Solar would not proceed with the project. Absent the project, the existing farmland would eventually return to production and the potential to redistribute irrigation water to adjacent farms would not occur. Under the No-Action Alternative, the land use designation for the existing farm would remain Industrial for a period of 3 years, after which Maricopa County would amend the land use plan and revert back to the Rural Development Area designation.

3.2 Visual Resources

3.2.1 Methods

The study area for the visual resources analysis includes an evaluation of the viewshed, or area surrounding the Solana CSP Project vicinity from which a significant number of people would be able to view the facilities from a fixed vantage point, such as a residence, roadway, or recreational area. The viewshed for the visual resource evaluation includes the Solana site, the Solana Gen-Tie alignment, and neighboring lands from which the Solana CSP Project might be viewed.

Potential effects to visual resources were evaluated using elements from the BLM Visual Resource Management (VRM) system (BLM 2008). Briefly, the VRM system entails an assessment of the existing scenic quality (through evaluation of basic design elements, such as form, line, color, and texture), identification of the level of visual sensitivity, and preparation of a photographic simulation from key observation points.[9] The following factors were used to evaluate the sensitivity of the existing visual setting to proposed changes associated with the Solana CSP Project:

- The extent to which the existing landscape is already altered from its natural condition
- The number of people within visual range of the area, including residents, highway travelers, and those involved in recreational activities
- The degree of public interest in or concern about the visual quality of the landscape

3.2.2 Affected Environment

The proposed Solana site and Solana Gen-Tie alignment are in the Sonoran Desert section of the Basin and Range Lowlands Province in central Arizona. This physiographic province is characterized by fault-block mountain ranges separated by broad, deep alluvial valleys with through-flowing drainage. The landscape is characterized by a broad alluvial basin created by the Gila River, and is bounded by mountainous terrain. The alluvial plain consists of a broad panorama of gently sloping, flat terrain dominated by agricultural activities.

Review of the Maricopa County 2020 Plan (Maricopa County 2002), Maricopa County Comprehensive Plan Amendment (Maricopa County 2008), Town of Gila Bend General Plan (Gila Bend 2006), and the BLM Lower Gila South Resource Management Plan (BLM 1985) did not identify any scenic areas or visual resources in the vicinity of the Solana CSP Project. In addition, there are no areas of special consideration such as Natural Areas, Wilderness Areas, Wild and Scenic Rivers, Scenic Roads, or Areas of Critical Environmental Concern that require protection of scenic resources in the vicinity of the Solana CSP Project.

The proposed Solana site is on private land approximately 8 miles west of the Town of Gila Bend municipal boundary. The landscape setting in the vicinity of the Solana site is rural, and consists primarily of agricultural land and open desert. There is a commercial dairy and associated residence immediately east of Painted Rock Dam Road.

The proposed Solana Gen-Tie alignment is on private land, and would originate approximately 8 miles west of the Town of Gila Bend municipal boundary and extend approximately 7.6 miles within the town's municipal boundary. The landscape in the vicinity of the proposed Solana

[9] Based on BLM VRM system evaluation factors, BLM-administered lands are placed into one of four visual resource inventory classes: Class I, II, III, or IV. Classes I and II are the most valued, Class III represents a moderate value, and Class IV represents the lowest value. The inventory classes provide the basis for visual considerations in the agency's resource management planning process. Because the Solana CSP Project area does not include BLM lands or other areas that would be incorporated into BLM resource management plans, class inventories were not assigned to the Solana site or the Solana Gen-Tie alignment.

Gen-Tie alignment is rural and is dominated by agriculture and open desert. Three commercial dairies operate approximately 2 miles south of the proposed Solana Gen-Tie alignment.

Undeveloped land in the Solana CSP Project vicinity consists of sparse vegetation, which is characteristic of the desert scrub found in undeveloped areas of Maricopa County. Vegetation abundance and diversity increases near Bull Durham Wash and the Gila River, approximately 7.7 miles north of the proposed Solana site and 5.5 miles north of the proposed Solana Gen-Tie alignment.

The visual character of the Solana CSP Project vicinity has been highly modified from its natural state. Modifications to the natural setting include agriculture, rural residential uses, dairies, irrigation canals, various sizes and types of electrical transmission and distribution lines, and two communications towers (one on the Solana site and one south of Interstate 8). In addition, several transportation facilities extend through or are adjacent to the Solana CSP Project vicinity, including Interstate 8, Painted Rock Dam Road, Powerline Road, Watermelon Road, and the Union Pacific Railroad. Based on the factors described in Section 3.2.1, the overall existing scenic quality of the landscape is considered low because the area has been substantially modified from its natural state and because it lacks a variety and contrast in natural features, landforms, and vegetation.

3.2.3 Environmental Consequences

3.2.3.1 Proposed Action

Visual effects resulting from the development of the Solana site would include changes to the visual character of the landscape. Solana would introduce new elements into the landscape, and would alter the form, line, color, and texture that characterize the existing landscape.

The primary viewpoints of the proposed Solana site include those visible to one residence to the east and to travelers on Interstate 8 and Painted Rock Dam Road. There are no designated recreational use areas in the Solana site vicinity. The Interstate 8 overpass at Painted Rock Dam Road is elevated above the intersection and creates the point from which the greatest number of travelers might view the Solana site. Therefore, the overpass at Painted Rock Dam Road was selected as key observation point 1.

For the Solana Gen-Tie alignment, the primary viewpoints are at the intersection of Interstate 8 and Painted Rock Dam Road, sporadic residential dwellings adjacent to Watermelon Road, and at the San Lucy Village. The proposed Solana Gen-Tie alignment would be approximately 1 mile south of the developed portions of the Gatlin Site[10] and one-half mile south of the undeveloped portions of the site. The Gatlin Site is the only recreational use facility in the vicinity of the Solana CSP Project. Due to changes in topography, the Solana Gen-Tie alignment would not be visible from the developed portions of the Gatlin Site. Additional consideration is given to the Gatlin Site in Section 3.9 Cultural Resources.

[10] The Gatlin Site is a prehistoric Hohokam site designated by the National Park Service as a National Historic Landmark. The site is currently being developed as a regional cultural park by the Town of Gila Bend with assistance from the Arizona State Parks Heritage Fund Matching Grant.

Key observation point 2 is along Watermelon Road west of the Panda Substation, and was selected to represent views for residents near Watermelon Road. Key observation point 2 is representative of the infrastructure north of the San Lucy Village. Figure 3-4 shows the locations of the key observation points in relation to the Solana CSP Project. Photographs depicting baseline conditions at the key observation points were taken in 2008.

As shown in Figure 3-5, the existing view is to the northwest and one can see Painted Rock Dam Road, the Interstate 8 access ramps, and a distribution line in the foreground; existing agriculture and associated facilities in the mid ground; and open desert and mountains in the background. Using the factors described in Section 3.2.1, viewer sensitivity is rated as moderate based on the high number of passersby on Interstate 8 and consideration of the appearance of the Solana site when viewed from the air.

As shown on Figure 3-6, the Solana site has been simulated into the existing conditions from the key observation point location. At the Solana site, the power island would be distinguishable from the solar field due to the change in color and form as compared with the solar field. The power island would be approximately 1.5 miles from key observation point 1. The Solana site would result in a contrast of color, line, form, and texture, and would appear blue when viewed from the air because the mirrors would reflect the blue sky.

Although the development of the Solana site would result in a change to the existing visual landscape, the overall visual impact would be minimal because the existing visual setting has already been modified from its natural state. In addition, the viewing time from key observation point 1 would be short due to the high speed at which vehicles travel on Interstate 8.

The design for the eastern boundary of the Solana site would incorporate some form of security fencing and landscaping that would screen the Solana site and minimize its visibility from the view of passersby on Painted Rock Dam Road and the adjacent residence. Given the raised elevation of Interstate 8, which is approximately 30 feet above the surrounding land, and the anticipated minimum 20 foot height of the parabolic trough collectors, vehicles traveling along Interstate 8 would be level to or only slightly higher than the solar field. Due to the anticipated acute viewing angle from Interstate 8 to the solar field, coupled with the fact that the mirrors would reflect internally rather than externally, vehicles traveling on Interstate 8 would not be subject to glare.

The Barry M. Goldwater Range is south of Interstate 8 and less than 10 miles from the proposed Solana site. Abengoa Solar is committed to ensuring Solana operations would be compatible with range operations. The parabolic trough mirrors that would comprise the solar field are designed to maximize the collection of solar energy without generating glare because they focus sunlight onto receiver tubes at the center aperture of the collectors rather than skyward; therefore, aircraft flying over the solar field would not be subject to intense sunlight reflecting off the mirrors. In addition, all outdoor lighting, including building-mounted and parking lot lighting would face downward. As a result, Solana would not impair visibility or otherwise interfere with operating aircraft.

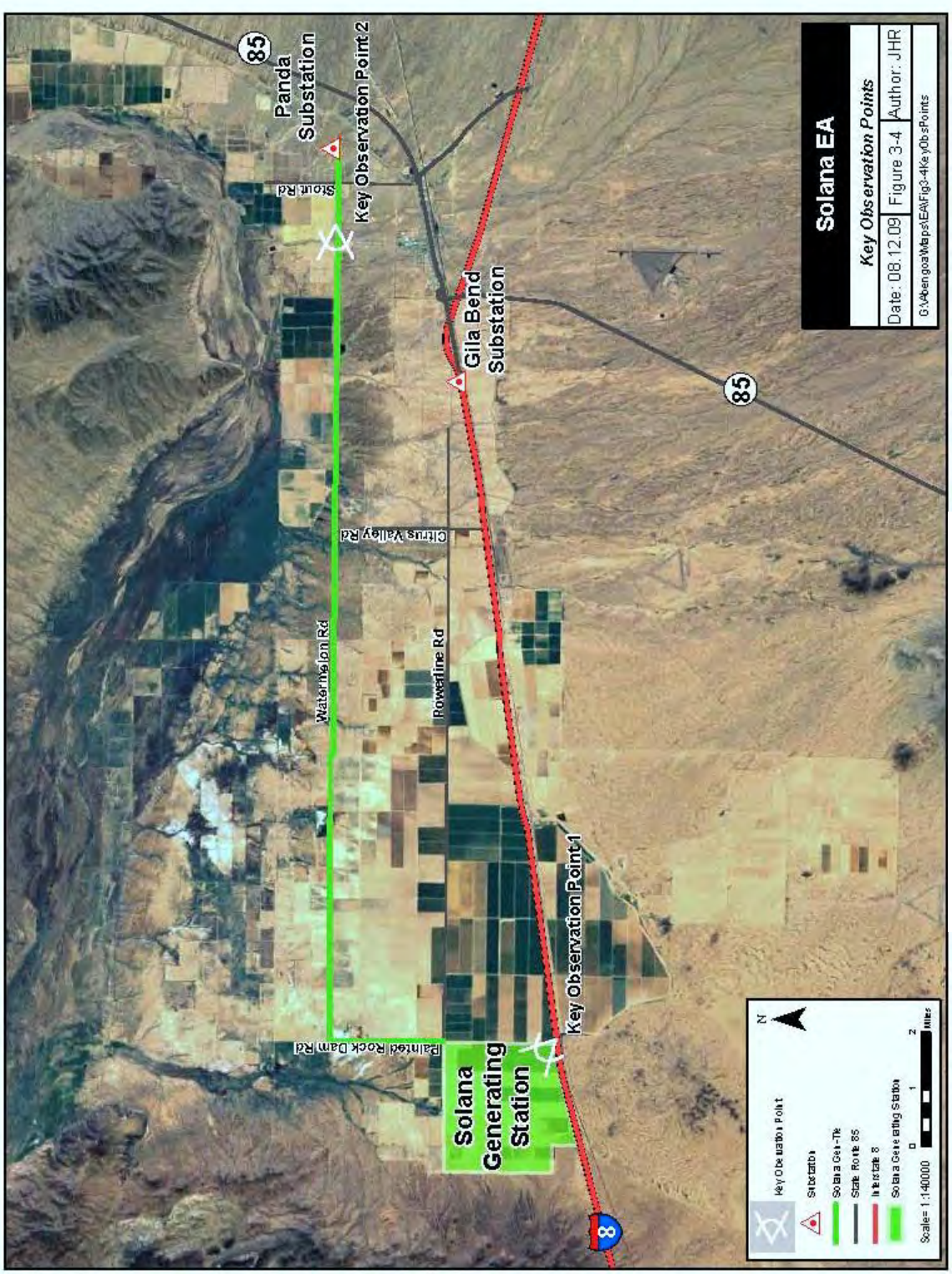

Figure 3-4 Key Observation Points

Figure 3-5 Key Observation Point 1 Existing Conditions.
Description: View is to the northwest from Interstate 8 overpass of Painted Rock Dam Road.

Figure 3-6 Key Observation Point 1 Visual Simulation.
Description: Visual simulation of Solana from Interstate 8 overpass of Painted Rock Dam Road.

As shown on Figure 3-7, the view from key observation point 2 is to the west and one can see agricultural land, Watermelon Road, the existing 230 kilovolt transmission line, and the existing 69 kilovolt transmission line with 12 kilovolt underbuild in the foreground; agriculture and the existing 69 kilovolt transmission line with 12 kilovolt underbuild in the mid ground; and the existing 69 kilovolt transmission line with 12 kilovolt underbuild and mountains in the background. This view is representative of views from residences in the area. Based on the factors in Section 3.2.1, viewer sensitivity is rated as low due to the presence of existing transmission lines and the limited number of passersby traveling on Watermelon Road.

For purposes of this analysis, three possible build-out scenarios have been developed to evaluate the potential visual change that would occur as a result of the Solana Gen-Tie. The first scenario assumes that the proposed Solana Gen-Tie alignment would be added to the existing infrastructure without consolidation (that is, a third utility line with structures and conductors would be constructed along Watermelon Road). Figure 3-8 shows the proposed Solana Gen-Tie simulated into the existing conditions from the key observation point. The simulation shows the proposed Solana Gen-Tie on the south side of Watermelon Road and parallel to the existing 230 kilovolt transmission line, along with the existing 69 kilovolt and 12 kilovolt lines on the north side of Watermelon Road.

The second build-out scenario assumes that the proposed Solana Gen-Tie would be consolidated with existing distribution lines. Figure 3-9 is a simulation of the proposed Solana Gen-Tie consolidated with the existing 69 kilovolt and 12 kilovolt lines, as an underbuild, on the south side of the existing 230 kilovolt transmission line on the south side of Watermelon Road.

The third build-out scenario assumes that the previously permitted 500 kilovolt transmission line has been built (see Section 3.1.2 Affected Environment, for a description of the 500 kilovolt transmission line). Figure 3-10 shows the permitted 500 kilovolt transmission line consolidated with the existing 230 kilovolt transmission line on the south side of Watermelon Road and simulates the proposed Solana Gen-Tie consolidated with the existing 69 kilovolt and 12 kilovolt lines on the south side of the aforementioned structures.

The proposed transmission line for the Solana CSP Project would introduce an additional utility structure into the existing environment. Although the new transmission poles would be approximately 100 to 140 feet tall, these proposed metal non-reflective structures would blend with the background more than the existing 65-foot-tall wood structures because they would not present such a dramatic contrast with the desert background. Arizona Public Service Company (the local electrical utility operator) has been systematically replacing the wooden structures as needed due to wind storms and system upgrades. As part of Arizona Public Service Company's system upgrades, which is an action independent from the Solana CSP Project, the existing Arizona Public Service Company structures might be changed from 65-foot-tall wood structures to 175-foot-tall wood or steel structures, regardless of whether the Solana CSP Project is built.

Because two existing transmission lines and numerous distribution lines are already part of the built environment, impacts to visual resources from the Solana Gen-Tie would be small and would result in little change to the existing visual quality of the landscape for all three build-out scenarios. Due to the presence of existing transmission and distribution structures, the addition

Figure 3-7 Key Observation Point 2 Existing Conditions.
Description: View is facing west along Watermelon Road, approximately 1 mile west of Panda Substation.

Figure 3-8 Key Observation Point 2 Visual Simulation.
Description: Visual simulation of proposed Solana Gen-Tie south of existing infrastructure.

Figure 3-7 Key Observation Point 2 Existing Conditions (repeated from above for ease of comparison).
Description: View is facing west along Watermelon Road, approximately 1 mile west of Panda Substation.

Figure 3-9 Key Observation Point 2 Second Visual Simulation.
Description: Visual simulation of proposed Solana Gen-Tie, with 69 kilovolt and 12 kilovolt underbuild, south of existing infrastructure.

Figure 3-7 Key Observation Point 2 Existing Conditions (repeated from above for ease of comparison).
Description: View is facing west along Watermelon Road, approximately 1 mile west of Panda Substation.

Figure 3-10 Key Observation Point 2 Third Visual Simulation.
Description: Visual simulation of proposed Solana Gen-Tie, with 69 kilovolt and 12 kilovolt underbuild, south of simulated 500 kilovolt/230 kilovolt infrastructure.

of the Solana Gen-Tie would not adversely alter the form, line, color, or texture that characterize the existing landscape.

3.2.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, there would be no changes to the visual character of the landscape and no new elements would be introduced into the existing landscape.

3.3 Air Quality

3.3.1 Regulatory Framework

The Clean Air Act established the principal framework for national, state, and local efforts to protect air quality in the United States (42 U.S.C. 7401−7642). Under the Clean Air Act, the U.S. Environmental Protection Agency (EPA) has set standards known as National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants considered to be key indicators of air quality, as follows: carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and two categories of particulate matter, including 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 ($PM_{2.5}$). These standards are codified in 40 CFR 51.

A NAAQS is comprised 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 NAAQS define levels of air quality with an adequate margin of safety that sets limits to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary NAAQS define levels of air quality judged necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Table 3-3 lists the prevailing primary and secondary NAAQS for the criteria pollutants.

Nonattainment, attainment, and unclassifiable areas are defined in Title I, Part A, Section 107 of the Clean Air Act 107(d)(1)(A), as follows:

(i) Nonattainment, any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant

(ii) Attainment, any area (other than an area identified in clause (i)) that meets the national primary or secondary ambient air quality standard for the pollutant

(iii) Unclassifiable, any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

Table 3-3 National Ambient Air Quality Standards[a]

	Primary Standards		Secondary Standards	
Pollutant[b]	**Level[c]**	**Averaging Time**	**Level**	**Averaging Time**
CO	9 ppm (10 mg/m^3)	8 hours	None	
	35 ppm (40 mg/m^3)	1 hours		
Pb	0.15 µg/m^3	Rolling 3-month average	Same as Primary	
	1.5 µg/m^3	Quarterly average		
NO_2	0.053 ppm (100 µg/m^3)	Annual arithmetic mean	Same as Primary	
PM_{10}	150 µg/m^3	24 hours	Same as Primary	
$PM_{2.5}$	15.0 µg/m^3	Annual arithmetic mean	Same as Primary	
	35 µg/m^3	24 hours		
O_3[d]	0.075 ppm (2008 standard)	8 hours	Same as Primary	
	0.08 ppm (1997 standard)	8 hours		
	0.12 ppm	1 hour		
SO_2	0.03 ppm	Annual arithmetic mean	0.5 ppm (1,300 µg/m^3)	3-hour
	0.14 ppm	24 hours		

a. Source: EPA 2009a.
b. CO = carbon monoxide; Pb = lead; NO_2 = nitrogen dioxide; PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less; $PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less; O_3 = ozone; SO_2 = sulfur dioxide.
c. ppm = parts per million; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter.
d. The Arizona 8-hour O_3 primary and secondary standards are listed in the Arizona Administrative Code (R-18-203B) as 0.08 ppm.

Unclassifiable areas are considered as in attainment.

The EPA is responsible for ensuring that these air quality standards are met or attained in cooperation with state, tribal, and local governments through national strategies to control pollutant emissions from automobiles, factories, and other sources. As delegated by the EPA, the State of Arizona is responsible for protecting Arizona's air quality. The ADEQ Air Quality Division is the state body responsible for the administration of air quality regulations, which are found in the Arizona Revised Statutes Title 49, Chapter 3, Sections 401-493, codified in the Arizona Administrative Code Title 18, Chapter 2 (RS-2) and unless otherwise noted therein, are stated to be in accordance with federal standards.

The Maricopa County Air Quality Department (MCAQD) is the local agency charged with regulating and enforcing air quality standards over businesses and individuals in Maricopa County through permitting, monitoring, and other compliance activities. With oversight from ADEQ, the MCAQD Non-Title V permitting program issues minor-source permits for sources that are below emissions thresholds and that are not considered exempt or insignificant. The permits include conditions that regulate source-specific emissions limits and operational requirements.

3.3.2 Affected Environment

The Solana CSP Project area is in a portion of Maricopa County currently listed as in attainment for all criteria pollutants. The nearest nonattainment areas to the project vicinity are associated with the Phoenix area (ADEQ 2009) (Figure 3-11). The closest portion of the particulate matter nonattainment area is 26 miles away. At present, the closest portion of the ozone nonattainment area is 37 miles away.

However, on March 12, 2009, the State of Arizona in its recommendation to the EPA for Attainment/Unclassifiable/and Nonattainment areas pursuant to the ozone 2008 8-hour 0.075 parts per million standard, included a portion of Maricopa County as nonattainment for 8-hour ozone NAAQS. The proposed Solana site would be approximately 14 miles west of the revised nonattainment area. The eastern 1.5 miles of the Solana Gen-Tie alignment, near the Panda Substation, would extend into the revised nonattainment area (Figure 3-12).

Class I and Class II airsheds were established under the Clean Air Act to evaluate if emissions would result in air quality impacts in attainment areas. Class I airsheds are specifically designated natural areas that include national parks, wilderness areas, and other protected federal areas that meet specifications defined in the Clean Air Act. Class II airsheds typically include natural areas not designated as Class I, and urban areas.

Prevention of Significant Deterioration (PSD) standards, established by the Clean Air Act, and incremental impact evaluation are often used to identify near-field and far-field ambient air quality impacts for major sources or major modifications in an attainment area. Near-field ambient air quality is typically evaluated within 10 kilometers (approximately 6 miles) of a project. Distance limitations have not been set for far-field ambient air quality evaluations. Impacts to far-field ambient air quality are typically evaluated for areas where there is a special interest in protecting Class I pristine air quality and scenic values.

Federal land management agencies consider a source more than approximately 30 miles from a Class I area to have negligible impacts in relation to air quality related values, such as visibility and acidic deposition, if total annual sulfur dioxide, oxides of nitrogen, PM_{10}, and sulfuric acid emissions (expressed in tons per year) divided by the distance (expressed in kilometers) between the source and the Class I area (that is, tons per year per kilometer) is 10 or less. The closest Class I airshed, the Superstition Wilderness, is more than 145 kilometers (approximately 90 miles) east of the Solana site (see Figure 3-11). The Phoenix nonattainment areas are between the Solana site and the Superstition Wilderness.

3.3.3 Environmental Consequences

3.3.3.1 Proposed Action

Construction and operation of the Solana CSP Project would generate air emissions. As shown in Tables 3-4 and 3-5, these emissions levels would be below applicable limits and major source thresholds. Therefore, the project would be permitted as a minor source, as described below.

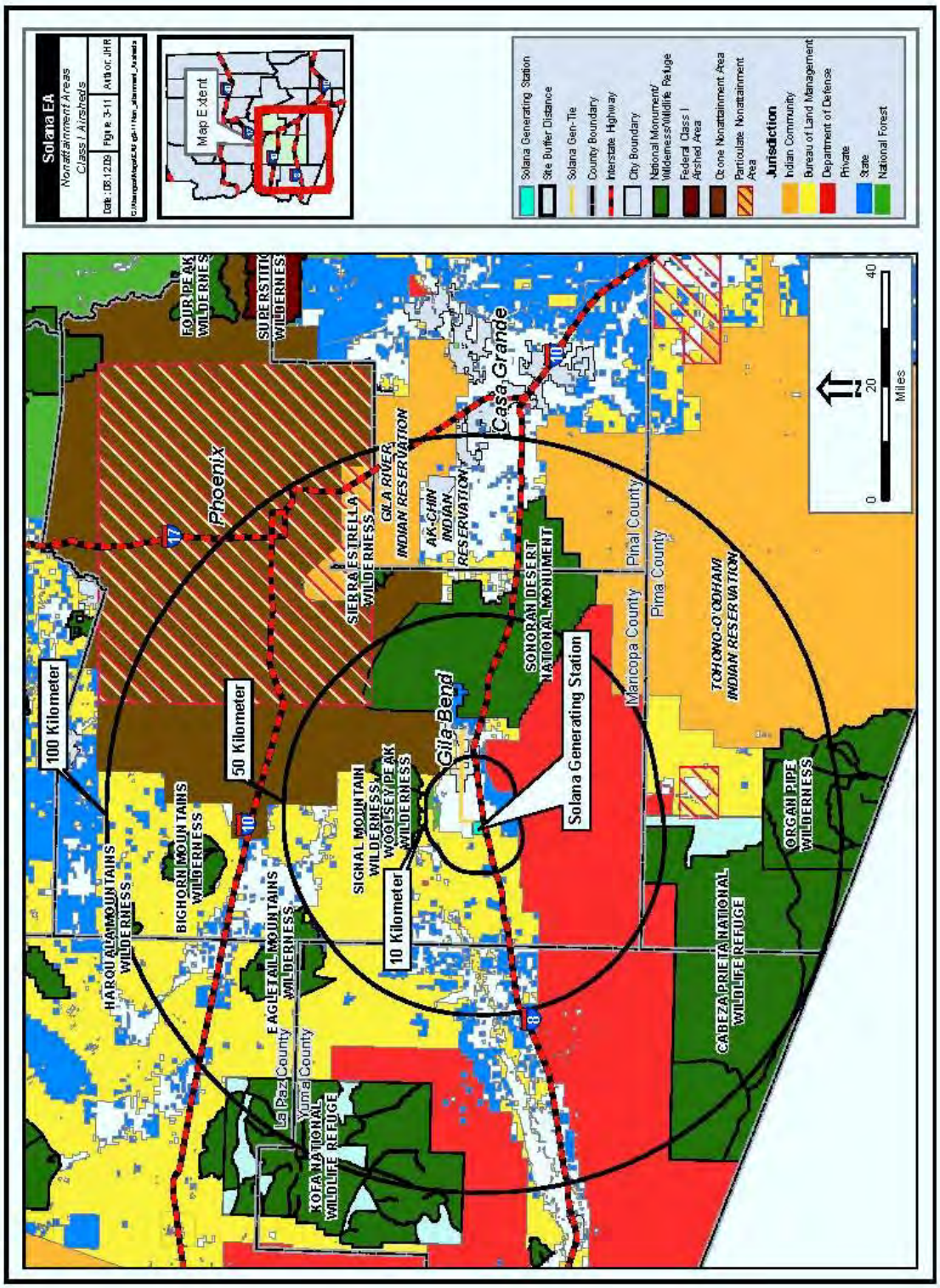

Figure 3-11 Nonattainment Areas and Class I Airsheds

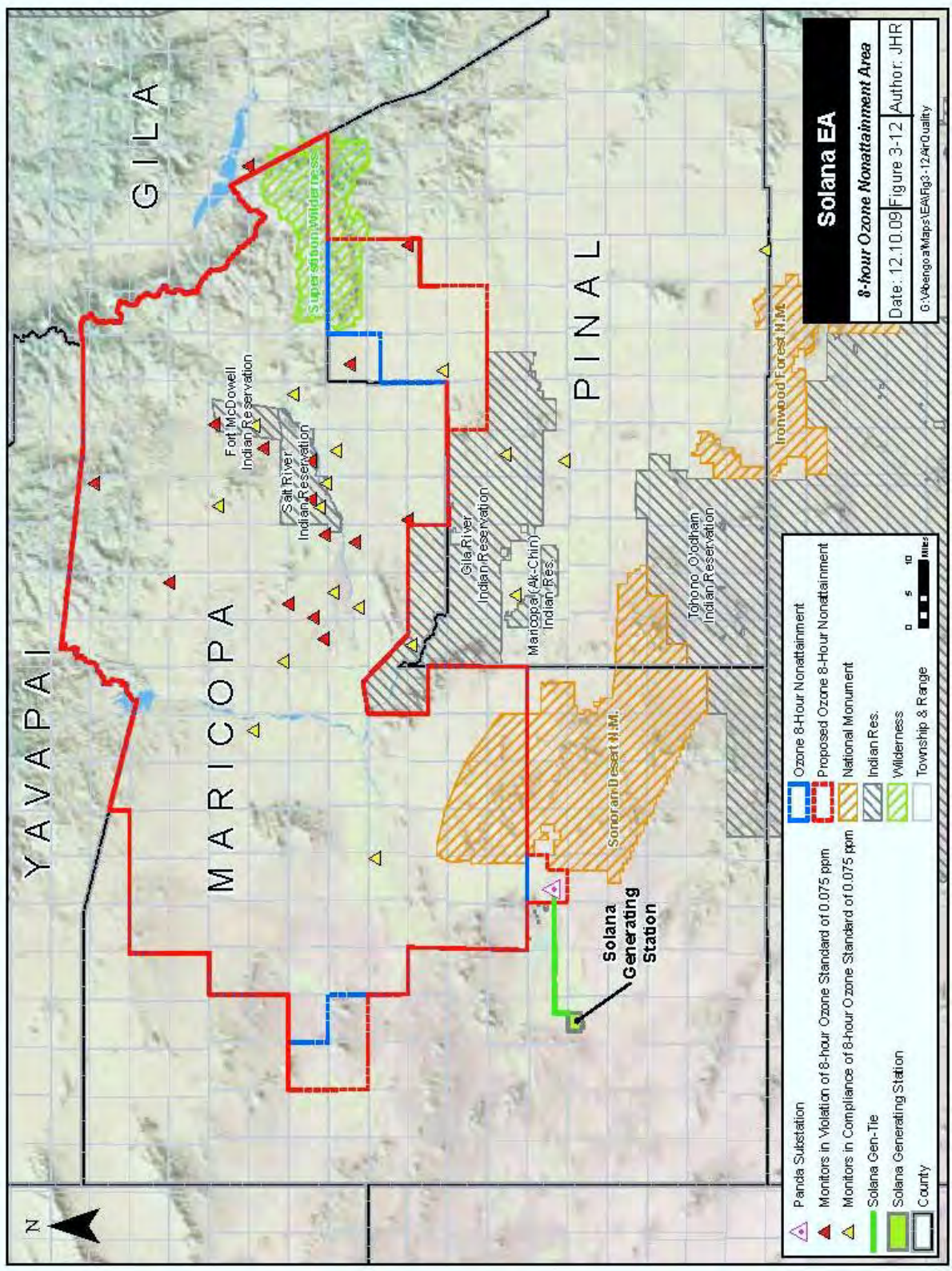

Figure 3-12 Recommended Ozone Nonattainment Area Redesignation

Construction

Project-related construction activities would generate dust and emissions, thereby resulting in short-term impacts to air quality. Sources of emissions and dust related to the construction of the Solana CSP Project would include grading, excavation, vehicular travel on paved and unpaved surfaces, equipment exhaust, and vehicular exhaust emitted from automobiles used by construction workers traveling to and from the construction site. In addition, the direct-fired furnaces and the auxiliary boiler would have the potential to emit regulated air pollutants during construction. Table 3-4 summarizes the anticipated construction emissions associated with the Solana site.

Table 3-4 Solana Construction Emissions Estimates and Applicable Limits

Pollutant[a]	Source	Emission Rate (pounds per MMBtu)[b]	Applicable Limits[c]	Total Projected Emissions (tons)[d]
CO	Rental Boiler[e]	0.082 lb/MMBtu	400 ppm (0.29 lb/MMBtu)	29.93
	Salt Melters[f]	0.082 lb/MMBtu	None	
VOCs	Rental Boiler and Salt Melters	0.0109 lb/MMBtu	None	3.98
NO_x	Rental Boiler	0.042 lb/MMBtu	0.2 lb/MMBtu	30.02
	Salt Melters	0.142 lb/MMBtu	None	
PM_{10}	Rental Boiler and Salt Melters	0.00765 lb/MMBtu	None	2.79
$PM_{2.5}$	Rental Boiler and Salt Melters	0.00765 lb/MMBtu	None	2.79
CO_2	Rental Boiler and Salt Melters	137 lb/MMBtu	None	49,859

a. CO = carbon monoxide; VOCs = volatile organic compounds; NOx = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less; $PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less; CO2 = carbon dioxide.
b. MMBtu = million British thermal units.
c. ppm = parts per million.
d. The construction emissions shown represent the total projected emissions resulting from all fuel-burning equipment to be used for the duration of the construction process. Unlike operations emissions, which would recur each year, construction emissions would be one-time events.
e. Rental boilers would be used during the last year of construction (prior to commencement of commercial operations) to provide steam generation to "warm-up" the equipment associated with Solana to prepare it for operation.
f. Salt melters would be used to raise the temperature of the salt within the molten salt storage tanks to the level required for operation of the thermal energy storage system.

As shown in Table 3-4, emissions rates estimated for Solana construction are below the applicable limits. Emissions generated during construction would be regulated in accordance with the minor source ADEQ Non-Title V air permit, which was filed with the ADEQ in July 2008.

MCAQD Rule 310 establishes limits for emissions of fugitive dust and the requirements for dust control plans. Because Solana construction would generate fugitive dust, Abengoa Solar would

be required to submit a dust control permit and plan to the Maricopa County Dust Compliance Division in accordance with Section 402 of Rule 310.

Because the closest Class I airshed, Superstition Wilderness, is more than 90 miles east of the Solana CSP Project, and anticipated construction emissions for the project would be below applicable limits, construction activities associated with the Solana CSP Project would not impact the airshed.

Operations

Solana would generate limited air pollutant emissions from sources subject to the permitting requirements of MCAQD and ADEQ. These sources would comprise a standby generator, a cooling tower, emergency diesel fire pumps, the heat transfer fluid system, and vehicular travel. Table 3-5 provides the anticipated operations emissions for Solana.

Table 3-5 Annual Solana Operations Emissions

Pollutant[a]	Source	Emissions Rate (pounds per hour)	Total Projected Emissions (tons per year)	Major Source Threshold (tons per year)[b]
CO	Internal Combustion Engines	14.63	2.881	100
SO_2	Internal Combustion Engines	0.051	0.011	100
NO_X	Internal Combustion Engines	63.22	15.0	100
PM_{10}	Internal Combustion Engines	0.658	0.12	100
	Cooling Tower	9.07	42.3	Not Applicable[c]
	Vehicle Traffic	4.41		
$PM_{2.5}$	Internal Combustion Engines	0.658	0.12	100
	Cooling Tower	9.07	28.1	Not Applicable[c]
	Vehicle Traffic	0.44		
VOCs	Internal Combustion Engines	1.45	17.11	100
	Heat Transfer Fluid Venting	92		
CO_2	Internal Combustion Engines	5,258	1,159	Not Applicable

a. CO = carbon monoxide; SO_2 = sulfur dioxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less; $PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less; VOCs = volatile organic compounds; CO_2 = carbon dioxide

b. The Solana facility would be a synthetic minor source, because NO_x emissions from the internal combustion engines will not exceed 100 tons per year at continuous operation.

c. Emissions from the cooling tower and vehicle traffic are fugitive emissions and are not included in determining whether Solana would be a major stationary source.

As shown in Table 3-5, the total projected operations emissions for Solana are below the permitting thresholds for a major stationary source, as defined by Title V of the Clean Air Act. Because operations emissions for Solana are projected to be below major source thresholds, emissions generated during facility operations would be regulated with the minor source ADEQ Non-Title V air permit, which was filed with ADEQ in July 2008.

MCAQD Rule 310 establishes limits for emissions of fugitive dust and the requirements for dust control plans. Because Solana operations would generate fugitive dust, Abengoa Solar would be required to submit a dust control permit and plan to the Maricopa County Dust Compliance Division in accordance with Section 402 of Rule 310.

Because the closest Class I airshed, Superstition Wilderness, is more than 90 miles east of the Solana site and the anticipated plant operations emissions would be below applicable thresholds, Solana operations would not impact the airshed.

Conformity Review

Section 176(c) of the Clean Air Act requires that federal actions conform to the appropriate State Implementation Plan (SIP). A SIP 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 final rule for "Determining Conformity of Federal Actions to State or Federal Implementation Plans" was promulgated by the EPA on November 30, 1993 (58 *Federal Register* 63214) and took effect on January 31, 1994 (40 CFR Parts 6, 51, and 93).[11] This "General Conformity" rule established the conformity criteria and procedures necessary to ensure that federal actions conform to the SIP and meet the provisions of the Clean Air Act. In general, this rule ensures that all criteria air pollutant emissions and VOCs are specifically identified and accounted for in the SIP's attainment or maintenance demonstration and conform to a SIP's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. The State of Arizona adopted the General Conformity rule in Arizona Revised Statutes 49-48-408, and codified the rule in Arizona Administrative Code R18-2-1438. If the action were undertaken in a federally classified nonattainment or maintenance area,[12] the provisions of the final rule for conformity would apply.

At present, the proposed Solana site is within an attainment area for all criteria air pollutants. As described in Section 3.3.2, the EPA is reviewing the State of Arizona recommendation to expand the nonattainment area for 8-hour ozone NAAQS based on monitoring violations of the 2008 8-hour 0.075 parts per million standard (Figure 3-12). The EPA decision on the revised 8-hour ozone nonattainment area designation was anticipated in March 2010; however, at the time of preparation of this EA, the decision had not yet been rendered. If the EPA concurs with the Arizona recommendation, the ADEQ would be required to submit to EPA a revised 8-hour ozone plan for the expanded nonattainment area. The plan would be prepared in accordance with

[11] The EPA is currently revising the General Conformity rule, which is expected to be finalized in 2010.

[12] A maintenance area is an area that a state has 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 SIP. The maintenance plan must show that the NAAQS will be maintained for at least 10 years after redesignation and also include contingency measures to address any violation of the NAAQS.

Section 110(a)(2) of the Clean Air Act and would outline measures for achieving attainment. The ozone plan also would become a revision to the Arizona SIP.

As previously stated, the Clean Air Act requires federal agencies to conform to applicable SIPs. For there to be conformity, a federal action must not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of standards in the area of concern (DOE 2000). Ozone precursor emissions (that is, oxides of nitrogen and volatile organic compounds) generated by the proposed project within the revised nonattainment area would be limited to construction activities associated with the eastern 1.5 miles of the Solana Gen-Tie alignment (or 8 to 10 transmission structures, depending on span length). Given the short-term nature of construction in this area, coupled with the fact that the projected construction emissions rates for ozone precursors would be below applicable limits (for the entire Solana CSP Project), construction activities associated with the eastern 1.5 miles of the Solana Gen-Tie within the potentially revised nonattainment area would not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of the 8-hour ozone standard.

3.3.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, there would be no new emissions or changes in air quality at the site. Fugitive dust would continue to be generated by ongoing agricultural operations. Not constructing the Solana CSP Project would decrease the potential for replacing energy sources that burn fossil fuels with renewable solar energy. The benefits of avoided emissions and other air pollutants by replacing fossil-fuel-fired electric generation would not occur.

3.3.4 Greenhouse Gases and Global Climate Change

In its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) stated that warming of Earth's climate system is unequivocal, and that warming is very likely due to anthropogenic greenhouse gas concentrations (IPCC 2007). DOE is not aware of any methods to correlate exclusively the carbon dioxide emissions resulting from the proposed project to any specific impact to 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 to global warming. Although the project would contribute to cumulative increases in greenhouse gases and related climate change when combined with other projects globally through the emissions described in Section 3.3.3.1, greenhouse gas emissions from the project would be minimal and limited to increases in carbon dioxide, resulting from slight increases in vehicular travel and temporary construction emissions.

The Solana CSP Project would help local utilities fulfill mandatory state renewable energy requirements. While comparable capacity in fossil-fuel-fired generation might produce enough electricity to meet Arizona's rising electricity demand, the Solana CSP Project would produce enough electricity to account for a year's growth in Arizona's demand for electricity with far fewer greenhouse gas emissions.

Except for emissions associated with system component production, system start-up, and emergencies, CSP technology generates electricity while producing fewer greenhouse gas emissions than fossil-based sources. Annually, the Solana CSP Project would avoid emissions of carbon dioxide by more than 475,000 tons if an equivalent amount of electric power was produced using natural gas. Furthermore, compared to natural gas, the Solana CSP Project would avoid more than 520 tons of sulfur dioxide and more than 1,065 tons of nitrogen.

3.4 Noise

3.4.1 Affected Environment

Commonly heard sounds have complex frequency and pressure characteristics. Discussions of environmental noise do not focus on pure tones; rather, the focus is on tones that people hear more easily. For measuring noise in ordinary environments, A-weighted correction factors are used to give more weight to the frequencies that people hear more easily. The A-weighted decibel (dBA) deemphasizes the very low and very high frequencies of sound in a manner similar to the response of the human ear. Therefore, dBA is a good correlation to a human's subjective reaction to noise.

In 1974, the EPA established guidelines for safe noise levels that could be used to protect public health and welfare, including preventing hearing damage, sleep disturbance, and communication disruption. Outdoor values of 55 dBA were identified as desirable to protect against activity interference and hearing loss. When annual averages of the daily level are considered over a period of 40 years, the EPA identified average noise levels equal to or less than 70 dBA as the level of environmental noise that will prevent any measurable hearing loss over the course of a lifetime.

A quiet whisper at 15 feet is typically 30 dBA. Typical ranges of common sounds include approximately 60 to 90 dBA for an automobile at a distance of 50 feet, approximately 76 to 89 dBA for a heavy truck at a distance of 50 feet, approximately 80 to 110 dBA as perceived by the driver of a motorcycle, and approximately 103 to 115 dBA for the operator of a chainsaw.

Typical agricultural crop land is approximately 44 dBA (EPA 1979). Although land use on and adjacent to the Solana site is typical agricultural cropland, additional noise sources near the site include military and civilian aircraft operations, vehicular traffic on Interstate 8 and other main roads, and railcars on the Union Pacific Railroad. Proximity to these additional noise sources results in an increase in ambient noise levels compared to typical agricultural areas.

The nearest sensitive noise receptor would be the residence east of Painted Rock Dam Road, approximately 1 mile east of the proposed power island. The next closest residence is more than 4 miles east of the Solana site on Paloma Road.

3.4.2 Environmental Consequences

3.4.2.1 Proposed Action

Construction and operation of the Solana CSP Project would generate limited noise at the site boundary, as summarized below.

Construction activities associated with the Solana CSP Project would begin at 5:00 a.m. or 6:00 a.m. (depending on the time of year) and end by 7:00 p.m. each day, as stipulated by Maricopa County ordinances. Noise generated during Solana operations would occur primarily at the center of the site within the power island, and would dissipate before reaching the perimeter of the site. Furthermore, Solana's primary mode of operation would occur during daylight hours and there would be minimal noise generated overnight. Accordingly, this analysis does not consider the day-night average sound level, which represents the cumulative noise exposure from all events occurring over a 24-hour period, but with a 10 decibel penalty imposed on noise occurring between 10:00 p.m. and 7:00 a.m.

Construction

Table 3-6 lists noise levels of typical construction equipment expected to be used to construct the Solana CSP Project. These values assume that the equipment is operating at full power at a distance of 45 feet. All of the construction equipment listed in Table 3-6 would not be operating at the same time and, depending on the activity, would be spread throughout the construction site.

Table 3-6 Construction Equipment Noise Levels[a]

	Noise Levels (A-weighted decibels) at Specified Distance					
Equipment Category	**45 Feet**	**90 Feet[b]**	**180 Feet[b]**	**360 Feet[b]**	**720 Feet[b]**	**1,440 Feet[b]**
Dump Truck	88	82	76	70	64	58
Portable Rock Drill	88	82	76	70	64	58
Concrete Mixer Truck	85	79	73	67	61	55
Pneumatic Tool	85	79	73	67	61	55
Grader	85	79	73	67	61	55
Front-End Loader	84	78	72	66	60	54
Mobile Crane	83	77	71	65	59	53
Excavator	82	76	70	64	58	52
Backhoe	81	75	69	63	57	51
Dozer	78	72	66	60	54	48

a. Source: Crocker 1982.
b. Generally, sound levels for a point source decrease by 6 A-weighted decibels for every doubling of distance from the source.

As shown in Table 3-6, the typical uncontrolled noise level 45 feet from a construction site would be approximately 85 dBA. Generally, sound levels for a point source decrease by 6 dBA for every doubling of distance. The nearest residence (associated with a commercial dairy) is on the east side of Painted Rock Dam Road and would be approximately 1 mile away from the power island. While a small proportion of construction activities could occur as close as 360 feet from the nearest residence, most construction would occur more than 0.25 mile away.

The data in Table 3-6 indicate that there would be a temporary increase in ambient noise limited to the construction phase of the Solana CSP Project. Construction activities would result in a

temporary increase in ambient noise; however, these levels would be below the EPA-recommended guideline of 70 dBA to prevent measurable hearing loss and in most instances would be near the EPA-recommended guideline of 55 dBA to protect against outdoor activity interference.

To minimize the effect of temporary increases in ambient noise, Abengoa Solar would complete construction of the Solana CSP Project in accordance with the provisions of the Maricopa County Hours of Construction Ordinance (Maricopa County 2004). The ordinance is designed to ensure construction activity does not conflict with the use of nearby property. Section 102 of the ordinance regulates the start and stop times for all construction work, as described below:

1. Construction work (residential): From April 15th to October 15th, inclusive, all construction work in or within 500 feet of Rural or Residential zones as per the Maricopa County Zoning Ordinance, and within 1,500 feet of an occupied residence, shall not begin prior to 5:00 a.m. and must stop by 7:00 p.m. each day. From October 16th to April 14th, inclusive, all other construction work in or within 500 feet of Rural or Residential zones as per the Maricopa County Zoning Ordinance, and within 1,500 feet of an occupied residence, shall not begin prior to 6:00 a.m. and must stop by 7:00 p.m. each day.
2. Construction work (non-residential): All construction work in Commercial and Industrial zones not within 500 feet of Rural or Residential zones as per the Maricopa County Zoning Ordinance, or within any zone but not within 1,500 feet of an occupied residence, shall not begin prior to 5:00 a.m. and must stop by 10:00 p.m.
3. Weekends and holidays excluded: Notwithstanding the foregoing, construction work subject to Section 102.1 of this ordinance shall not begin prior to 6:00 a.m. and must stop by 7:00 p.m. on any Saturday, Sunday, or federal holiday.

Operations

A simple noise propagation model was used to predict the environmental noise emissions of Solana during normal operations. Normal operations would exclude intermittent activities such as startup and shutdown, and any emergency or upset operating conditions. Table 3-7 lists the sound level specifications for anticipated equipment at a distance of 1 meter (3.28 feet). These equipment sound level specifications are anticipated to be available with standard packaged equipment.

Cumulative noise emissions for the equipment identified in Table 3-7 were calculated at varying distances, and are listed in Table 3-8. The noise sources would be primarily in the center of the solar field within the power island, approximately 1 mile from the Solana site boundary. The cumulative noise emissions are for daytime operations noise levels. Cumulative noise emissions for nighttime operations are expected to be approximately 30 dBA less than daytime levels.

As shown in Table 3-8, cumulative noise emissions generated within the Solana power island would attenuate rapidly and diminish into the background ambient noise levels at the site boundary and be well below the EPA-recommended guidelines. Noise emissions would be anticipated not to exceed a sound pressure level of approximately 46 dBA within approximately 1 mile from the power island. Therefore, the anticipated noise level at the nearest residence would

be approximately 46 dBA and would blend with the existing ambient noise levels. Solana operations would not result in significant or detrimental noise impacts to adjacent lands.

Table 3-7 Sound Level Specifications for Standard Packaged Equipment[a]

Equipment Type	Number of Units	Sound Level Specification per Unit[b]
Circulating Water Pumps	8	90
Condensate Pumps	2	88.2
Cooling Tower	2	85
Cooling Tower to Transfer Pumps[13]	1	89
Diesel Generator	1	102
Diesel Generator Exhaust	1	103
Feed Water Pumps	6	92
Heat Transfer Fluid Circulation Pumps	8	100
Refrigeration Pumps Close Circuit	2	92
Transfer Pumps	1	89
Steam Turbine Generator	2	89

a. Source: Manufacturer data.
b. Sound level measured in A-weighted decibels, 1 meter (3.28 feet) from the source.

Table 3-8 Cumulative Noise Emissions at Varying Distances

Distance	Sound Level (dBA) (daytime predicted noise level)
500 feet	67.9
1,000 feet	61.8
0.5 mile	53.4
1 mile	46.2

Under certain conditions, the localized electric field near an energized conductor can be sufficiently concentrated to produce a tiny electric discharge that can ionize air close to the conductors (EPRI 1982). This partial discharge of electrical energy is called corona discharge, or corona. Corona is the transmission line characteristic most likely to result in noise. Because power loss is costly and noise resulting from coronal discharge is undesirable, corona have been studied and are well understood by engineers (EPRI 1982). Consequently, steps to minimize

[13] The transfer pumps would be used to pipe the cooling tower blow-down to the evaporation ponds (see Section 2.1 Proposed Action for a more detailed description).

coronal discharge are one of the major factors in transmission line design for extra high voltage transmission lines (345 to 765 kilovolts). Coronal discharge is usually not a design issue for power lines rated at 230 kilovolts and lower (PG&E 2005). Accordingly, noise associated with the operation of the Solana Gen-Tie is not anticipated.

