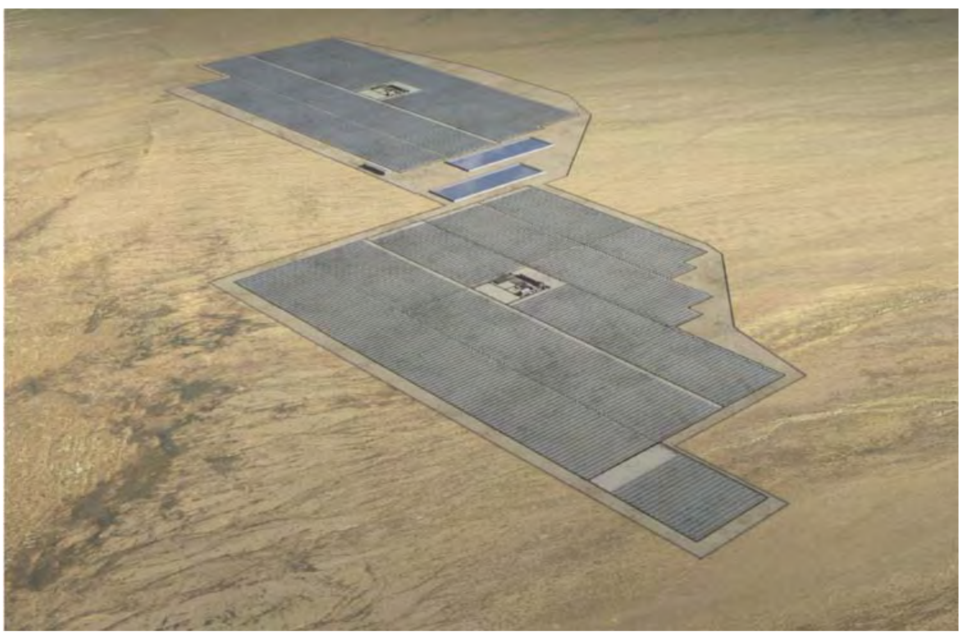
BLM

Bureau of Land Management

PLAN AMENDMENT/FINAL EIS FOR THE GENESIS SOLAR ENERGY PROJECT

Volume 1 of 3



August 2010

DOI Control No. FES 10-42

United States Department of the Interior
Bureau of Land Management

Plan Amendment / Final EIS
for the
Genesis Solar Energy Project

For the

Palm Springs – South Coast Field Office
Palm Springs, California

August 2010

John R. Kalish

John R. Kalish
Field Manager

8/27/2010

Date

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United States Department of the Interior

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In reply refer to:
CACA 048880

August 27, 2010

Dear Reader:

Enclosed is the Proposed Resource Management Plan-Amendment/Final Environmental Impact Statement (PA/FEIS) for the California Desert Conservation Area (CDCA) Plan and Genesis Solar Energy Project (GSEP). The Bureau of Land Management (BLM) prepared the PA/FEIS in consultation with cooperating agencies, taking into account public comments received during the National Environmental Policy Act (NEPA) process. The proposed decision on the plan amendment would add the GSEP site to those identified in the current CDCA Plan, as amended, for solar energy production. The preferred alternative on the GSEP is to approve the dry cooling alternative to the right-of-way grant applied for by Genesis Solar, LLC.

This PA/FEIS for the GSEP has been developed in accordance with NEPA and the Federal Land Policy and Management Act of 1976. The PA is largely based on the preferred alternative in the Draft Resource Management Plan-Amendment/Draft Environmental Impact Statement (DRMP-A/DEIS), which was released on April 9, 2010. The PA/FEIS for the GSEP contains the proposed plan and project description, a summary of changes made between the DRMP-A/DEIS and PRMP-A/FEIS, an analysis of the impacts of the decisions, a summary of written comments received during the public review period for the DRMP-A/DEIS and responses to comments.

The BLM will be accepting additional public comment on the PA/FEIS within 30 days after the Environmental Protection Agency publishes the Notice of Availability in the Federal Register. Comments can be sent to Allison Shaffer, Project Manager, by mail: 1201 Bird Center Drive, Palm Springs, CA, 92264; phone: (760) 833-7100; or email CAPSSolarNextEraFPL@blm.gov. All substantive comments will be reviewed and responded to in the Record of Decision.