3.4.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa would not proceed with the project. Absent the project, there would be no increase in existing ambient noise levels.

3.5 Geology and Seismicity

3.5.1 Affected Environment

The Solana site is located in the Basin and Range physiographic province, which is characterized by fault-block mountain ranges separated by broad, deep alluvial valleys with through-flowing drainage. The Painted Rock and Gila Bend mountains border the project area to the west and north, respectively. In the vicinity of the Solana site, alluvial valleys were formed by the Gila River, which dominates the geologic history of the area. Sediments filling the intermontane basins contain gravels, sands, silts, clays, marl, gypsum, and salt that represent combinations of fluvial, lacustrine, colluvial, and alluvial fan deposits.

According to the U.S. Geological Survey, there are no fault lines in the vicinity of the Solana site or in the broader southwest region (USGS 2006). The Geological Survey National Seismic Hazards Map online mapping tool illustrates the probability for earthquakes or other seismic events to occur over a specified period (USGS 2007). Figure 3-13 depicts the seismic hazard contours for the project region (expressed as a percentage of gravity), which represent the frequency of exceeding a set of seismic circumstances within a 50-year period. Based on Figure 3-13, the Solana site (indicated by the red star) is in an area assigned a relatively low value, between 2 and 4 percent, compared to areas of southern California with known faults, which have values greater than 40 percent. Accordingly, the probability for an earthquake, ground shaking, or other seismic event to occur in the vicinity of the Solana site is very low.

Soils in the vicinity of the proposed Solana site are comprised of three associations – Gunsight-Rillito-Pinal, Laveen-Rillito, and Torrifluvents (Hendricks 1985). Table 3-9 describes each of the soil associations. The Solana site consists primarily of Laveen-Rillito soils, although the northwest portion of the site also contains Gunsight-Rillito-Pinal soils. Soils in the western portion of the proposed Solana Gen-Tie alignment include the Gunsight-Rillito-Pinal association. Torrifluvents, which are typically found on floodplains and alluvial fans, is the dominant soil association east of Citrus Valley Road and along the Gila River (Figure 3-14).

3.5.2 Environmental Consequences

3.5.2.1 Proposed Action

Because there are no fault lines in the region and there is very low probability for seismic activity in the Solana CSP Project vicinity, project construction and operations would not expose people

or structures to risks associated with earthquakes, fault ruptures, or other geologic events. In addition, the soil associations present in the vicinity of the Solana site are not susceptible to high rates of erosion. Therefore, the proposed project would not be expected to result in increased erosion or sedimentation.

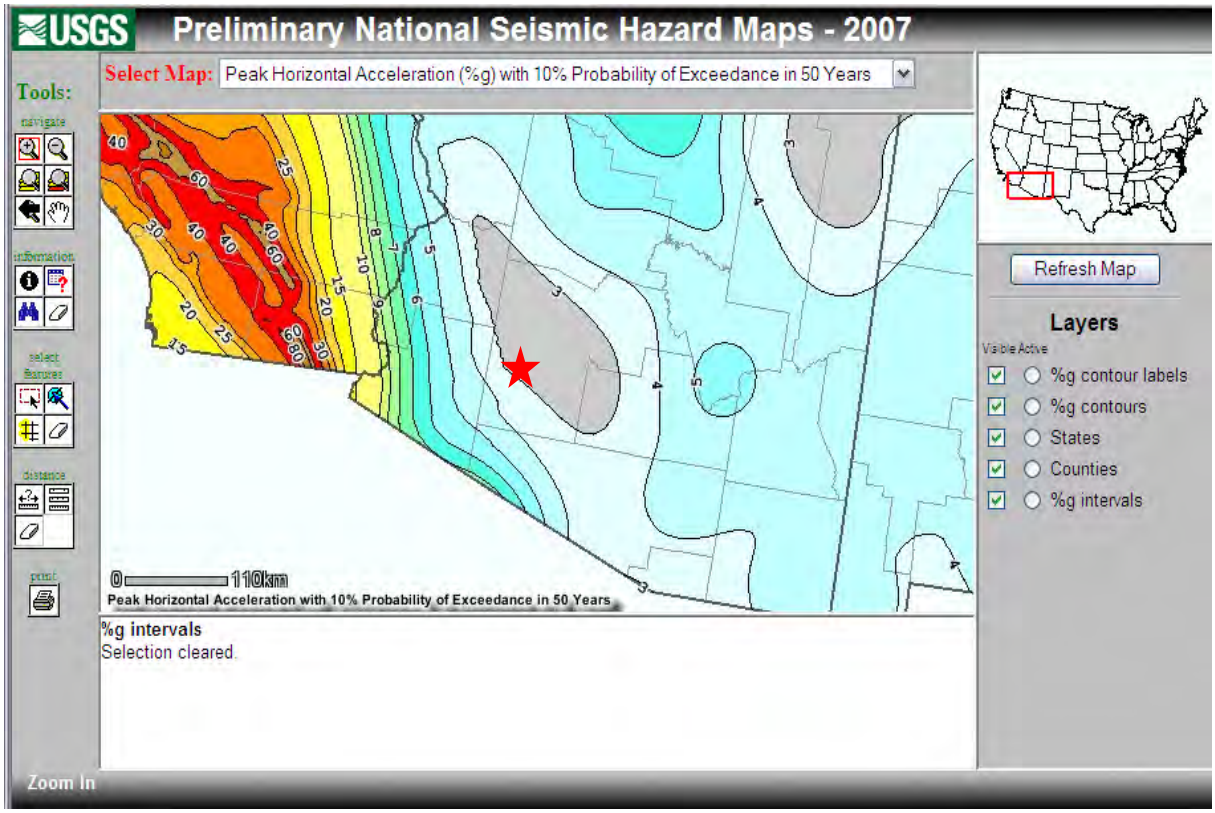

Figure 3-13 Probability of Seismic Activity in the Vicinity of the Solana Site

Table 3-9 Soil Associations in the Vicinity of the Solana Site

Soil Association	Slope (percent)	Description
Gunsight-Rillito-Pinal	0 – 5, up to 15	Soils consist of deep and shallow, limy, gravelly, medium and moderately coarse-textured, nearly level to strongly sloping soils on alluvial surfaces and valley plains. Factors limiting these soils for homesite and community uses are high lime and excessive gravel contents. Excavations require the use of heavy equipment in most places. The soils are fairly well suited to support for low buildings without basements. Gunsight and Rillito soils are suitable for use as septic tank absorption fields but have excessive seepage for use as water retention structures. The soils have a high content of gravel, sand, and calcium carbonate, and therefore are not as susceptible to erosion as soils with high silt content.
Laveen-Rillito	0 – 3	Soils consist of deep, medium and moderately coarse-textured, nearly level to gently sloping, limy soils on low alluvial surfaces and valley plains. The soils in this association generally have only slight limitations for most community uses such as homesites, septic tank absorption fields, sanitary landfill and excavations. They are somewhat dusty and water retention structures such as sewage lagoons and earthen ponds may seep excessively. The soils have a high content of sand and gravel, and therefore are not as susceptible to erosion as soils with high silt content.
Torrifluvents	0 – 5	Soils consist of deep, stratified, coarse to fine-textured, nearly level to gently sloping soils on floodplains and lower alluvial fans. Flooding potential is the major limitation of these soils; all of the soils in this association are subject to seasonal, brief flooding unless protected. Runoff is slow and the hazard of erosion is usually slight except along entrenched streams where soils are subject to bank cutting, piping and gullying.

Sources: Hendricks 1985; USDA 1997.

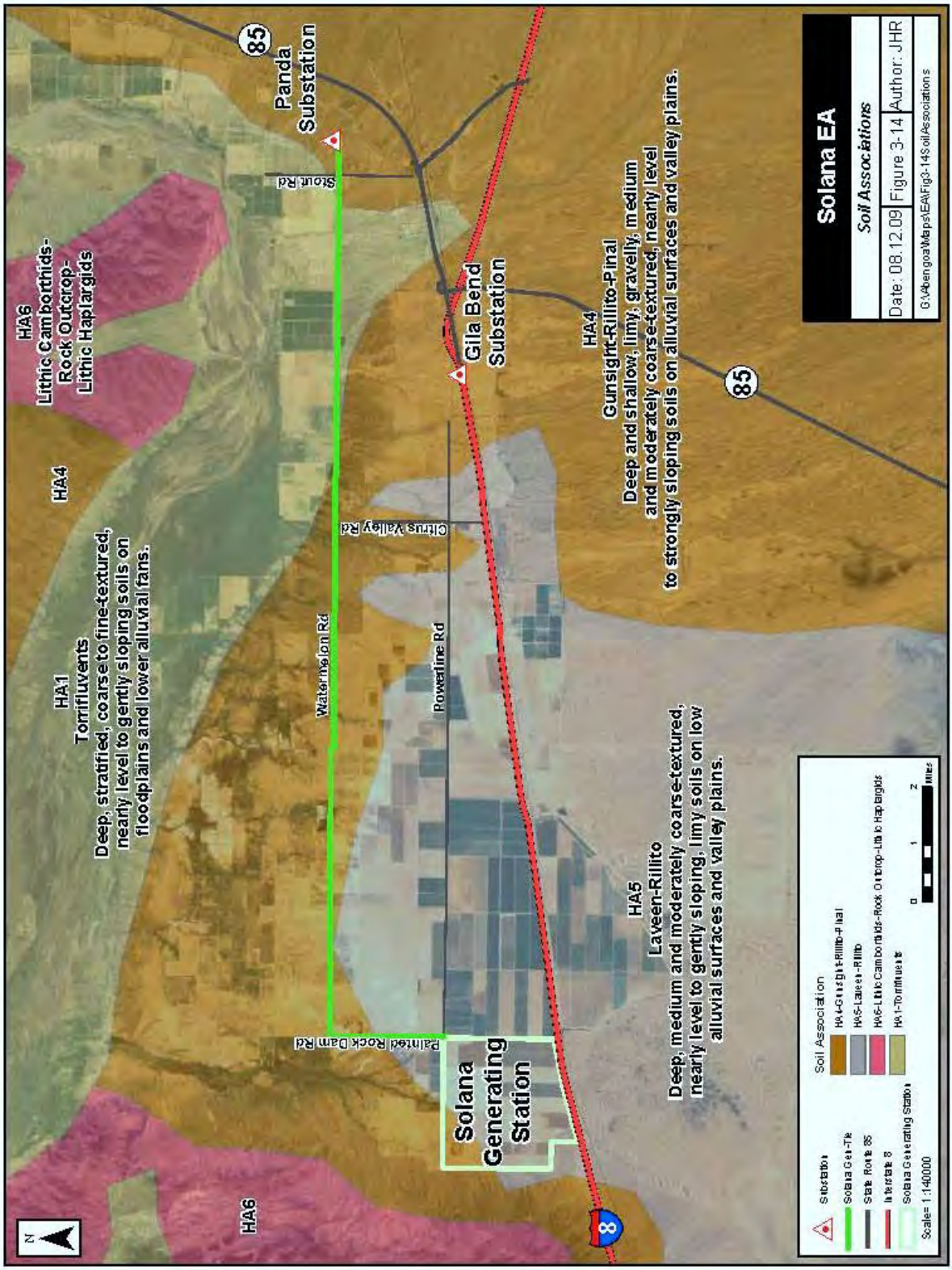

Figure 3-14 Soil Associations in the Vicinity of the Solana Site

3.5.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the project, geologic and seismic conditions would remain constant, and the probability for seismic activity to occur in the area would continue to be very low.

3.6 Water Resources

3.6.1 Regulatory Framework

3.6.1.1 Surface Water

The Clean Water Act of 1972, as amended (33 U.S.C. 1251 *et seq.*), regulates surface water quality in waters of the United States. The Clean Water Act gives the EPA the authority to set standards for discharge of point source pollutants and set water quality standards for all contaminants in surface waters. The EPA publishes surface water quality standards and toxic pollutant criteria at 40 CFR Part 131.

The Clean Water Act mandates water-quality-based control measures. States, territories, and authorized tribes set water quality standards, and under Clean Water Act Section 303(d), states, territories, and tribes are required to develop lists of impaired waters that do not meet water quality standards and establish total maximum daily loads (TMDLs) for specific pollutants. TMDLs represent the maximum amount of a pollutant that a waterbody can receive from all contributing point and non-point sources and still meet water quality standards. The calculation must include a margin of safety to ensure that the waterbody can be used for the purposes the state has designated and must account for seasonal variations in water quality to gain EPA approval.

Under Title 18, Chapter 11, Article 1 of the Arizona Administrative Code, the ADEQ is responsible for regulation of activities and factors that could affect the quality of surface waters of the state.

3.6.1.2 Wetlands

Executive Order 11990, *Protection of Wetlands* (May 24, 1977), directs federal agencies to avoid, to the extent possible, adverse impacts associated with the destruction or modification of wetlands. Under DOE policy, a wetlands assessment is required for any action involving wetlands (10 CFR 1022).

3.6.1.3 Floodplains

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 any action involving floodplains (10 CFR 1022).

3.6.1.4 Groundwater

The Arizona Department of Water Resources manages groundwater under the Groundwater Management Code of 1980, codified in Title 49 of the Arizona Revised Statutes. The ADEQ regulates groundwater quality in accordance with Title 18, Chapter 11, Article 4 of the Arizona Administrative Code. At present, all aquifers of the state are protected for drinking-water use.

3.6.2 Affected Environment

3.6.2.1 Surface Water

The Solana site is in the Lower Gila-Painted Rock Reservoir Subbasin of the Lower Colorado River region. The Gila River and its tributaries comprise the surface drainage system. At the northern end of the basin, the Gila River begins near Gillespie Dam and flows south to the Town of Gila Bend. The river turns west and exits the basin at Painted Rock Dam. Over this 36-mile length, the Gila River is ephemeral, flowing in response to precipitation events or water releases from upstream dams (ADWR 1994).

More locally, flow in response to precipitation events approaches the Solana site from watersheds to the west and to the south (Figure 3-15). The western watershed originates in the Painted Rock Mountains and is approximately 3 square miles in size. This watershed is relatively short and steep. Ephemeral flows from the watershed west of the property are directed north by a berm and currently discharge into Bull Durham Wash approximately 1 mile north of the Solana site. Bull Durham Wash conveys flows from the western boundary of the Solana site into the Gila River approximately 4 miles upstream of Painted Rock Dam.

South of the Solana site, a watershed, approximately 25.5 square miles in size, extends to the White Hills of the Sauceda Mountains. This watershed is long and narrow and conveys flows in response to precipitation events generally in a sheet flow condition to an existing topographic saddle formed by a hill approximately 2 miles south of Interstate 8. On the southern slope of this hill, ephemeral flows are naturally diverted by the saddle either west or east, with most of the ephemeral flow conveyed west, away from the Solana site. The flow directed east of this natural saddle point is captured by an elevated lateral irrigation ditch and conveyed northward where the flow ponds behind the lateral canal berm south of Interstate 8. Interstate 8 is an impediment to the historic flow pattern from the south. Flow accumulates in this location and is conveyed through a culvert under Interstate 8, which discharges northward at the southern boundary of the Solana site.

Onsite, storm water generally flows in sheets through irrigated agricultural fields that direct flow in response to precipitation events either west to east or south to north. Irrigation canals with lateral structures and tailwater[14] ditches limit the accumulation of flow into rill and gully formations on the property. PIDD operates and maintains irrigation facilities. Onsite flow discharges to PIDD irrigation water infrastructure and then to Bull Durham Wash at the approximate center of the Solana site's northern boundary.

[14] Tailwater runoff is the remaining portion of applied irrigation water that is not consumed by the crop or does not evaporate, and results in a surface flow leaving the farm.

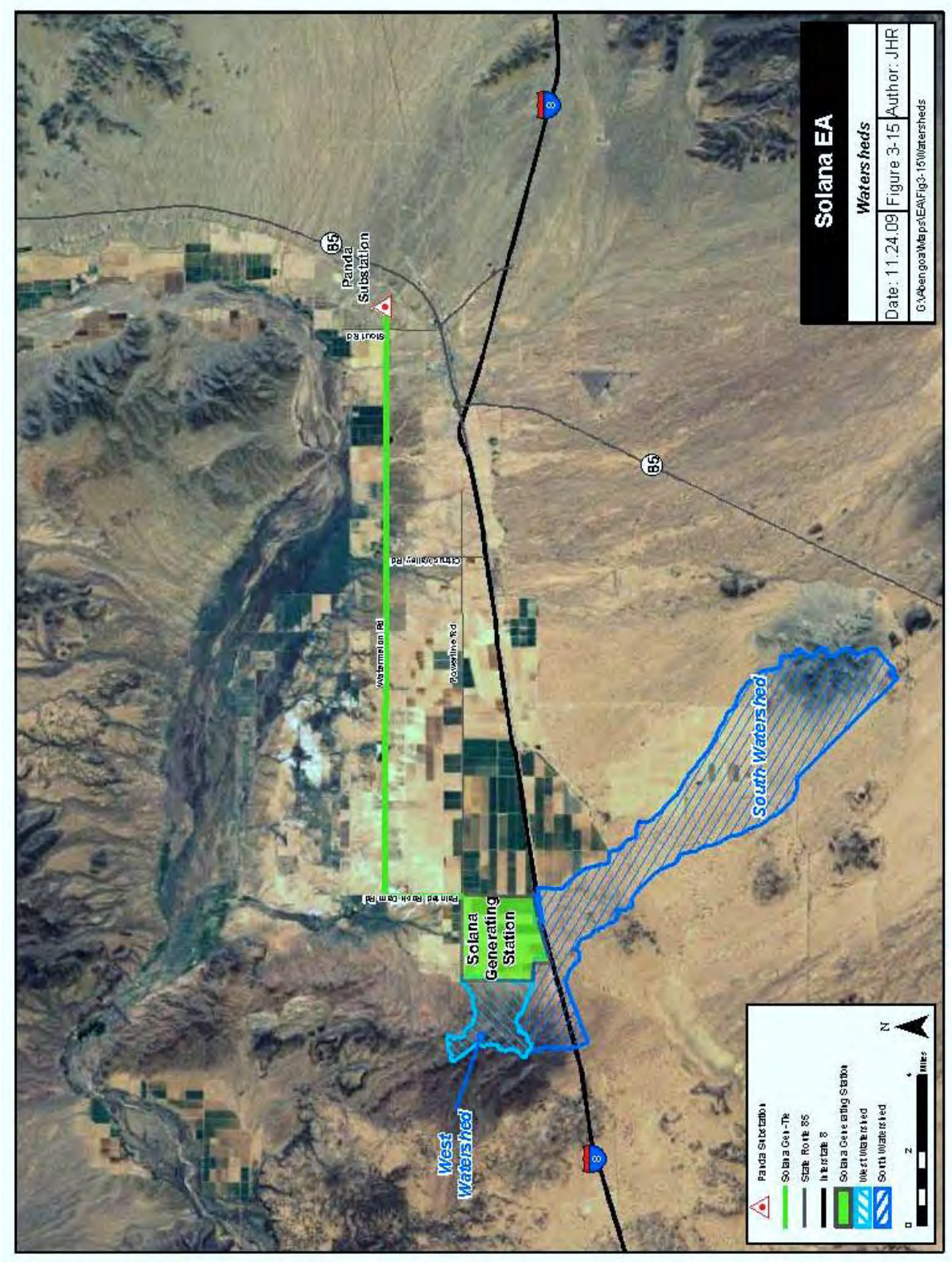

Figure 3-15 Watersheds in the Vicinity of the Solana Site

Flow that discharges to Bull Durham Wash ultimately discharges to the Gila River. There are no waters listed as impaired in accordance with Clean Water Act Section 303(d) in the vicinity of the Solana site.

Additional surface water features on and adjacent to the Solana site include PIDD infrastructure (such as canals, reservoirs, and relift pumps). PIDD canals on the Solana site provide water for agricultural operations on adjacent farms, and have resulted in tailwater delivery to a series of earthen-lined reservoirs and relift pumps north of the Solana site, within Bull Durham Wash. PIDD created the reservoirs to capture the agricultural tailwater runoff and operational spills, which are then relifted by pumps for reuse on adjacent farms. These reservoirs are the only source of water for the farmland north of the Solana site and west of Bull Durham Wash. A small portion (approximately 0.5 acre in size) of one of the earthen-lined reservoirs north of the Solana site is within the boundary of the property owned by Abengoa Solar.

3.6.2.2 Wetlands

No wetlands were identified within the Solana site or Solana Gen-Tie corridor. Irrigation flows that are not relifted for irrigation purposes (within the PIDD facilities described above) may overtop the irrigation facilities and discharge to Bull Durham Wash. Bull Durham Wash is outside the Solana CSP Project boundary, but is presumed to include wetlands.

3.6.2.3 Floodplains

The natural drainage of the Solana site has been altered to allow for farming. The historical drainage has been partially redirected around the western edge of the property by a constructed berm. The washes surrounding the property discharge to Bull Durham Wash, a tributary of the Gila River.

The Solana site is on Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) No. 04013C3450F. The FIRM panel identifies the property to be within the 500-year flood zone, which FEMA defines as having a 0.2 percent annual chance of flooding. The aforementioned FIRM and FIRM panel numbers 04013C3475F and 04013C3480F identify the flood hazard zones associated with the Solana Gen-Tie alignment. The Solana Gen-Tie would primarily cross the 500-year flood zone. An approximately 3-mile-long segment would cross Zone A intermittently, which has a 1 percent annual chance of flooding (100-year floodplain). Table 3-10 describes the flood zones in the vicinity of the Solana site; Figures 3-16 and 3-17 show the floodplains. DOE published a Notice of Floodplain Involvement on March 4, 2010, in the Gila Bend Sun to notify the public that a summary of the floodplain impacts would be prepared in this EA.

Table 3-10 Federal Emergency Management Agency Flood Zones

Zone	Description
A (100-year Floodplain)	Areas with a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Because detailed analyses are not performed for such areas, no depths or base flood elevations are shown within these zones.
AE	Areas with a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. In most instances, base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AH	Areas with a 1 percent annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Base flood elevations derived from detailed analyses are shown at selected intervals within these zones.
AO	River or stream flood hazard areas and areas with a 1 percent or greater chance of shallow flooding each year, usually in the form of sheet flow, with an average depth ranging from 1 to 3 feet. These areas have a 26 percent chance of flooding over the life of a 30-year mortgage. Average flood depths derived from detailed analyses are shown within these zones.
D	Areas with possible but undetermined flood hazards. No flood hazard analysis has been conducted. Flood insurance rates are commensurate with the uncertainty of the flood risk.
500-Year Flood Zone	Areas of 0.2 percent annual chance flood.

Source: FEMA 2009.

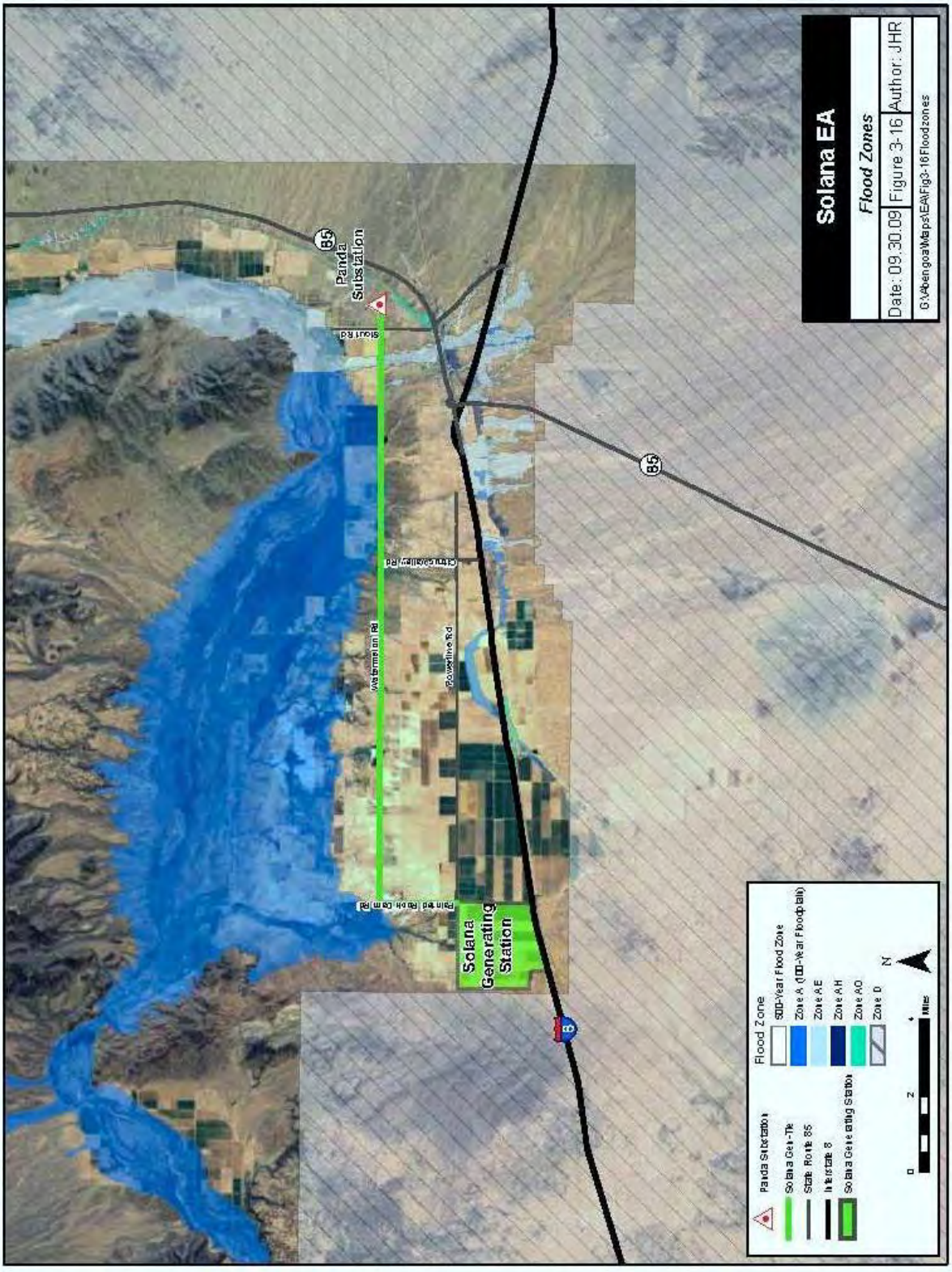

Figure 3-16 Flood Zones in the Vicinity of the Solana CSP Project

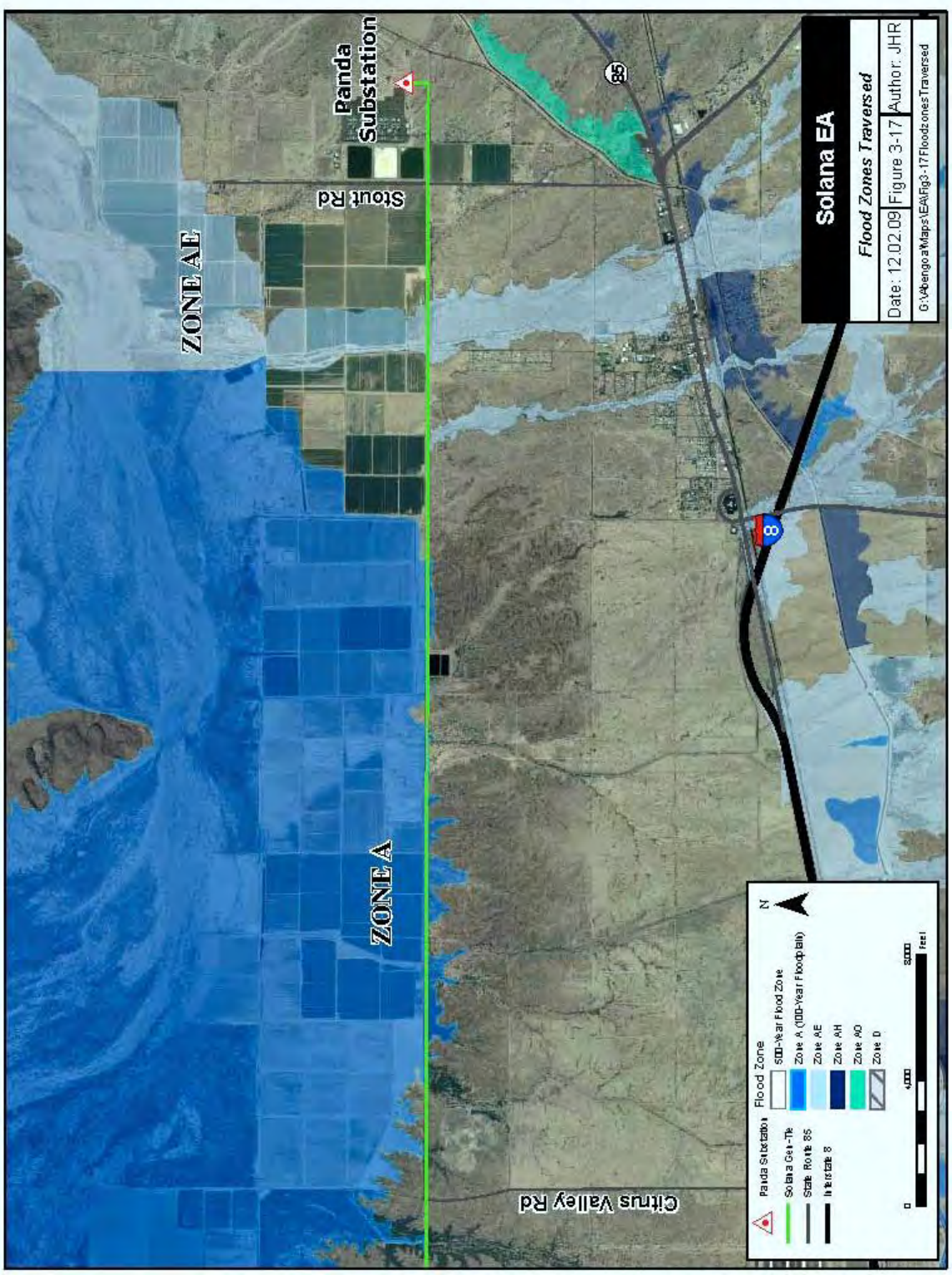

Figure 3-17 Flood Zones Traversed by the Solana Gen-Tie Alignment

3.6.2.4 Waters of the United States

In accordance with Regulatory Guidance Letter 08-02 (USACE 2008), a Preliminary Jurisdictional Determination request was submitted to the U.S. Army Corps of Engineers on January 14, 2010, including washes recommended as waters of the United States. Figures 3-18 through 3-21 show the washes recommended as waters of the United States. In a letter dated March 17, 2010, the Army Corps of Engineers concurred with the recommendations submitted in the Preliminary Jurisdictional Determination (Appendix D).

There is no perennial surface water on the Solana site or along the Solana Gen-Tie alignment, except as related to irrigation infrastructure. Irrigation ditches, ponds, and other irrigation facilities excavated on dry land and used exclusively for such purposes as irrigation are generally not considered waters of the United States (USACE 2001).

There are no features on the Solana site recommended as waters of the United States. Two offsite ephemeral washes northwest of the site boundary are recommended as jurisdictional. Portions of Bull Durham Wash north of the irrigation facilities and the Solana site also might be jurisdictional; however, this area would not be disturbed during project activities.

Along the Solana Gen-Tie alignment, the segment that parallels Painted Rock Dam Road straddles active and fallow farm fields. Historical flow characteristics along this reach have been changed due to agricultural activities, and no features are recommended as jurisdictional waters of the United States. The western extent of the Solana Gen-Tie alignment parallel to Watermelon Road crosses agricultural lands. At 375th Avenue, the landscape transitions to a mix of previously disturbed active and fallow agricultural fields and native Sonoran desert (see Figures 3-18 through 3-21).

3.6.2.5 Groundwater

The Solana CSP Project would be within the Gila Bend groundwater basin, an area of 1,280 square miles consisting of a wide, gently sloping alluvial plain surrounded by low, fault-block mountains. Elevations on the basin's alluvial plain range from about 700 feet to 1,400 feet above mean sea level. The mountains surrounding the basin have elevations of 2,100 feet to 3,200 feet above mean seal level. The basin is bounded by the Gila Bend Mountains and Buckeye Hills on the north, the Maricopa and Sand Tank mountains on the east, the Sauceda Mountains on the south, and the Painted Rock Mountains on the west. The main water-bearing unit in the Gila Bend basin is the alluvial valley-fill material, which is divided into alluvial units. The alluvial units yield water to wells and can be considered as one aquifer because of their hydrologic connection. Groundwater in the alluvial aquifer is usually unconfined, but there are several areas where fine-grained layers in the alluvium cause confined conditions. There are perched-water-table conditions caused by downward percolation of irrigation water in localized areas of the basin.

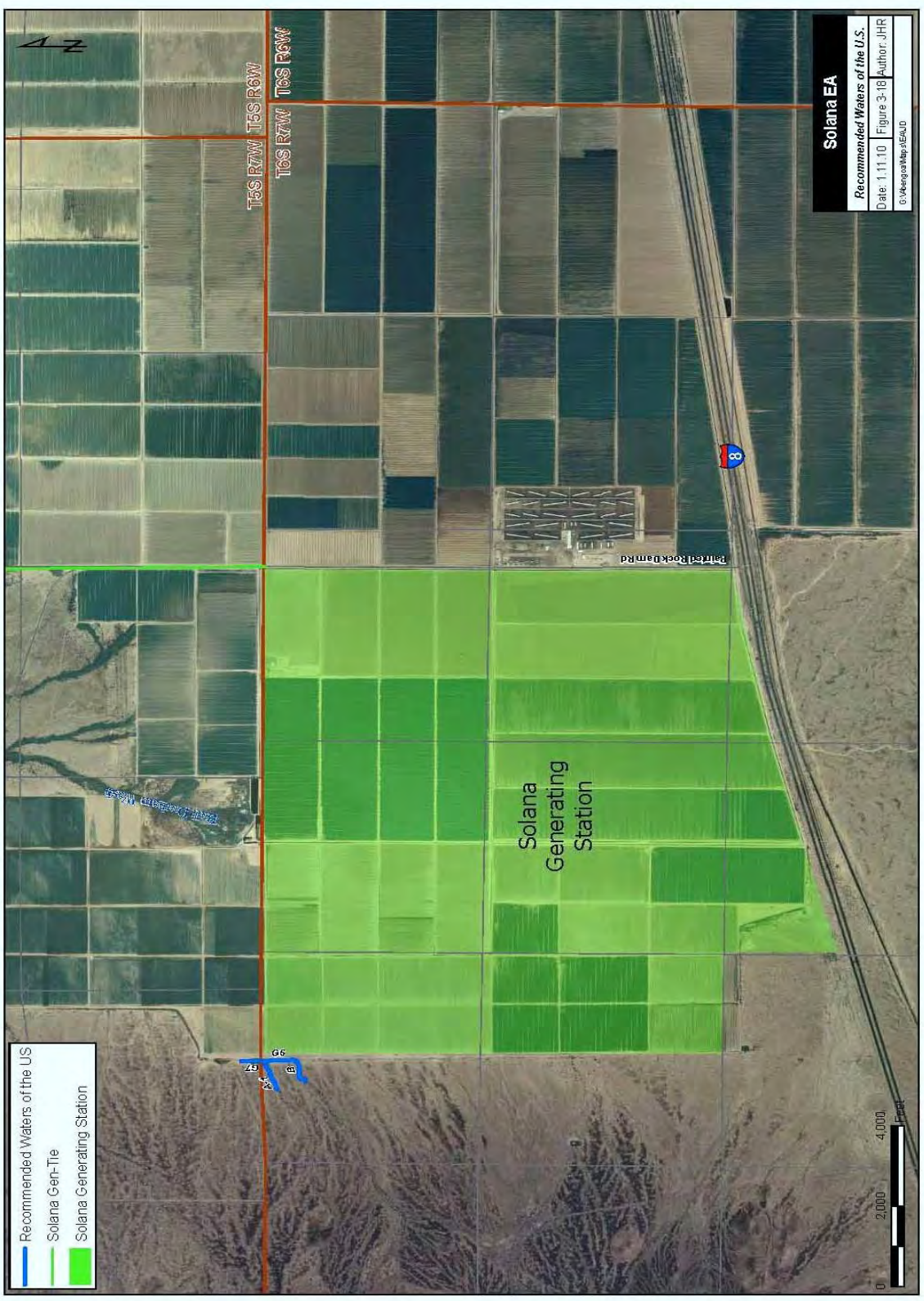

Figure 3-18 Recommended Waters of the United States

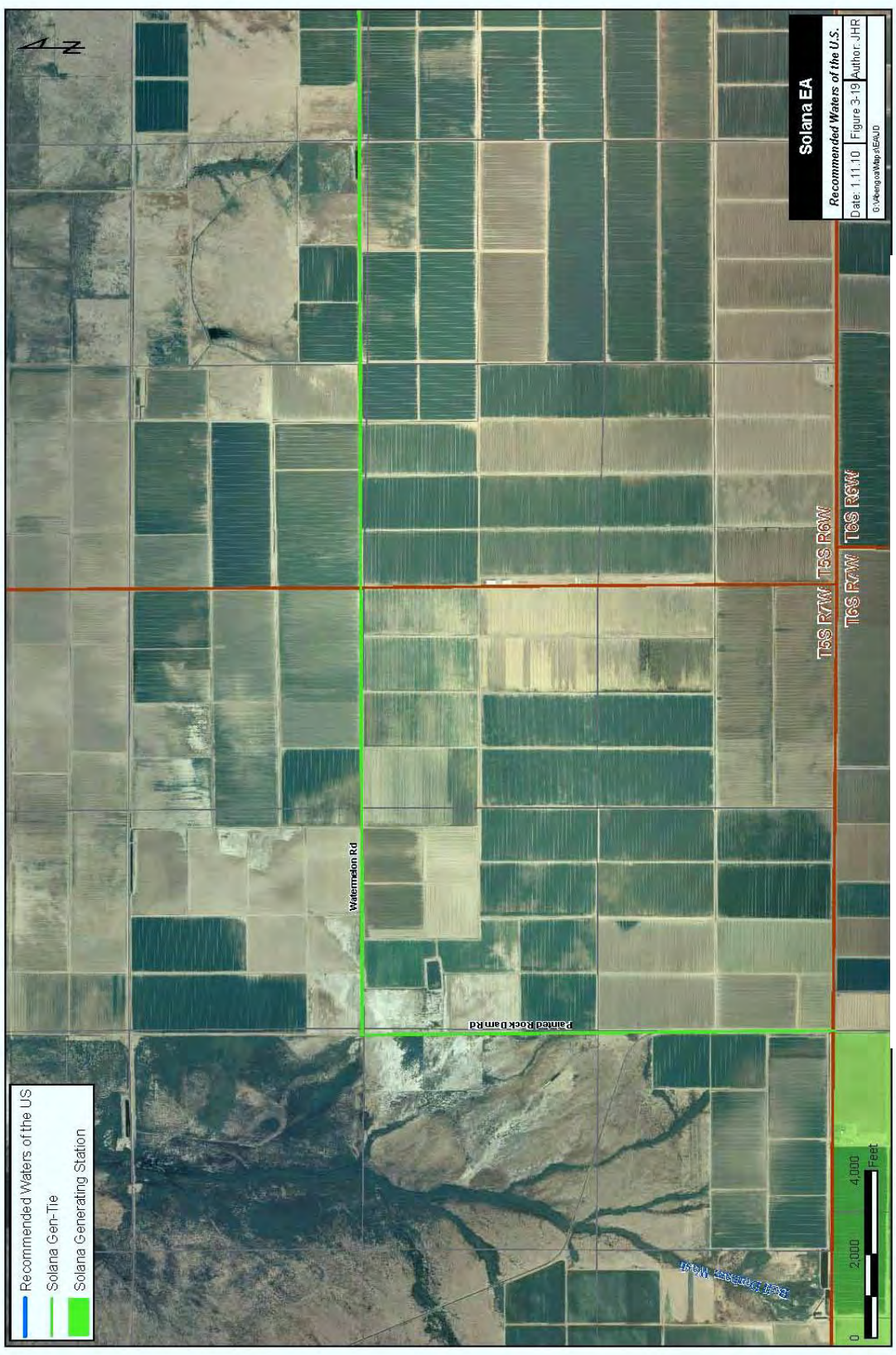

Figure 3-19 Recommended Waters of the United States (North and East of Plant)

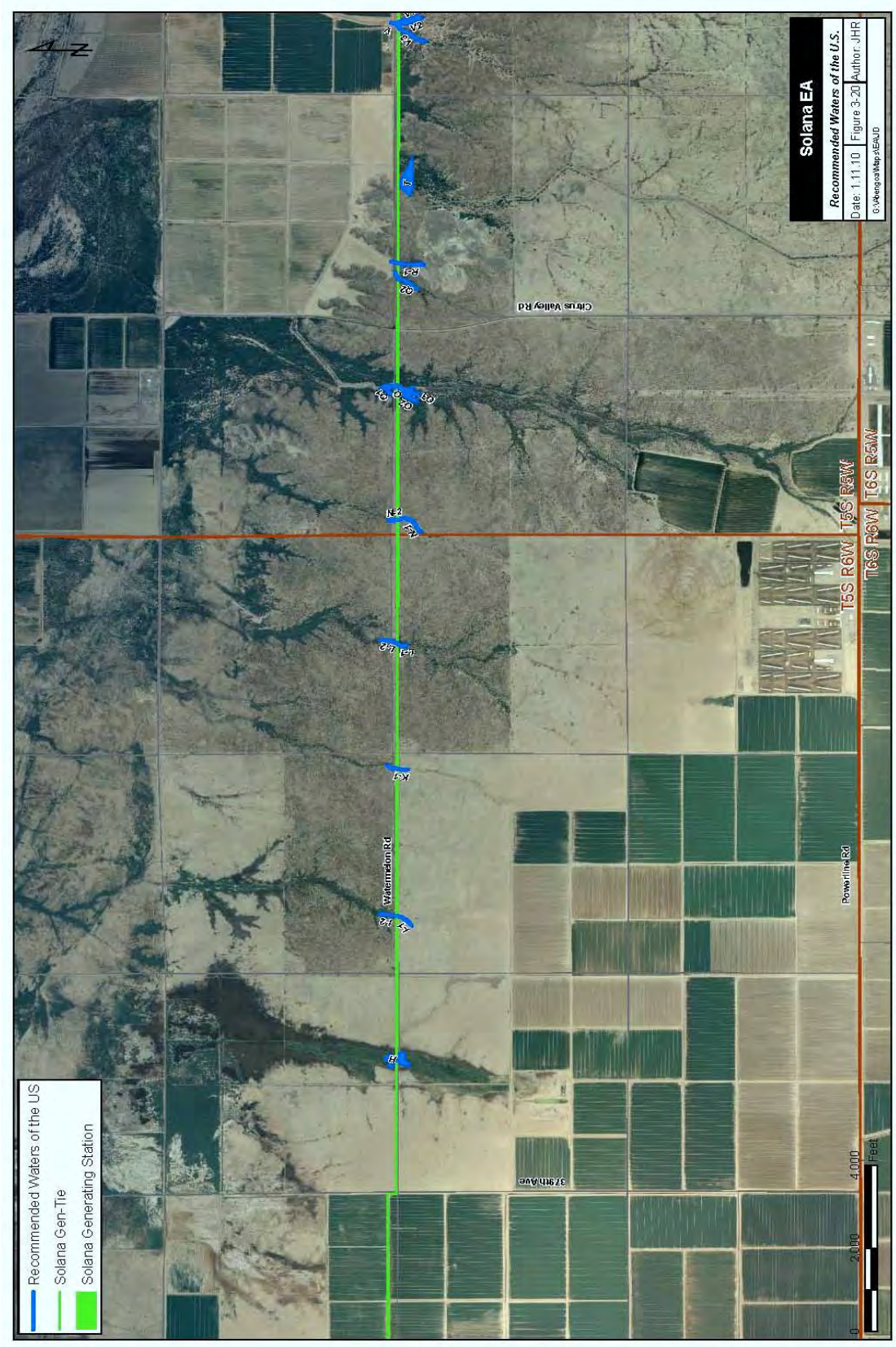

Figure 3-20 Recommended Waters of the United States (Further East of Site)

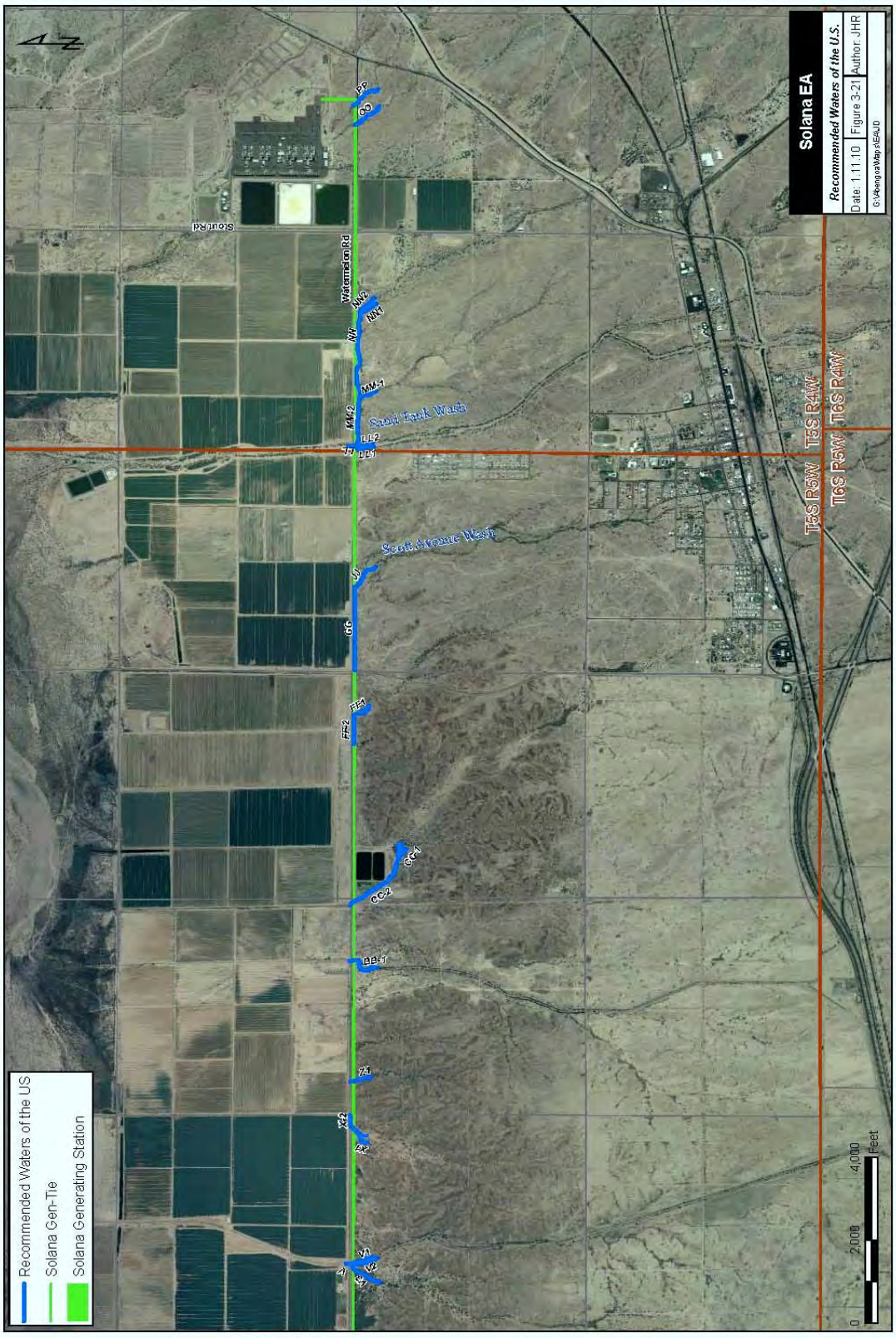

Figure 3-21 Recommended Waters of the United States (Further East of Site)

The subsurface geology in the vicinity of the Solana CSP Project identifies three aquifer units, as follows (Southwest Water and Mineral Resources 2009):

- Upper alluvium unit comprised of unconsolidated sand and gravel with intermixed zones of silty sand or sandy silt
- Middle alluvium unit comprised of silt, sandy silt/silty sand and intermixed zones of poorly indurated sand and silty sand
- Lower alluvium unit comprised of poorly indurated-to poorly-cemented sandy gravel, volcanic conglomerate and some intermixed zones of silty sand with minor clay

Under the Solana site, volcanic bedrock (basalt) has been encountered at shallower depths at the western and southern edges of the site. In addition, higher quality groundwater is anticipated from the lower alluvial units.

3.6.3 Environmental Consequences

3.6.3.1 Proposed Action

Construction

Solana CSP Project construction would include site grading and removal of the existing berm along the western boundary. Currently, water runoff from the mountains is diverted north of the Solana property by the berm. Once the berm is removed, an open channel will be constructed in its place, which will intercept and convey offsite flows along the west and north sides of the Solana site for release to Bull Durham Wash.

Water would be used for dust control and other construction-related activities. Site grading would incorporate provisions in the engineering design of the facility to address both onsite and offsite storm water management in accordance with the Floodplain Regulations for Maricopa County (FCDMC 2006).

The Solana CSP Project would be designed and constructed to avoid or minimize direct impacts to waters of the United States. Based on concurrence with the Preliminary Jurisdictional Determination by the Army Corps of Engineers on March 17, 2010, no significant impacts to waters of the United States would be anticipated during project construction. The Solana Gen-Tie transmission structures would not be placed in waters of the United States. Table 3-11 lists the widths of the recommended waters of the United States and the corresponding areas of impact.

As described in Section 2.1, an access road might be required along limited portions of the alignment for construction of the Solana Gen-Tie. For this analysis, a conservative scenario assumes that a 25-foot-wide access road would be constructed along the entire length of the Solana Gen-Tie alignment. Under this scenario, the estimated area of impact to waters of the United States would be less than 0.4 acre. This potential disturbance would meet the requirements of an Army Corps of Engineers Section 404 Nationwide Permit No. 12 for Utility

Table 3-11 Estimated Impacts to Waters of the United States

Waters of the United States Feature Label	Width (feet)	Potential Area of Impact* (acres)
H	250	0.1435
I-1	8	0.0046
I-2	11	0.0063
K-2	9	0.0052
L-2	20	0.0115
N-1	12	0.0069
O	7	0.0042
O1	7	0.0040
O2	6	0.0034
O3	7	0.0040
Q2	6	0.0032
R-1	6	0.0034
V	45	0.0258
V1	22	0.0126
V2	24	0.0138
V3	10	0.0057
X-2	6	0.0034
X1	3	0.0017
X2	4	0.0023
Z1	5	0.0029
BB-2	36	0.0207
CC-1	5	0.0029
CC-2	11	0.0063
FF1	8	0.0046
FF2	7	0.0040
JJ	5	0.0029
LL1	36	0.0207
LL2	37	0.0212
MM-1	9	0.0052
NN1	6	0.0034
NN2	10	0.0055
OO	6	0.0034
PP	7	0.0040
Totals	650	0.3732

*Calculation of the potential area of impact conservatively assumes a 25-foot-wide access road would cross the widest portion of each water of the United States that drains perpendicular to the Solana Gen-Tie alignment. Individual poles would not be placed within the jurisdictional limits of waters of the United States. An access road would not be constructed through the bottom of the impounded waters of the United States identified as area "T."

Line Activities. Nationwide Permit No. 12 allows for construction of utility lines and associated facilities in waters of the United States provided the activity does not result in the loss of more than 0.5 acre of waters of the United States. A more likely scenario would be to use the existing, developed portions of Watermelon Road for access to the Solana Gen-Tie, thereby limiting the number of crossings that would need to be constructed over waters of the United States.

The ADEQ has granted a conditional certification under Section 401 of the Clean Water Act for Nationwide Permit No. 12. The Section 401 Water Quality Certification will be approved concurrently with the Section 404 permit.

Potential indirect impacts to waters of the United States would be managed through implementation of a Storm Water Pollution Prevention Plan and accompanying best management practices (BMPs). Examples of BMPs include, but are not limited to, the use of silt fences, storm water retention, and sediment traps. The goal of BMPs is runoff management and improved water quality by means of sediment control, soil stabilization, and pollutant removal.

Areas of permanent disturbance to floodplains along the Solana Gen-Tie alignment would be limited to the footprint of the steel monopole transmission structures and associated concrete footings, which are anticipated to be approximately 7 feet by 7 feet (or 49 square feet) per structure. Based on typical span lengths of 800 to 1,000 feet for 230 kilovolt transmission lines, the number of transmission structures to be placed within the 100-year floodplain would range between 18 and 20 poles. Therefore, the total area of permanent disturbance within the 100-year floodplain resulting from the Solana Gen-Tie would range between 882 square feet (0.020 acre) and 980 square feet (0.022 acre). The exact placement of individual poles would be determined during final engineering and design. Where possible, however, pole placement within the 100-year floodplain would be avoided through spanning.

Pursuant to Article IV of the Floodplain Regulations for Maricopa County, allowable uses within Zones A and AE include utility transmission lines (FCDMC 2006). Before starting construction, Abengoa Solar would obtain a floodplain use permit from the Floodplain Administrator to ensure compliance with county floodplain regulations.

Given the overall size of the 100-year floodplain associated with the Gila River, coupled with the limited extent of permanent disturbance that would result from the transmission structures, no short-term or long-term adverse effects to the 100-year floodplain would be anticipated. Even during 100-year or greater flood events, it would be unlikely that the footprint of a maximum of 20 transmission structures within the floodplain (which is considered an allowable use per Flood Control District regulations) would impede or redirect flood flows, or be measurably different compared to existing conditions. 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 Solana CSP Project would not affect the 100-year floodplain.

Construction or operation of the Solana CSP Project would not result in direct impacts to wetlands. Because the Solana site is currently irrigated agricultural land, removing this land from agricultural production has the potential to result in indirect impacts to wetlands by reducing the amount of agricultural tailwater runoff returned to the irrigation reservoirs north of the Solana site. These irrigation reservoirs are one of many water inputs to Bull Durham Wash, which

include adjacent farms and irrigation system operational spills. As a result, the Solana site represents a minor contribution (approximately 3 to 5 percent) to the overall system which supports the riparian areas within Bull Durham Wash (see Section 3.7 Biological Resources for a more detailed discussion).

Abengoa Solar would provide water to the head of Bull Durham Wash as a direct off-set for the portion of the reduced agricultural tailwater runoff that would otherwise remain in the irrigation reservoirs and contribute to operational spills. The off-set would equalize water lost as a result of the farm being taken out of production. Section 3.7 provides an expanded discussion of Bull Durham Wash and presents the analysis used to determine the off-set.

Construction activities associated with the Solana site and the Solana Gen-Tie alignment would be conducted under a Storm Water Pollution Prevention Plan and subject to a Flood Control District floodplain use permit and an Army Corps of Engineers-administered Section 404 nationwide permit. In addition, Abengoa Solar would provide a direct off-set to equalize water lost to the Bull Durham Wash as a result of the farm being taken out of production. Therefore, Solana CSP Project construction would not be expected to result in a significant impact to water resources.

Operations

Solana site design includes the relocation of onsite PIDD canals to ensure the future delivery of water to the reservoirs and relift pumps for continued agricultural use north of the Solana site.

Solana site water consumption is estimated to be 3,000 acre-feet per year. The Solana site would be constructed on active farmland, not native desert or undisturbed land. Converting the land from agriculture to solar energy production would reduce current water usage by more than 75 percent, thereby reducing demand on Arizona's water supply. The source water for Solana is anticipated to be groundwater, although provisions for surface water deliveries from PIDD could be considered. It is anticipated that the amount of agricultural tailwater returned to the reservoirs north of the Solana site might be reduced as a result of the change in Solana site use; however, these reservoirs would be sustained to provide sufficient water to farmland north of the Solana site.

Solana would utilize conventional water cooling with cooling towers. Cooling water blow-down would be evaporated in double-lined evaporation ponds with leak detection. Abengoa Solar proposes to have 100 percent redundancy of the evaporation ponds (that is, the evaporation ponds would have twice the capacity of that estimated to be required). As preventive maintenance, however, the evaporation ponds might require cleaning every 3 to 5 years. Abengoa Solar would obtain an individual aquifer protection permit, which would monitor and regulate potential discharges. Abengoa Solar does not plan direct discharges to surface waters during plant operations.

Onsite and offsite storm water would be managed in accordance with Floodplain Regulations for Maricopa County (FCDMC 2006). Onsite storm water runoff would be routed through retention ponds and infiltration areas to remove pollutants and improve water quality before discharge.

As described above, Abengoa Solar would provide a direct off-set to Bull Durham Wash to equalize water lost as a result of the farm being taken out of production. Therefore, no impacts to water resources are anticipated from Solana Generating Plant operations.

3.6.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, the Solana site would continue to be used for farmland and there would be no changes to current water resource conditions. Water demand to support the continued agricultural production of the land would be greater under the No-Action Alternative. Assuming agricultural operations continued on the property, there would be no impacts to waters of the United States under the No-Action Alternative.

3.7 Biological Resources

3.7.1 Regulatory Framework

The principal statute pertaining to the protection of plants and animals is the federal Endangered Species Act of 1973, as amended, which requires protection of federally listed threatened and endangered species and their habitats. The U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration National Marine Fisheries Service administer the Endangered Species Act. The act establishes protection and conservation of threatened and endangered species and the ecosystems upon which they depend.

The Migratory Bird Treaty Act of 1918 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. Each of the conventions protect selected species of birds common to both countries (that is, species occur in both countries at some point during their annual life cycle). The act protects all migratory birds and their parts (including eggs, nests, and feathers).

3.7.2 Affected Environment

To comply with the requirements of the Endangered Species Act, a Biological Assessment was prepared for the Solana CSP Project to identify threatened or endangered species with the potential to occur in the vicinity of the project (Tierra Environmental Consultants 2010). The following paragraphs summarize the results of the Biological Assessment.

3.7.2.1 Vegetation

The identification of existing vegetation resources was conducted using high-resolution aerial photography and field verification to map vegetation types in the Solana CSP Project area. Vegetation data was acquired from the Brown and Lowe vegetation database available through the Arizona Game and Fish Department (AGFD). Vegetation typical of the Sonoran Desertscrub community of the Lower Colorado River Valley subdivision was identified as the primary land cover class based on vegetative characteristics in the Solana CSP Project area (Brown 1994). Vegetation in the vicinity of the Solana CSP Project includes:

- Agriculture land use – areas in active crop production or farmed during recent growing seasons.
- Creosotebush-bursage community – typical Sonoran Desert community characterized by a sparse, open shrub canopy of creosotebush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Other common species typically present at low densities include brittlebush (*Encelia farinosa*), mesquite (*Prosopis sp.*), and big galleta grass (*Hilaria rigida*). The diversity of shrubs tends to increase in dry washes.
- Mixed paloverde-cacti and creosotebush-bursage communities – combination of species including triangle bursage (*Ambrosia deltoidea*), saguaro cactus (*Carnegiea gigantean*), white brittlebush (*Encelia farinosa*), ocotillo (*Fouquieria splendens*), stag-horn cholla (*Opuntia acanthocarpa*), paloverde (*Parkinsonia microphylla*), and the above described creosotebush-bursage community.
- Riparian deciduous woodland – associated with the Gila River floodplain. Dominant vegetation species include Fremont cottonwood (*Populus fremontii*), willow (*Salix spp.*), salt cedar (*Tamarisk ramosissima*), honey mesquite (*Prosopis glandulosa*), arrowweed (*Pluchea sericea*), desert broom (*Bacharis sarothroides*), and alkali saltbush (*Atriplex polycarpa*).
- Saltbush community – associated with the Gila River floodplain. Dominant vegetation species include saltbush (*Atriplex spp.*) and arrowweed (*Pluchea sericea*).

Several onsite field evaluations were conducted in 2008 and 2009 to confirm the vegetation identified by Brown (1994). The Solana CSP Project area is comprised mostly of agriculture and desertscrub vegetation typical of the Sonoran Desertscrub community. The Solana site is comprised of agricultural land and has been actively farmed for several decades, and almost all natural vegetation has been disturbed. An approximately 50-acre portion of the southwest corner of the Solana site contains native vegetation and a communications tower. The proposed Solana Gen-Tie alignment crosses agricultural lands and creosotebush-bursage, mixed paloverde-cacti, and saltbush communities interspersed with dry washes. The native desert areas to the south and west of the Solana site include creosotebush-bursage communities characterized by sparse, open shrub canopies of creosotebush and white bursage. Other common species typically present at low densities include brittlebush, mesquite, and big galleta grass. There are riparian areas associated with agricultural tailwater to the north of the site. Riparian areas and saltbush communities are predominant along Bull Durham Wash, extending from the northern boundary of the Solana site to the Gila River, which is approximately 7.7 miles north.

3.7.2.2 Wildlife

Wildlife resources in the Solana CSP Project area are those predominantly associated with the Sonoran desertscrub community of the Lower Colorado River Valley subdivision and agricultural land habitats.

Mammals

Most mammalian species likely to be present are small, inconspicuous, largely nocturnal species of rodents and bats. Desert-adapted rodents include pocket mice and kangaroo rats. Several

species of bats might be present. Additional larger mammals likely to be found in the vicinity include desert cottontail (*Sylvilagus auduboni*), black-tailed jackrabbits (*Lepus californicus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Felis rufus*), badger (*Taxidae taxus*), and desert mule deer (*Odocoileus hemionus crooki*).

Birds

Bird species likely to be present are those associated with agricultural or developed land use and undisturbed Sonoran desertscrub. Because water resources in the immediate vicinity are limited to irrigation canals and ditches, species abundance might be less than that for the greater regional area (for example, near the Gila River). Most of the birds present during any given season are small songbirds, raptors, or other migratory birds such as the mourning dove (*Zenaida macroura*) and red-tailed hawk (*Buteo jamaicensis*). Red-tailed hawk, cliff swallows (*Petrochelidon pyrrhonota*), mourning doves, white wing doves (*Zenaida asiatica*), northern mocking birds (*Mimus polyglottos*), red-winged black birds (*Agelaius phoeniceus*), yellow-winged black birds (*Agelaius thilius*), killdeer (*Charadrius vociferous*), black-throated sparrows (*Amphispiza bilineata*), western burrowing owls (*Athene cunicularia hypugaea*), great egrets (*Ardea alba)*, snowy egrets (*Egretta thula)*, blue herons (*Ardea herodias*), and Le Conte's thrashers (*Toxostoma lecontei*) were observed during field evaluations.

Reptiles and Amphibians

Relatively undisturbed desert habitats represent the best habitat for reptiles, although some species can be found in agricultural areas. Suitable habitat for amphibians, such as the Sonoran Desert toad (*Bufo alvarius*), could be present in washes whenever water is present. Rattlesnakes (*Crotalus sp.*), gopher snakes (*Pituophis melanoleucus*), and red racers (*Masticophis flagellum piceus*) were observed during several field evaluations. Other common reptile species that could occur in the Solana CSP Project area include desert horned lizards (*Phrynosoma platyrhinos*), southern whiptails (*Cnemidophorus tigris gracilis*), western whiptails (*Cnemidophorus tigris*), western diamondback rattlesnakes (*Crotalus atrox*), sidewinders (*Crotalus cerastes*), zebra tail lizards (*Callisaurus draconoides*), fringe-toed lizards (*Uma notate*), and brush lizards (*Urosaurus graciosus*).

3.7.2.3 Special Status Species

Qualified biologists reviewed AGFD and U.S. Fish and Wildlife Service special status species lists for Maricopa County to determine species potentially occurring in the project vicinity. Special status species include those listed as federal endangered, threatened, proposed, or candidate species; those designated by the BLM as sensitive species; or those listed as Wildlife of Special Concern by the State of Arizona.

The AGFD and U.S. Fish and Wildlife Service special status species lists identified 20 plant species and 56 wildlife species with the potential to occur in Maricopa County (AGFD 2009a). Appendix E, Table E-1, lists special status species potentially occurring in Maricopa County, listed by taxon, scientific name, common name, status, preferred habitat, and potential to occur in the Solana CSP Project vicinity.

The AGFD online project review tool was accessed on June 9, 2009, to identify special status species occurrences and/or critical habitat within 5 miles of the Solana CSP Project. The AGFD online tool reported that the following five special status species have been observed within 5 miles of the Solana CSP Project (AGFD 2009b): Yuma clapper rail (*Rallus longirostris yumanensis*), western burrowing owl (*Athene cunicularia hypugaea*), Tucson shovel-nosed snake (*Chionactis occipitalis klauberi*), snowy egret (*Egretta thula*), and cave myotis (*Myotis velifer*).

Critical Habitat

The U.S. Fish and Wildlife Service critical habitat portal revealed no designated critical habitat in the vicinity of the Solana CSP Project (FWS 2009b).

3.7.3 Environmental Consequences

3.7.3.1 Proposed Action

Vegetation

Effects to vegetation would result from grading the Solana site and site clearing within the Solana Gen-Tie alignment. The Solana site is actively farmed and contains minimal native vegetation. Areas with native vegetation are classified as creosotebush-bursage and account for approximately 50 acres, or 1.5 percent of the Solana site. Removal of native vegetation along the proposed Solana Gen-Tie alignment is anticipated to be minimal due to the amount of existing agricultural land adjacent to the alignment and the proximity of the alignment to Watermelon Road. Therefore, construction of the Solana CSP Project would result in small impacts to native vegetation.

Wildlife

The Solana site provides poor quality habitat for wildlife species. The site consists almost entirely of disturbed agricultural land that has been actively farmed for decades. Construction would have direct and indirect effects on wildlife populations in the vicinity of the Solana CSP Project. Direct effects to reptiles and small mammals, including direct mortality caused by equipment, could occur during construction. Animals such as lizards, snakes, and small mammals could be affected by construction and maintenance vehicles; however, vehicles would typically be traveling at speeds slow enough to allow most wildlife to avoid harm.

Burrowing mammals, birds, amphibians, and reptiles could experience a low occurrence of mortality during construction. Bird nests or nest sites would not likely be destroyed when vegetation was cleared for roads or structure sites, because native vegetation exists at such low densities on the Solana site. The overall number of individual animals that could be affected by heavy equipment and other construction vehicles would be expected to be relatively few, and the species affected generally common and widespread in similar habitats in the vicinity.

Bull Durham Wash drains a large area within the PIDD territory, receiving tailwater from agriculture-related activities and storm water runoff in response to precipitation events. In addition, PIDD owns and operates a series of earthen-lined reservoirs north of the Solana site boundary. PIDD created these reservoirs to capture agricultural tailwater runoff for agricultural

reuse. A series of pumps relift the water from the reservoirs to adjacent farms, and provide the only source of water for the farmland west of Bull Durham Wash. These earthen-lined reservoirs and associated water spillage have created a man-made riparian area adjacent to the reservoirs within Bull Durham Wash.

Taking the Solana site out of agricultural production could result in a reduction of tailwater returning to the irrigation reservoirs north of the site, potentially reducing the amount of available nesting and foraging habitat for wildlife. Of the many contributions to Bull Durham Wash that result from irrigation and water management practices, the Solana site accounts for approximately 3 to 5 percent of the total water input. In coordination with AGFD and U.S. Fish and Wildlife Service, a tailwater analysis was prepared to estimate the Solana site's contribution to the amount of runoff potentially reaching Bull Durham Wash. Based on an understanding of tailwater reuse by the adjacent farm, the intake ratios and irrigation performance at the Solana site, and other contributing sources of water to Bull Durham Wash, the Solana site represents a minor contribution (3 to 5 percent) to the overall water sources that spill from PIDD facilities and support marsh habitat in Bull Durham Wash. A brief overview of the analysis is provided below.

The existing farm slated for construction of the Solana Generating Plant contains approximately 3,000 acres of irrigated farmland. Historically, PIDD has provided surface water to the Solana site for irrigation and agricultural use. PIDD records were reviewed and the tenant farmer was interviewed to evaluate the Solana site's average annual water consumption. Based on the evaluation of 5 years of data, the annual average irrigation rate is 10 acre-feet per acre or 30,000 acre-feet for the entire farm per year. The amount of tailwater leaving a farm depends on crop type and soil characteristics. The Solana site has been used to produce primarily alfalfa. Alfalfa consumes a high amount of water compared to other crop types. The Solana site is composed primarily of soils that have high to moderate potential for water absorption and, therefore, a low to moderate potential to result in runoff (NRCS 2009).

Based on annual water consumption, crop type, soil characteristics, and border arrangement of the fields, it is estimated that approximately 4.46 percent (or approximately 1,340 acre-feet per year) of the irrigation water applied to the site is collected and channeled to the irrigation reservoirs immediately north of the Solana site. The reservoirs are the sole source of water for the agricultural property north of the Solana site and west of Bull Durham Wash. Approximately two-thirds of the 1,340 acre-feet per year (or approximately 894 acre-feet per year) of the tailwater from the Solana site is used for irrigation water on the adjacent 760-acre farm; the remaining one-third (or approximately 447 acre-feet per year) of the tailwater remains in the irrigation reservoirs and contributes to PIDD operational spills of water into Bull Durham Wash.

As a result of the tailwater analysis, and in coordination with AGFD and U.S. Fish and Wildlife Service, Abengoa Solar would provide 447 acre-feet of water annually as the direct off-set to the reduction in tailwater runoff from the farm. The off-set would equalize water lost as a result of the farm being taken out of production. Abengoa Solar has the option to provide water either directly through one of its onsite wells or indirectly through an agreement with PIDD.

Onsite evaporation ponds associated with the Solana CSP Project could be attractive to migratory waterfowl. The ponds would contain an estimated 45,000 parts per million of total

dissolved solids, similar to the level of total dissolved solids occurring in the Salton Sea. Due to the brine concentration that would be piped to the evaporation ponds, Abengoa Solar has identified the following measures to deter birds from using the evaporation ponds:

- Evaporation ponds would be located in a high activity area undesirable to wildlife between the electric generating plant and within 0.25 mile of Interstate 8.
- There would be other open bodies of water not containing brine concentration near the Solana site, including irrigation canals and Bull Durham Wash, reducing the attractiveness of the evaporation ponds.
- Abengoa Solar would implement means to deter migratory waterfowl from using evaporation ponds. Onsite personnel would be present to impose actions to ward off birds. Methods could include making loud noises with propane noise guns and foil stringers in constant motion to ward off birds.
- Habitat enhancement of the area would be prevented through the use of herbicides on vegetation to prohibit growth around the edges of the ponds, discouraging stopover birds from remaining.

Special Status Species

The following paragraphs identify species selected for impact analysis based on their potential or known occurrence in the Solana CSP Project area.

Great Egret *(Ardea alba)* (State of Arizona - Wildlife of Special Concern; BLM - Sensitive)

Great egret habitat occurs in marshes, swampy woods, tidal estuaries, lagoons, mangroves, streams, lakes, rivers, ponds, fields, and meadows. Great egrets are found in Arizona at elevations ranging between 100 to 1,500 feet (AGFD 2002e).

In Arizona, great egrets are migratory birds that occur statewide and can be found year-round in the southwest. They are reported to breed and winter along the Colorado River and in Maricopa and Pinal counties in south-central Arizona. Great egrets have been documented in Maricopa, La Paz, Pinal, and Yuma counties. The great egret's historic elevation and distribution range includes the Solana site (AGFD 2002e).

Agricultural runoff has created riparian areas north of the Solana site that feed into suitable habitat for great egrets in Bull Durham Wash adjacent to and extending 3 miles north of the site. Construction activities would be confined within the Solana site boundary and, therefore, would not directly disturb or destroy suitable great egret habitat in Bull Durham Wash.

As previously stated, Abengoa Solar would provide 447 acre-feet of water to the head of Bull Durham Wash on an annualized basis as a direct off-set for the portion of the reduced agricultural tailwater runoff. In addition, Abengoa Solar would implement means to deter migratory birds such as the great egret from using onsite evaporation ponds.

Construction and operation of the Solana CSP Project would result in a loss of foraging habitat for the great egret, because the species uses the agricultural fields that would be taken out of

production. However, there is similar habitat available immediately surrounding the project area. Species would continue to forage outside the Solana site boundary. Therefore, the Solana CSP Project may affect, but would not be likely to adversely affect, this species.

Western Burrowing Owl (*Athene cunicularia hypugaea)* (Endangered Species Act - Species of Concern; BLM - Sensitive)

Western burrowing owls are variable in open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. Western burrowing owls are also sometimes found in open areas such as vacant lots near human habitation, golf courses, or airports. Western burrowing owls are found in Arizona at elevations ranging between 650 and 6,140 feet (AGFD 2001h).

In Arizona, western burrowing owls occur locally in open areas, generally year-round, with only a few winter records on the Colorado Plateau in the northeastern part of the state. They are found in the Navajo Nation, in broad valleys near Seligman, along the bottomlands of the Colorado River, in the Lower Colorado River valley, in the Yuma area, in southern and southeastern Arizona, and in agricultural areas of Maricopa and Pinal counties. They are predominately nonmigratory throughout most of their range in Arizona; however, they disperse widely.

Previous agricultural disturbances in the vicinity of the Solana site have created suitable conditions for the western burrowing owl. Burrowing owls use the raised sides of canal banks on the site. Therefore, construction activities could displace or harm individuals, particularly eggs or young in unidentified, subterranean nests. In accordance with the AGFD Arizona Burrowing Owl Working Group, *Burrowing Owl Project Clearance Guidance for Landowners* (ABOWG 2007) (see Appendix E), Abengoa Solar would translocate the owls that populate the Solana site and relocate them to an appropriate burrowing owl management area that can accommodate additional individuals.

Construction and operation of the Solana CSP Project would result in a loss of habitat for the western burrowing owl; however with successful relocation efforts, the Solana CSP Project may affect, but would not be likely to adversely affect, this species.

Snowy Egret *(Egretta thula)* (State of Arizona -Wildlife of Special Concern; BLM - Sensitive)

The snowy egret can be found in marshes, lakes, ponds, lagoons, mangroves, and shallow coastal habitats. They can be found in Arizona at elevations ranging between 100 and 1,950 feet. They breed and winter along the lower Colorado River, in west-central Maricopa County along the Gila River, and along the Hassayampa River. They also have been reported along the Salt River in Gila County (AGFD 2002e). The snowy egret's historic elevation and distribution range includes the Solana site. The snowy egret is not currently protected under the Endangered Species Act, but it is protected under the Migratory Bird Treaty Act.

Agricultural runoff has created riparian areas north of the Solana site that feed into suitable habitat for snowy egrets in Bull Durham Wash adjacent to and extending 3 miles north of the Solana site. Construction activities would be confined within the Solana site boundary and, therefore, would not directly disturb or destroy suitable habitat in Bull Durham Wash.

Abengoa Solar would provide 447 acre-feet of water to the head of Bull Durham Wash on an annualized basis as a direct off-set for the portion of the reduced agricultural tailwater runoff. In addition, Abengoa Solar would implement means to deter migratory birds such as the snowy egret from using onsite evaporation ponds.

Construction and operation of the Solana CSP Project would result in a loss of foraging habitat for the snowy egret, because the species uses the agricultural fields that would be taken out of production. However, there is similar immediate habitat available surrounding the project area. Species would continue to forage outside of the site boundaries. Therefore, the Solana CSP Project may affect, but would not be likely to adversely affect, this species.

Western Snowy Plover *(Charadrius alexandrines nivosus)* (State of Arizona -Wildlife of Special Concern)

In North America, this species inhabits beaches, lagoons, salt-evaporation ponds on coasts, barren sparsely vegetated salt flats, and braided river channels inland. In Arizona, this species might occasionally nest along temporary lakes on sandy playas. This subspecies has been observed at 580 feet (AGFD 2002c).

In Arizona, western snowy plovers breed irregularly when conditions are appropriate. Breeding sites are limited to several man-made and alkali ponds near Willcox in Cochise County and the ephemeral Painted Rock Reservoir in Maricopa County. They are known to winter casually along the lower Colorado and Gila rivers and as far north as Phoenix and Prescott. Western snowy plovers are migratory throughout the state and their historic distribution range includes the Solana site (AGFD 2002c).

Agricultural runoff has created riparian areas north of the Solana site. This riparian area feeds into suitable habitat for snowy plovers in Bull Durham Wash adjacent to and extending 3 miles north of the Solana site. Construction activities would be confined within the Solana site boundary and, therefore, would not directly disturb or destroy suitable habitat in Bull Durham Wash.

Abengoa Solar would provide 447 acre-feet of water to the head of Bull Durham Wash on an annualized basis as a direct off-set for the portion of the reduced agricultural tailwater runoff. In addition, Abengoa Solar would implement means to deter migratory birds such as the western snowy plover from using onsite evaporation ponds.

Construction and operation of the Solana CSP Project would result in a loss of potential foraging habitat for the western snowy plover; however, there is similar immediate habitat available surrounding the project area. Species would continue to forage outside the site boundaries. Therefore, the Solana CSP Project may affect, but would not be likely to adversely affect, this species.

Tucson Shovel-nosed Snake *(Chionactis occipitalis klauberi)* (BLM - Sensitive)

The Tucson shovel-nosed snake can be found in arid deserts with sandy washes, dunes, and rocky hillsides. They prefer areas with scattered mesquite-creosotebush and can be found at elevations ranging from sea level to 4,700 feet. This snake has been reported in south-central

Arizona, and in Pima and Pinal counties (AGFD 2002n). The historic elevation and distribution range of the Tucson shovel-nosed snake includes the Solana site.

Tucson shovel-nosed snakes require approximately 5 acres for a home range. The species has no known corridor or migratory needs, but potential barriers could include highways, major roads, and streams. This species moves by a swimming, sideways swaying motion under or on the surface of sand or loose soil. It usually rests by day under a creosotebush, although it can occasionally be found under surface objects such as boards (AGFD 2002n).

Construction and operation of the Solana CSP Project would result in a loss of potential foraging habitat for the Tucson shovel-nosed snake; however, there is similar immediate habitat available surrounding the project area. The species would continue to forage outside the site boundaries. Therefore, the Solana CSP Project may affect, but would not be likely to adversely affect, this species.

Cave Myotis *(Myotis velifer)* (Endangered Species Act - Species of Concern)

Cave myotis habitat includes desertscrub of creosotebush, brittlebush, paloverde and cacti. This species is known to roost in caves, tunnels, and mineshafts and under bridges, and sometimes in buildings within a few miles of water. There are a number of records of one or a few individuals roosting in cliff and barn swallow nests. This species is most often found at elevations ranging from 300 to 5,000 feet, although there is at least 1 record from 5,800 feet on the Nantan Plateau and at least 6 records between 6,000 and 8,800 feet on Cane Ridge and in the Santa Rita, Patagonia, Pinaleno, and Huachuca mountains (AGFD 2002m). The cave myotis' historic elevation and distribution range includes the Solana site.

The Solana site is comprised of agricultural land that has been actively farmed for several decades, resulting in the disturbance of almost all natural vegetation. Native desertscrub is present in the southwest corner of the site; there are very few cacti or other succulents present, mainly in isolated stands of few individuals. Based on the absence of known roosts, the Solana CSP Project would have no effect on the cave myotis.

Federally Listed Species

Yuma Clapper Rail *(Rallus longirostris yumanensis)* (Endangered Species Act - Endangered; State of Arizona -Wildlife of Special Concern)

This is the only clapper rail to breed in freshwater marshes; this species also inhabits brackish water marshes and side waters. They prefer the tallest, densest cattail and bulrush marshes. Most are found within the Lower Colorado Subdivision of the Sonoran Desertscrub biome. The species occurs in dense bulrush and cattail marshes along the lower Colorado River from Lake Mead south to Mexico, including the lower Bill Williams River, and on the Gila and Salt rivers upstream to the Verde confluence. In Arizona, clapper rails are found at elevations ranging from about 100 to 1,500 feet (AGFD 2006c). The historic elevation and distribution range of the Yuma clapper rail includes the Solana site. Suitable Yuma clapper rail habitat includes the riparian habitat dense with cattail and bulrush north of the relift facility and extends through Bull Durham Wash north of the Solana site.

AGFD 1992 to 2009 survey data reported Yuma clapper rails present on the northern boundary of the Solana site near the relift facility in 2001, 2004 through 2006, 2008, and in 2009. In addition, Yuma clapper rails were reported observed in 2004 through 2006 3 miles north, outside the Solana site in Bull Durham Wash off West Sisson Road (AGFD 2007b; AGFD 2009e).

Agricultural runoff has created riparian areas north of the Solana site. This riparian area feeds into suitable Yuma clapper rail habitat in Bull Durham Wash adjacent to and extending 3 miles north of the Solana site. Construction activities would be confined within the Solana site boundaries and, therefore, would not directly disturb or destroy suitable habitat in Bull Durham Wash.

Abengoa Solar would provide 447 acre-feet of water to the head of Bull Durham Wash on an annualized basis as a direct off-set for the portion of the reduced agricultural tailwater runoff. In addition, Abengoa Solar would implement means to deter migratory birds such as the Yuma clapper rail from using onsite evaporation ponds.

Construction and operation of the Solana CSP Project would result in a loss of foraging habitat for the Yuma clapper rail, because the species uses the agricultural fields that would be taken out of production. Although not likely to be found in alfalfa fields, the species might continue to forage in the similar adjacent habitat surrounding the site, and north of the site in Bull Durham Wash, where larger populations have been observed. Therefore, the Solana CSP Project may affect, but would not be likely to adversely affect, this species.

DOE Determination

On March 12, 2010, DOE sent a determination of "may affect, but is not likely to adversely affect" for the Yuma clapper rail, western burrowing owl, and the snowy egret to the U.S. Fish and Wildlife Service in Phoenix, Arizona. In summary, the Proposed Action may result in minor impacts to biological resources, but is not likely to result in adverse impacts to Special Status or Federally Listed species. On April 12, 2010, the U.S. Fish and Wildlife Service concurred with DOE's determination (see Appendix E).

3.7.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, current land uses would continue at the Solana site and along the proposed Solana Gen-Tie alignment. There would be no additional loss of vegetation, wildlife, or potential habitat for special status species that might be present in the vicinity of the project site.

3.8 Tribal Consultation and Coordination

As the lead federal agency for the NEPA process and for 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 Solana CSP Project. DOE sent letters describing the Proposed Action to the following tribes:

- Ak-Chin Indian Community
- Fort McDowell Yavapai Nation
- Gila River Indian Community
- Hopi Tribe
- Salt River Pima-Maricopa Indian Community
- San Carlos Apache Tribe
- Tohono O'odham Nation
- White Mountain Apache Tribe
- Yavapai-Apache Nation

To date, DOE has received one response – Steere (Tohono O'odham, Tribal Historic Preservation Officer) to Matthew McMillen (DOE, Director of Environmental Compliance Division, Loan Guarantee Program Office), email dated July 23, 2009 (see Appendix F). Table 3-12 summarizes the items the Tohono O'odham Nation requested and the status of each request.

Table 3-12 Status of Tohono O'odham Nation Requests

Request	Description of Request	Status
1	Invite interested tribes to participate in the NEPA process.	Ongoing
2	Conduct Class I and Class III investigations for the Solana CSP Project.	Completed
3	Prepare an ethnographic overview for the Solana CSP Project vicinity.	Completed
4	Conduct cultural and natural landscape studies for the Solana CSP Project vicinity.	Completed
5	DOE to meet with the Four Southern Tribes Cultural Resource Working Group* to discuss the Solana CSP Project.	Completed
6	Implement a process to govern the responsible development of large-scale solar projects.	Ongoing

* The Four Southern Tribes Cultural Resource Working Group meets monthly, and includes the Tohono O'odham Nation, the Gila River Indian Community, the Salt River Pima-Maricopa Indian Community, and the Ak-Chin Indian Community.

DOE has given each of the Tohono O'odham Nation's requests full consideration. Details about the status of the requests are provided below.

NEPA Process Participation (Request 1)

Interested tribes have been invited to participate in the NEPA and Section 106 processes. Tribal contacts were provided an opportunity to review and comment on the draft EA and the cultural resources documentation prepared for the project. Hard copies of these materials were sent to the Tribes at the same time they were sent to the State of Arizona for review. With the exception of the Tohono O'odham Nation requests described above, no additional comments were received from the Tribes on the draft EA or on the cultural resources documentation prepared for the project.

Class I and Class III Investigations (Request 2)

A Class I records search was completed for the project in 2008. An updated Class I records search was conducted in conjunction with the Class III cultural resources survey in 2009. Participation of a Tohono O'odham Nation tribal member in the Class III cultural resources survey was coordinated through the Nation's Cultural Affairs Program. The Class I report was previously distributed for review and comment by interested tribes. The Final Class III survey report has been provided to interested tribes for their review (see Appendix F). Section 3.9 Cultural Resources, provides additional information on the results of the Class I and Class III investigations.

Ethnographic Research (Requests 3 and 4)

Abengoa Solar commissioned an ethnographic study to accompany the Class III cultural resources survey report (see Section 3.9, Cultural Resources). The study focused on the Solana CSP Project vicinity, but also considered the larger Gila River Valley. The study includes three distinct, but related components – (1) a comprehensive cultural and natural setting, with an emphasis on settlement and subsistence; (2) an ethnographic overview; and (3) interviews with tribal elders. The results of the ethnographic investigations are presented in a second cultural resources volume that serves as a companion document to the Class III survey report.

Four Southern Tribes Cultural Resource Working Group Meeting (Request 5)

DOE attended the Four Southern Tribes Cultural Resource Working Group's monthly meeting on February 19, 2010, to present an overview of the loan guarantee program and its relationship to the NEPA and Section 106 processes; provide the status of the Solana CSP Project within the federal processes; discuss details of the Solana CSP Project; and provide a forum for the exchange of ideas, questions, and comments about the project.

Large-Scale Solar Project Development Process (Request 6)

In response to the Tohono O'odham Nation's request to develop a process for implementing utility-scale solar projects, DOE asked Abengoa Solar to explore the options for assembling a forum of relevant stakeholders to discuss planned energy development projects in southwestern Arizona. Abengoa Solar began discussions with the Sonoran Institute, the Arizona Corporation Commission, the ASLD, and others to explore the idea of conducting a symposium that would bring stakeholders together to discuss the scope and potential environmental and cultural impacts associated with development of numerous renewable energy projects.

Initially, the entities envisioned an event or series of events that would gather thought leaders with a diverse array of perspectives and from a broad cross-section of affiliations. However, in her State-of-the-State address on January 11, 2010, Governor Brewer announced her Executive Order 2010-02 directing that a Renewable Energy and Public Agency Coordination Summit be held in February of 2010. The objectives of the summit were very closely aligned with the principal goal of reviewing the number of and need for solar facilities. Moreover, the Executive Order specifies that tribal leaders be invited to the summit.

The Renewable Energy Summit was held on February 11, 2010, at Arizona State University. The summit assembled a broad base of stakeholders, including land managing agencies (the ASLD, the BLM, the U.S. Forest Service, and Luke Air Force Base); utility representatives (Arizona Public Service Company, Salt River Project, Tucson Electric Power, and Arizona's Generation and Transmission Cooperatives); state regulating agencies (the Arizona Corporation Commission, the ADEQ, the AGFD, the Arizona Department of Water Resources, and the State Historic Preservation Office [SHPO]); tribal representatives (the Navajo Nation and the Fort Mojave Tribe); renewable energy researchers from Arizona State University; and representatives of Abengoa Solar.

While the February 11 meeting was government and industry-focused, the aim of the second meeting was to engage members of the public. On April 15, 2010, the second part of the Governor's Renewable Energy Summit was held to update the public on efforts (both public and private) being made in the pursuit of Renewable Energy for Arizona. In addition, the second meeting also aimed to gather information from the public and private sectors, including generators, manufacturers, bankers, environmentalists, and government agencies. Information from both meetings is available on the Governor's webpage (located at http://azgovernor.gov/renewable/index.asp).

3.9 Cultural Resources

3.9.1 Regulatory Framework

The term "cultural resource" refers to a broad category of resources that includes 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* and afforded certain protections under the NHPA. Regardless of age, cultural resources listed on or eligible for listing on the National Register are termed *historic properties*.

Because the Solana CSP Project might be funded in part through a DOE loan guarantee, it is a project subject to compliance with Section 106 of the NHPA of 1966, as amended (16 U.S.C. 470 *et seq.*). Section 106 (36 CFR Part 800, as amended August 5, 2004) requires federal agencies to consider the effects of their undertakings on historic properties, and consult with the SHPO.

To be eligible for listing on the National Register, a property must be significant under one or more of the 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

In addition, a property must 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.

3.9.2 Affected Environment

3.9.2.1 Cultural Setting

This section presents a brief overview of the cultural chronology of the project vicinity to provide a context for understanding the cultural resources in the project area. A more extensive cultural setting is provided in Appendix F. The following discussion is excerpted from the cultural resources technical report prepared for the Solana CSP Project (Sperinck et al. 2010).

Paleoindian Period

The earliest broadly accepted human occupation of the "New World" is identified as the Paleoindian Period, which appeared near the end of the last Ice Age, perhaps around 15,000 BC (Faught and Freeman 1998). The remains of two at least partially contemporaneous Paleoindian cultures have been identified in the western Papaguería[15] – San Dieguito and Clovis. Paleoindian artifacts documented in the Papaguería include isolated surface artifacts, such as large, fluted projectile points used to hunt large game. However, a few archaeological sites, including Ventana Cave in the eastern Papaguería (Haury 1950), have been identified.

Archaic Period

The Archaic Period is marked by a transition to a mixed economy that included exploitation of small game and an increased reliance on wild plant foods (Cordell 1997; Reid and Whittlesey 1997). Huckell (1988) proposed three broad temporal divisions for the Archaic – Early (8500 to 4800 BC), Middle (4800 to 1500 BC), and Late (1500 BC to AD 1), which are based largely on tool assemblages, in particular varying styles of projectile points. The Archaic tool assemblage reflects the change in subsistence strategies, and includes projectile points and numerous implements associated with plant food procurement and processing (Mabry and Faught 1998).

Ceramic Period

The end of the Archaic Period is typically marked by the appearance of ceramics in the archaeological record, coupled with an increased reliance on agriculture. Ceramic artifacts are common throughout much of the Southwest by AD 500 (Cordell 1997), but are not introduced to the western Papaguería until about AD 700. Members of three commonly accepted

[15] The western Papaguería, which includes the Solana CSP Project area, is roughly bounded by the Colorado River on the west, Puerto Peñasco on the Gulf of California to the south, the Gila River to the north, and the eastern boundary of the Barry M. Goldwater Range (east of the Sand Tank Mountains).

archaeological traditions associated with distinct ceramic production techniques inhabited and perhaps overlapped in parts of the Papaguería during this time – the Patayan, who occupied the lower Colorado River and lower Gila River valleys; the Trincheras, who occupied most of northwest Sonora; and the Hohokam, who occupied the middle Gila, Salt, and Santa Cruz river valleys (Ahlstrom 2000; Altschul and Rankin 2008). It also has been suggested that a fourth Ceramic Period tradition, the Areneños, an Archaic-like group, occupied much of the non-riverine portion of the western Papaguería.

Ethnohistoric Period

In the Southwest, the period following the Ceramic Period and preceding the Historic Period is often referred to as the Protohistoric or, as used here, the Ethnohistoric Period. The Ethnohistoric Period spans from AD 1450 to 1700. By the time the first Spanish explorers entered what is now southern Arizona the region was occupied by a number of different cultures, including the Akimel O'odham (Pima), the Quechan (Yuman), Mohave, Cocopah, and Maricopa (Ahlstrom et al. 2000). The eastern Papaguería and Santa Cruz River valley were historically settled by the Tohono O'odham (Papago), while much of the western Papaguería was home to the Hia C-ed O'odham (Sand Papago; Areneños). The Hia C-ed O'odham were the primary inhabitants of the western Papaguería, and it has been suggested that they are the descendants of the ill-defined Ceramic Period Areneños (Doyel and Eiler 2003; Rankin 1995). The Hia C-ed O'odham have never been formally recognized as a group distinct from the Tohono O'odham, and today, most Hia C-ed O'odham reside with the Tohono O'odham on the Papago and San Lucy reservations, although smaller federally unrecognized enclaves reside near Ajo and Dome.

Historic Period

The United States went to war with Mexico in 1846, which caused American military forces to be sent into the Southwest. Military reconnaissance missions were lead from Missouri to San Diego, resulting in the establishment of the "Gila Trail" as a route between New Mexico and San Diego. In 1858, the Butterfield Overland Mail Trail began operating, following much of the Gila Trail. In the same year, a stage station for the Butterfield Overland Mail Trail, named the Gila Ranch Station, was established north of present-day Gila Bend (Ahnert 1973). The stage line continued to run through this area into the late 1870s, until it was replaced by the newly constructed transcontinental railroad line, which was completed in 1873 by the Southern Pacific Railroad Company.

On December 12, 1882, thirty-five sections of land were set aside by Executive Order as the "Gila Bend Reserve" for the "…Papago and other Indians now settled there…" (Secretary of the Interior 1883). In the early 20th century, the U.S. Government by Executive Order reduced the reservation from 22,391 acres to 10,231 acres (Secretary of the Interior 1909; DOI 1912). The reservation was further reduced in size in the latter half of the 20th Century when the U.S. Army Corps of Engineers constructed the Painted Rock Dam on the Gila River in 1960. While the dam was 10 miles down the river, the Corps of Engineers used the power of eminent domain to acquire an additional 7,700 acres of land from the reservation to be used as a reservoir (Parker 1989). The O'odham peoples who lived in the newly created reservoir area were relocated to a 40-acre tract of land about 1 mile south of the reservation border. This became known as San Lucy Village (Parker 1989).

3.9.2.2 Definition of the Area of Potential Effects

As defined in Section 106 (36 CFR Part 800.16(d)), the area of potential effects (APE) "means 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 Solana CSP Project includes the approximately 3,107-acre Solana site and the 18-mile-long Solana Gen-Tie alignment, which varies in width. While the total length of the Solana Gen-Tie alignment would be 20.2 miles, the first 2.2 miles would be internal to the Solana site.

3.9.2.3 Identification Methods and Findings

Class I

In 2008, a Class I Cultural Resources Assessment was conducted to determine the extent of previous cultural resource undertakings in the area and to assess the need for additional inventory for the Solana CSP Project (Moses 2008). The Class I assessment included a review of cultural resource records from the Arizona State Museum (ASM) , the SHPO, the AZSITE online database, the National Register online database, and the General Land Office plats available from the BLM.

The results of the Class I research indicated that less than 2 percent of the Solana site and approximately 30 percent of the Solana Gen-Tie alignment had been subject to previous Class III (100-percent coverage) cultural resource pedestrian surveys (Moses 2008). In addition, the records search revealed that portions of 5 previously recorded archaeological sites are within or immediately adjacent to the Solana CSP Project.

Two notable archaeological sites are outside the project extent, but within the general area, including Fortaleza and the Gatlin Site. Both are large prehistoric sites listed on the National Register under Criterion D for their potential to provide important information about the prehistory of the Phoenix Basin and its periphery. As described in Section 3.2 Visual Resources, the Gatlin Site is also designated as a National Historic Landmark. The Town of Gila Bend, along with assistance from the Arizona State Parks Heritage Fund Matching Grant, intends to develop the site as a regional cultural park.

Class III

To comply with NHPA Section 106, an updated Class I records search and a Class III cultural resource pedestrian survey were conducted in 2009 (Sperinck et al. 2010). The pedestrian survey was completed by archaeologists walking a series of transects spaced no more than 50 feet apart. The Class III survey resulted in the identification of 23 cultural resources, including prehistoric and historic artifact scatters, some of which contain features (such as rock clusters, trails, or petroglyphs). Table 3-13 summarizes the findings of the Class III survey.

Table 3-13 Class III Survey Results

Site Number	Description	NRHP Eligibility Recommendation
AZ Z:1:39 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:48 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:64 (ASM)	Prehistoric flaked stone scatter, pot break, and rock feature	Eligible, Criterion D
AZ Z:1:65 (ASM)	Prehistoric flaked stone scatter and rock feature	Eligible, Criterion D
AZ Z:1:78 (ASM)	Historic can dump	Ineligible
AZ Z:1:79 (ASM)	Prehistoric flaked stone scatter and portable petroglyph	Eligible, Criterion D
AZ Z:1:80 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:81 (ASM)	Prehistoric flaked stone scatter and ground stone manufacturing locus	Ineligible
AZ Z:1:82 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:1:83 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:1:84 (ASM)	Prehistoric flaked stone scatter and two rock features	Eligible, Criterion D
AZ Z:1:85 (ASM)	Prehistoric flaked stone scatter and trail	Eligible, Criterion D
AZ Z:1:86 (ASM)	Prehistoric flaked stone scatter, trail, and rock features	Eligible, Criterion D
AZ Z:1:87 (ASM)	Prehistoric flaked stone scatter and rock features	Eligible, Criterion D
AZ Z:1:88 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:1:89 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:90 (ASM)	Prehistoric flaked stone scatter and one rock feature	Eligible, Criterion D
AZ Z:2:68 (ASM)	Prehistoric artifact scatter and two rock features	Eligible, Criterion D
AZ Z:2:84 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:2:85 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:2:87 (ASM)	Prehistoric flaked stone scatter, trail, and 48 rock features	Eligible, Criterion D
AZ Z:2:86 (ASM)	Prehistoric flaked stone scatter and 13 rock features	Eligible, Criterion D
AZ Z:2:88 (ASM)	Historic trash scatter	Ineligible

Source: Sperinck et al. 2010.