Pursuant to BLM's planning regulations at 43 Code of Federal Regulations (CFR) 1610.5-2, any person who participated in the planning process for the PA and has an interest that is or may be adversely affected by the proposed resource management plan amendment may protest such amendment within 30 days from the date the Environmental Protection Agency (EPA) publishes its notice of availability for the PA/FEIS in the *Federal Register*. Unlike the planning decision, issuance of the proposed right-of-way grant is an implementation decision that is not subject to protest under the BLM planning regulations.

For further information on filing a protest, please see the accompanying protest regulations in the pages that follow (Attachment 1). The regulations specify the required elements in a protest. Protesting parties should take care to document all relevant facts and, as much as possible, reference or cite the planning documents or available planning records (e.g., meeting minutes or summaries, correspondence, etc.). To aid in ensuring the completeness of the protest, a protest checklist is attached to this letter (labeled as Attachment 2).

All protests must be in writing and mailed to one of the following addresses:

Regular Mail:
Director (210)
Attention: Brenda Hudgens-Wi1Iiams
BLM Protest Coordinator
P.O. Box 66538
Washington, D.C. 20035

Overnight Mail or Other Delivery:
Director (210)
Attention: Brenda Hudgens-Williams
BLM Protest Coordinator
1620 L Street, N.W., Soite 1075
Washington, D.C. 20036

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

Emailed and faxed protests will not be accepted as valid protests unless the protesting party also provides the original letter by either regular or overnight mail postmarked by the close of the protest period. Under these conditions, the BLM will consider the emailed or faxed protest as an advance copy and will afford it full consideration. If you wish to provide the BLM with such advance notification, please direct faxed protests to the attention of Brenda Hudgens-Williams - BLM Protest Expeditor at 202-912-7129, and emailed protests to Brenda Hudgens-WiIliamS@blm.gov.

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

Upon resolution of aU protests, the BLM may issue a Record of Decision (ROD) adopting the Approved PA and making a decision regarding issuance of the right-of-way grant for the GSEP. Copies of the ROD will be mailed or made available electronically to all who participated in this NEPA process and will be available to all parties through the "Planning" page of the BLM national website *(http://www.blm.gov/plann ini)*, or by mail upon request.

Sincerely,

John R. Kalish
Field Manager

Attachment 1

Protest Regulations

[CITE: 43CFR1610.5-2]

TITLE 43--PUBLIC LANDS: INTERIOR
CHAPTER II--BUREAU OF LAND MANAGEMENT, DEPARTMENT OF THE INTERIOR
PART 1600--PLANNING, PROGRAMMING, BUDGETING--Table of Contents
Subpart 1610--Resource Management Planning
Sec. 1610.5-2 Protest procedures.

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

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

(2) The protest shall contain:

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

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

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

Attachment 2

Resource Management Plan Protest
Critical Item Checklist

The following items *must* be included to constitute a valid protest whether using this optional format, or a narrative letter.
(43 CFR 1610.5-2)

BLM's practice is to make comments, including names and home addresses of respondents, available for public review. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, be advised that your entire comment--including your personal identifying information--may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so. All submissions from organizations and businesses, and from individuals identifying themselves as representatives or officials of organizations and businesses, will be available for public inspection in their entirety.

Resource Management Plan (RMP) or Amendment (RMPA) being protested:

Name:
Address:
Phone Number: ( )

Your interest in filing this protest (how will you be adversely affected by the approval or amendment of this plan?):

Issue or issues being protested:

Statement of the part or parts of the plan being protested:

Attach copies of all documents addressing the issue(s) that were submitted during the planning process by the protesting party, OR an indication of the date the issue(s) were discussed for the record.
Date(s):

A concise statement explaining why the State Director's decision is believed to be wrong:

Palm Springs South Coast Field Office

Genesis Solar Energy Project

Plan Amendment/Final Environmental Impact Statement

Lead Agency: Bureau of Land Management (BLM)
Palm Springs / South Coast Field Office (PSSCFO)
Palm Springs, California

For further information, contact:
Allison Shaffer, Project Manager PSSCFO -
1201 Bird Center Drive, Palm Springs, CA 92262