The information potential of 7 of the cultural resources – AZ Z:1:78 (ASM), AZ Z:1:81 (ASM), AZ Z:1:82 (ASM), AZ Z:1:83 (ASM), AZ Z:1:88 (ASM), AZ Z:2:85 (ASM), and AZ Z:2:88 (ASM) – is considered to have been exhausted through data collection and documentation during the Class III fieldwork. Therefore, all 7 sites were determined ineligible for listing on the National Register, and no further treatment of these resources is warranted. Because the remaining 16 cultural resources could contain additional data that could contribute important information to regional prehistoric land use, subsistence patterns, and stone tool production techniques, all 16 cultural resources were determined eligible for listing on the National Register under Criterion D (information potential). The SHPO concurred with the eligibility determinations in a letter dated April 22, 2010 (see Appendix F).

Ethnographic Research

In response to the Tohono O'odham Nation's request, Abengoa Solar commissioned an ethnographic study to accompany the Class III cultural resources survey report. As described in Section 3.8, Tribal Consultation and Coordination, the study focused on the Solana CSP Project vicinity, but also considered the larger Gila River Valley. The scope of the study is comprised of three distinct, but related components – (1) a comprehensive cultural and natural setting, with an emphasis on settlement and subsistence; (2) an ethnographic overview; and (3) interviews with tribal elders. The ethnographic investigations did not identify any traditional cultural properties or areas of religious or cultural importance (Ruter et al. 2010).

3.9.3 Environmental Consequences

3.9.3.1 Proposed Action

The Class III survey identified a single cultural resource on the Solana site that was determined ineligible for listing on the National Register in consultation with the SHPO (see Appendix F). Accordingly, construction of the solar field and supporting facilities at the Solana site would not adversely affect any historic properties (that is, cultural resources listed on or eligible for listing on the National Register).

The 16 cultural resources determined eligible for listing on the National Register are along the proposed Solana Gen-Tie alignment. The transmission structures proposed for the Solana Gen-Tie would be steel monopoles approximately 100 to 140 feet tall, depending on the span length required, with a maximum height of 190 feet above the ground surface. The length of spans would depend on several factors including soil conditions, topography, and other engineering and environmental considerations. Typical 230 kilovolt span lengths for the Solana CSP Project are anticipated to be approximately 800 to 1,000 feet. The steel monopole transmission structures and associated concrete footings would permanently disturb a 49-square-foot area per structure.

The 16 cultural resources determined eligible for listing on the National Register vary in width from 150 to 1,800 feet. Where the cultural resources extend into the proposed Solana Gen-Tie corridor, most of the resources measure 600 feet or less in width. Table 3-14 lists the maximum width of each site where it coincides with the proposed Solana Gen-Tie corridor. Based on the typical 230 kilovolt span length of 800 to 1,000 feet anticipated for the Solana CSP Project, all

but one of the cultural resources could be avoided by spanning. To avoid disturbing surface artifacts and features within the boundaries of all of the National Register-eligible sites, it would be necessary when stringing the conductors to pull them through by hand, rather than driving a vehicle.

Table 3-14 Maximum Width of NRHP-Eligible Cultural Resources

No.	Site Number	Approximate Maximum Width (feet)
1	AZ Z:1:39 (ASM)	1,800
2	AZ Z:1:48 (ASM)	525
3	AZ Z:1:64 (ASM)	500
4	AZ Z:1:65 (ASM)	600
5	AZ Z:2:68 (ASM)	500
6	AZ Z:1:80 (ASM)	190
7	AZ Z:1:84 (ASM)	180
8	AZ Z:1:79 (ASM)	140
9	AZ Z:1:85 (ASM)	230
10	AZ Z:1:86 (ASM)	160
11	AZ Z:1:87 (ASM)	440
12	AZ Z:1:89 (ASM)	190
13	AZ Z:1:90 (ASM)	975
14	AZ Z:2:84 (ASM)	200
15	AZ Z:2:87 (ASM)	425
16	AZ Z:2:86 (ASM)	400

At its widest point in the proposed Solana Gen-Tie corridor, site AZ Z:1:39 (ASM) measures approximately 1,800 feet. Based on the results of the Class III survey, site AZ Z:1:39 (ASM) consists of a surface artifact scatter with no potential for buried materials (Sperinck et al. 2010). Therefore, it would be possible to place the transmission structures in portions of the site lacking surface artifacts. As described above, when stringing the conductors, it would be necessary to pull them by hand through site AZ Z:1:39 (ASM) to avoid surface disturbances to the site.

By employing the strategies described above (that is, selective pole placement and pulling the conductors by hand through National Register-eligible sites), construction of the Solana Gen-Tie alignment would not adversely affect any historic properties within the transmission line corridor.

Because of its status as a National Historic Landmark and the Town of Gila Bend's proposed plans to develop the Gatlin Site into a regional cultural park, the SHPO requested that DOE consider potential visual effects that could result from the construction of the Solana Gen-Tie alignment. DOE has given extensive consideration to the existing visual setting surrounding the

Gatlin Site. Existing elements of the built environment include Panda Substation, which is located immediately adjacent to the southeast corner of the undeveloped portion of the Gatlin Site; sand and gravel operations north and south of the Gatlin Site; and a number of existing transmission and distribution lines along Stout Road, Watermelon Road, and extending into the boundaries of the Gatlin Site.

The proposed Solana Gen-Tie alignment would be constructed one-half mile south of the southern extent of the undeveloped portion of the Gatlin Site, and approximately 215 feet south of Watermelon Road to accommodate the existing 69 kilovolt and 230 kilovolt lines that are currently parallel to the roadway. The maximum height of the existing 69 kilovolt and 230 kilovolt transmission structures along Watermelon Road is approximately 70 feet; the anticipated pole heights for the Solana Gen-Tie alignment are expected to be in the range of 120 to 130 feet (pending finalization of the conductor analysis). Span lengths for the Solana Gen-Tie are anticipated to be 800 to 1,000 feet; span lengths for the existing 69 kilovolt and 230 kilovolt transmission lines range from 300 to 400 feet. Therefore, the overall number of structures to be introduced into the landscape to carry the new 230 kilovolt transmission line would be approximately one-half to one-third of the number of structures already visible on the horizon.

Due to the approximately 215 foot setback from Watermelon Road, the Solana Gen-Tie transmission structures would blend with the shorter existing 69 kilovolt and 230 kilovolt structures when viewed from the southern extent of the undeveloped portion of the Gatlin Site. In addition, the taller Solana Gen-Tie structures would appear shorter and less intrusive than the existing 12 kilovolt poles immediately adjacent to the Gatlin Site along Stout Road. The Solana Gen-Tie structures would not be visible from the more northerly developed portion of the Gatlin Site due to changes in topography. Views north of the Gatlin Site, which include the Gila River and the Gila Bend Mountains, would remain unchanged. In a letter dated March 30, 2010, the Town of Gila Bend indicated that the Solana Gen-Tie transmission line would not conflict with their preservation or development plans for the Gatlin Site (see Appendix F).

Construction of the Solana Gen-Tie alignment would introduce an additional transmission line into the regional vicinity – which includes the viewshed from the southern extent of the undeveloped portion of the Gatlin Site – and therefore would result in an incremental increase in the number of transmission structures on the horizon. In consideration of this incremental cumulative effect, DOE has revised its finding for the Solana CSP Project from "no historic properties affected" to "no adverse effect."[16] DOE conveyed this information to the Arizona State Historic Preservation Officer in correspondence dated March 15, 2010 and April 14, 2010 and the SHPO concurred on April 22, 2010 (see Appendix F).

It is possible that buried cultural resources could be encountered during grading, excavation, or other ground-disturbing activities associated with the Solana CSP Project. If previously unidentified cultural resources were encountered during construction, all ground-disturbing activities would cease in the immediate vicinity of the discovery. Abengoa Solar would be

[16] Subsequent to publication of the Class III cultural resources survey report (Sperinck et al. 2010), DOE gave additional consideration to the potential cumulative visual effects to the Gatlin Site resulting from the construction of the Solana Gen-Tie transmission structures. DOE concluded that the Solana CSP Project would result in "no adverse effect" to historic properties.

required to contact DOE immediately and allow time to properly assess the discovery and determine its appropriate treatment.

3.9.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the project, current land uses would continue at the Solana site and in the Solana Gen-Tie corridor. There would be no impacts to cultural resources under the No-Action Alternative.

3.10 Socioeconomics

3.10.1 Affected Environment

This section describes the socioeconomic setting of the Solana CSP Project in the context of demographic indicators, including population, housing, and employment data, which provide an economic profile of the project vicinity. Table 3-15 summarizes socioeconomic data from the project vicinity, and provides comparative data for Maricopa County and the State of Arizona.

Table 3-15 Socioeconomic Profile of the Solana CSP Project Vicinity[a]

Geographic Area	Population	Housing Units	Housing Vacancy Rate (percent)	Labor Force[b]
Census Tract 7233.02	5,417	1,959	13.4	2,118
Maricopa County	3,072,149	1,250,231	9.4	1,427,292
State of Arizona	5,130,632	2,189,189	13.1	2,233,004

a. Source: U.S. Census Bureau 2000.
b. Employed civilian population 16 years and over.

The Solana CSP Project would be in Census Tract 7233.02, which includes a large portion of southwestern Maricopa County. Measuring 185 miles across, Census Tract 7233.02 is bounded to the west by Yuma County, to the south by Pima County, to the east by Pinal County, and to the north by the Gila River and Estrella Mountain Park. Cities, towns, and communities in Census Tract 7233.02 include Gila Bend (approximately 8 miles east of the Solana site), Sentinel, the San Lucy District, and the southern portions of Goodyear and Avondale.

3.10.1.1 Population

Population data were collected from the U.S. Census Bureau for 1990, 2000, and 2007 to provide comparative statistics for population growth in the Solana CSP Project vicinity, the county, and the state. Table 3-16 lists population growth statistics for the identified geographic areas between 1990 and 2007.

Table 3-16 Population Data

Geographic Area	1990 Population	2000 Population	2007 Population
Gila Bend	1,747	1,980	1,870
Maricopa County	2,122,101	3,072,149	3,880,181
State of Arizona	3,665,228	5,130,632	6,338,755

Sources: U.S. Census Bureau 1990, 2000, 2007.

In 1990, the population of Gila Bend was 1,747. By 2000, the town's population had increased by 13 percent to 1,980. Over the last decade, however, the population of Gila Bend has decreased by 5.5 percent to 1,870. Unlike the Gila Bend area, Maricopa County and the State of Arizona experienced significant population increases between 1990 and 2007. The county and statewide populations increased by 44.8 percent and 40 percent, respectively, between 1990 and 2000. By 2007, the population of Maricopa County was 3,880,181, reflecting an increase of 26.3 percent since 2000. In 2007, the population of Arizona had increased 23.5 percent since 2000 to 6,338,755.

3.10.1.2 Housing

In Census Tract 7233.02, there are 1,959 housing units and a vacancy rate of 13.4 percent. More than two-thirds of the housing units are owner occupied (70.1 percent), and less than one-third are renter occupied (29.9 percent). In 2000, the median value of a home in the Gila Bend area was $55,900. The number of housing units statewide and within Maricopa County is drastically higher than Census Tract 7233.02. Housing vacancy rates for the state (13.1 percent) and county (9.4 percent), however, are comparable to the census tract. Like Census Tract 7233.02, the ratios of owner-occupied and renter-occupied housing units in Arizona and Maricopa County are approximately two-thirds to one-third, respectively. Median home values in the county ($129,200) and throughout the state ($121,300) are more than double that of Census Tract 7233.02.

3.10.1.3 Employment

Employment sectors in Census Tract 7233.02 include agriculture, construction, retail, transportation, public administration, education, health and social services, and entertainment and recreation. According to the Bureau of Labor Statistics (2000, 2009), unemployment rates within the Gila Bend area (3.4 percent) and county (3.4 percent) were slightly below the state level (4 percent) in 2000. In 2009, unemployment rates increased dramatically to 8.2 percent in the Gila Bend area, 6.5 percent in Maricopa County, and 8.7 percent in Arizona, due primarily to the nationwide economic recession. Section 3.11, Environmental Justice, provides additional income and poverty-level data.

3.10.2 Environmental Consequences

3.10.2.1 Proposed Action

Abengoa Solar would construct Solana on existing agricultural land approximately 8 miles west of the Town of Gila Bend and away from the area's population center. The Solana Gen-Tie alignment would parallel Watermelon Road in an area that includes several existing transmission lines.

Construction of the proposed Solana CSP Project would have local, regional, and statewide economic benefits. Abengoa Solar estimates that project construction would create approximately 1,600 to 1,700 construction jobs, which represents between 75 and 80 percent of the existing labor force in the area (see Table 3-15). Construction would occur in multiple phases, with phases partially overlapping. Therefore, construction of the second phase would start after initiation of the first phase but before completion of the first phase. As a result, the full range of construction personnel would not be present for the entire duration of construction; rather, there would be a "ramping up" of construction personnel as sequential phases are initiated and a subsequent decline of construction personnel as sequential phases are completed.

It is also anticipated that 85 skilled permanent jobs would be created once the Solana CSP Project was operational. To appeal to the largest pool of potential local candidates, Abengoa Solar has posted job opportunities on the Solana CSP Project website in English and Spanish.

Abengoa Solar adheres to a "local to global" hiring practice, which targets local communities first to fill open positions before considering regional, national, or international candidates. In order of consideration, the Solana CSP Project would search for qualified candidates from Gila Bend, other small nearby communities, Maricopa County, Arizona, nationwide, and if necessary, internationally. This hiring strategy would greatly benefit the local population by drawing on an available labor force in areas where current unemployment rates exceed 8 percent.

Abengoa Solar anticipates sponsoring a park-and-ride program during project construction for the portion of the workforce commuting from the Phoenix metropolitan area or surrounding counties. The park-and-ride program is intended to reduce the number of trips and minimize local traffic congestion associated with travel to and from the work site, and would be available for the duration of project construction.

The Solana CSP Project would contribute to Gila Bend's local economy by its workforce spending at local businesses. Additional beneficial economic impacts resulting from the project would include an estimated 300 to 400 million dollars in 30-year tax revenues and the addition of more than 1 billion dollars in gross state product to Arizona's economy.

The Solana CSP Project would have limited demand for public services; therefore, it would not strain existing police, fire, or other emergency services. The Maricopa County Sheriff's Department currently provides law enforcement for the area, while the Gila Bend Fire Department serves the Town of Gila Bend. Rural Metro provides fire services for the areas surrounding the Town of Gila Bend, and Abengoa Solar has begun discussions with Rural Metro for the provision of services for the Solana CSP Project. It is expected that the Solana site would be incorporated into regular sheriff patrols of the area. The Solana CSP Project would not affect

the ability of these departments to maintain acceptable response times or community service ratios.

In addition, the Solana CSP Project would not impact community facilities such as schools, libraries, medical clinics, or other community services. The construction workforce would be anticipated to be a blend of local, regional, and statewide workers. As a result, existing community facilities are expected to continue to adequately serve the families of local construction workers. Project personnel commuting from the Phoenix metropolitan area or other locations in surrounding counties would be expected to use these facilities on a limited or as-needed basis, which would not adversely affect the service levels provided by the existing community facilities. Because the population of Gila Bend has decreased over the last decade, it is anticipated that the addition of 85 permanent jobs associated with the operation of the Solana CSP Project would not represent a significant population increase which would require the creation of additional community facilities.

The Solana CSP Project would not be expected to adversely affect the housing market because there is a 13.4 percent vacancy rate in the area. Therefore, there is a surplus of housing to accommodate an incremental increase in short-term or long-term housing needs for construction workers or permanent employees. Additional short-term housing needs could be met by local recreational vehicle parks in Gila Bend.

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

3.10.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, socioeconomic conditions would remain relatively constant. Under the No-Action Alternative, none of the beneficial economic impacts described for the Proposed Action would occur.

3.11 Environmental Justice

3.11.1 Affected Environment

According to EPA (EPA 2009b), environmental justice is:

> The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

On February 11, 1994, President Clinton signed Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, which requires each federal agency to "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 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).

As the entity tasked with oversight of the Federal Government's compliance with Executive 12898, the CEQ developed guidance to help federal agencies comply with NEPA procedures to ensure that environmental justice concerns are effectively identified and addressed (CEQ 1997). DOE NEPA guidance recommends that the agency consider *how* minority and low-income populations could be affected by a particular action before determining that there are no disproportionately high and adverse impacts on the minority or low-income populations (DOE 2004).

Minority, minority population, and low-income population are defined by CEQ in *Environmental Justice, Guidance Under the National Environmental Policy Act* (CEQ 1997) as follows:

Minority: Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.

Minority population: Minority populations should be identified where either (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In identifying minority communities, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a geographically dispersed/transient set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect. The selection of the appropriate unit of geographic analysis may be a governing body's jurisdiction, a neighborhood, census tract, or other similar unit that is to be chosen so as not to artificially dilute or inflate the affected minority population. A minority population also exists if there is more than one minority group present and the minority percentage, as calculated by aggregating all minority persons, meets one of the above-stated thresholds.

Low-income population: Low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census Current Population

Reports on Income and Poverty. In identifying low-income populations, agencies may consider as a community either a group of individuals living in geographic proximity to one another, or a set of individuals (such as migrant workers or Native Americans), where either type of group experiences common conditions of environmental exposure or effect.

3.11.1.1 Demographics

DOE collected racial and ethnic data from the U.S. Census Bureau Decennial Census Data for the geographic area in which the proposed Solana CSP Project would be constructed and operated, along with comparative data for Maricopa County and Arizona (U.S. Census Bureau 2000). Table 3-17 lists the comparative data for the percentage of population by race/ethnicity for the census tract, county, and state.

Table 3-17 Total Percentage of Population by Race/Ethnicity[a]

Geographic Area	White	Black or African American	American Indian or Alaska Native	Asian, Native Hawaiian, or Pacific Islander	Hispanic or Latino (of any race)[b]	Some Other Race
Census Tract 7233.02	59.1	1.6	10.3	0.2	38.6	25.1
Maricopa County	77.4	3.7	1.8	2.3	24.8	11.9
State of Arizona	75.5	3.1	5	1.9	25.3	11.6

a. Source: U.S. Census Bureau 2000

b. For Census 2000 there are two minimum categories for ethnicity: *Hispanic or Latino* and *Not Hispanic or Latino.* The Federal Government considers race and Hispanic origin to be two separate and distinct concepts. Hispanics and Latinos may be of any race (US Census Bureau 2000). As a result, the percentages provided in Table 3-17 exceed 100 percent.

As shown in Table 3-17, the racial and ethnic populations statewide and in Maricopa County are comparable, with Whites comprising approximately three-quarters of the population, Hispanics or Latinos representing approximately one-quarter of the population, and those identifying with some other race encompassing slightly less than 12 percent. In Arizona and Maricopa County, the remaining racial and ethnic groups – including Blacks or African Americans, American Indians or Alaska Natives, and Asians, Native Hawaiians, or Pacific Islanders – represent 5 percent or less of the population. When compared against the state and county percentages, Census Tract 7233.02 includes proportionally lower numbers of Whites (59.1 percent), Blacks or African Americans (1.6 percent), and Asians, Native Hawaiians, or Pacific Islanders (0.2 percent). In addition, Census Tract 7233.02 comprises proportionally higher numbers of American Indians (10.3 percent), Hispanics or Latinos (38.6 percent), and more than double the percentage of people identifying with some other race (25.1 percent). The census tract of the Solana CSP Project includes minority populations that are statistically higher than those in Maricopa County and Arizona.

3.11.1.2 Income and Poverty Level

Table 3-18 lists income statistics for Census Tract 7233.02, Maricopa County, and Arizona. The median household income in the census tract is $33,576, which is notably lower than the county ($45,358) and the state ($40,558). Per capita income, which is often used as a measure of wealth

of a particular group, is the average individual income of a person in a defined population (for example, a census tract, city, county, or state). The per capita income for Arizona and Maricopa County are similar ($20,275 and $22,251, respectively), while the per capita income for Census Tract 7233.02 is markedly lower at $12,376. These income statistics translate into a larger portion of Census Tract 7233.02 living in poverty (19.4 percent) compared to Maricopa County (11.7 percent) or Arizona (13.9 percent). Census Tract 7233.02 represents a low-income population.

Table 3-18 Income and Poverty Level

Geographic Area	Percentage of Individuals Living in Poverty (2000)	Median Household Income (in dollars)	Per Capita Income (in dollars)
Census Tract 7233.02	19.4	33,576	12,376
Maricopa County	11.7	45,358	22,251
State of Arizona	13.9	40,558	20,275

Source: U.S. Census Bureau 2000.

3.11.2 Environmental Consequences

3.11.2.1 Proposed Action

As described above, the Solana CSP Project vicinity includes minority and low-income populations. The census tract of the Solana CSP Project includes Native American and Hispanic or Latino populations that are statistically higher than those in Maricopa County and Arizona. In addition, the Solana CSP Project vicinity contains a higher number of individuals living in poverty compared to the rest of the county and state, and a population whose median household and per capita incomes are significantly lower than countywide or statewide figures.

Because no potential adverse environmental impacts are anticipated under the Proposed Action, no disproportionately high and adverse human health or environmental effects would affect minority or low income populations in the project area. Any temporary impacts associated with construction, such as an increase in dust, would be minimized through compliance with Maricopa County dust control permitting requirements.

3.11.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, there would be no impact to any populations, including minority or low-income populations.

3.12 Public Health and Safety

3.12.1 Regulatory Framework

3.12.1.1 Occupational Safety and Health Act

The Occupational Safety and Health Act of 1970 recognized that personal injuries and illnesses incurred in a work setting result in reduced productivity, wage loss, and medical expenses. As a result of the act, the Occupational Safety and Health Administration was established to ensure the health and safety of workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health (29 CFR Part 1910).

The Arizona Division of Occupational Safety and Health operates under an approved plan with the U.S. Department of Labor to retain jurisdiction over occupational safety and health issues in Arizona, excluding mining operations, Indian Reservations, and federal employees. This jurisdiction encompasses approximately 2.1 million employees and 130,000 public and private establishments.

3.12.1.2 Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) of 1976 charges the EPA with controlling the generation, transportation, treatment, storage, and disposal of hazardous waste (42 U.S.C. 6901 *et seq.*). RCRA also promulgated a framework for the management of nonhazardous solid wastes. The 1986 amendments to RCRA enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

3.12.1.3 Comprehensive Environmental Response, Compensation, and Liability Act

Congress enacted the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, on December 11, 1980. This law created a tax on the chemical and petroleum industries and provided broad federal authority to respond directly to releases or threatened releases of hazardous substances that could endanger public health or the environment. CERCLA:

- Established prohibitions and requirements concerning closed and abandoned hazardous waste sites
- Provided for liability of persons responsible for releases of hazardous waste at these sites
- Established a trust fund to provide for cleanup when no responsible party could be identified

The law authorizes two kinds of response actions:

- Short-term removals, where actions can be taken to address releases or threatened releases requiring prompt response.

- Long-term remedial response actions that permanently and significantly reduce the dangers associated with releases or threats of releases of hazardous substances that are serious, but not immediately life threatening. These actions can be conducted only at sites listed on the EPA National Priorities List.

CERCLA also enabled the revision of the National Contingency Plan, which provided the guidelines and procedures needed to respond to releases and threatened releases of hazardous substances, pollutants, or contaminants. The National Contingency Plan also established the National Priorities List. CERCLA was amended by the Superfund Amendments and Reauthorization Act on October 17, 1986, which included several changes and additions to the program.

3.12.2 Affected Environment

3.12.2.1 Phase I Environmental Site Assessment

CMX conducted a Phase I Environmental Site Assessment in accordance with 40 CFR Part 312 and American Society for Testing and Materials Practice E1527-05 for the Solana site in February 2008 to provide a basis for Abengoa Solar to assert CERCLA Landowner Liability Protections, as necessary. The assessment evaluated environmental conditions that could impinge on the Solana site, whether from existing or past land uses or activities either on the property or on adjoining properties (CMX 2008). The assessment identified two recognized environmental conditions (RECs) in connection with the Solana site:

- Aboveground Storage Tank (REC-1) – Spillage of diesel fuel at the 10,000 to 15,000 gallon aboveground storage tank in the equipment maintenance and staging area has resulted in soil staining over a 10 foot by 10 foot area.
- Motor Oil Spills (REC-2) – Spillage of motor oil directly onto the unpaved ground surface has occurred in the farm equipment storage area.

3.12.2.2 Electric and Magnetic Fields

According to the National Institute of Environmental Health Sciences, electric and magnetic fields are “invisible lines of force associated with the production, transmission, and use of electric power such as those associated with high-voltage transmission lines, secondary power lines, and home wiring and lighting” (NIEHS 2009). Electric and magnetic fields also occur naturally from sources such as the electric charges created by molten activity in Earth’s core. Given the ubiquity of electric power and continuous presence of Earth’s magnetic field, humans are exposed to electric and magnetic fields throughout the course of their lives.

Electric fields are produced by voltage (or electric charges). Electric fields increase in strength as the voltage increases and are measured in units of volts per meter. Magnetic fields result from the flow of electrical current in transmission line conductors or home wiring, Earth’s ambient field, or any electrical device. The magnetic field also increases in strength exponentially as the current increases and is measured in units of Gauss or Tesla. Gauss is the unit most commonly used in the United States and Tesla is the internationally accepted scientific unit; 1 Tesla is equivalent to 10,000 Gauss. Because a Gauss or Tesla are both very large fields and most

magnetic field exposures are significantly lower, values reported and typically measured in human environments are in milligauss (1/1,000 of a Gauss) and microtesla (1/1,000,000 of a Tesla, equivalent to 10 milligauss).

Sources of existing electric and magnetic fields in the vicinity of the Solana CSP Project are the existing transmission and distribution lines, and common household wiring and appliances for residences in the area. Electric and magnetic field levels in homes and businesses vary widely with wiring configurations, the types of equipment and appliances in use, and proximity to these sources.

3.12.3 Environmental Consequences

3.12.3.1 Proposed Action

All activities associated with construction and operation of the Solana CSP Project would be conducted in accordance with local, state, and federal regulations to protect the health and safety of Solana employees and the general public, as described below.

Construction

Public health and safety topics associated with construction of the Solana CSP Project include hazardous materials management, RECs, and worker safety.

Hazardous Materials Management

Construction of the Solana CSP Project would generate limited amounts of certain hazardous and solid wastes. Because Solana would be developed on previously disturbed agricultural land, no demolition would be required. Generated wastes would be managed and disposed of in accordance with all applicable regulations under RCRA and equivalent Arizona statutes.

Recognized Environmental Conditions

As described in Section 3.12.2.1, the results of the Phase I Environmental Site Assessment indicate that the areas near the aboveground storage tank in the equipment maintenance and staging area and the oil spillage in the farm equipment storage area should be subject to further investigation. The RECs are associated with farming operations on the Solana site. At this time, the exact nature and extent of contamination is unknown, but appear to be limited to diesel fuel and motor oils spills. Before construction, Abengoa Solar would address the RECs and any other contaminants that might be present, through testing, analysis, and, if appropriate, remediation. If required, remediation would be accomplished through the excavation and proper disposal of petroleum-contaminated soils (PCSs). Pursuant to Title 18, Chapter 13, of the Arizona Administrative Code, the PCSs would be classified as either special waste PCSs, solid waste PCSs, or non-regulated soil, and would then be appropriately transported and disposed of at a permitted solid waste management facility.

With the anticipated removal of the PCSs and because the Solana site would be developed as an industrial facility, the risk associated with the limited extent of PCSs would be low. The

concentration of contaminants in the site soils would be below soil remediation levels in accordance with Title 18, Chapter 7, Article 2, of the Arizona Administrative Code.

It should be noted that Phase I Environmental Site Assessments of the Solana Gen-Tie corridor will be conducted as Abengoa Solar identifies and secures right-of-way easements. In accordance with the requirements of the DOE loan guarantee program, an updated Phase I assessment is in progress for the Solana site, which will enable further assessment and appropriate treatment of the previously identified RECs.

Worker Safety

During construction, health and safety procedures would be implemented in accordance with Occupational Safety and Health Administration and Arizona Department of Occupational Safety and Health standards to minimize the risk of accidents or injuries. Safety planning and regular training sessions would occur to ensure that workers were adequately prepared to address any site-specific hazards, such as electrocution, fires, accidents (such as slips, trips, or falls), or exposure to poisonous wildlife. In addition, workers would be trained on the appropriate use of safety equipment and personal protective equipment.

Operations

Public health and safety topics associated with the Solana CSP Project operations include electric and magnetic fields, hazardous materials management, heat transfer fluid, molten salt, employee safety, and intentional destructive acts.

Electric and Magnetic Fields

Electric field induction effects are not generally associated with 230 kilovolt transmission lines. Values for the expected electric and magnetic field strengths were calculated based on a load of 250 megawatts on a single-circuit 230 kilovolt transmission line. Typically, electric and magnetic field levels drop to background levels by the edge of the transmission line right-of-way. Figure 3-22 illustrates the electric field profile for a single-circuit 230 kilovolt transmission line. Figure 3-23 illustrates the expected magnetic field levels for a 230 kilovolt transmission line. Both the electric and magnetic fields decrease rapidly, or attenuate, with distance from the source.

Additional information on electric and magnetic fields is available from the following resources:

- California Department of Health Services, California Electric and Magnetic Field Program; web site at http://www.dhs.ca.gov/ps/deodc/ehib/emf/general.html
- Medical College of Wisconsin, Electromagnetic Fields and Human Health; web site at http://www.mcw.edu/gcrc/cop/powerlines-cancer-FAQ/toc.html
- Environmental Health Information Service; web site at http://ehis.niehs.nih.gov/
- Microwave News; web site at http://www.microwavenews.com
- World Health Organization; web site at http://www.who.int/emf

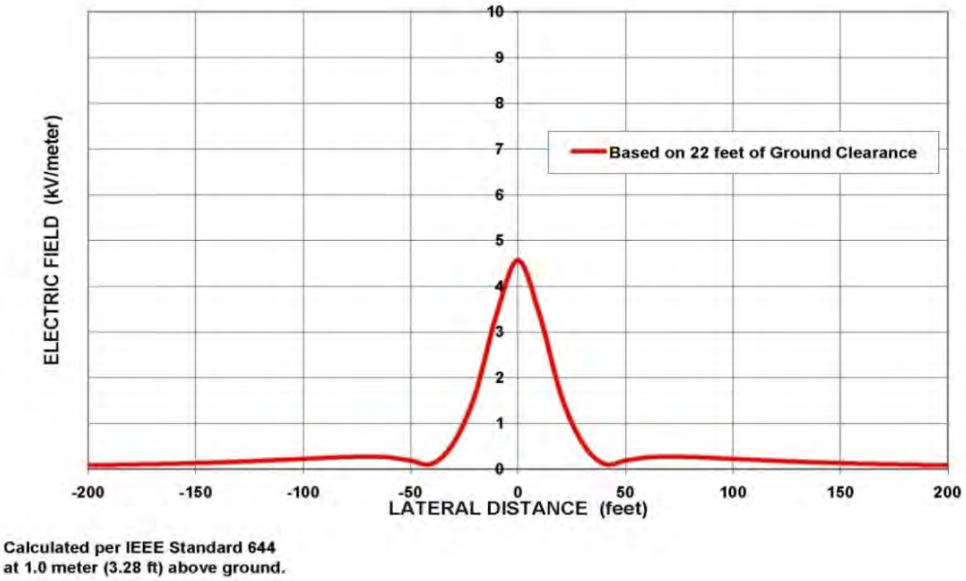

Figure 3-22 Electric Field Profile for a Solana Single-Circuit 230 Kilovolt Transmission Line

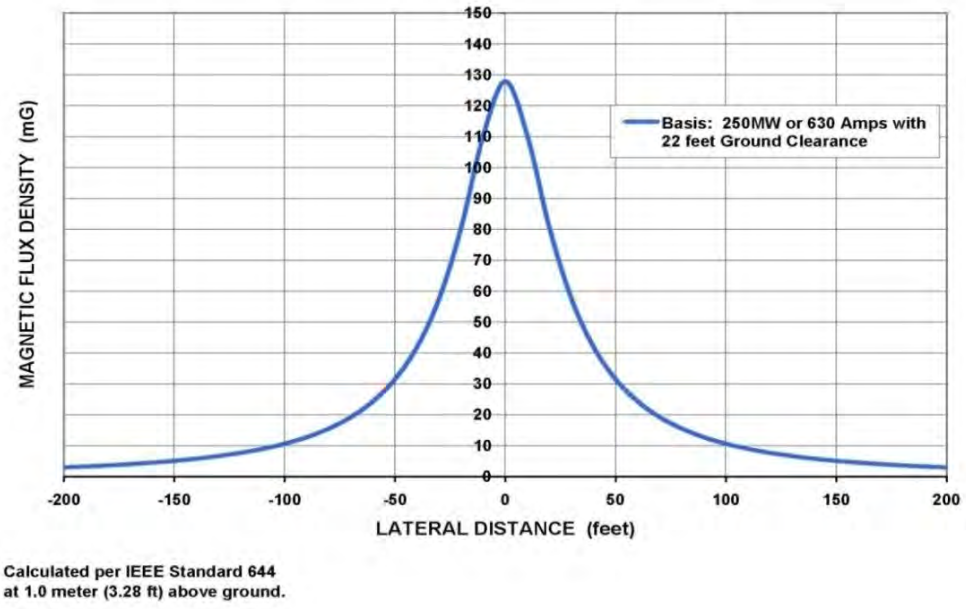

Figure 3-23 Expected Magnetic Field Levels for a Solana 230 Kilovolt Transmission Line

Over the past 25 to 30 years, hundreds of studies have been conducted to examine whether power-frequency (60 hertz) electric and magnetic fields pose a potential human health risk. Most of the scientific studies have been conducted in the research fields of epidemiology, laboratory cellular research, and animal studies. In the United States and internationally, expert scientists from a variety of disciplines were assembled to review this very large body of research material and to assess the potential health risk. Major reviews of the existing research have concluded that the existing body of scientific evidence does not show that exposure to power-frequency (60 hertz) electric and magnetic fields represent a human health hazard.

Key considerations in these scientific findings have been the weakness of the epidemiological studies, inconsistent and inconclusive epidemiological findings, the inability of epidemiology to identify a dose-response relationship, little or no replication of observed results, and the lack of support from laboratory research. The laboratory studies that have examined exposure of cells, tissue cultures, and a variety of animal species to electric and magnetic fields have been essentially negative. Despite more than 30 years of research, electric and magnetic field exposure has not been proven to be a human health factor (ICNIRP 2001). No significant environmental impacts associated with electric and magnetic fields would be anticipated as a result of the Solana CSP Project.

Hazardous Materials Management

Management of hazardous materials during Solana CSP Project operations would pose little risk of significant environmental impacts. Only limited hazardous materials would be used or generated during operations, including gasoline, diesel fuel, oil, lubricants, solvents, paints, and water treatment chemicals. All hazardous materials used and generated during operations would be carefully managed in compliance with the manufacturers' guidance and in accordance with state and federal standards applicable to conditionally exempt small quantity generators under RCRA. These standards would ensure that all materials were handled safely and that any releases were quickly and comprehensively managed to minimize any risk of environmental harm.

Heat Transfer Fluid

Heat transfer fluid is the working fluid of the collector field, which would serve as the means for transferring the collected solar energy to the solar steam generation heat exchangers in the power plant. Successful storage of the heat transfer fluid, retaining most of its entrained heat, results in the dispatchability of the Solana CSP Project.

Heat transfer fluid is an organic synthetic oil composed of an eutectic mixture of bi-phenyl, di-phenyl oxide. It is a stable mixture at high temperatures. The principal requirement for thermal oil used as heat transfer fluid in a parabolic trough solar plant is good thermal stability at high temperatures (at least 752 degrees Fahrenheit). The probable heat transfer fluid for the Solana CSP Project would be Dowtherm A or Therminol VP1. The heat transfer fluid has been classified as a non-RCRA hazardous material and as a nonhazardous material by the State of Arizona.

There is little risk that an onsite release could occur that would result in significant environmental impacts. Significant research has gone into developing the thermal collection and conveyance system that utilizes heat transfer fluid. Recent developments with ball-joint assemblies, straight-pipe configurations, and heat pump sealants, for instance, have significantly reduced the potential for system failures. In addition, these system designs ensure that any mean-time failures would result in only nominal material releases.

Nonetheless, in the event of heat transfer fluid pipe leaks, all contaminated soils would be removed and would be sent for treatment to an onsite land farm. Treatment in the land farm unit would involve the addition of nitrogen and phosphorous (fertilizers) as nutrients to the heat transfer fluid-contaminated soil to stimulate consumption of heat transfer fluid by the indigenous bacteria.

Molten Salt

The Solana CSP Project would include an indirect molten salt thermal energy storage system capable of storing solar heat during the day for later operation of the power plant when solar energy is otherwise not available. The molten salt to be used in the thermal energy storage system is a binary salt, 60 percent sodium nitrate and 40 percent potassium nitrate, and is not considered a hazardous material. The 108,000 tons of salt anticipated for use would be stored in tanks surrounded by an earthen berm. In addition to the thermal energy storage system being designed to minimize any opportunity for tank ruptures, the earthen berm would ensure isolation and containment. In the event of a rupture, once the molten salt hit ambient air, the salt would instantly solidify. Therefore, the salt would stay on the ground surface, and would not permeate the soil. The salt would be collected, and remelted for reuse in the thermal energy storage system.

Employee Safety

During operations, health and safety procedures would be implemented in accordance with Occupational Safety and Health Administration and Arizona Department of Occupational Safety and Health standards to minimize the risk of accidents or injuries. Safety planning and regular training sessions would occur to ensure that employees are adequately prepared to address any site-specific operations hazards, such as electrocution, fires, accidents (such as slips, trips, or falls), or exposure to poisonous wildlife. In addition, employees would be trained on the appropriate use of safety equipment and personal protective equipment.

Intentional Destructive Acts

Before it commenced operations, Abengoa Solar would develop a comprehensive security plan for the Solana CSP Project. Although the potential for intentional destructive acts would be low, Abengoa Solar anticipates having a 24-hour onsite security presence to dissuade any malicious behavior. Fencing or some form of protective barrier would be constructed around Solana for the safety of the public and the welfare of the facility. While the type of protective barrier has not yet been selected, it is anticipated that Abengoa Solar would select materials that are consistent with the surrounding landscape and that provide maximum visibility for security personnel.

The thermal inertia associated with the large volume of heat transfer fluid circulating throughout the plant's solar field gives rise to an additional potential security concern. As noted in the discussion of "Heat Transfer Fluid" above, the heat transfer medium would be either Dowtherm A or Therminol VP1. Both are eutectic mixtures of diphenyl oxide and diphenyl, and are designed for stable, continuous operation at temperatures up to 752 Fahrenheit, and temporary film temperatures of up to 806 Fahrenheit. Sustained operating temperatures above these ranges could cause chemical breakdown of the fluid, but not flammability. The autoignition temperature for these diphenyl blends is approximately 1,149 Fahrenheit, while the maximum continuous operating temperature of the heat transfer fluid used for Solana would be approximately 735 Fahrenheit.

The Dowtherm A or Therminol VP1 product to be used as the working fluid for Solana is unlike the previous generations of heat transfer fluids used in the Solar Electric Generating Station plants constructed in the California Mohave Desert in the 1980s. Fires occurred in the late 1990s at the Daggett plant (Solar I), where heat transfer fluid with an ignition point much lower than that of Dowtherm A or Therminol VP1 was used as a thermal storage medium onsite. Further, Daggett's stored heat transfer fluid was insulated from atmospheric oxygen via a "blanket" of natural gas within storage tanks. Upon tank leakage incidents, a combination of high operating temperatures, introduction of oxygen, and the presence of highly flammable natural gas caused serious fire incidents to occur.

Unlike the Daggett plant, Solana would not use heat transfer fluid as a storage medium, nor would natural gas be used in any form on the plant site during its operational period. Rather, Solana's heat transfer fluid would be isolated from atmospheric oxygen via a blanket of inert nitrogen, and its thermal storage medium would be molten salt, a potassium nitrate compound, as described above. As such, no threats of destructive acts caused by fire are expected for Solana.

With these security measures in place, impacts to the Solana CSP Project from intentional destructive acts would be very small.

3.12.3.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, no personnel or members of the public would be exposed to hazardous materials or conditions beyond those that currently exist.

3.13 Transportation

3.13.1 Affected Environment

A traffic impact analysis was prepared to analyze potential impacts to traffic circulation resulting from construction and operation of the Solana CSP Project (CivTech 2009). The analysis evaluated existing levels of service provided by the existing roadway network, anticipated trips generated during project construction and operations, and the capacity of the existing roadway system to accommodate additional trips generated by construction and operation of the Solana CSP Project.

The existing regional roadway network in the vicinity of the proposed Solana CSP Project includes Interstate 8, the area's major east-west interstate, and State Route 85, the principal roadway providing north-south access to southern Arizona and points north, including Buckeye and Phoenix. The local road network near the proposed Solana site consists of Interstate 8, Painted Rock Dam Road, and the Interstate 8 frontage road.

Peak hour turning movement counts were collected at the three principal intersections that provide access to the proposed Solana site – Painted Rock Dam Road and Interstate 8 (westbound ramps), Painted Rock Dam Road and Interstate 8 (eastbound ramps), and Painted Rock Dam Road and the frontage road.

Using the traffic count data, CivTech characterized the existing levels of service (LOS) provided by the three intersections. The concept of LOS uses qualitative measures to evaluate operational conditions in the traffic stream. LOS considers several factors, including speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Based on these factors, traffic facilities are assigned letter designations A through F, where A represents the best conditions and F represents the worst traffic scenarios. LOS for intersections are defined in terms of delay ranges, as shown in Table 3-19.

Table 3-19 Level of Service Criteria

Level of Service	Control Delay (seconds per vehicle)	
	Signalized Intersections	Unsignalized Intersections
A	Less than or equal to 10	Less than or equal to 10
B	More than 10 to 20	More than 10 to 15
C	More than 20 to 35	More than 15 to 25
D	More than 35 to 55	More than 25 to 35
E	More than 55 to 80	More than 35 to 50
F	More than 80	More than 50

Source: Transportation Research Board 2000.

Table 3-20 lists the results of the existing LOS analyses for morning (a.m., occurring from 7:00 a.m. to 9:00 a.m.) and evening (p.m., occurring from 4:00 p.m. to 6:00 p.m.) peak hours. According to the Maricopa County Department of Transportation Roadway Design Manual (MCDOT 2004), rural arterial roadways operating at LOS C or better are considered acceptable. Under existing conditions, the stop-controlled movements at all three intersections operate at LOS A during the a.m. and p.m. peak hours.

Table 3-20 Existing Peak Hour Levels of Service

ID	Intersection	Approach/ Movement	Peak Hour Level of Service a.m. (p.m.)
1	Painted Rock Dam Road and Interstate 8 (Westbound Ramps)	Northbound Left Westbound	A (A) A (A)
2	Painted Rock Dam Road and Interstate 8 (Eastbound Ramps)	Southbound Left Eastbound	A (A) A (A)
3	Painted Rock Dam Road and Frontage Road	Southbound Eastbound Left	A (A) A (A)

Source: CivTech 2009.

3.13.2 Environmental Consequences

3.13.2.1 Proposed Action

Solana CSP Project construction and operations would increase the number of vehicles traveling to and from the area, as described below. Regional access to the Solana site would be via Interstate 8, while direct access to the facility would be via Painted Rock Dam Road. The main access point to the Solana site would be from Painted Rock Dam Road approximately 0.5 mile north of Interstate 8.

Construction

As described in Chapter 2, Solana CSP Project construction would occur sequentially in multiple phases, which would be completed before operations commenced. Project construction is expected to require between 1,600 and 1,700 construction workers. The number of vehicle trips generated during the construction phases was estimated based on the following assumptions:

- Workers would arrive within the 60 minutes before the start of their shift.
- Workers would leave within 60 minutes after the end of their shift.
- The average auto occupancy would be two workers per vehicle.
- Mirror assembly employees would be divided evenly between each shift.

During construction, delivery/truck traffic is estimated at a rate of 37 to 90 trucks each day, with 11 deliveries per hour during a.m. and p.m. peak hours. Table 3-21 summarizes the peak demand for workers, shift hours, the number of trips anticipated during a day, and a breakdown of a.m. and p.m. peak commuting hour trips. During the peak construction period, the project would be expected to generate 1,886 total daily trips, with 22 in the a.m. peak hour and 543 in the p.m. peak hour. As shown in Table 3-21, construction workers would typically arrive at times outside of peak commuting hours.

Table 3-21 Anticipated Peak Construction Trip Generation

Shift Times	Work Unit	Peak Workers	Weekday Trip Generation						
			Daily Total	A.M. Peak Hour			P.M. Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total
4 a.m. – 2 p.m.	Site Preparation	52	52	0	0	0	0	0	0
7 a.m. – 5:30 p.m.	Power Block	449	449	0	0	0	0	220	220
5:30 a.m. – 4 p.m.	Mirror Assembly	1205	602	0	0	0	0	301	301
8 p.m. – 5:30 a.m.			603	0	0	0	0	0	0
All Day	Deliveries	90	180	11	11	22	11	11	22
		Totals	1,886	11	11	22	11	532	543

Source: CivTech 2009.

To minimize construction traffic and the number of trips during construction, Abengoa Solar intends to provide offsite locations in Gila Bend and Buckeye for construction workers to park their personal vehicles and ride buses to the construction site. To demonstrate the most conservative scenario, the trip generation in Table 3-21 does not account for any reduction in the number of trips that would be attributed to the park-and-ride program. Based on the number of trips anticipated for the peak construction period, the three intersections listed in Table 3-20 would continue to operate at acceptable levels of service during a.m. and p.m. peak hours.

During the special use permit process, Abengoa Solar would coordinate with Maricopa County Department of Transportation to achieve appropriate right-of-way widths along all perimeter roadways at the Solana site. The Maricopa County Department of Transportation anticipates that improvements would only be required at the Solana site access point. Therefore, no construction-related traffic impacts would be expected.

Operations

Once operational, approximately 40 employees would be present during any one shift, during which most workers would be at the Solana site from sunrise to 6 hours after sunset. This would require a split shift of workers, each working 9 hours. There would be only a few employees working during the overnight shift. For purposes of this trip generation analysis, it is assumed that 80 employees would be working during the day, 40 employees per shift, and that the remaining 5 employees would work the overnight shift. Sunrise typically occurs before the a.m. peak hours (that is, 7:00 a.m. to 9:00 a.m.); therefore, the 40 employees that would be arriving for the first daytime shift and the 5 employees that would be leaving the overnight shift would be traveling before the typical commuter peak hours. Similarly, the second daytime shift would be arriving and the first daytime shift would be leaving before the typical p.m. peak hours (that is, 4:00 p.m. to 6:00 p.m.). The overnight shift employees would arrive and the second daytime shift would leave much later than the typical p.m. peak hours.

Table 3-22 lists the peak hour trip generation expected during Solana CSP Project operations. Due to anticipated operations at the Solana site, peak hours of trip generation would not coincide with peak commuting hours. During regular operations, the Solana site could generate 168 trips daily, with 28 trips during the a.m. peak hour and 10 trips during the p.m. peak hour. The a.m. and p.m. peak traffic refer to the busiest travel times for those traveling to and from the Solana site, rather than regional peak commuting hours.

Table 3-22 Anticipated Operations Trip Generation

Weekday Trip Generation						
Daily Total	A.M. Peak Hour			P.M. Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total
168	28	0	28	2	8	10

The 2006 and 2007 Arizona Department of Transportation count data were compared to determine an annual growth rate of traffic volumes in the vicinity of the Solana site. The resulting growth rate was approximately 1 percent per year, which was applied to the existing traffic volumes to estimate 2013 background traffic volumes. Projected background traffic volumes for 2013 represent the traffic volumes that would exist without the proposed Solana CSP Project. The total traffic expected in 2013 was determined by adding the traffic generated by the Solana CSP Project to the projected background traffic. Table 3-23 lists the peak hour LOS for the 2013 anticipated total traffic.

Table 3-23 2013 Peak Hour Levels of Service

ID	Intersection	Approach/ Movement	Peak Hour LOS a.m. (p.m.)
1	Painted Rock Dam Road and Interstate 8 (Westbound Ramps)	Northbound Left Westbound	A (A) A (A)
2	Painted Rock Dam Road and Interstate 8 (Eastbound Ramps)	Southbound Left Eastbound	A (A) A (A)
3	Painted Rock Dam Road and Frontage Road	Southbound Eastbound Left	A (A) A (A)
4	Painted Rock Dam Road and Main Access to the Solana Site	Northbound Left Eastbound	A (A) A (A)

Source: CivTech 2009.

In 2013, with the proposed project in operation, the four intersections would be expected to operate at acceptable levels of service under the existing lane configurations and traffic control. Therefore, DOE would not anticipate impacts to traffic related to the Solana CSP Project operations.

There have been preliminary meetings between the Maricopa Association of Governments, the Arizona Department of Transportation, and the Maricopa County Department of Transportation regarding the best and most efficient uses of existing and future transportation systems in the area. The Maricopa Association of Governments is performing an area transportation framework study for the Interstate 8 and Interstate 10/Hidden Valley Roadway, which encompasses the

region of southwest Maricopa County and western Pinal County. The study area is bounded by the Gila River/northern boundary of the Gila River Indian Community to the north, the Interstate 8 corridor to the south, Overfield Road to the east, and 459th Avenue to the west, and would include part of the Town of Gila Bend. Abengoa Solar would continue to work closely with the Maricopa Association of Governments, the Maricopa County Department of Transportation, and the Arizona Department of Transportation to ensure compatibility between the Solana CSP Project and the proposed Interstate 8 and Interstate 10/Hidden Valley Transportation Framework.

None of the local roadways serving the Solana site are included in the Maricopa Association of Governments' Transportation Improvement Program (MAG 2007a) for fiscal years 2008 through 2012. Therefore, they would not be planned or programmed as viable projects before Solana operations commence. Any future improvements to local roads would enhance localized circulation and minimize the potential for congestion. Solana CSP Project operations would not interfere with state and local transportation planning efforts or with the potential roadway projects resulting from those planning efforts.

3.13.2.2 No-Action Alternative

Under the No-Action Alternative, DOE would not issue Abengoa Solar a loan guarantee for construction of the Solana CSP Project, and Abengoa Solar would not proceed with the project. Absent the Solana CSP Project, traffic levels in the area would remain relatively constant. Any planned or programmed roadway improvements in the area would still occur.

4 CUMULATIVE EFFECTS

The term "cumulative effect" is defined in CEQ regulations as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions" (40 CFR 1508.7).

This chapter defines the area DOE considered in the cumulative effects analysis, provides an overview of relevant past and present actions in the Solana CSP Project vicinity, presents the reasonably foreseeable actions in the area of consideration based on information from local planning agencies and the availability of documentation for future projects, and concludes with the cumulative effects analysis.

4.1 Area of Evaluation

The spatial parameters for the cumulative effects analysis were established through natural geographic boundaries, which include the Gila River and Gila Bend Mountains to the north, the Painted Rock Mountains to the west, the Sauceda Mountains to the south, and State Route 85 to the east.

4.2 Past and Present Actions

As described in Section 3.1, Land Use, past and present actions in the proposed Solana CSP Project vicinity consist primarily of irrigated agriculture. Other actions related to agricultural use in the area include the PIDD canal, relift pumps, reservoirs, and the Gila Bend Canal.

Additional past and present actions that have influenced the project vicinity include residential, commercial, communications, military, utility, and transportation projects. Residences in the vicinity of the Solana CSP Project are sparse and mostly associated with agricultural operations. Past and present commercial actions include three dairy operations east of the Solana site along Powerline Road. There are two communications towers in the project vicinity – one at the southern extent of the Solana site and the other south of Interstate 8. The Barry M. Goldwater Range, which has been in operation since World War II, is approximately 8 miles south of the Solana site and Interstate 8.

Utility actions include the Panda Gila River Power Generating Facility and the Arizona Public Service Company Gila Bend Substation. In addition, the Arizona Public Service Company owns and operates a 69 kilovolt single-circuit line, a 230 kilovolt single-circuit line, and several 12 kilovolt distribution lines in the vicinity of the Solana CSP Project.

Past and present transportation actions are related to the major road and rail corridors in the area, including Interstate 8, State Route 85, and the Union Pacific Railroad. Other transportation actions are associated with the local road network, including paved (Painted Rock Dam Road, Citrus Valley Road, and portions of Watermelon Road) and unpaved roads (Powerline Road and portions of section line alignments).

4.3 Past, Present, and Reasonably Foreseeable Future Actions

The following sections describe projects identified for potential inclusion in this cumulative effects analysis. However, several of the projects were found to be in such early stages of development, and were considered so unlikely to proceed, that they were not included in the analysis. Section 4.3.1 describes those projects. Section 4.3.2 describes future actions believed to have a reasonable likelihood of occurring.

4.3.1 Projects Excluded from the Cumulative Effects Analysis

Several projects were previously identified in the state-level planning and permitting documents prepared for the Solana CSP Project. They are described here for consistency and completeness. For many of the projects identified in this section, the planning process began under very different economic conditions than those that currently exist. As a result, some of these projects are now on hold indefinitely, and therefore are no longer "reasonably foreseeable." The projects excluded from this analysis and the reasons for their exclusion are described below and organized by topic.

4.3.1.1 Residential and Mixed-Use Development

Three possible residential and mixed-use developments have been identified in the vicinity of the Solana CSP Project, including the Vanguard Property, San Lucy District, and Merrill-Paloma Ranch developments. Through conversations with residents and officials of the Town of Gila Bend, it is believed that the Vanguard Property would be north of Interstate 8 between the Town of Gila Bend and Citrus Valley Road. In November 2008, the San Lucy District released a Request for Proposal for land use planning and engineering services for a 3,759-acre mixed-use development adjacent to the northern boundary of the Solana site. At this time, no additional information is available for either the Vanguard project or the San Lucy District development; therefore both projects are considered speculative and have been excluded from this analysis.

The Merrill-Paloma Ranch is planned as a 10,000-acre mixed-use development with a range of housing densities, neighborhood commercial areas, and an open-space system proposed south of Interstate 8. The Development Agreement, approved by the Town of Gila Bend in April 2004, includes a land use plan as part of the master development plan for the ranch. The proposed uses include a range of residential types with target densities from 10 to 16 dwelling units per acre, along with open-space areas and areas for general business, neighborhood business, light industrial, mobile home, and recreational vehicle uses (Gila Bend 2006). The Merrill-Paloma Ranch development was proposed during a time when residential development was in high demand. The permitting process for the project has not yet begun, and no additional information is available on the project; therefore, the project has been excluded from this analysis.

4.3.1.2 Industrial

Volkswagen has proposed a test track facility on 12,500 acres located entirely on ASLD land south of Interstate 8. Due to the economic constraints on the auto industry, this proposal became inactive and was put on hold for an indefinite amount of time. Therefore, this project has been excluded from the analysis.

4.3.1.3 Utility

A future utility plan known only as "Q-31" was identified through the Arizona Public Service Company transmission interconnection request queue. All projects contemplating interconnection with a utility transmission operator must submit an interconnection request to begin the study process to evaluate potential impacts of the project on the transmission system. This is often a lengthy process; therefore, many projects submit interconnection requests on a confidential basis so that the developer can maintain anonymity as they pursue additional study work, evaluations, and pre-permitting activities. Q-31 is considered confidential and would interconnect to Panda Substation. Additional information pertaining to project type and location is not available for the Q-31 interconnection request. Based on the limited knowledge about this project, it has been excluded from this analysis.

4.3.1.4 Transportation

The Maricopa Association of Governments' 2007 Regional Transportation Plan (MAG 2007b) identifies local and regional transportation projects in the Solana CSP Project vicinity. Although not directly stated as a future project, the plan includes a map depicting arterial streets in 2028 that shows what appears to be Powerline, Watermelon, and Citrus Valley Roads as future four-lane roadways. The expansion of these roads is not a formally proposed project. The Maricopa Association of Governments is performing an area transportation framework study for the Interstate 8 and Interstate 10/Hidden Valley Roadway, which encompasses the region of southwest Maricopa County and western Pinal County. The western extent of the study area includes Interstate 8 and the Town of Gila Bend. At this time, preliminary studies are underway to identify possible future transportation facilities. The Regional Transportation Plan for the Gila Bend area has changed frequently. Because the transportation model is for the year 2028, it should be considered a tentative plan. Therefore, it has been excluded from this analysis.

4.3.2 Reasonably Foreseeable Future Actions Included in the Cumulative Effects Analysis

4.3.2.1 Industrial

Based on a review of the Maricopa County PlanNet (Maricopa County 2009) online database and discussions with the developer of the proposed project, there is a 350-acre corn-flaking facility proposed south of Interstate 8 near Painted Rock Dam Road. At this time, start of construction for this facility is anticipated to be a minimum of 5 to 10 years away.

4.3.2.2 Utility

The GBPP 500 kilovolt transmission line would originate at the planned Gila Bend generating station and terminate at the GBPP proposed Watermelon Switchyard. The 500 kilovolt transmission alignment would parallel and be adjacent to the south side of Watermelon Road for approximately 7.5 miles. The remaining 1.5 miles would extend in an easterly direction from the point where Watermelon Road terminates at Old U.S. Highway 80.

4.3.2.3 Recreation

The Gatlin Site, a prehistoric Hohokam archaeological site, is being developed as a regional cultural park by the Town of Gila Bend with assistance from the Arizona State Parks Heritage Fund Matching Grant. The park currently has a 1.25 mile interpretive trail. Future development will include exhibits, signage, and a brochure (Gila Bend 2006).

4.4 Cumulative Effects Analysis

This section analyzes the cumulative effects from the past, present, and reasonably foreseeable future projects in conjunction with the Solana CSP Project. This analysis addresses only the resources to which the Solana CSP Project has the potential to contribute an incremental impact (positive or negative).

4.4.1 Land Use

Like the Solana CSP Project, the projects identified in Section 4.3.2 would be required to comply with adopted land use plans and zoning requirements, including compatibility with Barry M. Goldwater Range operations. Therefore, the identified projects would be consistent with the overall land use policies of Maricopa County and the Town of Gila Bend, and would not result in any cumulative effects that would be incompatible with existing or long-term land use patterns.

Removal of 3,000 acres of agricultural land from production for the proposed Solana CSP Project would represent an incremental increase in farmlands converted to non-agricultural uses. The NRCS land evaluation indicates that the proposed Solana site represents 1.12 percent of the farmable land in Maricopa County and 1.60 percent of farmland (as defined by the FPPA) in Maricopa County.

Due to PIDD's lack of capacity to deliver sufficient water during summer, the farm adjacent to the Solana site east of Painted Rock Dam Road is unable to keep all of its land in production. During summer, the adjacent farm must fallow 640 acres to meet the irrigation demand of the remaining portion of the farm (Brown 2009). Therefore, a net reduction of 1.60 percent of farmland would not be cumulatively considerable, because the potential for redistributing the irrigation water made available by taking the Solana site out of crop production would enable adjacent farms to increase productivity through higher crop yield.

The proposed 350-acre corn-flaking facility would not be on irrigated agricultural land. The proposed GBPP 500 kilovolt transmission line would parallel the south side of Watermelon Road within an existing utility corridor and would not affect farmland. Development of the Gatlin Site as a regional cultural park would not impact any agricultural land. Therefore, no cumulatively considerable impacts to farmlands would be anticipated with implementation of the Solana CSP Project.

4.4.2 Visual Resources

Although development of the Solana CSP Project would result in a change to the existing visual landscape through the introduction of the solar plant and transmission line, the overall visual impact would be very small. Due to a number of existing agricultural, transportation, and utility

elements in the built environment, the existing visual setting has already been modified from its natural state.

Construction of the proposed 350-acre corn-flaking facility adjacent to Interstate 8 would result in a visual change to the landscape. However, the proposed location of the corn-flaking facility is close to Interstate 8; therefore, much of the visual change that would occur would likely be absorbed by the existing interstate. The proposed GBPP 500 kilovolt transmission line would parallel the south side of Watermelon Road within an existing utility corridor and would not be expected to result in a notable visual change to the landscape. Development of the Gatlin Site as a regional cultural park would not affect visual resources because the introduction of natural elements into the landscape (such as trails and vegetation) would contribute to the overall setting of the park. Therefore, no cumulatively considerable impacts to visual resources would be anticipated.

4.4.3 Air Quality

4.4.3.1 Construction

The proposed Solana CSP Project area is in an attainment area for all criteria air pollutants. As described in Section 3.3, the EPA is reviewing the State of Arizona's recommendation to expand the nonattainment area for 8-hour ozone NAAQS based on monitoring violations of the 2008 8-hour 0.075 parts per million standard. The EPA decision on the revised 8-hour ozone nonattainment area designation was anticipated for March 2010; however, a decision had not yet been rendered at the time this document was prepared.

Ozone precursor emissions generated by the project in the revised nonattainment area would be limited to construction activities associated with the eastern 1.5 miles of the Solana Gen-Tie alignment. Given the short-term nature of construction in this area, coupled with the fact that the projected construction emissions rates for ozone precursors would be below applicable limits (for the entire Solana CSP Project), construction activities associated with the eastern 1.5 miles of the Solana Gen-Tie in the revised nonattainment area would not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of the 8-hour ozone standard.

The projects described in Section 4.3.2 represent short- and long-range plans and would be required to comply with Maricopa County air permitting requirements, as appropriate. Air emissions generated during construction of the Solana CSP Project would be regulated in accordance with the ADEQ Non-Title V air permit. Fugitive dust generated during project construction would be subject to a dust control permit and plan to comply with MCAQD Rule 310. It is not likely that construction of these projects would occur simultaneously; therefore, cumulative impacts associated with construction emissions would not be likely.

4.4.3.2 Operations

As described above, the EPA is reviewing the extent of the 8-hour ozone nonattainment area. Regardless of the EPA decision, the Solana site would be in an area that is in attainment for all criteria pollutants, including 8-hour ozone. Some of the equipment associated with Solana operations would generate limited air emissions from the standby generator, cooling tower,

emergency diesel fire pumps, heat transfer fluid system, and vehicular travel to and from the site. Operations emissions would be regulated in accordance with a Non-Title V air permit. Fugitive dust generated during operations would be subject to a dust control permit and plan to comply with MCAQD Rule 310.

All other projects in the area of consideration, in particular the GBPP 500 kilovolt transmission line and power generating facility, would be required to obtain an air permit to prevent construction and operations emissions from exceeding applicable thresholds. An incremental increase in air emissions associated with the Solana operations (subject to the requirements of a Non-Title V air permit) would not contribute to cumulatively significant impacts to air quality.

4.4.4 Noise

4.4.4.1 Construction

As described in Section 3.4, analysis of the noise levels of the equipment expected to be used during Solana CSP Project construction indicates that there would be a temporary increase in ambient noise. As shown in Table 3-6, these levels would be below the EPA-recommended guideline of 70 dBA to prevent measurable hearing loss and, in most instances, would be near the EPA-recommended guideline of 55 dBA to protect against outdoor activity interference. All construction activities associated with the Solana CSP Project would adhere to the Maricopa County Hours of Construction Ordinance. Interstate 8 and the railroad would lie between the corn-flaking facility and the Solana site. The GBPP power generating facility would be approximately 8.3 miles away from the Solana site. In addition, the likelihood of any of the reasonably foreseeable future projects being constructed at the same time as the Solana CSP Project is considered very low. For these reasons, no construction-related cumulative noise impacts would be expected.

4.4.4.2 Operations

Noise emissions generated during operations at the Solana power island would attenuate rapidly and diminish into the background ambient noise levels at the site boundary, and would be well below the EPA-recommended guidelines. Noise associated with corona discharge would be unlikely for 230 kilovolt transmission lines. Solana operations would not result in cumulatively significant noise impacts to adjacent lands.

4.4.5 Water Resources

As described in Chapters 2 and 3, approximately 100 acres within the Solana site boundaries contain irrigation infrastructure (including canals, reservoirs, and relift pumps) that provide irrigation water delivery to existing agricultural operations on and adjacent to the site. North of the Solana site, PIDD created a series of reservoirs and relift pumps to capture agricultural tailwater runoff for agricultural reuse. These reservoirs, and the PIDD irrigation infrastructure as a whole, have contributed to a notable change in surface water baseline conditions of the Solana site and adjacent lands.

4.4.5.1 Construction

As part of the Solana CSP Project, the PIDD infrastructure within the Solana site boundaries that conveys irrigation water to down-gradient parcels would be relocated during construction to maintain the integrity of PIDD's irrigation water delivery system. The Solana CSP Project would be designed and constructed to avoid and minimize direct impacts to waters of the United States. Unavoidable impacts, if any, associated with the construction of an access road parallel to the Solana Gen-Tie alignment would be accomplished under a U.S. Army Corps of Engineers Section 404 Nationwide Permit No. 12.

As described in Section 3.6 Water Resources and Section 3.7 Biological Resources, construction or operation of the Solana CSP Project would not result in direct impacts to wetlands. Because the Solana site is currently irrigated agricultural land, removing this land from agricultural production has the potential to result in indirect impacts to wetlands by reducing the amount of agricultural tailwater runoff returned to the irrigation reservoirs north of the Solana site. It is estimated that the Solana site represents a minor contribution (approximately 3 to 5 percent) to the overall system which supports the riparian areas within Bull Durham Wash. Abengoa Solar would provide 447 acre-feet of water to the head of Bull Durham Wash on an annual basis as a direct off-set for the portion of the reduced agricultural tailwater runoff that would otherwise remain in the irrigation reservoirs and contribute to operational spills. The off-set would equalize water lost as a result of the farm being taken out of production.

During construction, the projects described in Section 4.3.2 would be required to implement BMPs under a Storm Water Pollution Prevention Plan and comply with Floodplain Regulations for Maricopa County (FCDMC 2006). Potential dredge or fill activities within waters of the United States would be regulated under an Army Corps of Engineers Section 404 permit. Therefore, cumulative construction impacts associated with water quality, floodplains, wetlands, waters of the United States, or storm water runoff would not be expected.

4.4.5.2 Operations

Solana operations would reduce the current water usage by more than 75 percent to an estimated consumption of more than 3,000 acre-feet per year. The source water for Solana is anticipated to be groundwater, although provisions for surface water might be considered during the construction period only. The Solana CSP Project has identified a water source that would provide a sufficient supply for operations. All other projects in the area of consideration, in particular the corn-flaking facility and GBPP power generating facility, would be required to secure their own water sources. Accordingly, the Solana CSP Project would not have a cumulative impact on regional water supplies.

Proposed future projects would be required to obtain aquifer protection permits from ADEQ for any potential discharges of pollutants to surface water or groundwater sources, and an Arizona Pollutant Discharge Elimination System permit for direct discharges to surface water. Further, projects would be designed to comply with Floodplain Regulations for Maricopa County (FCDMC 2006), which mandate that onsite storm water be treated through retention ponds or other mechanisms before release. Because potential discharges would be regulated through these requirements, cumulative contributions to storm water runoff and impacts to water quality would

not be expected. In addition, the Arizona Department of Water Resources manages groundwater withdrawals through the Assured and Adequate Groundwater Supply rules under the Groundwater Code; therefore, the State of Arizona would manage groundwater withdrawals and no cumulative impacts to groundwater supply would be expected.

4.4.6 Biological Resources

4.4.6.1 Construction

Vegetation

Grading of the Solana site and limited site clearing along the proposed Solana Gen-Tie corridor would affect vegetation. An approximately 50-acre portion of the southwest corner of the Solana site contains native vegetation, which would be removed during construction activities. Removal of native vegetation along the proposed Solana Gen-Tie corridor would be minimal due to the amount of existing agricultural land adjacent to the corridor and proximity of the corridor to Watermelon Road.

Construction of the proposed 350-acre corn-flaking facility would result in an incremental reduction in regional native vegetation. The proposed GBPP 500 kilovolt transmission line would parallel the south side of Watermelon Road within an existing utility corridor and would not be expected to contribute to a notable reduction in native vegetation. Development of the Gatlin Site as a regional cultural park would not be likely to result in the permanent removal of native vegetation because the retention of features of the natural landscape (such as existing vegetation) would contribute to the overall setting of the park. Therefore, no cumulatively significant impacts to native vegetation would be expected.

Wildlife

In general, the Solana site provides poor-quality habitat for wildlife species, as evidenced by the lack of designated critical habitat in the project area (FWS 2009b). As described in Section 3.7.3.1, Solana CSP Project construction would result in the loss of foraging habitat for the great egret, western burrowing owl, snowy egret, western snowy plover, Tucson shovel-nosed snake, and Yuma clapper rail. Similar habitat is available in the immediate area surrounding the Solana site, and species would continue to forage outside the project area. In addition, the translocation of western burrowing owls to an owl management area would ensure the survival of local populations. On March 12, 2010, DOE sent a determination of "may affect, but is not likely to adversely affect" for the Yuma clapper rail, western burrowing owl, and the snowy egret to the U.S. Fish and Wildlife Service in Phoenix, Arizona. In summary, the Proposed Action may result in minor impacts to biological resources, but is not likely to result in adverse impacts to Special Status or Federally Listed species. On April 12, 2010, the U.S. Fish and Wildlife Service concurred with DOE's determinations (see Appendix E).

The projects listed in Section 4.3.2 would be required to comply with local, state, or federal legislation enacted to protect and preserve threatened and endangered species. Therefore, no construction-related cumulative impacts to wildlife would be expected.

4.4.6.2 Operations

Vegetation

Because there would be no impacts to native vegetation once the Solana CSP Project became operational, no cumulative impacts to vegetation would be expected when considered in conjunction with the proposed corn-flaking facility, 500 kilovolt transmission line, or the Gatlin Site.

Wildlife

Converting the Solana site out of agricultural production could result in a reduction of tailwater returning to the irrigation reservoirs north of the site, potentially reducing the amount of available nesting and foraging habitat for wildlife. As described in Section 3.7.3.1, the Solana site is one of several sources that contribute runoff to Bull Durham Wash. As a direct off-set, Abengoa Solar would provide 447 acre-feet of water to the head of Bull Durham Wash on an annualized basis for the portion of the reduced agricultural tailwater runoff.

Abengoa Solar would implement means to deter migratory waterfowl from using the evaporation ponds. Personnel would be present to impose actions to ward off birds. Habitat enhancement of the area would be prevented through the use of herbicides to inhibit vegetation growth around the edges of the ponds, discouraging stopover birds from remaining onsite.

On March 12, 2010, DOE sent a determination of "may affect, but is not likely to adversely affect" for the Yuma clapper rail, western burrowing owl, and the snowy egret to the U.S. Fish and Wildlife Service in Phoenix, Arizona. In summary, the Proposed Action may result in minor impacts to biological resources, but is not likely to result in adverse impacts to Special Status or Federally Listed species. On April 12, 2010, the U.S. Fish and Wildlife Service concurred with DOE's determinations (see Appendix E).

Due to the respective locations of the reasonably foreseeable projects described in Section 4.3.2, the three proposed projects would not be expected to have any effect on the short- or long-term productivity of Bull Durham Wash. Of the three projects, only the corn-flaking facility would be expected to have an open-water storage facility, such as an evaporation, retention, or detention pond. Like the Solana CSP Project, the corn-flaking facility would be required to address its effects to bird populations. Therefore, no cumulative impacts to wildlife would be expected as a result of Solana operations.

4.4.7 Tribal Consultation and Coordination

As part of tribal consultation for the Solana CSP Project, the Tohono O'odham Nation requested that consideration be given to developing a process for implementing utility-scale solar projects. DOE asked Abengoa Solar to explore the options for assembling a forum of relevant stakeholders to discuss planned energy-development projects in southwestern Arizona. Abengoa Solar began discussions with the Sonoran Institute, the Arizona Corporation Commission, the ASLD, and others to explore the idea of conducting a symposium that would bring stakeholders together to discuss the scope and potential environmental and cultural impacts associated with development of numerous renewable energy projects.

Initially, the entities envisioned an event or series of events that would gather thought leaders with a diverse array of perspectives and from a broad cross-section of affiliations. However, in her State-of-the-State address on January 11, 2010, Governor Brewer announced her Executive Order 2010-02 directing that a Renewable Energy and Public Agency Coordination Summit be held in February of 2010. The objectives of the summit were very closely aligned with the principal goal of reviewing the number of and need for solar facilities. Moreover, the Executive Order specifies that tribal leaders be invited to the summit.

The Renewable Energy Summit was held on February 11, 2010, at Arizona State University. The summit assembled a broad base of stakeholders, including land managing agencies (the ASLD, the BLM, the U.S. Forest Service, and Luke Air Force Base); utility representatives (Arizona Public Service Company, Salt River Project, Tucson Electric Power, and Arizona's Generation and Transmission Cooperatives); state regulating agencies (the Arizona Corporation Commission, the ADEQ, the AGFD, the Arizona Department of Water Resources, and the SHPO); tribal representatives (the Navajo Nation and the Fort Mojave Tribe); renewable energy researchers from Arizona State University; and representatives of Abengoa Solar.

While the February 11 meeting was government and industry-focused, the aim of the second meeting was to engage members of the public. On April 15, 2010, the second part of the Governor's Renewable Energy Summit was held to update the public on efforts (both public and private) being made in the pursuit of Renewable Energy for Arizona. In addition, the second meeting also aimed to gather information from the public and private sectors, including generators, manufacturers, bankers, environmentalists, and government agencies. Information from both meetings is available on the Governor's webpage (located at http://azgovernor.gov/renewable/index.asp). The two meetings provided an opportunity to begin to develop solutions and recommendations to guide responsible implementation of utility-scale solar projects, thereby avoiding cumulatively considerable impacts to resources.

4.4.8 Cultural Resources

The 16 cultural resource sites determined eligible for listing on the National Register are located along the proposed Solana Gen-Tie alignment, and vary in width from 150 to 1,800 feet. Based on the proposed height of the transmission structures and the anticipated span length for a typical 230 kilovolt line, Abengoa Solar would avoid impacts to National Register-eligible cultural resources within the transmission line corridor through a combination of spanning, strategic pole placement, and manual distribution of the conductors through the site boundaries of eligible cultural resources. In addition, the ethnographic investigations did not identify any traditional cultural properties or areas of religious or cultural importance. The projects listed in Section 4.3.2 would be required to comply with local, state, and federal historic preservation legislation enacted to protect and preserve Arizona's cultural resources.

Because of its status as a National Historic Landmark and the Town of Gila Bend's proposed plans to develop the Gatlin site into a regional cultural park, the SHPO requested that DOE consider potential visual effects that could result from the construction of the Solana Gen-Tie alignment. As described in Section 3.9 Cultural Resources, DOE has given extensive consideration to the existing visual setting surrounding the Gatlin Site, and concluded that construction of the Solana Gen-Tie alignment would introduce an additional transmission line

into the regional vicinity. While views north of the Gatlin Site would remain unchanged, the viewshed from the southern extent of the undeveloped portion of the Gatlin Site would be subject to an incremental increase in the number of transmission structures on the horizon. In consideration of this incremental cumulative effect, DOE has revised its finding for the Solana CSP Project from "no historic properties affected" to "no adverse effect." DOE conveyed this information to the Arizona State Historic Preservation Officer in correspondence dated March 15, 2010 and April 14, 2010, and the SHPO concurred on April 22, 2010 (see Appendix F). The Solana CSP Project, however, would not result in cumulatively significant impacts to cultural resources.

4.4.9 Socioeconomics

4.4.9.1 Construction

It is unlikely that construction of the projects described in Section 4.3.2 would occur simultaneously, and therefore no cumulative impacts to socioeconomics are anticipated.

4.4.9.2 Operations

There is no available information about the potential operations workforces of the projects identified in Section 4.3.2; however, the cumulative number of additional workers required for those projects would be anticipated to be less than that required for the Solana CSP Project. As identified in Section 3.10, because the population of Gila Bend has decreased over the last decade, it is anticipated that the addition of 85 permanent jobs associated with Solana CSP Project operations would not represent a significant population increase that would require the creation of additional community facilities.

The Solana CSP Project would have limited demand for public services and would coordinate with local service providers to ensure maintenance of acceptable response times or community service ratios. Similarly, the projects described in Section 4.3.2 would need to coordinate with local service providers to ensure that the cumulative nature of those projects would not strain existing police, fire, or other emergency services.

As described in Section 3.10.2.1, the Solana CSP Project would result in a positive cumulative socioeconomic impact during construction and operations.

4.4.10 Transportation

4.4.10.1 Construction

Based on the number of trips anticipated for the peak construction period at the Solana site, traffic circulation at the three principal intersections would operate at acceptable LOS during a.m. and p.m. peak commuting hours. During the special use permit process, Abengoa Solar would coordinate with the Maricopa County Department of Transportation to achieve appropriate right-of-way widths along all perimeter roadways at the Solana site. The Maricopa County Department of Transportation anticipates that improvements would only be required at the Solana site access point (main entrance). It is not likely that construction of the projects described in Section 4.3 would occur simultaneously; however, similar to the Solana CSP

Project, other development projects in the area would be required to coordinate with the Maricopa County Department of Transportation to minimize potential construction-related impacts. Therefore, cumulative transportation impacts associated with Solana construction would not be likely.

4.4.10.2 Operations

Based on an annual growth rate in traffic volumes of 1 percent, the four intersections listed in Table 3-23 would be expected to operate at acceptable levels of service in 2013 when the proposed Solana CSP Project would become operational. Of the three projects described in Section 4.3.2, only the corn-flaking facility would have the potential to generate additional trips. The Gatlin Site is more than 12 miles east of the Solana site, and therefore would not contribute to traffic volumes at the identified intersections. Trip generation associated with the operation of the proposed GBPP 500 kilovolt line would be limited to periodic maintenance. Therefore, there would be no cumulative traffic impacts associated with Solana CSP Project operations.

Regional or local future roadway projects, such as the Interstate 8/Interstate 10 Hidden Valley Roadway and the expansion of Powerline, Watermelon, and Citrus Valley Roads to four-lane roadways, would occur in response to a decreased level of service or a substantial increase in traffic volume. The relatively few number of trips generated by Solana CSP Project operations, coupled with the fact that the additional trips would not coincide with peak commuting hours, would not be expected to have a cumulative impact on the area's transportation network.

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6 LIST OF AGENCIES AND NATIVE AMERICAN TRIBES CONTACTED

Sections 6.1 through 6.4 identify the agencies and Native American tribes contacted during preparation of this EA.

6.1 Federal Agencies

United States Air Force
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7383 N. Litchfield Road
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United States Army Corps of Engineers
Arizona Area Office
3636 N. Central Avenue, Suite 900
Phoenix, Arizona 85012

United States Bureau of Land Management
Phoenix District
21605 N. 7th Avenue
Phoenix, Arizona 85027

United States Department of Agriculture
Natural Resources Conservation Service
230 North 1st Avenue, Suite 509
Phoenix, Arizona 85003

United States Fish and Wildlife Service
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Phoenix, Arizona 85021

United States Fish and Wildlife Service
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Tucson, Arizona 85745

6.2 Native American Tribes

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42507 W. Peters & Nall Road
Maricopa, Arizona 85239

Fort McDowell Yavapai Nation
P.O. Box 17779
Fountain Hills, Arizona 85269

Gila River Indian Community
Cultural Resource Management Program
P.O. Box 2140
Sacaton, Arizona 85247

Salt River Pima-Maricopa Indian Community
10005 East Osborn Road
Scottsdale, Arizona 85256

San Carlos Apache Tribe
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Ajo, Arizona 85321

Tohono O'odham Nation, San Lucy District
P.O. Box GG
Gila Bend, Arizona 85337

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P.O. Box 837
Sells, Arizona 85634

White Mountain Apache Tribe
P.O. Box 700
Whiteriver, Arizona 85941

Yavapai-Apache Nation
2400 W. Datsi Street
Camp Verde, Arizona 86322

6.3 State Agencies

Arizona Department of Environmental Quality
Phoenix Main Office
1110 W. Washington Street
Phoenix, Arizona 85007

Arizona State Land Department
1616 W. Adams Street
Phoenix, Arizona 85007

Arizona Department of Transportation
Yuma District Office
2243 E. Gila Ridge Road
Yuma, Arizona 85365

State Historic Preservation Office
Arizona State Parks
1300 West Washington Street
Phoenix, Arizona 85007

Arizona Game and Fish Department
Region IV – Yuma Office
9140 E. 28th St.
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Maricopa Association of Governments
302 North 1st Avenue, Suite 300
Phoenix, Arizona 85003

Maricopa County Planning and Development Department
Main Office Building
501 N. 44th Street, Suite 200
Phoenix, Arizona 85008

Maricopa County Department of Transportation
The Durango Complex
2901 W. Durango
Phoenix, Arizona 85009

Town of Gila Bend
644 W. Pima Street
P.O. Box A
Gila Bend, Arizona 85337

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APPENDIX A

Public Support

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

9 October 2008

Mr. James R. Mitchell
Director, Community Initiatives Team
56th Fighter Wing
14185 West Falcon Street
Luke AFB AZ 85309-1629

Ms. Sobia Naqvi, Project Manager
Abengoa Solar Incorporated
4505 East Chandler, Suite 120
Phoenix AZ 85048

Re: Solana Generating Station and Gen Tie Project

Dear Ms. Naqvi

Thank you for the opportunity to comment on the Solana Generating Station and Gen Tie Project. I have reviewed the preferred and alternative routes that Abengoa Solar Incorporated has filed with the Arizona Corporation Commission for consideration of constructing the new Solana Generating Station and Gen Tie Project in the Gila Bend Area.

The proposed plant and preferred and alternative routes do not interfere with training and flight operations at the Gila Bend Auxiliary Air Field and therefore Luke AFB does not oppose construction of the facilities as shown, in your application. Luke AFB appreciates the efforts made by Abengoa Solar Incorporated to include us in your planning process. I look forward to continuing our working relationship with Abengoa Solar Incorporated.

For further information concerning Luke AFB facilities, we recommend a review of the Luke AFB web site at http://www.luke.af.mil, Community Interests and Community Initiatives links.

If there are any questions, please contact my Community Planner, Mr. Bob Dubsky, at (623) 856-6195.

Sincerely

JAMES R. MITCHELL

cc:
Colonel Henry M. Reed III, Vice Commander, 56th Fighter Wing

EXHIBIT
A-9

L-00000GG-08-0407-00139
L-00000GG-08-0408-00140

TOWN OF GILA BEND ARIZONA

The Heart of Arizona

GILA BEND AZ
AUG 26 2008
RECEIVED

ORIGINAL

July 30. 2008

Arizona Corporation Commission
DOCKETED
AUG 28 2008
DOCKETED BY

Chairman John Foreman
Arizona Power Plant and Transmission
Line Siting Committee
1200 West Washington
Phoenix, AZ 85007-2996

RE: Solana Generating Station Project near the Town of Gila Bend, Arizona

Dear Chairman Foreman,

The Town of Gila Bend participated in the March 27, 2008 and June 5, 2008 Stakeholder Meetings, the April 10, 2008 and June 19, 2008 Open Houses, and various other individual meetings with Abengoa Solar Inc. regarding the Solana Generating Station Project. The Town of Gila Bend wishes to express support for the Solana Generating Station Project and will continue to coordinate with Abengoa Solar Inc. on matters pertaining to the project.

Sincerely,

Fred Hull

Fred Hull, Mayor

AZ CORP COMMISSION
DOCKET CONTROL
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EXHIBIT
A-6

P.O. Box A, 644 W. Pima Street Gila Bend, AZ 85337-0019 (928) 683-2255
FAX (928) 683-6430 TDD 800-367-8939

ORIGINAL

SONORAN INSTITUTE
WWW.SONORAN.ORG

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2008 AUG 18 A 11:53

AZ CORP COMMISSION
DOCKET CONTROL

HELENA, MONTANA
GRAND JUNCTION, COLORADO
CHEYENNE, WYOMING
DENVER, COLORADO

August 14, 2008

Arizona Corporation Commission
DOCKETED
AUG 18 2008
DOCKETED BY

TO: Honorable Commissioner Mike Gleason, Chairman
Honorable Commissioner Jeff Hatch - Miller
Honorable Commissioner Kristen Mayes
Honorable Commissioner Bill Mundell
Honorable Commissioner Gary Pierce
Honorable Judge John Foreman
Brian McNeill, Executive Director

SUBJECT: **SOLANA SOLAR GENERATING STATION AND TRANSMISSION– SUPPORT**
Generating Station: Case # 139, Docket: L-00000GG-08-0407-00139
Transmission Line: Case # 140, Docket: L-00000GG-08-0408-00140

For nearly two decades the Sonoran Institute's work has focused on issues related to conservation, smart growth and sustainability in the western United States. Here in Arizona, these issues, set against the backdrop of high population growth and infrastructure needs, are increasingly complex and interconnected.

A confluence of economic, environmental and political forces is reshaping our energy policy like never before. Recognizing the need to take a bold step forward, in 2006 the Corporation Commission passed Renewable Energy Standard rules designed to reduce our reliance on fossil fuels and capitalize on Arizona's natural renewable energy assets – particularly solar.

Today, Arizona is witnessing a wave of new investment in solar technology and infrastructure. Recently, the U.S. Bureau of Land Management responded to a dramatic influx of solar permit applications seeking to locate solar facilities on public lands, by announcing they are embarking on a two year process to develop assessment criteria and create a consistent and sensible new policy framework to evaluate these applications. These criteria will be heavily influenced by environmental considerations, particularly impacts to the land and habitat.

The Solana Solar Generating Station will be the first of its kind in Arizona and, as such, will likely set a standard for those that follow. In short, we believe Solana has set a high standard. Specifically, the following points form the basis for our support:

1. Private Lands - The proposed Solana plant would be built on private lands. While we are not opposed to the location of large generation facilities on public lands once sound criteria have been established, we believe private lands should be the first alternative.
2. Disturbed Lands - The lands chosen for the plant are previously disturbed agricultural lands. Although the process of producing solar energy creates far less environmental disruption than carbon based technologies, the impact to the underlying lands is still severe and long-term. As undisturbed desert land becomes an increasingly scarce and valued commodity, the fact that Solana will not involve the scraping of our precious natural environment is important.

3. Transmission - While the Solana plant will require some new transmission lines, they will not be in new corridors on sensitive desert lands with adverse impacts to the landscape.
4. Outreach Process - Abengoa's public outreach and stakeholder contact process has been effective and inclusive. We believe it provides a good model for public engagement and the dissemination of information for future applicants as well.

Arizona is poised to reap great economic and environmental benefits from the development of renewable energy resources. The Sonoran Institute stands with the growing body of organizations, citizens and consumers who not only support the development of renewables, but support doing so in a prudent and environmentally sensitive manner. We believe Solana meets that test.

Respectfully,

Luther Propst

Luther Propst
Executive Director
Sonoran Institute

Timothy M. Hogan (004567)
ARIZONA CENTER FOR LAW
IN THE PUBLIC INTEREST
202 E. McDowell Rd., Suite 153
Phoenix, Arizona 85004
(602) 258-8850
Attorneys for Sierra Club – Grand Canyon Chapter

BEFORE THE ARIZONA POWER PLANT AND TRANSMISSION LINE SITING COMMITTEE

IN THE MATTER OF THE APPLICATION OF ARIZONA SOLAR ONE, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES §§ 40-360, *et seq.*, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE CONSTRUCTION OF THE SOLANA GENERATING STATION, LOCATED IN SECTION 9, TOWNSHIP 6 SOUTH, RANGE 7 WEST, MARICOPA COUNTY, ARIZONA.	Docket No. L-00000GG-08-0407-00139 Case No. 139
IN THE MATTER OF THE APPLICATION OF ARIZONA SOLAR ONE, LLC, IN CONFORMANCE WITH THE REQUIREMENTS OF ARIZONA REVISED STATUTES §§ 40-360, *et seq.*, FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AUTHORIZING THE CONSTRUCTION OF THE SOLANA GENTIE, WHICH ORIGINATES AT THE SOLANA GENERATING STATION, LOCATED IN SECTION 9, TOWNSHIP 6 SOUTH, RANGE 7 WEST, MARICOPA COUNTY, AND TERMINATES AT THE PANDA 230 Kv SUBSTATION, LOCATED IN SECTION 20, TOWNSHIP 5 SOUTH, RANGE 4 WEST, GILA BEND, ARIZONA.	Docket No. L-00000GG-08-0408-000140 Case No. 140

NOTICE OF FILING WITNESS SUMMARY

Pursuant to Chairman Foreman's August 6, 2008 Procedural Order, Sierra Club - Grand Canyon Chapter, files the attached witness summary of Sandy Bahr.

DATED this 17th day of September, 2008.

ARIZONA CENTER FOR LAW IN
THE PUBLIC INTEREST

By _____
Timothy M. Hogan
202 E. McDowell Rd., Suite 153
Phoenix, Arizona 85004
Attorneys for Sierra Club – Grand Canyon Chapter

ORIGINAL and 25 COPIES of the foregoing filed this 17th day of September, 2008, with:

Docketing Supervisor
Docket Control
Arizona Corporation Commission
1200 W. Washington
Phoenix, AZ 85007

COPIES of the foregoing electronically transmitted this 17th day of September, 2008 to all parties of record

_____

Arizona Solar One, LLC Construction Project
Docket No. L-00000GG-08-0407-00139

Arizona Solar One, LLC Transmission Project
Docket No. L-00000GG-08-0408-00140

Witness Summary
Of
Sandy Bahr

Sandy Bahr is the Conservation Outreach Director for the Sierra Club – Grand Canyon Chapter. Ms. Bahr's testimony will express the Sierra Club's support for the proposed Solana facility, a proposed 280 megawatt concentrating solar power facility near Gila Bend, Arizona.

Ms. Bahr will outline the basic reasons for the Sierra Club's support including why the proposed location for this facility is appropriate from an environmental perspective and the need for concentrating solar power facilities to be a strong component of a clean energy plan for Arizona. The proposed facility site is not an environmentally sensitive area, it is on private land that has been used for agricultural purposes and will actually use less water than the current use. It is also located to take advantage of an existing transmission line corridor.

Arizona is a high growth state. In order to meet our energy needs for the future and limit the negative impacts on the environment, we will need to invest in energy efficiency and renewables as outlined in the Western Resource Advocates' *A Clean Energy Strategy for Arizona*. A component of the renewable resources generated in Arizona should be concentrating solar power. Environmental benefits are realized from concentrating solar plants because they generate power without producing greenhouse gas emissions and other air pollutants.

THE WITNESS: I apologize for that confusion.

CHMN. FOREMAN: Any follow-up questions?

MS. MITCHELL: No, thank you, Mr. Chairman.

CHMN. FOREMAN: All right. Mr. Hogan, you may proceed.

MEMBER WONG: Mr. Chairman, may I interject before you start, Mr. Hogan? Mr. Chairman, just for the record, as we were stepping out, I just wanted to make a clarification if anybody was wondering. Mr. Williamson had stopped me on the way out, just -- we just had made a clarification about my last comment to Mr. Dinkel about the distributed issue, and he just -- Mr. Williamson at the Corporation Commission clarified that the distributed was to help offset costs of the actual customer as opposed to the -- what Mr. Dinkel was saying about the overall system, and I made it clear that I was not an opponent of distributed, and I just wanted to set that straight for the record if anyone wondered what that discussion was about. Thank you.

CHMN. FOREMAN: Very good.

MR. HOGAN: Thank you. Sierra Club calls Sandy Bahr to testify.

CHMN. FOREMAN: Would you like to have an oath or affirmation?

THE WITNESS: Affirmation, please.

(Sandy Bahr was duly affirmed.)

CHMN. FOREMAN: Tell us your name and spell your last name for court reporter, please.

THE WITNESS: Sandy Bahr, spelled B-a-h-r.

CHMN. FOREMAN: Counsel, you may proceed.

MR. HOGAN: Thank you, Mr. Chairman. Before I do, I would like to say that we appreciate the courtesy extended by the Applicant and the other parties and the Committee taking Ms. Bahr out of order here so we can accommodate our schedules. We appreciate it.

SANDY BAHR,

a witness herein, having been first duly affirmed by the Chairman to speak the truth and nothing but the truth, was examined and testified as follows:

DIRECT EXAMINATION

Q. BY MR. HOGAN: Ms. Bahr, can you tell us what your current position is?

A. I work for the Sierra Club-Grand Canyon Chapter. I'm the chapter director, conservation outreach director. Grand Canyon Chapter is all of Arizona.

Q. And do you have in front of you what has been marked for identification as S-1? It may not show up on

yours, but believe me it is S-1.

A. Is that the resumé?

Q. Yes.

A. I do.

Q. Can you identify that?

A. Yes. That is my resumé.

Q. And so that shows your current position and your qualifications?

A. Correct.

CHMN. FOREMAN: Counsel advised me that he was going to present this. This has not previously been submitted to the other parties for your review. Is there any objection to the use of this document in this proceeding?

MR. CAMPBELL: No, Mr. Chairman.

MR. HAINS: No objection.

MR. ZIMMERMAN: No objection.

CHMN. FOREMAN: Then I will allow it.

Counsel, you may proceed.

MR. HOGAN: Thank you.

Q. BY MR. HOGAN: How long have you been in your current position, and what are your responsibilities in that position?

A. I've worked in this position for over 10 years. My responsibilities include outreach and advocacy with

various governmental entities, public lands agencies and state and federal agencies dealing with wildlife, parks, transportation, energy, as well as outreach and advocacy with the Arizona legislature, the governor's office, and congressional offices.

My work includes reviewing, researching, and commenting on National Environmental Policy Act documents and other government documents, research and developing report fact sheets, articles, other documents on key priority issues. I do organizing and outreach, including presentations on our key priorities, training and mentoring volunteer leaders, organizing service projects and other outdoor educational opportunities, working on ballot measures when appropriate, and I also do some fund-raising.

Q. And you've testified in front of the Power Plant and Transmission Line Siting Committee previously; correct?

A. Yes, that is correct.

Q. Now, what is the Sierra Club's particular interest in this project that is the subject of the application?

A. Well, first of all, I wanted to state what the Sierra Club mission is, and I think that helps to give background on why we are interested. The Sierra Club

mission is to explore and join and protect the wild places of the earth, to practice and promote the responsible use of the ecosystems and resources, and to educate and enlist humanity to protect and restore the quality of the natural and human environments.

The Grand Canyon chapter or Arizona chapter is one of more than 60 Sierra Club chapters throughout the country. We have about 14,000 members here in Arizona, and our particular chapter was formed in 1966. We have a significant interest in the project, because one of our key conservation priorities is promoting smart energy solutions to global warming. We strongly support investing in renewable energy resources, such as solar, and believe that it is a key component of a balanced energy plan that will help us to reduce greenhouse gas emissions against to address global warming.

Q. And what is the Sierra Club's position on whether or not the Committee should approve the certificate that has been applied for in this particular case?

A. We are supporting the granting of the Certificate of Environmental Comparability for the Solana project.

Q. You want to amplify that for us and explain why?

A. Sure. The Sierra Club is supporting the project because we think that generation of electricity from renewable energy sources is essential to helping to reduce

greenhouse gas emissions that contribute to global climate change, and the Sierra Club believes that global climate change is one of the greatest environmental threats we face.

Arizona's greenhouse gas emissions are expected to increase 148 percent between 1990 and 2020. That -- you will find that number in the climate change action plan which was produced by the governor's climate change advisory group, and that is dated August 2006. The best scientists tell us we must reduce global warming pollutants 80 percent by 2050 in order to avoid the worst impact of global climate change.

In Arizona, the electricity sector accounts for about 38 percent of our greenhouse gas emissions. So it is imperative that we seek ways to stop both the growth in those emissions and actually reduce emissions. We cannot do that effectively without significant use of renewable energy resources including solar energy.

Arizona, as you've heard from many, is an adeal place for solar generated electricity due to the abundant amount of sunshine we have in our state. And while we strongly support distributed solar electric generation, we think concentrating solar power also must be a key component of a clean energy future for Arizona.

It has no greenhouse gas emissions and, of

course, that is a key factor for our support. We support it because it will avoid 475,000 tons of carbon dioxide emissions per year, and that number is from the application. That is a significant environmental benefit.

We also support it because it doesn't emit a lot of other pollutants either, including sulfur dioxide, hazardous air pollutants such as mercury. Obviously, that is both an environmental and public health benefit.

While the facility does use water, it will reduce the water consumption from the current use from between 75 and 85 percent, depending on how you calculate it. And of course, that is an important issue in our arid state as well.

As has been stated by previous speakers, the facility will also help to meet the requirements of the renewable energy standard, which the Sierra Club is very supportive of. And I just wanted to note that in the Western Resource Advocates report, clean electric energy strategy for Arizona where they looked at various energy generation sources, they noted that, quote, CSP with storage makes a moderate contribution for serving load growth through 2025. If this technology performs well, it could play a much more important role.

And finally, we support it because solar energy is renewable and thus a more sustainable method of

generating electricity for Arizona.

Q. And have you been to the site for the proposed project?

A. Yes, I have.

Q. And is Sierra Club supportive of locating the project at that site?

A. Yes, we are. There are several reasons we are supportive of the location of this facility. First of all, it is located on private land rather than on public lands. It is on land that is disturbed. It is currently in agricultural production from a crop that uses a lots of water, alfalfa.

The preferred route for the transmission line follows an existing transmission area. A lot of it along the aptly named Powerline Road, as has been noted. So there isn't a need to cut across sensitive lands with a new transmission line. The location is not in an environmentally sensitive location. It is not next to a wilderness area. It is not in or near a roadless area. It is not near a wildlife refuge or national monument or other sensitive area, and those are all key issues for us.

Q. Is there anything else you would like to add to your testimony?

A. I just wanted to say that we really appreciate the opportunity to participate in this process. We are

very supportive of the project, and urge approval of the Certificate of Environmental Compatibility. We believe that this facility is an important project for Arizona's energy future.

Thank you.

MR. HOGAN: Thank you.

Ms. Bahr is available for questioning.

CHMN. FOREMAN: Cross-examination from the Commission Staff.

MR. HAINS: Thank you. I have no questions.

CHMN. FOREMAN: From Paloma Irrigation.

MR. ZIMMERMAN: Thank you. We have no questions either.

CHMN. FOREMAN: From the Applicant.

MR. CAMPBELL: No questions, Mr. Chairman.

CHMN. FOREMAN: Members of the Committee with questions? Member Houtz.

MEMBER HOUTZ: Ms. Bahr, this is somewhat tongue in cheek, but this is monumental to me that the Sierra Club is in agreement with APS. The only other time I can think of that is the decommission of Fossil Creek. Can you think of any other circumstances like that?

THE WITNESS: I suspect you are pretty close. That is the other one that comes to mind to me, as well.

MEMBER HOUTZ: I appreciate your testimony.

THE WITNESS: Thank you.

CHMN. FOREMAN: Member Wong.

MEMBER WONG: Yes. Thank you, Mr. Chairman.

EXAMINATION

Q. BY MEMBER WONG: Ms. Bahr, from a subject of water, is there any -- should there be any concern with the use of 3,000 acre feet of water per year which is as testified by the APS witnesses, is more -- there is a greater usage than some of the alternative fossil fuel-type generation plants, like coal and natural gas? Would you talk about that, please?

A. Commissioner Wong, we believe the environmental benefits from this facility far outweigh any negatives. And as stated very clearly, there will be a net decrease in the use of water, so that itself is a significant benefit.

But the fossil fuel generated electricity has carbon emissions, and as I stated, our number one priority is trying to reduce greenhouse gas emissions in order to begin to address global warming and from that perspective, this facility is far above any of the other types of generation.

Q. Would there be any instance where, if a similar

project was located in the desert in Arizona that did not take away or eliminate a farm usage, would that in of itself cause a concern with the Sierra Club, your organization?

A. Commissioner Wong, we -- we look at each proposal and look at the pluses and the minuses. It would really depend on where it was sited, what kind of facility, you know, all of those things. And so, you know, without having all of the factors, I couldn't really answer it. Obviously, water is always something we would look at. It is always an issue in Arizona.

Q. Is the use of treated effluent a preference for Sierra Club versus fresh groundwater usage?

A. Obviously, if effluent is -- if we can use it in more industrial processes, you know, obviously that is a better use for it. But it has to be available for it to be used.

MEMBER WONG: Thank you.

CHMN. FOREMAN: Member Noland.

MEMBER NOLAND: Thank you.

EXAMINATION

Q. BY MEMBER NOLAND: Ms. Bahr, you mentioned the Powerline Road alignment. However, you didn't mention

whether you support or do not support the alternative alignments. Can you let us know what your feeling is about the alternative alignment on Watermelon Road?

A. Commissioner Noland, we took a position supporting the preferred alternative. We did not take a position on the alternatives. And I can tell you from having been out there, the preferred alternative causes the least disturbance from our perspective, that most of it is down a road that is very much a graded Powerline Road. There are power lines going along it currently, and most of it goes through agricultural fields.

MEMBER NOLAND: Thank you.

CHMN. FOREMAN: Are there any other questions?

(No response.)

CHMN. FOREMAN: Very good. Thank you for coming and testifying.

THE WITNESS: Thank you very much.

MR. HOGAN: We don't have anything else, Mr. Chairman.

CHMN. FOREMAN: Thank you.

Counsel, we will return to the Applicant's case.

MR. CAMPBELL: Yes, Mr. Chairman. And Mr. Acken is going to be presenting the next panel.

CHMN. FOREMAN: All right. Counsel, call your next witnesses.

APPENDIX B

Email Correspondence for BLM Form 2920-1

and

BLM Cost Recovery Agreement and Fee Decision

-----Original Message-----
From: JoAnn_Goodlow@blm.gov [mailto:JoAnn_Goodlow@blm.gov]
Sent: Monday, February 22, 2010 4:31 PM
To: Jessica Wilton
Subject: Re: Abengoa Solar - Form 2920-1

Jessica

Yes, I will be getting the Cost Recovery document out to Abengoa Solar tomorrow. It will have instructions on what will be required of Abengoa Solar to proceed to the next steps. Once the letter is received, please feel free to contact me with any questions or concerns.

Also, as discussed, the 2920 Permit should be able to be completed with the CX with no additional problems. The CX rationale to be used will be the "Issuance of short-term (3 years or less) rights-of-way or land use authorizations for such uses as storage sites, apiary sites, and construction sites where the proposal includes rehabilitation to restore the land to its natural or original condition".

Hope this helps. If you need additional information, please do not hesitate to contact me. Thanks.

Jo Ann Goodlow, Realty Specialist
Lower Sonoran Field Office
21605 North 7th Avenue, Phoenix, AZ 85027
Phone: 623-580-5548 / Fax: 623-580-5580

From "Jessica Wilton" <JWilton@tierra-ec.com>
Sent: 02/22/10 03:00 PM
To: <joann.goodlow@blm.gov>
Subject: Abengoa Solar - Form 2920-1

JoAnn,

As discussed in our phone conversation, I understand you will try to send information that will assist in processing form 2920-1 to Abengoa Solar tomorrow or Wednesday. I appreciate your attention to this matter as Abengoa Solar needs to have the land use permit approved by April to support their project schedule.

Also as discussed in prior phone conversations with you, as well as in a meeting with Jim Andersen and Kathleen Depukat, it is my understanding that this request for land use permit falls within a standard BLM Categorical Exclusion. As such, I am sending this message to ask for your concurrence that this land use permit falls within a BLM Categorical Exclusion.

Thanks again for your time,

Jessica Wilton
Tierra Environmental Consultants
480-491-2230 Office
480-266-4267 Mobile
480-491-0260 Fax

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Phoenix District
Lower Sonoran Field Office
21605 North 7th Avenue
Phoenix, Arizona 85027
www.blm.gov/az/

MAR 2 2010

In Reply Refer To:
2920 (P020)
AZA-35161

CERTIFIED MAIL - RETURN RECEIPT REQUESTED NO. 7009 1410 0001 9977 4867

DECISION

Ms. Kate Maracas	:	Land Use Permit and Application
Abengoa Solar Inc.	:	SERIAL NO. AZA-35161
4505 East Chandler Boulevard, Suite 120	:	
Phoenix, Arizona 85048	:	

Processing Category Determined
For Application AZA-35161

We are in receipt of your Land Use Application and Permit (Form 2920-1), filed on July 30, 2009, for a permit to correct a man-made berm that has been constructed in trespass on public land. The following public lands are affected by your application:

T. 6 S., R. 7 W., Section 5, E½E½W½

In your future correspondence with this office, we ask that you refer to the Bureau of Land Management (BLM) serial number AZA-35161, which has been assigned to this application.

Based on Federal regulations contained in 43 CFR 2920.6 (b), the reimbursement of costs for authorizations issued under part 2920 will be in accordance with section 2804.14, which provides for the reimbursement of processing fees. The BLM is required to be reimbursed for the costs incurred in processing Land Use Applications and Permits. We have determined that the appropriate processing category for your application is Category 2. The nonrefundable processing fee for a Category 2 is $392 (see the enclosed Determination Decision). If we do not receive this amount within 30 days, we may reject your application.

We will begin processing your land use application and permit once we have received your processing fee. If we decide to issue the permit, you will be assessed monitoring fees based on the estimated number of hours required to monitor your activities allowed under the permit. You will also be charged rent for the use of public land that will be determined by an appraisal, and in no case will the rental be less than fair market value.

Please be aware that you may not legally carry out any proposed activities on public lands managed by the BLM until you have received an authorized permit from our office.

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR, Part 4, and the enclosed Form 1842-1, Information on Taking Appeals to the Interior Board of Land Appeals. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you have any questions regarding your right-of-way application or the fees connected with it, please contact Jo Ann Goodlow at 623-580-5548.

Emily Garber
Field Manager

Enclosures

Calendar Year 2010
Cost Recovery Processing Fee Category Determination Decision
For FLPMA and MLA Actions

Application Serial Number: AZA-35161
Applicant: Abengoa Solar Inc.
Address: 4505 East Chandler Boulevard, Suite 120
Phoenix Arizona 85048-7687

Agent: Kate Maracas
Phone: 480-705-0028

Application For: Land Use Authorization
Location: T. 6 S., R. 7 W., Sec. 5, E½E½W½

Pre-Application Meeting Held: ✓ No ___ Yes _____(date)

Land Use Plan Conformance? ___ No ✓ Yes

Estimated Processing Requirements:
Type of ROW/PERMIT: FLPMA

NEPA Action Required: _____ EIS _____ EA _____ Opt EA _____ DNA √ CE/CX

Personnel Needed for Processing	**Estimated Processing Hours**
Realty Specialist	3.0
Cultural/Paleontological Resources	2.0
Transportation/Engineering	0
Wildlife/T&E /Fisheries	2.0
Air/Water/Soils	0
Recreation/Visual	2.0
Range/Hydro	0
Fluids/Minerals	0
Administration/Accounting	1.0
Manager	1.0
Legal Instruments Examiner/Land Law Examiner	1.0
Other _____	0
TOTAL HOURS	12.0

The appropriate Processing Category for this application is Category II. The Processing fee for this Category is $392.00. Processing fees for Categories 1-4 are non-refundable. See enclosed table for Category definitions and fee schedule.

Prepared By: _____ 3/1/2010
Date

Approved By: _____ 3/2/2010
Authorized Officer Date

2010 Processing Fee Schedule for FLPMA and MLA Rights-of-Way/Permits

Processing Category	Federal Work Hours Involved	Processing fee as of January 1, 2010. To be adjusted annually for changes in the IPD-GDP.
1. Applications for new grants, assignments, renewals, and amendments to existing grants.	Estimated Federal work hours are $>1 \leq 8$.	$111
2. Applications for new grants, assignments, renewals, and amendments to existing grants.	Estimated Federal work hours are $> 8 \leq 24$.	$392
3. Applications for new grants, assignments, renewals, and amendments to existing grants.	Estimated Federal work hours are $> 24 \leq 36$.	$738
4. Applications for new grants, assignments, renewals, and amendments to existing grants.	Estimated Federal work hours are $> 36 \leq 50$.	$1,057
5. Master Agreements.	Varies.	As specified in the Agreement.
6. Applications for new grants, assignments, renewals, and amendments to existing grants.	Estimated Federal work hours are >50.	Full reasonable costs (FLPMA) Full actual costs (MLA

Form 1842-1
(September 2006)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INFORMATION ON TAKING APPEALS TO THE INTERIOR BOARD OF LAND APPEALS

DO NOT APPEAL UNLESS
1. This decision is adverse to you,
AND
2. You believe it is incorrect

IF YOU APPEAL, THE FOLLOWING PROCEDURES MUST BE FOLLOWED

1. NOTICE OF APPEAL.....

A person who wishes to appeal to the Interior Board of Land Appeals must file in the office of the officer who made the decision (not the Interior Board of Land Appeals) a notice that he wishes to appeal. A person served with the decision being appealed must transmit the *Notice of Appeal* in time for it to be filed in the office where it is required to be filed within 30 days after the date of service. If a decision is published in the FEDERAL REGISTER, a person not served with the decision must transmit a *Notice of Appeal* in time for it to be filed within 30 days after the date of publication (43 CFR 4.411 and 4.413).

2. WHERE TO FILE

NOTICE OF APPEAL.....
Bureau of Land Management
Phoenix District
21605 North 7th Avenue
Phoenix, Arizona 85027

WITH COPY TO SOLICITOR...
Office of the Field Solicitor, USDOI; Attn: John Gaudio
Sandra Day O'Connor U.S. Courthouse, Suite 404
401 West Washington Street, SPC 404
Phoenix, Arizona 85003-2151

3. STATEMENT OF REASONS

Within 30 days after filing the *Notice of Appeal*, file a complete statement of the reasons why you are appealing. This must be filed with the United States Department of the Interior, Office of Hearings and Appeals, Interior Board of Land Appeals, 801 N. Quincy Street, MS 300-QC, Arlington, Virginia 22203. If you fully stated your reasons for appealing when filing the *Notice of Appeal*, no additional statement is necessary (43 CFR 4.412 and 4.413).

WITH COPY TO SOLICITOR.....
Office of the Field Solicitor, USDOI
Attn: John Gaudio
Sandra Day O'Connor U.S. Courthouse, Suite 404
401 West Washington Street, SPC 404
Phoenix, Arizona 85003-2151

4. ADVERSE PARTIES.....

Within 15 days after each document is filed, each adverse party named in the decision and the Regional Solicitor or Field Solicitor having jurisdiction over the State in which the appeal arose must be served with a copy of: (a) the *Notice of Appeal*, (b) the Statement of Reasons, and (c) any other documents filed (43 CFR 4.413).

5. PROOF OF SERVICE.....

Within 15 days after any document is served on an adverse party, file proof of that service with the United States Department of the Interior, Office of Hearings and Appeals, Interior Board of Land Appeals, 801 N. Quincy Street, MS 300-QC, Arlington, Virginia 22203. This may consist of a certified or registered mail "Return Receipt Card" signed by the adverse party (43 CFR 4.401(c)).

6. REQUEST FOR STAY.....

Except where program-specific regulations place this decision in full force and effect or provide for an automatic stay, the decision becomes effective upon the expiration of the time allowed for filing an appeal unless a petition for a stay is timely filed together with a *Notice of Appeal* (43 CFR 4.21). If you wish to file a petition for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Interior Board of Land Appeals, the petition for a stay must accompany your *Notice of Appeal* (43 CFR 4.21 or 43 CFR 2801.10 or 43 CFR 2881.10). A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the *Notice of Appeal* and Petition for a Stay **must** also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay. Except as otherwise provided by law or other pertinent regulations, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards: (1) the relative harm to the parties if the stay is granted or denied, (2) the likelihood of the appellant's success on the merits, (3) the likelihood of immediate and irreparable harm if the stay is not granted, and (4) whether the public interest favors granting the stay.

Unless these procedures are followed, your appeal will be subject to dismissal (43 CFR 4.402). Be certain that **all** communications are identified by serial number of the case being appealed.

NOTE: A document is not filed until it is actually received in the proper office (43 CFR 4.401(a)). See 43 CFR Part 4, Subpart B for general rules relating to procedures and practice involving appeals.

(Continued on page 2)

43 CFR SUBPART 1821--GENERAL INFORMATION

Sec. 1821.10 Where are BLM offices located? (a) In addition to the Headquarters Office in Washington, D.C. and seven national level support and service centers, BLM operates 12 State Offices each having several subsidiary offices called Field Offices. The addresses of the State Offices can be found in the most recent edition of 43 CFR 1821.10. The State Office geographical areas of jurisdiction are as follows:

STATE OFFICES AND AREAS OF JURISDICTION:

Alaska State Office ---------- Alaska
Arizona State Office --------- Arizona
California State Office ------- California
Colorado State Office -------- Colorado
Eastern States Office --------- Arkansas, Iowa, Louisiana, Minnesota, Missouri
and, all States east of the Mississippi River
Idaho State Office ---------- Idaho
Montana State Office --------- Montana, North Dakota and South Dakota
Nevada State Office ---------- Nevada
New Mexico State Office ---- New Mexico, Kansas, Oklahoma and Texas
Oregon State Office ---------- Oregon and Washington
Utah State Office ---------- Utah
Wyoming State Office -------- Wyoming and Nebraska

(b) A list of the names, addresses, and geographical areas of jurisdiction of all Field Offices of the Bureau of Land Management can be obtained at the above addresses or any office of the Bureau of Land Management, including the Washington Office, Bureau of Land Management, 1849 C Street, NW, Washington, DC 20240.

APPENDIX C

Farmland Conversion Impact Rating Form, Supporting Documentation, and Correspondence

TIERRA
Environmental Consultants, LLC

3231 S. Country Club Way, Suite 102 • Tempe, Arizona 85282
Phone (480) 491-2230 • Fax (480) 491-0260

July 24, 2009

Mr. Steve Smarik
Farm Bill Program Manager
Natural Resources Conservation Service
230 North 1st Avenue, Suite 509
Phoenix, Arizona 85003

RE: Solana Generating Station

Dear Mr. Smarik,

Abengoa Solar Inc. (Abengoa) proposes to construct and operate the Solana Generating Station Project near the Town of Gila Bend, Arizona. The Solana Generating Station (Solana) is a 280-megawatt (MW) gross output (250MW nominal output) concentrating solar power (CSP) generating facility. The Solana site is located on sections 3, 4, 5, 8, 9 and 10, of Township 6 South, Range 7 West. Comprised of approximately 3,000 acres, the Solana site is owned by Abengoa and is generally located north of Interstate 8 (I-8), west of Painted Rock Dam Road, south of Powerline Road, and east of Bureau of Land Management (BLM) land within unincorporated Maricopa County. Solana would be comprised of a solar field, power block, thermal energy storage system, and ancillary facilities located within the project site.

Abengoa has applied to U.S. Department of Energy (DOE) for a loan guarantee. As part of the loan guarantee process, DOE is preparing an Environmental Assessment (EA) to comply with the National Environmental Policy Act (NEPA) (42 USC 4321, et. seq.), the Council on Environmental Quality's regulations for implementing NEPA (40 CFR Parts 1500-1508) and DOE's NEPA regulations (10 CFR Part 1021). The EA will assist DOE in making an informed decision of whether or not to provide a loan guarantee to Abengoa for the Solana project.

On behalf of the DOE, a Farmland Conversion Impact Rating form Parts I and III has been completed for your review, along with a map depicting the Solana Generating Station site. Please review the enclosed information and return the appropriate documents. If you have any questions regarding this project, I may be reached at 480-491-2230 or via email at jramsey@tierra-ec.com. Thank you for your time.

Sincerely,

Jason Ramsey
Sr. GIS Analyst
Tierra Environmental Consultants, LLC

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
U.S. Courthouse – Federal Building
230 N. First Avenue, Suite 509
Phoenix, Arizona 85003-1733
(602) 280-8801

SEP 14 2009

Jason Ramsey, Sr. GIS Analyst
Tierra Environmental Consultants, LLC
3231 South Country Club Way, Suite 102
Tempe, AZ 85282

Dear Mr. Ramsey:

This response is in regard to your request for Prime/Unique Farmland request in a letter dated July 24, 2009. Your request was in regard to the proposed Solana Generating Station in Maricopa County. NRCS was requested to evaluate 3000 acres for prime farmland.

The Natural Resources Conservation Service (NRCS) has general responsibility, nationwide, for implementing the Farmland Protection Policy Act (FPPA) and to review projects that may affect prime, unique, or statewide important farmland and/or wetlands associated with agriculture. You submitted the required form NRCS-CPA-106 with Parts I and III completed. NRCS has completed Parts II, IV, and V. After reviewing the information provided, the following has been determined:

1- Larry Killman of Tierra Environmental Consultants verbally informed Steve Smarik of NRCS that the irrigation water for the land under consideration has already been permanently discontinued. Under this scenario, it is our interpretation that the conversion of farmland commenced before federal dollars were infused into the project. Therefore, the land would no longer be considered "farmland" under the FPPA and not subject to any additional analysis for prime farmland conversion. However, if irrigation will be resumed, this land will be considered Prime and Unique and therefore subject to the FPPA. For this reason, we have completed the AD-1006 Farmland Conversion Impact Rating worksheet. If you determine that the land and project is subject to the FPPA, please complete Part VI and return a final copy to our office.
2- Mr. Killman also informed Steve Smarik that alternative land parcels were already considered for project feasibility before the purchase of this land was completed. There are no further alternatives to evaluate as the land purchase has already been made.
3- The weighted relative value of the farmland is 73. After you complete Part VI, if the Total Site Assessment Value is less than 160 points, then the project is considered "land already committed to urban development." Under this scenario, the land is no longer subject to the FPPA and no further analysis is necessary.
4- We are enclosing a customized soil report that describes the soils in your project area, including prime and unique status.

5- We do not see any immediate concerns or impacts that would directly affect wetland areas associated with agriculture.

Should you have questions, please feel free contact Stephen Smarik, Environmental Specialist at 602-280-8785. Thank you again for the opportunity to review the proposed project.

Sincerely,

Thomas Hedt
Assistant State Conservationist

Enclosures

cc:
Corey Nelson, District Conservationist, NRCS, Avondale, Arizona
Stephen Smarik, Environmental Specialist, NRCS, Phoenix, Arizona

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 7/24/09
Name Of Project Solana Generating Station	Federal Agency Involved Department of Energy
Proposed Land Use Solar Generating Facility	County And State Maricopa County, Arizona
PART II *(To be completed by NRCS)*	Date Request Received By NRCS July 28, 2009 S. Smith

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* Yes ☑ No ☐ | Acres Irrigated ~3000 | Average Farm Size 302 ac

Major Crop(s)	Farmable Land In Govt. Jurisdiction	Amount Of Farmland As Defined in FPPA
Alfalfa, Cotton, Grains	Acres: 267,295 % 3.2	Acres: 190,182 % 22
Name Of Land Evaluation System Used: NA	Name Of Local Site Assessment System: NA	Date Land Evaluation Returned By NRCS: Sept. 11, 2009

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	3,000.0			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	3,000.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	3000			
B. Total Acres Statewide And Local Important Farmland	—			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	1.6 %			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	60			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	73	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use					
2. Perimeter In Nonurban Use					
3. Percent Of Site Being Farmed					
4. Protection Provided By State And Local Government					
5. Distance From Urban Builtup Area					
6. Distance To Urban Support Services					
7. Size Of Present Farm Unit Compared To Average					
8. Creation Of Nonfarmable Farmland					
9. Availability Of Farm Support Services					
10. On-Farm Investments					
11. Effects Of Conversion On Farm Support Services					
12. Compatibility With Existing Agricultural Use					
TOTAL SITE ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency).*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

Site Selected: | Date Of Selection | Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

Department of Energy
Washington, DC 20585

DEC 11 2009

Thomas Hedt
Assistant State Conservationist
Natural Resources Conservation Service
U.S. Courthouse - Federal Building
230 N. First Avenue, Suite 509
Phoenix, Arizona 85003-1733

Subject: NRCS Farmland Conversion Impact Rating for Abengoa's Solana project

Dear Mr. Hedt:

Under Title XVII of the Energy Policy Act of 2005, the U.S. Department of Energy (DOE) is proposing to provide a Federal loan guarantee to Abengoa Solar Inc. (ASI) for construction of a 250 megawatt (MW) parabolic trough concentrating solar power plant 12 miles west of Gila Bend, Arizona. The Abengoa project proposes to convert agricultural lands for purposes of this power plant.

DOE is aware that the Natural Resources Conservation Service (NRCS) has general responsibility, nationwide, for implementing the Farmland Protection Policy Act (FPPA) and to review projects that may affect prime, unique, or statewide important farmland and/or wetlands associated with agriculture. NRCS has completed Parts II, IV, and V of the form, and DOE has completed parts I and III. Pursuant to §658.4(g) of the FPPA, after the agency has made a final decision on a project in which one or more of the alternative sites contain farmland subject to the FPPA, the agency is requested to return a copy of the Form AD–1006 to the NRCS, indicating the final decision of the agency. The attached final Form AD–1006 confirms the score of 162 for the Abengoa project.

As stated in 7 USC Section 658.4(c) of the FPPA, USDA recommends that:

(1) Sites with the highest combined scores be regarded as most suitable for protection and sites with the lowest scores as least suitable.

(2) Sites receiving a total score of less than 160 need not be given further consideration for protection and no additional alternatives need to be evaluated.

(3) Sites receiving scores totaling 160 or more be given increasingly higher levels of consideration for protection.

(4) When making decisions on proposed actions for sites receiving scores totaling 160 or more, federal agency personnel consider:

   i. Use of land that is not farmland or use of existing structures;

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ii. Alternative sites, locations and designs that would serve the proposed purpose but convert either fewer acres of farmland or other farmland that has a lower relative value;

iii. Special siting requirements of the proposed project and the extent to which an alternative site fails to satisfy the special requirements as well as the originally selected site.

Abengoa Solar conducted a site selection screening for the Solana CSP Project to identify opportunities and constraints for siting the proposed facility. Because southwest Arizona possesses some of the highest solar potential values in the world, the Gila Bend area was a primary siting target. In addition to solar potential, the site selection screening considered slope, proximity to existing electrical infrastructure, proximity to transportation infrastructure (rail and highway), water availability, compatibility with adjacent land uses, and previously disturbed private property (to avoid potential impacts to native desert). Based on these criteria, Abengoa Solar identified three sites for further evaluation; all three are located north of I-8 and in the vicinity of Painted Rock Dam Road. Of the three sites, only the proposed Solana Site meets the special siting requirements – that is, optimal proportions (the length and width of the proposed Solana Site are nearly equal) – for placement of solar facilities. As a result, the Solana Site was selected for the proposed Solana CSP Project.

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 me at 202-586-8198 or email Joseph.Marhamati@hq.doe.gov.

Sincerely,

Joseph Marhamati
Loan Guarantee Program
NEPA Document Manager

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 7/24/09
Name Of Project Solana Generating Station	Federal Agency Involved Department of Energy
Proposed Land Use Solar Generating Facility	County And State Maricopa County, Arizona
PART II *(To be completed by NRCS)*	Date Request Received By NRCS July 28, 2009 S. Smauk

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply – do not complete additional parts of this form).*	Yes ☒	No ☐	Acres Irrigated ~3000	Average Farm Size 302 ac

Major Crop(s)	Farmable Land In Govt. Jurisdiction	Amount Of Farmland As Defined in FPPA
Alfalfa, Cotton, Grains	Acres: 267,295 % 3.2	Acres: 190,182 % 22
Name Of Land Evaluation System Used: NA	Name Of Local Site Assessment System: NA	Date Land Evaluation Returned By NRCS: Sept. 11, 2009

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	3,000.0			
B. Total Acres To Be Converted Indirectly	0.0			
C. Total Acres In Site	3,000.0	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland	3000			
B. Total Acres Statewide And Local Important Farmland	—			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	1.6 %			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	60			
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	73	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	15			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Site Being Farmed	20	20			
4. Protection Provided By State And Local Government	20	0			
5. Distance From Urban Builtup Area	15	15			
6. Distance To Urban Support Services	15	10			
7. Size Of Present Farm Unit Compared To Average	10	10			
8. Creation Of Nonfarmable Farmland	10	0			
9. Availability Of Farm Support Services	5	4			
10. On-Farm Investments	20	4			
11. Effects Of Conversion On Farm Support Services	10	1			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	0 89	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0 73	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	0 89	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0 162	0	0	0

Site Selected: A (Solana Site) Date Of Selection 2006 Was A Local Site Assessment Used? Yes ☐ No ☒

Reason For Selection:
The following criteria were considered during the previous site selection: (1) incoming solar radiation, (2) minimal slope; (3) proximity to transportation corridors; (4) water availability, (5) previously disturbed land; and (6) proximity to transmission grid. The 2006 site screening considered three locations. The Solana Site was the only one with optimal proportions (length and width of property), and therefore was selected for the project.

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

Farmland Protection Policy Act

Supporting Documentation for NRCS Form AD-1006 Farmland Conversion Impact Rating

As described in Section 3.2, the Secretary of Agriculture established criteria under the FPPA for federal agencies to identify and take into account the adverse effects of their activities on the preservation of farmland. The criteria developed by the Secretary of Agriculture include two parts: 1) the land evaluation criterion for which the NRCS provides the score, and 2) the site assessment criteria, for which the federal agency derives its own scores. A summary of the Farmland Conversion Impact Rating for the Solana Site is provided below.

LAND EVALUATION

NRCS completed the land evaluation portion of Form AD-1006 on September 14, 2009, and determined that the 3,000 acres[1] proposed for the Solana Generating Station are considered Prime and Unique Farmland. Based on soil surveys, soil potential ratings, soil productivity ratings, and land capability classifications, NRCS assigned a land evaluation score of 73 to the Solana Site. The land evaluation score represents the relative value for agricultural production of the farmland to be converted by the project compared to other farmland in the same local government jurisdiction.

SITE ASSESSMENT

The site assessment portion of Form AD-1006 includes a scoring system for consideration of 12 criteria used to evaluate the suitability of the Solana Site for protection as farmland. Each criterion is considered below, along with a summary of how each scoring decision was derived.

Criterion 1: Area in Non-Urban Use

This criterion considers the amount of land in non-urban use within a one-mile radius of the proposed Solana Site. Based on the site assessment guidelines, "non-urban" includes: agricultural land, range land, forest land, golf courses, non-paved parks and recreational areas, mining sites, farm storage, lakes and other water bodies, open space, wetlands, fish production, and pasture or hayland. Using GIS, the total area of a one-mile radius surrounding (but excluding) the proposed Solana Site was calculated to be 7,653.59 acres. The total area was compared against Figure 3.2-1 Land Ownership and Figure 3.2-2 Land Use, which depict land uses surrounding the proposed Solana Site. Of the total 7,653.59 acres, approximately 7,513.59 acres are in non-urban use as agriculture or open space. The single urban use is the I-8 corridor, which encompasses approximately 140 acres. These figures indicate that approximately 98 percent of the area within one mile of the proposed Solana Site is in non-urban use. In consideration of the point system presented below, a **score of 15** is assigned to this criterion for the Solana Site.

---

[1] Approximately 100 acres of the 3,100-acre Solana Site are attributed to the existing irrigation infrastructure that is currently owned, operated, and maintained by PIDD. Therefore, this acreage has been excluded from the FPPA evaluation.

Criterion 1 Point System

Percent Non-Urban Land within One Mile	Points
90 percent or greater	15
85 to 89 percent	14
80 to 84 percent	13
75 to 79 percent	12
70 to 74 percent	11
65 to 69 percent	10
60 to 64 percent	9
55 to 59 percent	8
50 to 54 percent	7
45 to 49 percent	6
40 to 44 percent	5
35 to 39 percent	4
30 to 34 percent	3
25 to 29 percent	2
21 to 24 percent	1
20 percent or less	0

Criterion 2: Perimeter in Non-Urban Use

Google Earth aerials were used to determine the percentage of land in non-urban use that borders the perimeter of the proposed Solana Site. Because the site is located in a predominantly rural area, adjacent lands are primarily agricultural and open space. The major exceptions are Painted Rock Dam Road and the I-8 corridor which border the eastern and southern extents of the proposed Solana Site, respectively. In accordance with the site assessment guidelines, both roads were categorized by the land uses opposite the respective roadways, which are non-urban uses. Based on these assumptions, 90 percent or more of the perimeter of the Solana Site is in non-urban use. A **score of 10** is assigned to this criterion for the Solana Site.

Criterion 2 Point System

Percentage of Perimeter in Non-Urban Use	Points
90 percent or greater	10
82 to 89 percent	9
74 to 81 percent	8
65 to 73 percent	7
58 to 64 percent	6
50 to 57 percent	5
42 to 49 percent	4
34 to 41 percent	3
27 to 33 percent	2
21 to 26 percent	1
20 percent or less	0

Criterion 3: Percent of Site Being Farmed

This criterion evaluates how much of the site has been farmed or managed for agricultural purposes for more than 5 of the last 10 years. Because the entire site has been farmed for more than 5 of the last 10 years, a **score of 20** is assigned to this criterion for the Solana Site.

Criterion 3 Point System

Percentage of Site Farmed	Points
90 percent or greater	20
86 to 89 percent	19
82 to 85 percent	18
78 to 81 percent	17
74 to 77 percent	16
70 to 73 percent	15
66 to 69 percent	14
62 to 65 percent	13
58 to 61 percent	12
54 to 57 percent	11
50 to 53 percent	10
46 to 49 percent	9
42 to 45 percent	8
38 to 41 percent	7
35 to 37 percent	6
32 to 34 percent	5
29 to 31 percent	4
26 to 28 percent	3
23 to 25 percent	2
20 to 22 percent	1
Less than 20 percent	0

Criterion 4: Protection Provided by State and Local Government

This criterion evaluates the extent to which state and local government and private programs have made efforts to protect the site from conversion. State and local policies and programs include: tax relief, "right to farm" laws, agricultural districting, land use controls (such as agricultural zoning), development rights, Governor's Executive order, voluntary state programs, and mandatory state programs.

Based on a review of the Maricopa County Comprehensive Plan (2002) and the Town of Gila Bend General Plan (2006), there are no programs or policies in place at the proposed Solana Site. In addition, the project has ensured local land use and zoning consistency through the filing of a Comprehensive Plan Amendment (CPA) with Maricopa County; the CPA was approved by Maricopa County on December 17, 2008. In consideration of the point system provided below, a **score of 0** has been assigned to this criterion for the Solana Site.

Criterion 4 Point System

Protection Provided by State or Local Government	Points
Site is protected	20
Site is not protected	0

Criterion 5: Distance from an Urban or Built-Up Area

This criterion evaluates the proximity of the site to existing urban or built-up areas. The site assessment guidelines define urban and built up areas as having a minimum population of 2,500 and a minimum density of 30 structures per 40 acres. Although it has a population of slightly less than 2,500 people, the Town of Gila Bend, which is 8 miles east of the proposed Solana Site, is the closest urban or built-up area. Based on the point system shown below, a **score of 15** points has been assigned to this criterion for the Solana Site.

Criterion 5 Point System

Distance from an Urban or Built-Up Area	Points
Site is 2 miles or more from an urban or built-up area	15
Site is more than 1 mile but less than 2 miles from an urban or built-up area	10
Site is less than 1 mile from, but is not adjacent to, an urban and built-up area	5
Site is adjacent to an urban and built-up area	0

Criterion 6: Distance to Urban Support Services

This criterion evaluates the extent of existing infrastructure which could facilitate non-agricultural development. Existing infrastructure and other public facilities include: water lines, sewer lines, power lines, roads, schools, and fire and police protection. The closest municipal water and sewer lines and fire and police protection are located eight miles east in the Town of Gila Bend. The Paloma Elementary School is located four miles east of the existing farm. There is an extensive network of existing transmission and distribution lines located on-site and adjacent to the existing farm. In addition, I-8 is located along the southern extent of the existing farm and Painted Rock Dam Road is located along the eastern boundary of the property. Accordingly, a **score of 10** has been assigned to this criterion for the Solana Site.

Criterion 6 Point System

Distance to Urban Support Services	Points
None of the services exist nearer than 3 miles from the site	15
Some of the services exist more than 1 but less than 3 miles from the site	10
All of the services exist within ½ mile of the site	0

Criterion 7: Size of Present Farm Unit Compared to Average

This criterion compares the county's average farming unit size with the farm unit containing the proposed Solana Site. According to NRCS, the average farm size in Maricopa County is 302 acres. The proposed Solana Site encompasses 3,000 acres, and is therefore larger than the county's average farm unit. A **score of 10** is assigned to this criterion for the Solana Site.

Criterion 7 Point System

Parcel Size Compared to Average County Size	Points
Same size or larger than average (100 percent)	10
95 percent of average	9
90 percent of average	8
85 percent of average	7
80 percent of average	6
75 percent of average	5
70 percent of average	4
65 percent of average	3
60 percent of average	2
55 percent of average	1
50 percent or below county average	0

Criterion 8: Creation of Non-Farmable Farmland

This criterion considers how the proposed project would affect any remaining portions of the farm. Conversions that make the rest of the property non-farmable include any development which blocks accessibility to the rest of the site. Examples include highways, railroads, dams, or development along the front of a site restricting access to the rest of the property. Construction of the proposed Solana Generating Station would convert the entire site, and therefore would not render any remaining portions of the farm as non-farmable. In addition, conversion of the farm for the proposed Solana Site would not affect existing operations at other farms in the area. Accordingly, a **score of 0** has been assigned to this criterion.

Criterion 8 Point System

Amount of Land Excluding the Site Which Becomes Non-Farmable	Points
Acreage equal to more than 25 percent of acres directly converted by the project	10
Acreage equal to between 25 and 5 percent of the acres directly converted by the project	9 to 1
Acreage equal to less than 5 percent of the acres directly converted by the project	0

Criterion 9: Availability of Farm Support Services

This criterion evaluates whether there are adequate support facilities, activities, and industry to maintain the existing agricultural business. The more support facilities available to the agricultural operation, the more feasible it is for the business to stay in operation. Support facilities include, but are not limited to, farm suppliers, equipment dealers, processing and storage facilities, and farmer's markets.

The existing farm has been operational for several years, and therefore it is presumed that adequate facilities are available to support agricultural operations, although at some distance. The existing farm is located more than 60 miles from a major population center, and therefore proximity to additional comprehensive support facilities has been considered for this criterion assessment. Accordingly, it is estimated that existing farm support facilities represent approximately 75 percent of that required for agricultural operations, and therefore a **score of 4** has been assigned to this criterion.

Criterion 9 Point System

Percent of Services Available	Points
100 percent	5
75 to 99 percent	4
50 to 74 percent	3
25 to 49 percent	2
1 to 24 percent	1
No services	0

Criterion 10: On-Farm Investments

This criterion assesses the quantity and quality of agricultural facilities in place on the proposed site by identifying on-farm investments such as barns, storage buildings, fruit trees, vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures. The existing farm has limited on-site storage facilities, as well as an internal network of canals, re-lift pumps, and reservoirs owned and operated by PIDD. Irrigation water for the land, however, was permanently discontinued during the summer of 2009. Although the irrigation facilities are in place, the discontinuation of water eliminates the potential for a successful crop.

In addition, the poorly maintained irrigation facilities are at or near their life expectancy. The concrete which lines the canals has eroded, and the outdated re-lift pumps are attributed to the highest delivery cost of any farm located within PIDD (Figures C-1 – C-4). The existing farm proposed for the Solana Site is located at the western extent of PIDD's delivery area. In addition, the site is located in the foothills of the Painted Rock Mountains, and therefore at a higher elevation than other PIDD deliveries. As a result, water dispatched by PIDD to the farm is subject to multiple re-lifts in order to deliver water to points higher and further from the operational point of origin. Because the pumps are not outfitted with the modern controls to manage the amount of water released, each re-lift leads to operational spills and often results in a delivery of excess water, thereby increasing the cost of delivery. Overall, the facilities would require a considerable reinvestment to achieve optimal operational capacity. It is estimated that

Figure C-1. Existing PIDD Canal on the Solana Site

Figure C-2. Existing PIDD Infrastructure on the Solana Site

Figure C-3. Existing PIDD Infrastructure on the Solana Site

Figure C-4. Existing PIDD Canal on the Solana Site

approximately 80 percent of the existing on-site irrigation facilities would need to be upgraded or replaced to resume agricultural operations. It should be noted that no on-site improvements have been made in recent years, as compared to other farms in the area. The existing agricultural infrastructure reflects a depreciated value of the on-farm investments. As a result, a **score of 4** has been assigned to this criterion for the Solana Site.

Criterion 10 Point System

Amount of On-Farm Investment	Points
100 percent	20
95 to 99 percent	19
90 to 94 percent	18
85 to 89 percent	17
80 to 84 percent	16
75 to 79 percent	15
70 to 74 percent	14
65 to 69 percent	13
60 to 64 percent	12
55 to 59 percent	11
50 to 54 percent	10
45 to 49 percent	9
40 to 44 percent	8
35 to 39 percent	7
30 to 34 percent	6
25 to 29 percent	5
20 to 24 percent	4
15 to 19 percent	3
10 to 14 percent	2
5 to 9 percent	1
0 to 4 percent	0

Criterion 11: Effects of Conversion on Farm Support Services

This criterion determines whether there are other agriculturally related activities, businesses, or jobs dependent upon the working of the pre-converted site for others to remain in production. Further, this factor establishes if the conversion of farmland to non-agricultural uses would reduce the need for farm support services so as to jeopardize the viability of the farms remaining in the area. As described under Criterion 9, the somewhat limited farm support services represent a regional presence, as opposed to a localized one, and therefore the conversion of the farm to a non-agricultural use would represent a minimal effect on other farms in the area by reducing the overall demand for support services. This minimal effect is expected not to exceed 4 percent. Accordingly, a **score of 1** has been assigned to this criterion for the Solana Site.

Criterion 11 Point System

Amount of Reduction in Support Services if Converted	Points
100 percent reduction in demand for support services	10
Some reduction in demand for support services (deduct one point for every 4 percent)	9 to 1
No significant reduction in demand for support services	0

Criterion 12: Compatibility with Existing Agricultural Use

This criterion determines whether conversion of the agricultural site would eventually cause the conversion of neighboring farmland as a result of incompatibility with the new use. Unlike residential uses, which are often intolerant of the noise, dust, and smell associated with nearby farmland, industrial uses, such as the proposed Solana Generating Station, would be tolerant of the nearby agricultural operations. Therefore, a **score of 0** is assigned to this criterion for the Solana Site.

Criterion 12 Point System

Compatibility with Adjacent Agricultural Lands	Points
Proposed project is incompatible with existing agricultural use of surrounding farmland	10
Proposed project is tolerable of existing agricultural use of surrounding farmland	9 to 1
Proposed project is fully compatible with existing agricultural use of surrounding farmland	0

Summary of Site Assessment Scores

Criteria	Points
Criterion 1: Area in Non-Urban Use	15
Criterion 2: Perimeter in Non-Urban Use	10
Criterion 3: Percent of Site Being Farmed	20
Criterion 4: Protection Provided by State and Local Government	0
Criterion 5: Distance from Urban Built Up Area	15
Criterion 6: Distance to Urban Support Services	10
Criterion 7: Size of Present Farm Unit Compared to Average	10
Criterion 8: Creation of Non-Farmable Farmland	0
Criterion 9: Availability of Farm Support Services	4
Criterion 10: On-Farm Investments	4
Criterion 11: Effects of Conversion on Farm Support Services	1
Criterion 12: Compatibility with Existing Agricultural Use	0
Total	**89**

APPENDIX D

Correspondence for the Preliminary Jurisdictional Determination

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
ARIZONA-NEVADA AREA OFFICE
3636 NORTH CENTRAL AVENUE, SUITE 900
PHOENIX, ARIZONA 85012-1939

REPLY TO
ATTENTION OF:

March 17, 2010

Office of the Chief
Regulatory Division

Abengoa Solar, Inc.
C/O Nasír Raza
Gannett Fleming, Inc.
4722 North 24th Street, Suite 250
Phoenix, Arizona 85016-4852

SUBJECT: Preliminary Jurisdictional Determination regarding presence/absence of geographic jurisdiction

Dear Mr. Raza:

Reference is made to your request (File No. SPL-2010-00105-RWF) dated January 14, 2010, for a preliminary Department of the Army jurisdictional determination (JD) for the unnamed washes that may be within the site of the proposed 3,000-acre Solana Solar Power Generating Plant and the 18-mile long by 400-foot wide power line corridor. The site of the proposed solar power generating plant is located approximately 13 miles west of the Town of Gila Bend, (Sections 3, 4, 5, 8, 9, 10 and 16, T6S, R7W), Maricopa County, Arizona. As part of the evaluation process, we have made the jurisdictional determination below.

As you may know, the Corps' evaluation process for determining whether or not a Department of the Army permit is needed involves two tests. If both tests are met, then a permit is required. The first test determines whether or not the proposed project is located in a water of the United States (i.e., it is within the Corps' geographic jurisdiction). The second test determines whether or not the proposed project is a regulated activity under Section 10 of the River and Harbor Act or Section 404 of the Clean Water Act. As part of the evaluation process, pertaining to the first test only, we have made the jurisdictional determination below.

Based on available information, it appears waters of the United States may be present on the site in the approximate locations noted on the enclosed drawings. The basis for the preliminary JD can be found on the enclosed "Preliminary Jurisdictional Determination Form." Please note preliminary JDs are non-binding ". . . written indications that there may be waters of the United States, including wetlands, on a parcel or indications of the approximate location(s) of waters of the United States or wetlands on a parcel. Preliminary JDs are advisory in nature and may not be appealed." (33 C.F.R. 331.2.). The permit applicant or other affected party who requested this preliminary JD is hereby advised of the option to request and obtain an approved jurisdictional determination for this site. The option to obtain an approved JD in this instance and at this time has been declined. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S.

Please be reminded that preliminary JDs may not be appealed through the Corps' administrative appeal process set out at 33 CFR Part 331. Preliminary jurisdictional determinations are fully explained in the enclosed Regulatory Guidance Letter 08-02, dated June 26, 2008. Further, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

This determination has been conducted to identify the extent of the Corps' Clean Water Act jurisdiction on the site identified in your request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

If you have any questions, please contact me at (602) 640-5385 Ext 226 or via e-mail at Ronald.W.Fowler@usace.army.mil.

Please be advised that you can now comment on your experience with Regulatory Division by accessing the Corps web-based customer survey form at: http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Ron Fowler
Senior Project Manager
Arizona Branch, Regulatory Division

Enclosures

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies ll aquatic features on the site that could be affected by the proposed activity, based on the following information:

District Office: Los Angeles District | File/ORM #: | PJD Date: 17MAR2010

State: AZ | City/County: Maricopa County

Nearest Waterbody: Gila River

Location: TRS, LatLong or UTM: See Preliminary Jurisdictional Determination Report. TRS #s are included on report figures 6, 7, 8 & 9.

Name/ Address of Person Requesting PJD: Sobia Naqvi, Senior Program Manager, Abengoa Solar, Inc., 4505 E. Chandler Blvd., Suite 120, Phoenix, AZ 85048

Identify (Estimate) Amount of Waters in the Review Area:

Non-Wetland Waters: linear ft | width | acres | Stream Flow:

Wetlands: acre(s) | Cowardin Class:

Name of Any Water Bodies on the Site Identified as Section 10 Waters: Tidal: | Non-Tidal:

☐ Office (Desk) Determination
☐ Field Determination: Date of Field Trip:

SUPPORTING DATA: Data reviewed for preliminary JD (check all that apply - checked items should be included in case file and, where checked and requested, appropriately reference sources below):

- ☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: Abengoa Solar Inc./Gannett Fleming, Inc.
- ☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps
- ☐ Corps navigable waters' study:
- ☑ U.S. Geological Survey Hydrologic Atlas:
  - ☑ USGS NHD data.
  - ☑ USGS 8 and 12 digit HUC maps.
- ☑ U.S. Geological Survey map(s). Cite quad name: Multiple. See Preliminary JD Report
- ☑ USDA Natural Resources Conservation Service Soil Survey. Citation: Gila Bend-Aje Area, AZ Parts of Maricopa and Pin
- ☑ National wetlands inventory map(s). Cite name: Nation Wetlands Inventory Online Wetlands Map
- ☐ State/Local wetland inventory map(s):
- ☑ FEMA/FIRM maps: Multiple. See Preliminary JD Report
- ☐ 100-year Floodplain Elevation is:
- ☑ Photographs: ☑ Aerial (Name & Date): On-site Aerial Photography: Cooper Aerial, 2008; Off-site Aerial Photography: USGS Digital Ortho Quarter Quadrangle (DOQQ), 2007
  - ☑ Other (Name & Date): Site Photos. See Preliminary JD Report
- ☐ Previous determination(s). File no. and date of response letter:
- ☑ Other information (please specify): See Preliminary JD Report

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

17MAR2010
Signature and Date of Regulatory Project Manager (REQUIRED)

Signature and Date of Person Requesting Preliminary JD (REQUIRED, unless obtaining the signature is impracticable)

EXPLANATION OF PRELIMINARY AND APPROVED JURISDICTIONAL DETERMINATIONS:

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "preconstruction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.

APPENDIX E

FWS Concurrence, Table E-1 Special Status Species, and Burrowing Owl Project Clearance Guidance for Landowners

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
22410-2010-I-0328

April 12, 2010

Email Transmission

Mr. Joe Marhamati, Environmental Protection Specialist
Department of Energy, CF-1.3
1000 Independence Avenue, S.W.
Washington, DC 20585

Dear Mr. Marhamati:

Thank you for your correspondence received on March 16, 2010. This letter documents our review of the proposed Abengoa Solar Inc. Solana Solar Thermal Generating Station Project (Solana project), near the Town of Gila Bend, in Maricopa County, Arizona, in compliance with section 7 of the Endangered Species Act of 1973 (ESA) as amended (16 U.S.C. 1531 et seq.). Your letter concluded that the proposed project "may affect, but is not likely to adversely affect" the endangered Yuma clapper rail (*Rallus longirostris yumanensis*), and the western burrowing owl (*Athene cunicularia hypugaea*) and snowy egret (*Egretta thula*). (We note that the western burrowing owl and the snowy egret are not listed as threatened or endangered under the ESA, and are primarily protected under the Migratory Bird Treaty Act (MBTA). We have included a technical assistance review on these two species in this document. We concur with your determination for the Yuma clapper rail and provide our rationale below.

You also concluded there would be "no effect" to the lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), southwestern willow flycatcher (*Empidonax traillii extimus*), razorback sucker (*Xyrauchen texanus*), desert pupfish (*Cyprinodon macularius*), bonytail chub (*Gila elegans*), Gila topminnow (*Poeciliopsis occidentalis*), Colorado pikeminnow (*Ptychocheilus lucius*), woundfin (*Plagopterus argentissimus*), Sonoran pronghorn (*Antilocapra sonoriensis*), Arizona cliffrose (*Purshia subintegra*), brown pelican (*Pelecanus occidentalis*), Sonoran desert population of the bald eagle (*Haliaeetus leucocephalus*), and the Mexican spotted owl (*Strix occidentalis lucida*). Species with "no effect" determinations do not require review from the Fish and Wildlife Service, and are not addressed further.

Description of the Proposed Action

A complete description of the proposed action is found in your March 1, 2010, biological evaluation and assessment (BAE) and the accompanying maps sent to our office the same day.

Abengoa Solar Inc. is seeking a Federal loan guarantee from The Department of Energy (DOE) for the construction, startup and operation of the Solana Generating Station Project near the Town of Gila Bend, Arizona. Scheduled to begin construction in November 2010, the 280MW concentrating solar power (CSP) generating facility would be comprised of a solar field, power block, thermal energy storage system, and ancillary facilities located within 3,100 acres owned by Abengoa Solar Inc. The Solana project site will be located on land previously farmed for alfalfa and is generally located north of Interstate 8, west of Painted Rock Dam Road, south of Powerline Road, and east of Bureau of Land Management (BLM) land within Maricopa County.

Conservation measures

In coordination with our office and the Arizona Game and Fish Department (AGFD), three voluntary conservation measures will be taken by Abengoa Solar to help minimize impacts from the construction and operation of the Solana project. These measures include:

- Supplying up to 447 acre-feet of water per year to Bull Durham Wash three miles north of the Solana project site to offset the reduced agricultural tailwater run-off from the 3,100 acre site. This water is intended to minimize potential water loss flowing into Bull Durham Wash as a result of the farm being taken out of production. This additional water will conserve valuable marsh habitat used by the Yuma clapper rail, wading birds and various waterfowl species.

- Translocation of nesting western burrowing owls. Previous farming activity and disturbances have created suitable conditions on site for the western burrowing owl. Acknowledging that construction and operation activities may harm or displace individual or groups of owls, Abengoa Solar will coordinated with the AGFD Burrowing Owl Working Group to translocate owls existing on the Solana project site to an appropriate burrowing owl management area that can accommodate additional individuals.

- Deterring resident and migratory birds from utilizing potentially harmful onsite evaporation ponds. Evaporation ponds will contain concentrations of total dissolved solids (45,000 parts per million) potentially harmful to the Yuma clapper rail, snowy egret and other wildlife. Abengoa Solar will locate the ponds in areas of high industrial activity undesirable to wildlife, employ various hazing techniques (e.g. propane cannons, noise guns, and reflective foil flags), and prevent vegetation from growing in or near the ponds in an attempt to prevent the creation of an attractive nuisance.

Technical Assistance Review

The western burrowing owl and the snowy egret are not listed as threatened or endangered under the ESA and therefore do not require consultation under section 7. However, regarding the western burrowing owl, our technical assistance review agrees with your assessment that with successful relocation efforts in accordance with the AGFD Burrowing Owl Working Group (and with the necessary State permits and Federal permits under MBTA) the Solana project should minimize effects to the owl. We also agree with your assessment that although construction and operation of the Solana site may result in a loss of foraging habitat for the snowy egret, suitable habitat for the egret is available in areas surrounding the project area. Various deterring techniques in and around the onsite evaporation ponds will also aid in minimizing effects to the

egret. Finally, supplying additional water into Bull Durham Wash to off-set any potential reduction in tailwater runoff from previously farmed land will help minimize the loss of egret foraging habitat due to construction or operation of the Solana Project.

DETERMINATION OF EFFECTS

We concur with your determination that the proposed action "may affect, but is not likely to adversely affect" the Yuma clapper rail for the following reasons:

- Construction activities will be confined within the Solana project site boundary previously used for agriculture and, therefore, will not directly disturb or destroy suitable clapper rail habitat. Clapper rails were, however, reported observed in 2004 and 2006 three miles north of the Solana Site in Bull Durham Wash, thus Abengoa Solar will supply additional water (up to 447 acre-feet per year) to the wash to offset the reduced agricultural tailwater run-off from the Solana project site. This water is intended to minimize water loss flowing into Bull Durham Wash as a result of the formerly farmed land being taken out of production. This action is intended to conserve valuable marsh habitat used by the Yuma clapper rail for breeding, nesting and foraging. Delivery of the water will be coordinated by Albengoa Solar, Arizona Game and Fish Department (AGFD), and our office.

- Additionally, Abengoa's plan to deter resident and migratory birds from utilizing the potentially harmful onsite evaporation ponds will also ensure that construction and operation of the Solana project site will protect individual Yuma clapper rails.

Thank you for your continued coordination. No further section 7 consultation is required for this project at this time. Should project plans change, or if information on the distribution or abundance of listed species or critical habitat becomes available, this determination may need to be reconsidered. In all future correspondence on this project, please refer to the consultation number 22410-2010-I-0328. We also encourage you to continue coordinating the review of this project with the AGFD. Should you require further assistance or if you have any questions, please contact Ryan Gordon at (602) 242-0210 (x225) or Debra Bills (x239).

Sincerely,

Debra T. Bills

for Steven L. Spangle
Field Supervisor

cc: Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Phoenix, AZ

W:\Kevin Reynolds\Endangered Species\Section 7\Solana Solar Project\solana solar_Draft1.docx:cgg

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Amphibians						
Arizona Toad	*Bufo microscaphus*	SC[2]			Rocky streams and canyons in the pine-oak belt. Also occurs in lower deserts e.g. Agua Fria River area. Elevation ranges from 480-8400 feet.	No – outside historic distribution range.
Great plains Narrow-mouthed Toad	*Gastrophryne olivacea*		WSC	S	In Arizona, from mesquite semi-desert grassland to oak woodland, in the vicinity of streams, springs and rain pools. They are more terrestrial than aquatic in habits. They can be found in deep, moist crevices or burrows, often with various rodents, and under large flat rocks, dead wood, and other debris near water. Elevation ranges from sea level to around 4,100 feet.	No – outside historic distribution range.
Lowland Leopard Frog	*Lithobates yavapaiensis*	SC[2]	WSC	S	Currently inhabits big rivers, streams, cattle tanks, agricultural canals, ditches, mine adits, and other aquatic systems from the Yuma Valley Sonoran Desertscrub to pinyon-juniper woodland. Elevation ranges from near sea level to almost 6,000 feet. Prefer unregulated streams that are subject to periodic floods.	No – outside historic distribution range.
Lowland Burrowing Treefrog	*Pternohla fodiens*		WSC	S	Inhabit aquatic systems in desert grasslands to pinyon-juniper. Natural systems include rivers, permanent streams, permanent pools in intermittent streams, beaver ponds, cienegas, or wetlands, and springs, while man-made systems include earthen cattle tanks, livestock drinkers, canals, irrigation sloughs, wells, mine adits, abandoned swimming pools, and ornamental backyard ponds. Found in central and southeastern part of Arizona. In Arizona elevation ranges from 480 – 8200 feet.	No – outside historic distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Birds						
Great Egret	*Ardea alba*		WSC	S	Marshes, swampy woods, tidal estuaries, lagoons, mangroves, streams, lakes, rivers and ponds; also in fields and meadows. In Arizona they have been found between 100-1,500 feet.	High – species have been documented to occur.
Western Burrowing Owl	*Athene cunicularia hypugaea*	SC[2]		S	Variable in open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals. Sometimes in open areas such as vacant lots near human habitation, golf courses or airports. In Arizona they have been found between 650 - 6,140 feet.	High – species have been documented to occur.
Common Black-Hawk	*Buteogallus anthracinus*		WSC	S	Obligate riparian nester, dependent on mature, relatively undisturbed habitat supported by a permanent flowing stream. Groves of trees are preferred over single trees. Elevation ranges from 1,750 - 7,080 feet.	No – outside historic elevation and distribution range.
Western Snowy Plover	*Charadrius alexandrines nivosus*		WSC		Inhabits beaches, lagoons, and salt-evaporation ponds on coasts and barren sparsely vegetated salt flats and braided river channels inland. In Arizona, may occasionally nest along temporary lakes on sandy playas. In Arizona, the subspecies has been observed at 580 feet.	High – species have been documented to occur.
Western Yellow-billed Cuckoo	*Coccyzus americanusoccidentalis*	C[1], C[2]	WSC		In Arizona, streamside cottonwood, willow groves, and larger mesquite bosques for migrating and breeding preferred. Rarely observed as transient in xeric desert or urban settings. Elevation ranges from 90 – 6,710 feet.	No - outside historic distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Black-bellied Whistling-Duck	*Dendrocygna autumnalis*		WSC		Estuarine/ riparian/terrestrial. Found along rivers, ponds, stock tanks, marshes, and swamps. Uses natural cavities in live or dead trees for nesting. Prefer thickets such as those of willow, mesquite or cactus; also will use ground. Ground nests are usually situated with overstory. Sites are usually near freshwater pond or lakes. Uses wetland areas with dense stands of emergent vegetation for feeding. Elevation in Arizona ranges between 985-4,200 feet.	No – outside historic elevation and distribution range.
Snowy Egret	*Egretta thula*		WSC	S	Marshes, lakes, ponds, lagoons, mangroves and shallow coastal habitats. They breed and winter along the lower Colorado River, in west-central Maricopa County along the Gila River, and along the Hassayampa River. Also reported along the Salt River in Gila County. Elevation in Arizona ranges 100-1,950 feet.	High – species have been documented to occur.
Southwestern Willow Flycatcher	*Empidonax trailli extimus*	E[1],LE[2]	WSC		Riparian obligate. Prefers dense canopy cover, a large volume of foliage, and surface water during midsummer. Appears to avoid riparian areas found in steep, closed canyons. Found in Arizona at elevations ranging from 75 - 9,180 feet.	No - outside historic distribution range.
American Peregrine Falcon	*Falco peregrinus anatum*	SC[2]	WSC	S	Found in Arizona wherever sufficient prey is found near cliffs. Optimum habitat is steep, sheer cliffs overlooking woodlands, riparian areas or other habitats supporting avian prey species in abundance. In Arizona these birds utilize areas from around 400 feet along the lower Colorado River, to 9,000 feet.	No - outside historic distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Cactus Ferruginous Pygmy-owl	*Glaucidium brasilianium cactorum*	SC[2]	WSC	S	In Arizona according to Monson, "it has occurred in streamside cottonwoods and willows and adjacent mesquite bosques, usually with saguaros on nearby slopes. Less often it has been found along dry washes where large mesquite, paloverde, ironwood, and saguaro thrive." In Arizona it has been found between 1,300 - 4,000 feet.	No – outside historic elevation and distribution range.
Bald Eagle – Winter Population	*Haliaeetus leucocephalus*	SC[2]	WSC	S	In Arizona, bald eagles nest on the Mogollon Rim at Stoneman Lake, Mormon Lake, and Lake Mary, however, no breeding currently occurs there (mainly wintering populations). Wintering populations of bald eagles are found in both Central and Northern Arizona. Territories and nesting localities have occurred in the Bill Williams River Drainage, upper and lower Verde and Salt Rivers (including winter and nonbreeding sightings on the Black River, and on Cherry Creek), Roosevelt Lake, Gila River (only when favorable conditions are available), Colorado River(sporadically observed wintering individuals), and the Mogollon Rim and White Mountain Lakes. In Arizona, have been observed from 460 - 7,930 feet.	Low – no species documented within Solana Site. Yearly surveys for winter counts of bald eagles do not include the lower Gila River approximately four miles north of the Solana Site.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Bald Eagle – Sonoran Desert area population	*Haliaeetus leucocephalus*	DM[1], LT[2]	WSC	S	In Arizona, populations are found in Yavapai, Gila, Graham, Pinal, Maricopa, southern Mohave (that portion south and east of the center of Interstate Highway 40 and east of Arizona Highway 95), and eastern La Paz counties (that portion east of the centerline of U.S. and Arizona Highways 95), and north of the centerline of Interstate Highway 8). In Arizona, have been observed from 460 - 7,930 feet.	Low – no species documented. Solana Site within the Interim Threatened Sonoran Desert Area distribution range. FWS documented Breeding Bird Locations do not occur in the Solana Site.
Mississippi Kite	*Ictinia mississippiensis*		WSC	S	Tall forest, open woodland, prairie, semiarid rangeland, shelterbelts, wooded areas bordering lakes and streams in more open regions, scrubby oaks and mesquite, and lowland/floodplain forests. Requires open areas near nesting sites for foraging. Breeding habitat in Arizona consists of riparian deciduous forests that border desertscrub upland habitats. Man-made habitat in central Arizona consists of pecan orchards. Elevation ranges from 1,400-3,040 feet.	No – outside historic elevation and distribution range.
Least Bittern	*Ixobrychus exilis*		WSC	S	Breeding: freshwater and brackish marshes with dense, tall growths of aquatic or semiaquatic vegetation (particularly *Typha*, Carex, *Scirpus*, *Sagittaria*, or *Myriscus*) interspersed with clumps of woody vegetation and open water. Winter: occurs mainly in brackish and saline swamps and marshes, but little is known about wintering range. Elevation ranges between 850 - 1,500 feet.	No – outside historic elevation and distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Belted Kingfisher	*Megaceryle alcyon*		WSC		Rivers, brooks, ponds, lakes, coasts, streams, tidal creeks, mangroves, swamps and estuaries. According to AGFD HDMS unpublished records they have been found in Gila, Apache, Yavapai and Coconino counties. Elevation ranges from 1,840-8,400 feet.	No – outside historic elevation and distribution range.
Osprey	*Pandion haliateus*		WSC	S	In Arizona, nests in coniferous trees, alongside or near rivers and lakes in the White Mountains and across the Mogollon Plateau (usually within 6-7 miles). A few occur year round at lower elevations along the Salt and Gila Rivers, but no desert nest sites have yet been documented. For Arizona, they range from 800 – 8,300 feet, although they usually occur at elevations around 6,000 - 7,800 feet.	No – outside historic elevation and distribution range.
Brown Pelican	*Pelecanus occidentalis*	Delisted			Found most often in marine environments in California and Mexico. Juveniles are particularly prone to being blown inland by weather events and they are currently found in small numbers at the Salton Sea and along the lower Colorado River. Most Arizona records are along the Colorado River including north to Davis Dam and even to Lake Mead (La Paz and Yuma counties), and Gila Valley (Maricopa, Pinal, Mojave and Gila counties) but stragglers reach most of the state.	High – species have been documented to occur.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Yuma Clapper rail	*Rallus longirostris yumanensis*	E[1],LE[2]	WSC		This is the only clapper rail to breed in freshwater marshes; also inhabit brackish water marshes and side waters. They prefer the tallest, densest cattail and bulrush marshes. Most are found within the Lower Colorado Subdivision of the Sonoran Desertscrub biome. In Arizona, found at elevations ranging from about 100 to 1,000 feet and very locally to 1,500 feet.	High – species have been documented to occur.
Mexican Spotted Owl	*Strix occidentalis lucida*	T[1],LT[2]	WSC		In Arizona, they occur primarily in mixed-conifer, pineoak, and evergreen oak forests; also occurs in ponderosa pine forest and rocky canyon lands. Generally forages in mixed-conifer forests. Elevation ranges between 2,720 – 9,600 feet.	No – outside historic elevation and distribution range.
Fish						
Gila Longfin Dace	*Agosia chrysogaster*	SC[2]		S	Intermittent hot low-desert streams to clear and cool brooks at higher elevations. They are rarely abundant in large streams or above 5,000 feet.	No – outside historic distribution range.
Desert Sucker	*Catostomus clarki*	SC[2]		S	Found in rapids and flowing pools of streams and rivers primarily over bottoms of gravel-rubble with sandy silt in the interstices. Elevation ranges between 480 to 8,840 feet.	No – outside historic distribution range.
Sonora Sucker	*Catostomus insignis*	SC[2]		S	The Sonora sucker is found in a variety of habitats from warm water rivers to trout streams. It has an affinity for gravelly or rocky pools, or at least for relatively deep, quiet waters. Found in elevation between 1,210 to 8,730 feet.	No – outside historic elevation and distribution range.
Little Colorado Sucker	*Castostomus sp.3*	SC[2]	WSC	S	In creeks, small to medium rivers, and impoundments. Predominantly found in pools with abundant cover. Also found in riffles. Elevation ranges from 4,900 to 7,350 feet.	No – outside historic elevation and distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Desert Pupfish	*Cyprinodon macularius*	E[1], LE[2]	WSC		There are no natural populations of this subspecies remaining in Arizona. Pupfish occupy shallow waters of springs, small streams, and marshes. Often associated with areas of soft substrates and clear water Elevation ranges from 1,200 to 3,450 feet.	No – outside historic elevation and distribution range.
Bonytail	*Gila elegans*	LE[2]	WSC		Available information suggests that bonytail chub utilized the main stream portions of mid-sized to large rivers (both strong current and pools), usually over mud or rocks. During spring flooding they utilized the ponded and inundated terrestrial habitats. In reservoirs, they occupy a variety of habitat types, but seem to appear to prefer the open water areas. Arizona records include elevations from 235 to 1,960 feet.	No – outside historic distribution range.
Roundtail Chub	*Gila robusta*	C[1],SC[2]	WSC	S	Occupy cool to warm water, mid-elevation streams and rivers where typical adult microhabitat consists of pools up to 6.6 feet deep adjacent to swifter riffles and runs. Cover is usually present and consists of large boulders, tree rootwads, submerged large trees and branches, undercut cliff walls, or deep water. Smaller chubs generally occupy shallower, low velocity water adjacent to overhead bank cover. Elevation range includes areas from approximately 1,210 to 7,220 feet, although more commonly found between 2,000 - 5,000 feet.	No – outside historic elevation and distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Woundfin	*Plagopterus argentissimus*	E[1] EXPN[1]			Swift parts of silty streams, seemingly avoiding clear waters and very seldom found in quieter pools. Occupies main channel of seasonally swift, highly turbid, and extremely warm streams, with sandy, constantly shifting bottoms. Elevation ranges from 1,900 – 3,000 feet in Arizona.	No – outside historic elevation and distribution range.
Gila Topminnow	*Poeciliopsis occidentalis occidentalis*	E[1],LE[2]	WSC		Occupy headwater springs and vegetated margins and backwater areas of intermittent and perennial streams and rivers. This species prefers shallow warm water in a moderate current with dense aquatic vegetation and algae mats. Topminnows can withstand water temperatures from near freezing to 90-100 degrees F. They also can live in a fairly wide range of water chemistries. Attempted re-introductions indicate the species prefers elevations below 5000 feet. Elevation ranges from 1,320 - 7,510 feet, with most below 5,000 feet.	No – outside historic elevation and distribution range.
Colorado Pikeminnow	*Ptychocheilus lucius*	LE[2], XN[2]	WSC		The Colorado pikeminnow was formerly widespread in the Colorado River basin from Wyoming to Arizona and California. Now, native populations are restricted to the upper basin in Wyoming, Colorado, Utah and New Mexico in the Green, Yampa, White, Gunnison and Colorado rivers.	No – outside historic distribution range.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Speckled Dace	*Rhinichthys osculus*	SC[2]		S	A bottom dweller, found in rocky riffles, runs, and pools of headwaters, creeks, and small to medium rivers, rarely in lakes. Reside in water less than 1.6 feet deep, with current averaging about 1.3 feet per second. Often congregate below riffles and eddies. Breeding adults prefer swift water. Elevation ranges from 1,550 - 8,920 feet.	No – outside historic elevation and distribution range.
Razorback Sucker	*Xyrauchen texanus*	E[1],LE[2]	WSC		Uses a variety of habitat types from mainstem channels to slow backwaters of medium and large streams and rivers, sometimes around cover. Arizona records indicate the razorback sucker occurs at elevations of 181 to 5,000 feet.	No – outside historic distribution range.
Invertebrates						
Maricopa Tiger Beetle	*Cicindela oregona maricopa*	SC[2]			Several different habitats within its range, most commonly on sandy stream banks and less commonly on gravels and clays along stream banks. May occur near seeps or reservoir banks. From 1,092 - 6,940 feet. Most easily located along stream drainages in the Central Highlands.	No – outside historic elevation and distribution range.
Squaw Peak Talussnail	*Sonorella allynsmithi*	SC[2]			Lower Sonoran Life-Zone under conditions of extreme aridity at low elevations. Because of porous epidermis, snails must inhabit very deep, open, talus piles or rockslides where they can seal shell apertures to solid rock while being protected from heat and dryness by rock layers and plants above. Requires calcium carbonate from which to build shells and to buffer carbonic acid created from exhaled water and carbon dioxide. Elevation ranges between 1,100 - 3,900 feet.	No – outside historic elevation range.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Mammals						
Sonoran Pronghorn	*Antilocapra Americana sonoriensis*	E[1],LE[2]	WSC		Habitat is characterized by broad alluvial valleys separated by block-faulted mountains. These valleys are partially filled with clay, silt and alluvium deposited from sheet erosion and ephemeral streams. The range of Sonoran pronghorn in Arizona is approximately 1 million hectare in size. Mean elevations of the valleys vary from 400 - 1,600 feet.	No – outside historic distribution range.
Pale Townsend's Big-eared Bat	*Corynorhinus townsedii pallescens*	SC[2]		S	In Arizona, summer day roosts are found in caves and mines from desertscrub up to woodlands and coniferous forests. Night roosts may often be in abandoned buildings. In winter, they hibernate in cold caves, lava tubes and mines mostly in uplands and mountains from the vicinity of the Grand Canyon to the southeastern part of the state. Based on records from AGFD HDMS unpublished records *Corynorhinus townsendii pallescens* has been found from 550-8,437 feet.	No – outside historic distribution range.
Greater Western Bonneted Bat	*Eumops perotis californicus*	SC[2]		S	Lower and upper Sonoran desertscrub near cliffs, preferring the rugged rocky canyons with abundant crevices. They prefer crowding into tight crevices a foot or more deep and two inches or more wide. Colonies prefer crevices even deeper, to ten or more feet. Based on records from AGFD HDMS, elevation ranges from 240 - 8,475 feet.	No – outside historic distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Western Red Bat	*Lasiurus blossevillii*		WSC	S	Riparian and other wooded areas. Roosts by day in trees. Summer roosts usually in tree foliage, sometimes in leafy shrubs or herbs. Often found in trees of fruit orchards. Elevation ranges between 1,900 - 7,200 feet.	No – outside historic elevation and distribution range.
Western Yellow Bat	*Lasiurus xanthinus*		WSC	S	Not clearly understood; may be associated with Washington fan palm trees, other palms or other leafy vegetation such as sycamores, hackberries and cottonwoods which provide roost sites. Individuals have been found roosting about 15 feet above the ground in a hackberry (*Celtis reticulata*) and sycamores (*Platanus wrightii*). Elevation ranges between 550 - 6,000 feet.	No – outside historic distribution range.
Lesser Long-Nosed Bat	*Leptonycteris curasoae yerbabuenae*	E[1],LE[2]	WSC		Desert grassland and shrubland up to oak transition. They roost in caves, mine tunnels, and occasionally in old buildings and reported once in a culvert in Madera Canyon, Santa Rita Mountains. They forage in areas of saguaro, ocotillo, paloverde, prickly pear and organ pipe cactus and later in the summer among agaves. There appear to be seasonal differences in when certain habitats are occupied. Elevation ranges from 1,190 - 7,320 feet.	No – outside historic elevation and distribution range.
California Leaf-Nosed Bat	*Macrotus californicus*	SC[2]	WSC	S	Found from southern California to western Arizona and southern Nevada, down into Mexico. Likes desert scrub areas, roosts by day in caves, abandoned mines and tunnels. Occurs in small numbers, rarely seen. All Arizona records below 4,000 feet with most below about 2,500 feet. Based on AGFD HDMS records, elevation ranges from 160 - 3,980 feet.	No – outside historic distribution range.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Cave Myotis	*Myotis velifer*	SC[2]			Desertscrub of creosote, brittlebush, palo verde and cacti. Roost in caves, tunnels, and mineshafts and under bridges and sometimes in buildings within a few miles of water. There are a number of records of one or a few individuals roosting in cliff and barn swallow nests. Mostly between 300 and 5,000 feet although there is at least one record from 5,800 feet on the Nantan Plateau and at least 6 records between 6,000 and 8,800 feet on Cane Ridge and in the Santa Rita, Patagonia, Pinaleno, and Huachuca mountains.	No – outside historic distribution range.
Yuma Myotis	*Myotis yumanensis*	SC[2]			Found in a wide variety of upland and lowland habitats, including riparian, desertscrub, moist woodlands and forests. Prefers cliffs and rocky walls near water. They are a colonial species, hanging in closely grouped clumps, utilizing caves, mines, cliff crevices, attics, buildings, underneath bridges, and similar structures.	No – outside historic distribution range.
Plants						
Pima Indian Mallow	*Abutilon parishii*	SC[2]	SR	S	Mesic situations in full sun within higher elevation in Sonoran desertscrub. On rocky hillsides, cliff bases, canyon bottoms, lower side slopes and ledges of canyons among rocks and boulders. Slopes can exceed 45°. In riparian zones, occurs on flat secondary terraces but typically not in canyon bottoms. Often found near trails, probably due to the influence of the trail on the light, heat and water of the micro-habitat. Elevation In Arizona ranges from 1,720 to 4,900 feet.	No – outside historic elevation and distribution range.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Arizona Agave	*Agave arizonica*		HS		Open, rocky slopes and mesas in Sonoran desertscrub, chaparral, or juniper grassland. Elevation ranges from 3,600-5,800 feet.	No – outside historic elevation and distribution range.
Tonto Basin Agave	*Agave delamateri*	SC[2]	HS		Usually found atop benches (often high benches), at edges of slopes, and on open hilly slopes in desert scrub, overlooking major drainages and perennial streams, from 2,350-5,100 feet elevation. Occasionally found in chaparral or juniper-grassland.	No – outside historic elevation and distribution range.
Hohokam Agave	*Agave delamateri*	SC[2]	HS	S	Usually found on benches or alluvial terraces on gentle bajada slopes above major drainages in desert scrub, with pre-Columbian agricultural and settlement features, having been cultivated by the Hohokam. Also found near rock piles, which discourage rodents and help accumulate nutrients and water. Elevation ranges from 1,300 - 3,200 feet.	No – outside historic elevation and distribution range.
Toumey Agave	*Agave toumeyana var. bella*		SR		Occurs in rocky hillsides, highland desert mesas, chaparral, or lower pine forest on open gravelly to rocky limestone or basalt slopes, mostly with desert scrub, chaparral, and pinyon juniper woodlands. Elevation ranges from 2,600 – 5,600 feet.	No – outside historic elevation range.
Bigelow Onion	*Allium bigelovii*		SR		Open rocky and sandy lopes in the Mohave Desert, including the desert mountain ranges. Elevation occurs between 2,720-2,900 feet.	No – outside historic elevation and distribution range.
Acuna Cactus	*Echinomastus erectocentrus acunensis*	C[2]	HS		Restricted range occurring on well-drained knolls and gravel ridges between major washes (Phillips, Phillips and Brian 1982), on granite soils in Sonoran Desert scrub association. Elevation ranges from 1,300 - 3,610 feet.	No – outside historic elevation and distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Fish Creek Fleabone	*Erigeron piscaticus*	SC[2]	SR	S	Moist, sandy canyon bottoms associated with perennial streams. One site, low terrace, bare soil with annual grasses, herbs, walnut, alder, little overstory. Another site, higher terrace, canyon walls, walnut, juniper. Elevation ranges between 2,250 to 3,500 feet.	No – outside historic elevation range.
Ripely Wild-buckwheat	*Eriogonum ripleyi*	SC[2]	S2	S	In Tertiary lakebeds on well-drained powdery soils derived from limestone, sandstone, or volcanic tuffs and ashes. Based on unpublished records from the AGFD HDMS, elevation ranges from 2,100 – 5,500 feet.	No – outside historic elevation range.
California Barrel Cactus	*Ferocactus cylindraceus var. cylindraceus*		SR		Gravelly or rocky hillsides, canyon walls, alluvial fans, and wash margins in the Mohave and Sonoran deserts, on igneous and limestone substrates. Collected on Lycium, Larrea flat. Elevation ranges from 200 to 2,900 feet.	Low - no documentation, poor habitat quality to support *Ferocactus cylindraceus var. cylindraceus* in the Solana Site.
Golden Barrel Cactus	*Ferocactus cylindraceus var. eastwoodiae*		SR		Found in Arizona, California, Nevada, Utah, and Mexico. Occurs in interior chaparral, Mojave desert scrub, Sonoran desert scrub, usually on rocky slopes, igneous and limestone substrates. Elevation ranges from sea level to 5,000 feet.	Low - no documentation, poor habitat quality to support *Ferocactus cylindraceus var. eastwoodiae* in the Solana Site.
Emory's Barrel-cactus	*Ferocactus emoryi*		SR		Hillsides, wash margins, alluvial fans, mesas, or flats, gravelly rocky or sandy soils, rocky slopes and adjacent bajadas, Sonoran desert scrub, igneous substrates. Elevation ranges from sea level to 4,000 feet.	Low - no documentation, poor habitat quality to support *Ferocactus emoryi* in the Solana Site.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Flannel Bush	*Fremontodendron californicum*		SR	S	Mainly well-drained rocky hillsides and ridges, in chaparral and oak/pine woodland. In Arizona, usually on dry, north slopes in canyons. In Arizona, elevation ranges from 3,500 to 6,500 feet.	No – outside historic elevation and distribution range.
Varied Fishhook Cactus	*Mammillaria viridiflora*		SR		Semidesert grasslands, interior chaparral, pinyon-juniper and oak woodlands, crevices, boulders, canyon sides and gravelly igneous substrates. In Arizona, elevation ranges from 2,600 – 6,500 feet.	No – outside historic elevation range.
Straw-top Cholla	*Opuntia enchinocarpa*		SR		Found over large areas, befitting a taxon that ranges throughout the entire Sonoran desert, and is found only in the driest, flat areas such as alluvial slopes and the desert floor. Elevation ranges from 984 to 4,593 feet.	No – outside historic elevation range.
Engelman Pricklypear, Cactus Apple	*Opuntia engelmannii var. flavispina*		SR		Found in the Sonoran desert on sandy bajadas. Elevation ranges from 1,600 – 2,700 feet.	No – outside historic elevation range.
Fish Creek Rock Daisy	*Perityle saxocola*	SC[2]			A narrow endemic with specific habitat requirements. It grows in very xeric habitat on very steep slopes, from cracks and crevices on cliff faces, large boulders and rocky outcrops in canyons and on buttes composed of Barnes conglomerate and Mescal limestone. Elevation ranges from 2,025 - 3,800 feet.	No – outside historic elevation and distribution range.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Arizona Cliff Rose	*Purshia subintegra*	E[1],LE[2]	HS		Rolling, rocky, limestone hills and slopes within Sonoran Desertscrub. The species occurs where the winters are mild, summers are hot, and the 22.9 - 86 cm of rainfall is evenly distributed between summer and winter rainfall periods. The landscape is dissected by ephemeral drainages and is sparsely vegetated. Elevation ranges from 2,120 to 4,000 feet.	No – outside historic elevation and distribution range.
Organ Pipe Cactus	*Stenocereus thurberi*		SR		Found on rocky hillsides up to 3,000 feet in elevation. It is sensitive to frost, so the species is rare in low desert areas, which can be more susceptible to frost. Slow growing, and prefers well-drained soil and full sun.	Low - no documentation, poor habitat quality to support *Stenocereus thurberi* in the Solana Site.
Tumamoc Globeberry	*Tumamoca macdougalii*		SR	S	This species occurs in xeric situations, in the shade of a variety of nurse plants along gullies and sandy washes of hills and valleys in Sonoran desertscrub and Sinaloan thornscrub communities. Found in elevation below 3,000 feet.	No – outside historic distribution range.
Reptiles						
Red-back Whiptail	*Aspidoscelis burti xanthonota*	SC[2]			In Arizona, they inhabit canyons and hills in juniper-oak woodlands, down to Sonoran upland desert habitats, among dense shrubby vegetation near and on the banks of semi-arid permanent streams and arroyos. Elevation ranges between 1,070 – 3,500 feet.	No – outside historic elevation and distribution range.
Desert Rosy Boa	*Charina trivirgata gracia*	SC[2]		S	In Arizona, rocky areas in desert range, especially in canyons with permanent or intermittent streams. Basalt, granite soils. Elevation ranges from 700 – 5,640 feet.	No – outside historic distribution range.

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Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Mexican Rosy Boa	*Charina trivirgata trivirgata*	SC[2]		S	In Arizona, usually found on or near rocky mountains or hillsides in desert ranges, where they inhabit the granite rock outcroppings that absorb the sun's rays providing heat and cover for these nocturnal snakes. Elevation ranges from 1,460 – 2,800 feet.	No – outside historic elevation and distribution range.
Tucson Shovel-nosed Snake	*Chionactis occipitalis klauberi*			S	They can be found in arid deserts with sandy washes, dunes and rocky hillsides. They prefer areas with scattered mesquite-creosote bush. Elevation ranges from sea level to 4,700 feet.	Moderate – none documented within Solana Site but suitable habitat within range.
Arizona Skink	*Eumeces gilberti arizonesis*	SC[2]	WSC		Occurs among rocks, logs and leaf litter near permanent or semi-permanent streams, in habitats ranging from mesquite riparian drainages up through oak and into pine woodlands. Elevation ranges from 1,865 – 1,970 feet.	No – outside historic elevation and distribution range.
Sonoran Desert Tortoise	*Gopherus agassizii (Sonoran population)*	SC[2]	WSC	S	The Sonoran population of the desert tortoise occurs primarily on rocky slopes and bajadas of Mojave and Sonoran desertscrub. Caliche caves in incised, cut banks of washes (arroyos) are also used for shelter sites, especially in the Lower Colorado River Valley subdivision. Shelter sites are rarely found in shallow soils. The Sonoran population occurs at elevations ranging from about 510 feet in Mojave desertscrub to semidesert grassland and interior chaparral at about 5,300 feet.	Low – no documentation, poor habitat quality to support *Gopherus agassizii* in the Solana Site.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Banded Gila Monster	*Heloderma suspectum cinctum*	SC[2]			In Arizona, primarily in Sonoran Desert and extreme western edge of Mohave Desert, less frequent in desert grassland and rare in oak woodland. Most common in undulating rocky foothills, bajadas and canyons. Less frequent or absent on open sandy plains. Elevation ranges from sea level to 5,000 feet.	No – outside historic distribution range.
Arizona Chuckwalla	*Sauromalus ater (Arizona Population)*	SC[2]		S	Preferred habitat is boulder-covered slopes, at elevations up to 4,500 feet, although they are more common at lower elevations. Predominantly found near cliffs, boulders or rocky slopes, where they use rocks as basking sites and rock crevices for shelter. They can be found in rocky desert, lava flows, hillsides and outcrops. Its distribution closely mirrors the combined Mojave and Sonoran Deserts.	No – outside historic elevation and distribution range.
Western Chuckwalla	*Sauromalus ater (Western Population)*	SC[2]		S	The western population is found from the Glen Canyon Dam south along the Colorado River to the southwestern part of the state. In interior part of State, it is found north of the Gila and Salt Rivers. Preferred habitat is boulder-covered slopes, at elevations up to 4,500 feet, although they are more common at lower elevations. Predominantly found near cliffs, boulders or rocky slopes, where they use rocks as basking sites and rock crevices for shelter.	No – outside historic elevation and distribution range.

Table E-1. Special Status Species with the Potential to Occur in Maricopa County, Arizona

Species		Protection Status			Preferred Habitat	Potential for Occurrence in the Solana Site
Common name	Scientific name	ESA	Arizona[2]	BLM[2]		
Northern Mexican Gartersnake	*Thamnophis eques megalops*	C[2]	WSC		In Arizona, these snakes are most abundant in densely vegetated habitat surrounding cienegas, cienega-streams, and stock tanks and in or near water along streams in valley floors and generally open areas, but not in steep mountain canyon stream habitat. Elevation usually ranges between 3,000 and 5,000 feet, but may reach elevations of 8,500 feet.	No – outside historic elevation and distribution range.

Sources: [1] = FWS 2009a, [2] = AGFD 2009a

Species Abstracts: FWS 1998a-b, 2009a-d; AGFD 2000a-c, 2001a-j, 2002a-u, 2003a-k, 2004a-c, 2005a-e, 2006a -c, 2007a, 2009a-c; eFloras 2008a-c

Notes: C=candidate; DM=delisted, being monitored; E=endangered; HS=highly safeguarded; LE= listed endangered; LT= listed threatened; S=sensitive; SC=species of concern; SR=salvage restricted; T=threatened; WSC=wildlife of special concern; XN= Experimental Nonessential population

BURROWING OWL PROJECT CLEARANCE GUIDANCE FOR LANDOWNERS

Arizona Burrowing Owl Working Group

Arizona Game and Fish Department
5000 West Carefree Highway
Phoenix, Arizona 85086

January 2009

BURROWING OWL PROJECT CLEARANCE GUIDANCE FOR LANDOWNERS

Arizona Burrowing Owl Working Group

INTRODUCTION

The western burrowing owl (*Athene cunicularia*) is one of the most interesting birds of prey in Arizona (Figure 1). Its species name, *cunicularia*, means "miner", in reference to this owl's unusual habit of spending time underground. It is also called the "rattlesnake owl", because young burrowing owls make a buzzing sound that sounds like a rattlesnake when disturbed. Burrowing owls can be seen during daylight hours, and use underground burrows for nesting and escape cover. Despite the fact they are active during the day and are adaptable to human presence, the burrowing owl can go unnoticed in an area due to their secretive nature. Their use of burrows also makes them susceptible to impacts from ground disturbing activities.

Figure 1. Adult burrowing owl. *Photo by Bruce Taubert.*

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. The burrowing owl is listed by the USFWS as a National Bird of Conservation Concern, listed as endangered in Canada, and threatened in Mexico. It is also listed as endangered, threatened, or a species of concern in 9 U.S. States. All owls in Arizona are protected federally by the Migratory Bird Treaty Act (MBTA) and Arizona state law (ARS Title 17). Violation of these laws, intentional or benign, may result in prosecution.

Burrowing owls are found in areas of Arizona where urbanization and other human activities are occurring. Arizona is one of the fastest growing states in the U.S., leading to frequent conflicts between burrowing owls and development. Owls can be affected by disturbance and habitat loss, even though there may be no direct impacts to the birds themselves or their burrows. There is often inadequate information about the presence of burrowing owls on a project site until ground disturbance is imminent. By then, it is too late to develop a solution that is helpful to the owls or the developer. These guidelines are intended to provide information and tools than can be applied when there is the potential for a project or action to adversely affect burrowing owls and the resources that support them. Each project and situation is different and should be evaluated for the tools and approach that is most effective in allowing a project to move forward while achieving burrowing owl conservation. These guidelines may not provide the necessary procedures for every project, and we encourage coordination with the agencies and entities listed in the Contact section of this document (Appendix A).

BURROWING OWLS SURVEY PROTOCOL

This guidance was developed by State, Federal, and other burrowing owl experts to help individuals avoid violating the laws protecting burrowing owls. This effort will provide a standardized means for conducting burrowing owl surveys in areas where burrows are likely to be disturbed by projects that may displace them in order to minimize impacts to the owls.

This protocol involves visual surveying for owls and burrows using transects to look for occupancy and/or signs of occupancy. We recommended that only individuals with proper training and certification conduct the survey. This document will be revised as necessary, and updates will be provided to certified surveyors, along with any guidance related to maintaining certification. Updates to this document will also be made available to the public. To facilitate statewide burrowing owl management, we recommend that all survey areas, routes, times, and detections be reported to Arizona Game and Fish Department (AGFD) within 30 days of survey completion. If owls or active burrows are detected, coordination with the appropriate agencies prior to initiating ground-disturbing activity will facilitate compliance with the applicable laws (see Appendix A).

SUITABLE HABITAT

Burrowing owl nesting habitat typically consists of dry, treeless, short-grassland or prairie plains. In the desert environment they nest in areas of short, open scrublands such as mesquite (*Prosopis* spp.), creosote bush (*Larrea tridentate*), rabbit-brush (*Chrysothanmus nauseous*), and four-wing saltbush (*Atriplex canescens*). They tend to be tolerant of human presence, and will nest in human-modified landscapes such as: abandoned lots within rapidly developing urban areas, airports, golf courses, agricultural fields, irrigation canals, storm drains, roadsides, and parking lots (Figure 2). In the western United States, burrowing owls do not dig their own burrows, and therefore depend on the presence of burrowing mammals. Throughout Arizona, burrowing owls are associated with Gunnison's prairie dogs (*Cynomys gunnisonii*), American badgers (*Taxidea taxus*), ground squirrels (*Spermophilus* spp.), rock squirrels (*Spermophilus variegatus*), foxes (*Vulpes* spp.), and coyotes (*Canis latrans*). Therefore, any open grassland, scrubland, or park-like area devoid of dense tree cover and containing burrowing mammals or adequate artificial nest burrows (e.g., erosion channels or storm drain pipes) can represent adequate nesting, wintering or migratory habitat.

Figure 2. Natural burrow on a wash bank. *Photo by Elissa Ostergaard.*

SURVEYOR CREDENTIALS

Burrowing owl surveyors should have burrowing owl survey protocol certification (training provided by AGFD; see Website in Contacts below for next date and location) with appropriate documentation.

Completed burrowing owl survey reports provided to AGFD should include each surveyor's certification. Certification will be awarded on an individual basis based on attendance at the training, and will not need to be renewed unless new information or conditions dictate substantial change to the survey protocol.

SURVEY TIMING

Burrowing owls are most likely to occupy breeding burrows between March and mid-July (Figure 3). While burrowing owl migration habits are not well documented, it is believed that owls in northern Arizona generally migrate south for the winter, whereas a larger proportion (12 to 61%; Conway and Ellis 2004) of owls in southern and western Arizona is thought to be non-migratory (Sheffield 1997).

We recommend that preliminary surveys be conducted at the time of property acquisition or before project design to allow time to properly accommodate or mitigate for owls, if present (Table 1). We recommend avoiding project initiation in March due to the possibility of new owls arriving during construction unless all suitable burrows were permanently closed by a properly permitted individual or group before project-related activities. If owls or occupied burrows are detected within the construction area at any time during project implementation, burrows must be avoided (see below for buffer requirements) until: 1) status of the burrows can be determined and owls removed by properly permitted individuals or groups, or 2) other conservation measures are implemented.

Figure 3. Artificial burrow with signs of occupancy. *Photo by Elissa Ostergaard.*

Surveys should be conducted within first light (typically ½ hour before sunrise) and 3 hours after sunrise, and between 2 hours before sunset until dusk (typically ½ hour after sunset). Do not conduct surveys during or within 24 hours after a heavy rain or when wind speed is greater than 32 km/hr (20 mi/hr).

Table 1. Schedule for burrowing owl surveys.

Fall or Winter Initial Survey	
Results	Action
No burrows detected	None.
Unoccupied burrows found	Implement conservation measures* and conduct a second survey 90 days prior to grading.
Occupied burrows or owls found	Implement conservation measures* and survey 30 days prior to grading.
Spring or Summer Initial Survey	
Results	Action
No burrows detected	None.
Unoccupied burrows found	Implement conservation measures* and conduct a second survey 30 days prior to grading.
Occupied burrows or owls found	See below.

*Potential conservation measures include: 1) collapsing all unoccupied burrows of suitable dimensions by a permitted individual, 2) identifying open space areas to be protected as a buffer around occupied and suitable owl burrows, 3) passive exclusion of owls, or 4) translocation of owls by a permitted individual.

Field Survey Protocol

We recommend that surveys be conducted in all portions of the project site that fit the description of Suitable Habitat (see above). Surveys are conducted by walking straight-line transects 10 m (33 ft) apart (or arranged so that all ground surfaces can be seen) and looking for evidence of owls: individuals, burrows, and sign of occupancy at burrow entrances (pellets, feces or other "ornamentation", feathers, prey remains, whitewash, etc) (Figure 4). Transects should be located over the entire project area, and oriented so the tops and sides of all topographic features are examined. For example, if the project area includes a wash with a steep bank, one transect should be near the top of the bank, and another near the base of the bank in the wash.

Figure 4. Adult burrowing owl at an artificial burrow entrance. *Photo by Bruce Taubert.*

At the start of each transect and every 100 m (300 ft), scan the entire visible project area for owls using binoculars or a spotting scope. Record the location of all burrows (natural and artificial). Burrows may include holes dug by mammals, birds, or created by erosion, pipes, spaces below concrete or other solid structures, etc. Each burrow (entrance height 8 + cm [3 + in]; width 8 +

cm [3 + in]; burrow depth > 1 m [3 ft]) should be assessed to determine potential use by burrowing owls, unless owls are present.

An "active" burrow has a live owl or owls, or shows sign of recent use (e.g., fresh whitewash, fresh pellets, feathers, or nest ornamentation – Figure 2). A "potentially active" burrow is one with evidence of previous use, but not recent (e.g., old whitewash, old pellets, cobwebs over entrance, and/or debris at burrow entrances). An "inactive" burrow exhibits no evidence of use by burrowing owls but is of suitable size for occupancy.

Record the number and location of all owls seen within or near the project area. Clean and remove all owl sign at potentially active burrows. Visit the site again after 2-8 days and check all potentially active burrows for fresh sign.

Survey Reporting

Record the surveys locations, dates, and the details of all burrow and owl detections (even if outside the construction zone), either on a hard copy map or as UTMs (Universal Transverse Mercator map coordinates compatible with GIS and GPS systems) using the standard form provided. Attach credentials of all surveyors as described above. Send within 30 days to raptors@azgfd.gov (preferred) or by mail:

Raptor Management Coordinator
Arizona Game and Fish Department
Nongame Branch
5000 West Carefree Highway
Phoenix, Arizona 85086

Owl Detections, Conservation and Mitigation

Should preliminary measures fail to prevent burrowing owl occupancy of a project site during implementation, or if active burrows are located in the construction zone during construction activities, the owls should not be disturbed as it may violate federal and state laws. A 35-m (100-ft) radius buffer, excluding all heavy machinery and foot traffic, should be set up around all active burrow entrances during construction and until the appropriate conservation action is determined (B. Fox, pers. comm.). To permanently accommodate owls on site, we recommend that a buffer of 35-m (100-ft) should remain in perpetuity between the burrows and new construction and managed to maintain breeding habitat suitability (Millsap and Bear 2000). On-site conservation areas should be connected to adjacent burrowing owl habitat through the use of habitat connections. Conservation areas should avoid isolation or fragmentation of burrowing owl habitat. Delineating protected areas (fencing, cones, etc.) is encouraged as long as it does not enclose the owls or prevent the owls' ability to see nearby predators.

If after surveys are completed and reports submitted to AGFD, burrowing owls or active or potentially active burrows are located within the project boundaries, the landowner is advised to contact the nearest AGFD office (see Appendix A) for direction. Further mitigation or costs may be avoided if occupied owl areas can be set aside for at least 10 years and if suitable habitat for nesting and foraging will remain after development is finished. If it is determined that the best option is to disturb and then mitigate for the disturbance of the owls, the owner must obtain a permit from U.S. Fish and Wildlife Service. Mitigation may include excluding owls from disturbed burrows prior to construction and/or providing artificial burrows on-site or in a different location and monitoring to determine the success of the actions taken.

Figure 5. Owlets at a natural burrow entrance. *Photo by Bruce Taubert.*

Literature Cited

Arizona Burrowing Owl Working Group. 2007. Burrowing Owl Mitigation Standards and Guidelines. Arizona Game and Fish Department, Phoenix, AZ. Azgfd.gov

Arizona Game and Fish Department. Arizona Revised Statutes, 17-235, Migratory birds, and 17-236, Taking birds; possession of raptors. Last accessed May 4, 2007. http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp?Title=17

Conway, C.J. and L.A. Ellis. 2004. Demography of Burrowing Owls Nesting in Urban and Agricultural Lands in Southern Arizona. Arizona Game and Fish Department, Heritage Grant Technical Report U03006, Phoenix, AZ.

Millsap, B.A. and C. Bear. 2000. Density and reproduction of burrowing owls along an urban development gradient. Journal of Wildlife Management 64:33-41.

Sheffield, S.R. 1997. Current status, distribution and conservation of the Burrowing Owl (*Speotyto cunicularia*) in midwestern and western North America. Pages 399-407 in J.R. Duncan, D.H. Johnson, and T.H. Nicholls [Eds.], Biology and Conservation of Owls of the Northern Hemisphere: Second International Symposium, February 5-9, 1997, Winnepeg, Manitoba, Canada. USDA For. Serv. Gen. Tech. Rep. NC-190.

U.S. Fish and Wildlife Service. Migratory Bird Treaty Act, Migratory Bird Permit Office. Last accessed May 4, 2007. http://www.fws.gov/permits/mbpermits/birdbasics.html

APPENDIX A: CONTACTS

In Tucson and southern AZ:

Arizona Game and Fish Department
Urban Wildlife Program, Tucson Office
555 N. Greasewood Rd.
Tucson, AZ 85745
(520) 628-5376

US Fish and Wildlife Service
Ecological Services Office
201 N. Bonita Ave., Ste. 141
Tucson, AZ 85745
(520) 670-6144

In Phoenix, central and northern AZ:

Arizona Game and Fish Department
Raptor Management Coordinator
5000 W. Carefree Highway
Phoenix, AZ 85086
(623) 236-7500
www.azgfd.gov

US Fish and Wildlife Service
Ecological Services Office
2321 W. Royal Palm Road, Ste. 103
Phoenix, AZ 85021
(602) 242-0210
http://www.fws.gov/southwest/es/arizona/

Burrowing Owl Working Group Members

Marit Alanen, U.S. Fish and Wildlife Service
Troy Corman, Nongame Branch, Arizona Game and Fish Department
Tim Snow, Region V, Arizona Game and Fish Department
James Driscoll, Nongame Branch, Arizona Game and Fish Department
Bob Fox, Wild At Heart (Burrowing Owl Conservation Group)
Sam Fox, Wild At Heart (Burrowing Owl Conservation Group)
David Grandmaison, Research Branch, Arizona Game and Fish Department
Mike Ingraldi, Research Branch, Arizona Game and Fish Department
Shawn Lowery, Research Branch, Arizona Game and Fish Department
Scott Richardson, U.S. Fish and Wildlife Service
Ray Schweinsberg, Research Branch, Arizona Game and Fish Department
Aninna Thornburg, Region V, Arizona Game and Fish Department

APPENDIX B. BURROWING OWL SURVEY REPORT FORM

Surveyor(s):

Date of Survey:

Project Location Information
Project Name:
City:
County:
Legal Description (address, ¼ Section, Township, Range):

Weather Conditions During Survey
Precipitation: Y / N (circle one)
Wind Speed (mph):
Temperature: °F / °C (circle)
% Cloud Cover:

Survey Data
Area Surveyed: acres / ha / km^2 / m^2 (circle one)
Adult burrowing owls detected:
Juvenile burrowing owls detected:
Total # burrowing owls detected:

Total # Active burrows:
Total # Potentially Active burrows:

Habitat Description within Project Area (check if applicable)

- Open, treeless area
- Creosote flats
- Wash corridor
- Suitable burrows
- Fossorial mammals present – list species:
- Sonoran desert scrub
- Agriculture
- Urban development

Attach map of surveyed area with locations of survey transects. Identify locations of owls and suitable burrows. List owl detections and active or potentially active burrow locations in the following table (please include coordinates and datum) Attach additional pages if necessary:

Observation Type (Owl or Burrow)	Coordinates

Observation Type (Owl or Burrow)	Coordinates

Return completed forms (regardless of whether burrowing owls are detected) along with the surveyor's certification to:

Raptor Management Coordinator
Arizona Game and Fish Department
Nongame Branch
5000 West Carefree Highway
Phoenix, AZ 85086
(623) 236-7500
raptors@azgfd.gov

APPENDIX F

Section 106 Consultation, Related Correspondence, and Cultural Setting

SHPO-2008-0938 (78144)

Department of Energy
Washington, DC 20585

RECEIVED

APR 21 2010

APR 22 2010

ARIZONA STATE PARKS/S.H.P.O.

April 14, 2010

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

RE: Continuing Section 106 Consultation ("No Adverse Effect")
Abengoa Solar Inc. Solana Generating Facility and Transmission Line
Previous State Historic Preservation Office (SHPO) correspondence: SHPO-2008-1064 (37442) and SHPO-2008-0938 (36761)

Dear Dr. Jacobs:

Per our previous correspondence you are aware that the U.S Department of Energy (DOE) is evaluating the application of Abengoa Solar Inc. (Abengoa Solar) for a federal loan guarantee to construct a 280 megawatt (MW) gross output (250 MW nominal output) concentrating solar power (CSP) generating facility and associated 230 kilovolt transmission line near the Town of Gila Bend, Maricopa County, Arizona. Funding through DOE's loan guarantee program constitutes a federal action subject to compliance with Section 106 of the National Historic Preservation Act and its implementing regulations (36 Code of Federal Regulations [CFR] Part 800).

In our previous consultation with you DOE described the proposed undertaking, defined the area of potential effects (APE), identified consulting parties, summarized the efforts to identify historic properties within the APE, and provided eligibility determinations for documented cultural resources (Marhamati [DOE] to Jacobs [SHPO] March 15, 2010). At that time, DOE concluded that a finding of "no historic properties affected" was appropriate for the Solana CSP Project. Subsequent correspondence with your office indicated a concern regarding potential visual effects to the Gatlin Site, a National Historic Landmark, which could result from the construction of the monopoles for the Solana Gen-Tie 230 kilovolt transmission line.

DOE has given further consideration to the existing visual setting surrounding the Gatlin Site, which will be documented in the Final Environmental Assessment. Upon further consideration, DOE has concluded that construction of the Solana Gen-Tie would introduce an additional transmission line into the regional vicinity. While views north of the Gatlin Site would remain unchanged, the viewshed from the southern extent of the undeveloped portion of the Gatlin Site would be subject to an incremental increase in the number of transmission structures on the

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horizon. The Solana Gen-Tie structures will not be visible looking north from the Gatlin Site, a viewshed important to the interpretive context of this archaeological site.

In a letter dated March 30, 2010, the Town of Gila Bend indicated that the Solana Gen-Tie transmission line would not conflict with their preservation or development plans for the Gatlin Site, a copy of which was provided to your office. In consideration of the incremental cumulative effect described above, DOE has revised its finding for the Solana CSP Project from "no historic properties affected" to "no adverse effect."

DOE requests your concurrence with our conclusions of effect, specifically the revised "no adverse effect" determination. If you have any questions or require additional information, please contact me via email at Mathew.McMillen@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) 586-7248.

Respectfully,

Matthew McMillen
Director
Environmental Compliance Division
DOE Loan Programs Office

CONCUR

22 APRIL 10

Arizona State Historic Preservation Office

Department of Energy
Washington, DC 20585

MAR 15 2010

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

RE: Section 106 Consultation ("No Historic Properties Affected")
Abengoa Solar Inc. Solana Generating Facility and Transmission Line

Dear Dr. Jacobs:

The U.S Department of Energy (DOE) is evaluating the application of Abengoa Solar Inc. (Abengoa Solar) for a federal loan guarantee to construct a 280 megawatt gross output (250MW nominal output) concentrating solar power (CSP) generating facility and associated 230 kilovolt (kV) transmission line near the Town of Gila Bend, Maricopa County, Arizona. 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, Fort McDowell Yavapai Nation, Gila River Indian Community, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation (including the Gu Vo, Hickiwan, and San Lucy District), White Mountain Apache Tribe, Yavapai-Apache Nation, and the Hopi Tribe.

Project Description

The CSP plant (Solana) and the associated 230 kV transmission line (Solana Gen-Tie) are collectively termed the "Solana CSP Project." Solana would be located north of Interstate 8 (I-8), west of Painted Rock Dam Road, south of Powerline Road, and east of Bureau of Land Management land within unincorporated Maricopa County in Sections 3, 4, 5, 8, 9 and 10, of Township 6 South, Range 7 West. Solana would be constructed on approximately 3,107 acres of previously disturbed agricultural land, the majority of which is owned by Abengoa Solar. Approximately 100 acres within the Solana Site boundary contain irrigation infrastructure that is currently owned, operated, and maintained by the Paloma Irrigation and Drainage District (PIDD). Abengoa Solar is negotiating with PIDD to purchase the interrelated land ownership.

The Solana facility would be comprised of a solar field, power block, thermal energy storage system, and ancillary facilities. Solana would use CSP technology to capture heat generated by sunlight and turn that heat into electricity. CSP works by using parabolic trough systems to concentrate the sun's energy through long, curved mirrors. Approximately 2,700 trough collectors covering roughly 1,757 acres of the overall 3,107 acres would comprise Solana's "solar field." Each row of parabolic trough collectors would be approximately 25 feet wide, 500 feet long, and 20 feet in height.

Solana would interconnect to the regional transmission grid via the proposed Solana Gen-Tie transmission line. The proposed 230 kV single-circuit transmission line would originate from the

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switchyard within Solana's power island and terminate 20.2 miles northeast at Arizona Public Service Company's existing Panda Substation, in Section 20, Township 5 South, Range 4 West in Gila Bend. The Solana Gen-Tie would consist of transmission structures, single-circuit conductors (three wires), and two overhead ground wires, one of which would contain a fiber-optic cable to serve as a communication system for the Solana CSP Project. The transmission structures would be steel monopoles approximately 100 to 140 feet tall, depending on the span length required, with a maximum height of 190 feet above the ground surface. Typical 230 kV span lengths would be approximately 800 to 1,000 feet.

The Solana Gen-Tie would cross private and municipal lands. Abengoa Solar is in the process of acquiring right-of-way easements to accommodate the transmission line.

Area of Potential Effects (APE)

The APE for the Solana CSP Project includes the 3,107-acre Solana Site and the 18-mile-long Solana Gen-Tie alignment, which varies in width between 250 feet and 1,000 feet. While the total length of the Solana Gen-Tie alignment would be 20.2 miles, the first 2.2 miles would be internal to the Solana Site.

Identification of Historic Properties

Efforts to identify historic properties within the APE included a Class III (100 percent coverage) pedestrian survey and ethnographic research, as described below.

Class III Survey

A Class III cultural resources survey of the APE was conducted by EcoPlan Associates, Inc. (EcoPlan), the results of which are reported in *A Cultural Resource Investigation for the Proposed Solana Generating Station and Associated Transmission Line, Volume I: Class I and Class III Inventory, Gila Bend, Arizona* (Sperinck and others 2010). The final version of the report was previously provided to your office for review and comment on February 12, 2010. As a result of the Class III survey conducted by EcoPlan, 23 cultural resources were identified within the APE. The cultural resources are summarized below in Table 1.

Upon receipt of the Class III survey report, you requested in an email dated February 22, 2010, that trail segments associated with three of the recorded sites be assigned a separate site number by the Arizona State Museum (ASM) to address the individual integrity of the trail. EcoPlan submitted a request for separate site numbers to Mr. Rick Karl at ASM. On March 1, 2010, Mr. Karl responded that ASM considers the trail segments to be features of the recorded sites, but acknowledged the potential for assigning an ASM number to the trail segments in the future, if it is determined that the trails are part of a larger system.

Table 1 Summary of Cultural Resources as Described by Sperinck and Others 2010

Site Number	Description	NRHP Eligibility Recommendation
AZ Z:1:39 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D

AZ Z:1:48 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:64 (ASM)	Prehistoric flaked stone scatter, pot break, and rock feature	Eligible, Criterion D
AZ Z:1:65 (ASM)	Prehistoric flaked stone scatter and rock feature	Eligible, Criterion D
AZ Z:1:78 (ASM)	Historic can scatter	Ineligible
AZ Z:1:79 (ASM)	Prehistoric flaked stone scatter and portable petroglyph	Eligible, Criterion D
AZ Z:1:80 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:81 (ASM)	Prehistoric flaked stone scatter and ground stone manufacturing locus	Ineligible
AZ Z:1:82 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:1:83 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:1:84 (ASM)	Prehistoric flaked stone scatter and two rock features	Eligible, Criterion D
AZ Z:1:85 (ASM)	Prehistoric flaked stone scatter and trail	Eligible, Criterion D
AZ Z:1:86 (ASM)	Prehistoric flaked stone scatter, trail, and rock features	Eligible, Criterion D
AZ Z:1:87 (ASM)	Prehistoric flaked stone scatter and rock features	Eligible, Criterion D
AZ Z:1:88 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:1:89 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:1:90 (ASM)	Prehistoric flaked stone scatter and one rock feature	Eligible, Criterion D
AZ Z:2:68 (ASM)	Prehistoric artifact scatter and two rock features	Eligible, Criterion D
AZ Z:2:84 (ASM)	Prehistoric flaked stone scatter	Eligible, Criterion D
AZ Z:2:85 (ASM)	Prehistoric flaked stone scatter	Ineligible
AZ Z:2:87 (ASM)	Prehistoric flaked stone scatter, trail, and 48 rock features	Eligible, Criterion D
AZ Z:2:86 (ASM)	Prehistoric flaked stone scatter and 13 rock features	Eligible, Criterion D
AZ Z:2:88 (ASM)	Historic trash scatter	Ineligible

The information potential of seven of the cultural resources is considered to have been exhausted through data collection and documentation during the Class III fieldwork, and therefore all seven sites are recommended ineligible for listing on the National Register of Historic Places (NRHP) (refer to Table 1). No further treatment of these resources is warranted.

The remaining 16 cultural resources may contain additional data which could contribute important information to regional prehistoric land use, subsistence patterns, and stone tool production techniques, and are therefore recommended as eligible for listing on the NRHP under Criterion D (information potential).

The 16 cultural resources recommended eligible for the NRHP are located along the proposed Solana Gen-Tie alignment, and vary in width between 150 and 1,800 feet. Where the cultural resources extend into the proposed Solana Gen-Tie corridor, the majority of the resources measure 600 feet or less in width. Based on the typical 230 kV span length of 800 to 1,000 feet anticipated for the Solana CSP Project, all but one of the cultural resources could be avoided by spanning. To avoid disturbing surface artifacts and features within the boundaries of all of the NRHP-eligible sites, it would be necessary when stringing the conductors to pull them through by hand, rather than driving a vehicle.

At its widest point within the proposed Solana Gen-Tie corridor, site AZ Z:1:39 (ASM) measures approximately 1,800 feet. Based on the results of the Class III survey, site AZ Z:1:39 (ASM) consists of a surface artifact scatter with no potential for buried materials. Therefore, it would be possible to place the transmission structures in portions of the site lacking surface artifacts. As described above, when stringing the conductors, it would be necessary to pull them by hand through site AZ Z:1:39 (ASM) to avoid surface disturbances to the site.

Ethnographic Research

As the lead federal agency for Section 106, DOE initiated government-to-government consultation with Native American tribes to identify locations of traditional or cultural importance within the vicinity of the Solana CSP Project. Letters describing the Solana CSP Project were transmitted to the following tribes: Ak-Chin Indian Community, Fort McDowell Yavapai Nation, Gila River Indian Community, Hopi Tribe, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, White Mountain Apache Tribe, and Yavapai-Apache Nation. To date, one response has been received from the Tohono O'odham Nation (Peter Steere [Tohono O'odham, Tribal Historic Preservation Officer] to Matthew McMillen [DOE, Director of Environmental Compliance Division, Office of Loan Programs], email dated July 23, 2009). The items requested by the Tohono O'odham Nation, along with the status of each request, are summarized below in Table 2.

In response to Requests 3 and 4 in Table 2, Abengoa Solar commissioned an ethnographic study to accompany the Class III cultural resources survey report. The study focuses on the APE, but also addresses the larger Gila River Valley. The study is comprised of three distinct, but related components: (1) a comprehensive cultural and natural setting, with an emphasis on settlement and subsistence; (2) an ethnographic overview; and (3) interviews with tribal elders. The results of the ethnographic research are reported in *A Cultural Resource Investigation for the Proposed Solana Generating Station and Associated Transmission Line, Volume II: Ethnographic Investigations, Gila Bend, Maricopa County, Arizona* (Ruter and others 2010), which is enclosed for your review and comment. The ethnographic research did not result in the identification of any historic properties within the project APE or its vicinity, including those of traditional religious or cultural importance.

Table 2 Status of Tohono O'odham Nation Requests

Request	Description of Request	Status
1	Invite interested tribes to participate in the NEPA process	Ongoing
2	Conduct Class I and Class III investigations for the Solana CSP Project	Completed
3	Prepare an ethnographic overview for the Solana CSP Project vicinity	Completed
4	Conduct cultural and natural landscape studies for the Solana CSP Project vicinity	Completed
5	DOE to meet with the Four Southern Tribes Cultural Resource Working Group to discuss the Solana CSP Project	Completed
6	Implement a process to govern the responsible development of large-scale solar projects	Ongoing

Determination of Project Effect

By employing the strategies described above (that is, selective pole placement and pulling the conductors by hand through NRHP-eligible sites), construction of the Solana Gen-Tie alignment would not adversely affect any historic properties within the APE. Accordingly, DOE has determined that a finding of "no historic properties affected" is appropriate for the Solana CSP 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

Enclosure: Ethnographic Investigations (Volume II)

Department of Energy
Washington, DC 20585

AUG 14 2009

Honorable Benjamin Nuvamsa
Chairman, The Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Re: Abengoa Solar Manufacturing Facility

Dear Chairman Nuvamsa,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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.

In an email message to me on July 23, 2009, Mr. Peter Steere, Cultural Affairs Office Manager, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were completed by EcoPlan Associates, Inc. Several archeological sites of interest were identified by the survey. The Class I and III survey and cultural resource report is enclosed for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

We would greatly appreciate receiving any comments or concerns you may have by January 11, 2010. Please send comments to me at the following address: U.S. Department of Energy, 1000 Independence Ave., SW, CF-1.3, Washington, DC 20585, or by email at matthew.mcmillen@hq.doe.gov. I can also be reached by telephone at 202-586-7248.

Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable Delia Carlyle
Chairperson
Ak Chin Indian Community of the Maricopa
42507 W. Peters & Nall Road
Maricopa, AZ 85239

Re: Abengoa Solar Manufacturing Facility

Dear Chairperson Carlyle,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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 2,000 acres of land of a 3000-acre parcel, which is currently being farmed. The site is in a rural area approximately 70 miles southwest of Phoenix. Abengoa would grade the site for construction, however given the relatively level existing site slope, these activities would be minimized. Our review of the project has not identified any historic or archeological resources, or sites of religious and cultural significance in the vicinity of the proposed project site; 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 August 17, 2009. 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, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable Dr. Clinton M. Pattea
President
Fort McDowell Yavapai Nation
P.O. Box 17779
Fountain Hills, AZ 85268

Re: Abengoa Solar Manufacturing Facility

Dear President Pattea,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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.

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We would greatly appreciate receiving any comments or concerns you may have by August 17, 2009. 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, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable William Rhodes
Governor
Gila River Indian Community of the Gila River Indian
P.O. Box 97
Sacaton, AZ 85247

Re: Abengoa Solar Manufacturing Facility

Dear Governor Rhodes,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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 2,000 acres of land of a 3000-acre parcel, which is currently being farmed. The site is in a rural area approximately 70 miles southwest of Phoenix. Abengoa would grade the site for construction, however given the relatively level existing site slope, these activities would be minimized. Our review of the project has not identified any historic or archeological resources, or sites of religious and cultural significance in the vicinity of the proposed project site; 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 August 17, 2009. 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, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable Diane Enos
President
Salt River Pima-Maricopa Indian Community
10005 E. Osborn
Scottsdale, AZ 85256

Re: Abengoa Solar Manufacturing Facility

Dear President Enos,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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 2,000 acres of land of a 3000-acre parcel, which is currently being farmed. The site is in a rural area approximately 70 miles southwest of Phoenix. Abengoa would grade the site for construction, however given the relatively level existing site slope, these activities would be minimized. Our review of the project has not identified any historic or archeological resources, or sites of religious and cultural significance in the vicinity of the proposed project site; 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 August 17, 2009. 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, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable Wendsler Nosie
Chairperson
San Carlos Apache Tribe of the San Carlos Reservation
P.O. Box 0
San Carlos, AZ 85550

Re: Abengoa Solar Manufacturing Facility

Dear Chairperson Nosie,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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 2,000 acres of land of a 3000-acre parcel, which is currently being farmed. The site is in a rural area approximately 70 miles southwest of Phoenix. Abengoa would grade the site for construction, however given the relatively level existing site slope, these activities would be minimized. Our review of the project has not identified any historic or archeological resources, or sites of religious and cultural significance in the vicinity of the proposed project site; 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 August 17, 2009. 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, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Ned Norris Jr., Chair
Isidro Lopez, Vice-Chair
Tohono O'odham Nation
P.O. Box 837
Sells, AZ 85634

Re: Abengoa Solar Manufacturing Facility

Dear Chairman Norris,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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.

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Respectfully,

Matthew McMillen
Director, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable Ronnie Lupe
Chairman
White Mountain Apache Tribe of the Fort Apache
P.O. Box 700
Whiteriver, AZ 85941

Re: Abengoa Solar Manufacturing Facility

Dear Chairman Lupe,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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.

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Respectfully,

Matthew McMillen
Director, NEPA Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

JUL 15 2009

Honorable Thomas Beauty
Chairman
Yavapai-Apache Nation of the Camp Verde Indian
2400 W. Datsi
Camp Verde, AZ 86322

Re: Abengoa Solar Manufacturing Facility

Dear Chairman Beauty,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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.

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We would greatly appreciate receiving any comments or concerns you may have by August 17, 2009. 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 M. Millen

Matthew McMillen
Director, NEPA Compliance
DOE Loan Guarantee Program Office

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Mcmillen, Matthew C

From: Peter Steere [peter.steere@tonation-nsn.gov]
Sent: Thursday, July 23, 2009 4:33 PM
To: Mcmillen, Matthew C
Cc: Barnaby.Lewis2@gric.nsn.us; Shane.Anton@SRPMIC-nsn.gov; Garcia-Lewis, Angela; Caroline Antone
Subject: Abengoa Solar Thermal Electric Power Plant, Gila bend, Arizona

Follow Up Flag: Follow up
Flag Status: Red

MEMORANDUM

DATE: July 23, 2009

TO: Matthew McMillen, Director, NEPA Compliance
DOE Loan Guarantee Program Office
Department of Energy
Washington, D.C. 20585

CC: Barnaby Lewis, Gila River Indian Community
Shane Anton, Salt River Pima-Maricopa Indian Community
Angela Garcia-Lewis, Salt River Pima-Maricopa Indian Community
Caroline Antone, Ak-Chin Indian Community

FROM: Peter L. Steere, Manager
Cultural Affairs Office, Tohono O'odham Nation P.O. Box 837 Sells, Arizona 85634

RE: Abengoa Solar Thermal Electric Power Plant, Gila Bend, Arizona

Thank you for your letter of July 15, 2009 consulting with the Tohono O'odham Nation on the proposed construction of the Abengoa Solar Thermal Electric Power Plant in Gila Bend, Arizona.

In your letter of July 15, 2009, you refer in paragraph 3 - to "our review." If this means you have completed a Class I records and literature review, please send copy of that report to our office and all interested tribes.

Please send detailed USGS Quad maps that cover the project area that have the project area and all infrastructure clearly marked.

Please send copy of application packet submitted by Abengoa Solar.

The Tohono O'odham Nation has received a number of notices about proposed solar plants being planned in various parts of Arizona in recent months, This is the second one planned in the Gila Bend area. Some of these are handled by DOE, some by BLM and some are private handled by Arizona State Regulatory agencies.

The proposed Abengoa Plant is located near Gila Bend, Arizona on lands regarded as Traditional-Use Lands by the Tohono O'odham Nation.

Since this proposed Abengoa Plant and others take up so much land surface (Abengoa-2,980 acres), there is the potential for significant impacts to cultural and natural resources. There is a significant impact to the cultural and natural landscapes.

The Tohono O'odham Nation requests that the following be completed and sent to all interested tribes for review:

1. NEPA EIS for this project and that interested tribes be invited to participate in the EIS process.

2. Class I (records review) and a Class III (100%) field survey and report for solar plant site and all infrastructure (connecting transmission lines etc.)

3. Ethnographic overview for the project area

4. Cultural and natural landscape study

5. Make arrangements for Department of Energy staff to meet with the Four Southern Tribes Cultural Resource Working Group (Tohono O'odham Nation, Gila River Indian Community, Salt River Pima-Maricopa Indian Community and the Ak Chin Indian Community) at their monthly meeting to present and review this project

6. Start an evaluation process to determine how many of these large ground-disturbing solar plants are needed in conjunction with proposed goals for lessening dependence on fossil fuel generating power and increasing production and usage of solar, wind and thermal generated power.

Hundreds of these solar plants are being proposed for parts of Arizona. Since these solar plants are large and have serious often negative impacts on thousands of acres of land, potentially damaging or destroying cultural and natural resources, there needs to some evaluation process that focuses in on how many of these solar plants are actually needed.

Department of Energy
Washington, DC 20585

DEC 14 2009

Honorable Thomas Beauty
Chairman
Yavapai-Apache Nation of the Camp Verde Indian
2400 W. Datsi
Camp Verde, AZ 86322

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairman Beauty,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Cultural Affairs Office Manager, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were completed by EcoPlan Associates, Inc. Several archeological sites of interest were identified by the survey. The Class I and III survey and cultural resource report is enclosed for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

For overall project questions or concerns, please contact 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: Class I and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 1 4 2009

Honorable Louis Manuel Jr.
Chairman, Ak-Chin Indian Community
42507 W. Peters and Nall Road
Maricopa, AZ 85238

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairman Manuel,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Cultural Affairs Office Manager, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were completed by EcoPlan Associates, Inc. Several archeological sites of interest were identified by the survey. The Class I and III survey and cultural resource report is enclosed for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 14 2009

Honorable Dr. Clinton M. Pattea
President
Fort McDowell Yavapai Nation
P.O. Box 17779
Fountain Hills, AZ 85268

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear President Pattea,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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For overall project questions or concerns, please contact 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: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

Printed with soy ink on recycled paper

Department of Energy
Washington, DC 20585

DEC 14 2009

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

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Governor Rhodes,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Director, Environmental Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

AUG 14 2009

Honorable Benjamin Nuvamsa
Chairman, The Hopi Tribe
P.O. Box 123
Kykotsmovi, AZ 86039

Re: Abengoa Solar Manufacturing Facility

Dear Chairman Nuvamsa,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar (Abengoa) for a Federal loan guarantee to construct a solar thermal electric power plant in the City of Gila Bend, Maricopa County, Arizona. DOE will be performing an environmental review of the Abengoa project in compliance with the National Environmental Policy Act (NEPA), and 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 Abengoa 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.

In an email message to me on July 23, 2009, Mr. Peter Steere, Cultural Affairs Office Manager, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were completed by EcoPlan Associates, Inc. Several archeological sites of interest were identified by the survey. The Class I and III survey and cultural resource report is enclosed for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

We would greatly appreciate receiving any comments or concerns you may have by January 11, 2010. Please send comments to me at the following address: U.S. Department of Energy, 1000 Independence Ave., SW, CF-1.3, Washington, DC 20585, or by email at matthew.mcmillen@hq.doe.gov. I can also be reached by telephone at 202-586-7248.

Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

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Department of Energy
Washington, DC 20585

DEC 1 4 2009

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

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear President Enos,

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 14 2009

Honorable Wendsler Nosie
Chairperson
San Carlos Apache Tribe of the San Carlos Reservation
P.O. Box 0
San Carlos, AZ 85550

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairperson Nosie,

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

OCT 14 2009

Dr. David Jacobs
Compliance Specialist/Archaeologist
Arizona State Parks
1300 W. Washington Street
Phoenix, AZ 85007

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Dr. Jacobs,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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For overall project questions or concerns, please contact 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.

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Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class I and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 14 2009

Mr. Joe Joaquin, Cultural Resource Specialist Mr. Peter Steere, THPO
Tohono O'odham Nation Cultural Affairs Office
P.O. Box 837
Sells, AZ 85634

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Mr. Joaquin and Mr. Steere,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

OCT 14 2009

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

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairwoman Ramon,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 14 2009

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

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairwoman Garcia,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 14 2009

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

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairman Joaquin,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

DEC 14 2009

Honorable Ronnie Lupe
Chairman
White Mountain Apache Tribe of the Fort Apache
P.O. Box 700
Whiteriver, AZ 85941

Re: Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairman Lupe,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Loan Guarantee Program Office

Enclosure: Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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*Please note that the Final Class I and Class III Inventory transmittals are incorrectly dated February 12, 2009. The correct date is February 12, 2010.

Department of Energy
Washington, DC 20585

FEB 12 2009

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

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairman Manuel,

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Office of Loan Programs

Enclosure: Final Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

FEB 12 2009

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

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

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Washington, DC 20585

FEB 1 2 2009

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

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

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Director, Environmental Compliance
DOE Office of Loan Programs

Enclosure: Final Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

FEB 1 2 2009

Honorable Louis Manuel Jr.
Chairman, Ak-Chin Indian Community
42507 W. Peters and Nall Road
Maricopa, AZ 85238

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairman Manuel,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

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Director, Environmental Compliance
DOE Office of Loan Programs

Enclosure: Final Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

FEB 1 2 2009

Honorable Dr. Clinton M. Pattea
President
Fort McDowell Yavapai Nation
P.O. Box 17779
Fountain Hills, AZ 85268

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear President Pattea,

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DOE Office of Loan Programs

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Washington, DC 20585

FEB 12 2009

Honorable Wendsler Nosie
Chairperson
San Carlos Apache Tribe of the San Carlos Reservation
P.O. Box 0
San Carlos, AZ 85550

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Dear Chairperson Nosie,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Tribal Historic Preservation Officer, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were carried out by EcoPlan Associates, Inc. on behalf of Abengoa Solar and DOE. Several archeological sites of interest were identified by the survey. On December 14, 2009, the Draft Class I and III survey and cultural resource report was sent to you. The Final Class I and III survey and cultural resource report is now complete and enclosed here for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

For overall project questions or concerns, please contact 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 Office of Loan Programs

Enclosure: Final Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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Department of Energy
Washington, DC 20585

FEB 12 2009

Dr. David Jacobs
Compliance Specialist/Archaeologist
Arizona State Parks
1300 W. Washington Street
Phoenix, AZ 85007

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Dr. Jacobs,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Tribal Historic Preservation Officer, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were carried out by EcoPlan Associates, Inc. on behalf of Abengoa Solar and DOE. Several archeological sites of interest were identified by the survey. On December 14, 2009, the Draft Class I and III survey and cultural resource report was sent to you. The Final Class I and III survey and cultural resource report is now complete and enclosed here for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Office of Loan Programs

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Department of Energy
Washington, DC 20585

FEB 12 2009

Mr. Joe Joaquin, Cultural Resource Specialist Mr. Peter Steere, THPO
Tohono O'odham Nation Cultural Affairs Office
P.O. Box 837
Sells, AZ 85634

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Mr. Joaquin and Mr. Steere,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Tribal Historic Preservation Officer, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. Peter requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were carried out by EcoPlan Associates, Inc. on behalf of Abengoa Solar and DOE. Several archeological sites of interest were identified by the survey. On December 14, 2009, the Draft Class I and III survey and cultural resource report was sent to you. The Final Class I and III survey and cultural resource report is now complete and enclosed here for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Office of Loan Programs

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Department of Energy
Washington, DC 20585

FEB 12 2009

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

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairwoman Ramon,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Tribal Historic Preservation Officer, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were carried out by EcoPlan Associates, Inc. on behalf of Abengoa Solar and DOE. Several archeological sites of interest were identified by the survey. On December 14, 2009, the Draft Class I and III survey and cultural resource report was sent to you. The Final Class I and III survey and cultural resource report is now complete and enclosed here for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Office of Loan Programs

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Department of Energy
Washington, DC 20585

FEB 12 2009

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

Re: Final Class I and Class III Inventory, Abengoa Solar Solana Generating Facility and Transmission Line

Dear Chairwoman Garcia,

The U.S. Department of Energy (DOE) is evaluating the application of a company called Abengoa Solar Inc. (Abengoa Solar) for a Federal loan guarantee to construct a 250 megawatt parabolic trough concentrating solar power plant on 2,980 acres of farmland 12 miles west of Gila Bend, Maricopa County, Arizona.

In an email message to me on July 23, 2009, Mr. Peter Steere, Tribal Historic Preservation Officer, on behalf of the Tohono O'odham Nation, indicated that the location of the proposed facility is considered part of the Traditional-Use Lands of the Tohono O'odham Nation. He requested that Class I and Class III cultural resource field surveys of the proposed plant site and transmission line corridor be completed, along with an ethnographic investigation, and a cultural and natural landscape study. The Class I and III surveys of the proposed power plant site and transmission line corridor were carried out by EcoPlan Associates, Inc. on behalf of Abengoa Solar and DOE. Several archeological sites of interest were identified by the survey. On December 14, 2009, the Draft Class I and III survey and cultural resource report was sent to you. The Final Class I and III survey and cultural resource report is now complete and enclosed here for your information. EcoPlan's research for the ethnographic and cultural and natural landscape studies is currently underway.

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Respectfully,

Matthew McMillen
Director, Environmental Compliance
DOE Office of Loan Programs

Enclosure: Final Class 1 and Class III Inventory, Gila Bend, Maricopa County, Arizona

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March 30, 2010

Ms. Sobia Naqvi
Abengoa Solar
4505 East Chandler Blvd., Suite 120
Phoenix, AZ 85048

RE: Solana Generating Facility and Transmission Line Project

Dear Ms. Naqvi:

As you are aware, the Town of Gila Bend participated in the March 27, 2008 and June 5, 2008 Stakeholder Meetings, the April 10, 2008 and June 19, 2008 Open Houses, and various other individual meetings with Abengoa Solar Inc. during which the Town of Gila Bend expressed support for the Solana Generating Facility and Transmission Line Project.

It is our understanding that the State Historic Preservation Office (SHPO) has expressed concern about the Gatlin Site and the proposed transmission monopoles to be constructed along the south side of Watermelon Road into an existing bay at the Panda Substation. The SHPO is specifically concerned that the construction of the transmission line may result in an indirect visual impact on the Gatlin Site, which may threaten development of the site into a regional cultural park.

Based on a review of project maps, the proposed transmission line will be located more than one-half mile south of the Gatlin Site, and will enter into the south side of the exiting Panda Substation. Given the scale of the existing substation, the Town of Gila Bend does not anticipate that the proposed transmission line will introduce any adverse visual impacts to the Gatlin Site beyond what currently exists. Furthermore, it is the Town's opinion that the Solana Generating Facility and Transmission Line Project will not conflict with our preservation and development plans for the Gatlin Site.

Be it known that the Town of Gila Bend remains highly supportive of the Solana Generating Facility and Transmission Line Project. If you have any further questions or concerns, please feel free to contact this office.

Sincerely,

Fredrick M. Buss, MPA, CSTM
Town Manager

Ron Henry
Mayor

Eric Fitzer, AICP
Planning and Economic Development Manager

CULTURAL SETTING

Paleoindian Period

The earliest broadly accepted human occupation of the "New World" is identified as the Paleoindian Period, which appeared near the end of the last Ice Age, perhaps around 15,000 BC or even earlier (Faught and Freeman 1998). The remains of two at least partially contemporaneous Paleoindian cultures have been identified in the western Papaguería – San Dieguito and Clovis. Paleoindian artifacts documented in the Papaguería are overwhelmingly isolated surface artifacts, such as large, fluted projectile points used to hunt large game. However, a few archaeological sites, including Ventana Cave in the eastern Papaguería (Haury 1950), have been identified.

Archaic Period

The Archaic Period is marked by a transition to a mixed economy that included the exploitation of birds and other small game and an increased reliance on wild plant foods (Cordell 1997; Reid and Whittlesey 1997). Huckell (1988) proposed three broad temporal divisions for the Archaic – Early (8500 to 4800 BC), Middle (4800 to 1500 BC), and Late (1500 BC to AD 1), which are based largely on tool assemblages, in particular varying styles of projectile points. The Archaic tool assemblage, which reflects the change in subsistence strategies, included triangular flaked stone projectile points and numerous implements associated with plant food procurement and processing, such as simple grinding slabs, milling stones, and various forms of basketry (Mabry and Faught 1998).

Current evidence suggests that farming was first incorporated into subsistence practices during the end of the Middle Archaic, and increased in prevalence through the Late Archaic. During this time, some groups continued to pursue a lifestyle centered around hunting and gathering, while others adopted a more sedentary lifestyle focused on agriculture (Mabry 1998, 2000). In addition, crude "incipient plain ware" ceramics are first incorporated into the material culture repertoire of Archaic groups around the same time (Heidke 1998, 1999, 2005a, 2005b; Heidke and Habicht-Mauche 1999; Kisselberg 1993). Although the end of the Archaic tradition has been described as the period when ceramics and farming were incorporated into the lifeways of the Southwest, the transition from hunting and gathering to agriculture was clearly a long process that likely occurred over the course of centuries.

Ceramic Period

The end of the Archaic Period is typically marked by the appearance of ceramics in the archaeological record, coupled with an increased reliance on agriculture. The first known ceramics in the Southwest come from habitation sites situated on the banks of the Santa Cruz River in the Tucson Basin and date to AD 200 (Mabry 2000). Ceramic artifacts are common throughout much of the Southwest by AD 500 (Cordell 1997), but are not introduced to the western Papaguería until about AD 700. Members of three commonly accepted archaeological traditions associated with distinct ceramic production techniques inhabited and perhaps overlapped in parts of the Papaguería during this time – the Patayan, who occupied the lower Colorado River and lower Gila River

valleys; the Trincheras, who occupied most of northwest Sonora; and the Hohokam, who occupied the middle Gila, Salt, and Santa Cruz River valleys (Ahlstrom 2000; Altschul and Rankin 2008). It also has been suggested that a fourth Ceramic Period tradition, the Areneños, an Archaic-like group, occupied much of the non-riverine portion of the western Papaguería. It remains unclear, however, how much value labels such as Hohokam, Patayan, Trincheras, and Areneños have in the western Papaguería. As Tagg et al. (2007) note, "Archaeologists have tended to view the ancient residents of the western portion of the Papaguería as maize agriculturalists, despite archaeological and ethnographic evidence indicating that these people were highly mobile hunter gatherers."

Ethnohistoric Period

In the Southwest, the period following the Ceramic Period and preceding the Historic Period is often referred to as the Protohistoric or, as used here, the Ethnohistoric Period. The Ethnohistoric Period spans from AD 1450 to 1700. By the time the first Spanish explorers entered what is now southern Arizona the region was occupied by a number of different cultures. Areas along the middle Gila River were settled by the Akimel O'odham (Pima), while the lower Gila and Colorado Rivers were settled by the Quechan (Yuman), Mohave, Cocopah, and Maricopa (Ahlstrom et al 2000). Thereafter, the Maricopa people moved east along the Gila River establishing settlements and eventually reaching into the middle Gila area. Father Francisco Garces noted the Opa, or Maricopa, people in his journey along the Gila River, as far east as Gila Bend in 1775 (Coues 1900). The eastern Papaguería and Santa Cruz River valley were historically settled by the Tohono O'odham (Papago), while much of the western Papaguería was home to the Hia C-ed O'odham (Sand Papago; Areneños).

The Hia C-ed O'odham were the primary inhabitants of the western Papaguería, and it has been suggested that they are the descendants of the ill-defined Ceramic Period Areneños (Doyel and Eiler 2003; Rankin 1995). The Hia C-ed O'odham lived in a few settled villages where small populations practiced agriculture while others moved from settlement to settlement to ensure adequate redistribution of precious few resources (Tagg et al 2007; Doyel and Eiler 2003; Nabhan et al. 1989). The Hia C-ed O'odham have never been formally recognized as a group distinct from the Tohono O'odham, and today, most Hia C-ed O'odham reside with the Tohono O'odham on the Papago and San Lucy Reservations, although smaller federally unrecognized enclaves reside near Ajo and Dome.

Historic Period

The many trips of Jesuit missionary Eusebio Francisco Kino, probably the most famous explorer of the region, sought to missionize local populations and establish suitable locations for missions; however, no permanent missions were ever built in the Papaguería proper. During his travels, Kino was known to have visited several Akimel, Tohono, and Hia C-ed O'odham settlements, including those at Gila Bend, Wellton, and Dome (Doyel and Eiler 2003). Father Kino is believed to have fought against the Spanish authorities regarding the use of native people as manual laborers in the silver mines of Mexico, but he was not averse to using aboriginal labor at the various missions he had established. With the death of Kino in 1711, relationships between the Spanish and native populations in the area became strained, and in 1751 a band of O'odham led a small uprising

against the Spanish. By 1754 Spain had reoccupied the Papaguería, but was never able to reestablish any missions in the interior of O'odham territory (Trimble 1993).

The United States went to war with Mexico in 1846, which caused American military forces to be sent into the Southwest. Lieutenant Colonels Philip St. George Cooke and William H. Emory led a military reconnaissance mission from Missouri to San Diego. This ultimately opened the "Gila Trail" as a route between New Mexico and San Diego. This route paralleled the Gila River west of the San Pedro River until meeting the Colorado River in Yuma. By the 1850s, the area was being surveyed to locate a practical route for the transcontinental railroad, although it took another 30 years before the railroad was built through the area. In 1858, the Butterfield Overland Mail began operating, following much of the Gila Trail.

In 1858, a stage station for the Butterfield Overland Mail Trail, named the Gila Ranch Station, was established north of present-day Gila Bend (Ahnert 1973). This site was documented in 1846 as a former Maricopa Village known as Tesotal (Emory et al. 1848). In 1865, following the arrival of the stage, a group of Euroamerican settlers located in the area of the "Bend of the Gila" and raised grains to sell to the stage company (Granger 1960). The stage line continued to run through this area into the late 1870s, at which point the need for it was obviated by the newly constructed transcontinental railroad line, which was completed in 1873 by the Southern Pacific Railroad Company.

As mentioned previously, the O'odham had long occupied settlements in the Papaguería. In his article "Generic Descent of the Papago Villages," J. W. Hoover characterizes the O'odham settlements as consisting of twelve primary village centers prior to 1860 (Hoover 1935). From these twelve parent villages came a number of descendant villages, including Akchin, near Maricopa, and Sil Mukik, near Gila Bend (Hoover 1935). Thirty-five sections of land were set aside by Executive Order on December 12, 1882, as the "Gila Bend Reserve" for the "…Papago and other Indians now settled there…" (Secretary of the Interior 1883). A later report from the Commissioner of Indian Affairs stated that "at that time some ten families – 40 or 50 people – lived on the reservation" (DOI 1897).

When ethnographer Carl Lumholtz visited the Gila Bend Reservation in 1909, he stated that approximately 300 persons lived in the three villages that made up the reservation, these being "Pelon, or 'lower village'; Tesota, or 'second village,' and an 'upper village,' which has only a Papago name, Siilimok" (Lumholtz 1909). Shortly following the time that Lumholtz passed through the Gila Bend Reservation, the U.S. Government by Executive Order reduced the reservation from 22,391 acres to 10,231 acres (Secretary of the Interior 1909; DOI 1912). The reservation was further reduced in size in the latter half of the 20th Century when the U.S. Army Corps of Engineers constructed the Painted Rock Dam on the Gila River in 1960. While the dam was 10 miles down the river, the Corps of Engineers used the power of eminent domain to acquire an additional 7,700 acres of land from the reservation to be used as a reservoir (Parker 1989). In effect, this action removed all arable lands from the reservation, limiting the potential for future farming activities. The O'odham peoples who lived in the newly created reservoir area were relocated to a 40-acre tract of land about 1 mile south of the reservation border. This became known as San Lucy Village (Parker 1989).

Department of Energy
Washington, DC 20585

DOE/EA-1683

FINDING OF NO SIGNIFICANT IMPACT
DEPARTMENT OF ENERGY LOAN GUARANTEE TO ABENGOA SOLAR INC. FOR THE SOLANA CONCENTRATING SOLAR POWER FACILITY NEAR GILA BEND, ARIZONA

AGENCY: U.S. Department of Energy, Loan Guarantee Program Office

ACTION: Finding of No Significant Impact

SUMMARY: The U.S. Department of Energy (DOE) has conducted an environmental assessment (EA) that analyzed the potential environmental impacts associated with a 280 Megawatt (MW) concentrating solar power (CSP) plant (Solana Generating Plant) and associated 230 kilovolt transmission line (Solana Gen-Tie) proposed by Abengoa Solar Inc. (Abengoa) near Gila Bend, Arizona (Solana Project). DOE, through its Loan Guarantee Program Office (LGPO), proposes to provide a Federal loan guarantee pursuant to Title XVII of the Energy Policy Act of 2005 (EPAct 05), as amended by Section 406 of the American Recovery and Reinvestment Act of 2009, to Abengoa to support the construction and startup of the proposed facility.[1] The purpose of DOE's proposed action is to expedite the deployment of a new energy technology into commercial use in the U.S. and to reduce emissions of greenhouse gases and other air pollutants.

The Solana Project would use CSP technology to capture heat generated by sunlight and turn that heat into electricity. CSP works by using parabolic trough systems to concentrate energy from the sun through long, curved mirrors. Approximately 2,700 trough collectors covering roughly 1,757 acres would comprise the "solar field." The parabolic trough systems would be tilted toward the sun and focus sunlight on a pipe running down the center of the trough. Heat from sunlight would warm an organic synthetic oil, known as heat transfer fluid, which would flow through the pipe to the power island. The heat transfer fluid would serve as the working fluid of the collector field, and would provide a means for transferring the collected solar energy to the heat exchangers. The collected solar energy would be used to convert water to steam for use in a conventional steam turbine generator to produce electricity. The Solana Project would employ molten salt storage tanks to retain and store up to 6 hours of heat, which could be dispatched as needed, and would allow Solana to produce electricity on cloudy days and after sunset.

The Solana Project would interconnect to the regional transmission grid via the Solana Gen-Tie, which would originate at the Solana Generating Plant and terminate at the existing Arizona Public Service Company Panda Substation, approximately 18.2 miles east of the Solana Project. The Solana Gen-Tie would consist of transmission structures, single-circuit conductors (three wires), and two overhead ground wires, one of which would contain a fiber-optic cable to serve as a communications system for the Solana Project. The transmission structures would be steel

[1] The amount requested for the loan guarantee is not being disclosed at this time because it is business sensitive. Moreover, should DOE approve a loan guarantee, the amount may differ from the original request.

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monopoles approximately 100 to 140 feet tall, depending on the span length required, with a maximum height of 190 feet above the ground surface.

All discussion and analysis related to the potential impacts of construction and operation of the proposed Solana Project are contained in the Final EA (DOE/EA-1683), which is incorporated here by reference. DOE examined potential impacts on the following resources and found none to be significant: floodplains; wetlands; water resources and water quality; threatened or endangered species and critical habitats; prime or unique farmlands; geology and soils; visual, recreational, and aesthetic resources; property of historic, archaeological, or architectural significance; Native American concerns; environmental justice; public health and safety; air quality; global climate change; waste management; transportation; socioeconomic conditions; noise; and terrorism-related impacts.

In accordance with applicable regulations and policies, DOE sent a notification letter regarding the Department's determination to prepare an EA to American Indian Tribes, the Arizona Department of Environmental Quality and the City of Gila Bend on July 8, 2009. The letter described the proposed action and stated that a draft EA would be sent to the state for review. On April 6, 2010, DOE sent the Draft EA to American Indian Tribes, the Arizona Department of Environmental Quality, and the City of Gila Bend inviting their comments on the draft. The Draft EA was also posted on the Loan Guarantee Program Office website. DOE received a comment letter from the Arizona Department of Environmental Quality (AZ DEQ) on April 27, 2010, requesting clarification on the use of the sewage pumps mentioned in Table 3-7 (Sound Level Specifications for Standard Packaged Equipment) of the Draft EA. Information was added to the EA indicating that these are transfer pumps which channel wastewater from cooling tower blowdown to evaporation ponds and would not involve sewage. The letter also provided additional information regarding the process for various AZ DEQ permits that were listed in the EA at Table 2-1.

DETERMINATION: On the basis of the Final EA, DOE has determined that providing a Federal loan guarantee to Abengoa for construction and startup of a 280MW CSP facility and its associated transmission line near Gila Bend, AZ, will not have a significant affect on the human environment. The preparation of an environmental impact statement is therefore not required, and DOE is issuing this Finding of No Significant Impact.

Copies of the Final EA are available at the DOE Loan Guarantee Program Office website at http://www.lgprogram.energy.gov/NEPA-1.html or from

Joseph Marhamati
NEPA Document Manager
U.S. Department of Energy
1000 Independence Ave, SW
Suite 4B-196 CF1.3
Washington, DC 20585
Joseph.Marhamati@hq.doe.gov

Additional information on the DOE NEPA process is available from:

Carol M. Borgstrom, Director
Office of NEPA Policy and Compliance (GC-54)
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
202-586-4600 or 1-800-472-2756

Issued in Washington, DC on the 6th day of May in the year 2010.

Jonathan Silver
Executive Director, Loan Programs