Abstract

This Plan Amendment/Final Environmental Impact Statement (PA/FEIS) addresses the possible United States Bureau of Land Management (BLM) approval of an amendment to the *California Desert Conservation Area Plan* (CDCA Plan) to allow for solar energy and of a right-of-way (ROW) grant to lease land managed by the BLM for construction, operation and decommissioning of a solar electricity generation facility. The Agency Preferred Alternative covers approximately 1,746 acres (ac), managed by the BLM, and would generate 250 megawatts (MW) of electricity. The PA/FEIS identifies impacts of the Agency Preferred Alternative, including impacts related to biological resources, cultural resources, land use, visual resources, and hydrology, water quality, and water use. Many of these adverse impacts can be avoided or substantially reduced based on compliance with applicable laws, ordinances, regulations and standards, and compliance with measures provided in this PA/FEIS.

Chapter 2 discusses the Genesis Solar Energy Project (GSEP) (250 MW on approximately 1,746 ac), a 250 MW Dry Cooling Alternative (250 MW on approximately 1,746 ac), a 125 MW Reduced Acreage Alternative (125 MW on approximately 950 ac), the No Action Alternative (No ROW Grant and No CDCA Plan Amendment), the No Project Alternative (No ROW Grant and Amend the CDCA Plan for No Solar), and the No Project Alternative (No ROW Grant and Amend the CDCA Plan for Other Solar). Chapter 3 describes the existing conditions on and in the vicinity of the project site. Chapter 4 describes the potential adverse environmental impacts expected under each of the Alternatives, including the Agency Preferred Alternative.

The Field Manager of the PSSCFO has the authority for site management of future activities related to the ROW grant and is the BLM Authorized Officer for this FEIS.

Relationship to the Genesis Solar Energy Project Staff Assessment and Draft Environmental Impact Statement

In accordance with the National Environmental Policy Act (NEPA), Federal Land Policy and Management Act (FLPMA), and California Environmental Quality Act (CEQA), the Bureau of Land Management (BLM) and the California Energy Commission (CEC) cooperatively prepared a Staff Assessment (SA) and Draft Environmental Impact Statement (DEIS) as a joint environmental analysis (SA/DEIS) to evaluate environmental impacts of the California Desert Conservation Area (CDCA) Plan Amendment applied for by Genesis Solar, for the Genesis Solar Energy Project (GSEP or proposed action).

The SA/DEIS satisfies NEPA, FLPMA and CEQA requirements. However, the format of the SA/DEIS differs from the format typically used for EISs prepared by the BLM. Therefore, this proposed Plan Amendment/Final EIS (PA/FEIS) has been prepared as a stand-alone document to provide the reader with a more familiar EIS format.

During this process, the Applicant provided information to the CEC (including, but not limited to, the Application for Certification, data responses and other related information) that informed best management practices, applicant proposed measures and mitigation measures that were included in the SA/DEIS. For purposes of this NEPA analysis, due to the evolution of such information throughout the environmental review process, measures initially proposed as "applicant proposed measures" are included as Mitigation Measures where applicable rather than as part of the Project Description.

The SA/DEIS provides the basis for the analyses presented in this PA/FEIS. The following table correlates the applicable SA/DEIS chapters to the PA/FEIS chapters provided herein.

PROPOSED PA/FEIS AND SA/DEIS CORRELATION CHART

PA/FEIS Chapter	SA/DEIS Chapter
Chapter 1 Introduction	A. Introduction
Chapter 2 Proposed Action and Alternatives	B. Description of the Proposed Project and Alternatives D.1 Facility Design D.3 Power Plant Efficiency D.4 Power Plant Reliability D.5 Transmission System Engineering E. General Conditions
Chapter 3: Affected Environment	
3.01 Introduction	C. Environmental Analysis
3.02 Air Resources	C.1 Air Quality
3.03 Global Climate Change	C.1 Air Quality
3.04 Cultural Resources	C.3 Cultural Resources and Native American Values
3.05 Environmental Justice	C.8 Socioeconomic and Environmental Justice
3.06 Lands and Realty	C.6 Land Use, Recreation, and Wilderness
3.07 Livestock and Grazing	Not applicable
3.08 Mineral Resources	D.2 Geology, Paleontology, and Minerals
3.09 Multiple Use Classes	C.6 Land Use, Recreation, and Wilderness
3.10 Noise	C.7 Noise and Vibration
3.11 Paleontological Resources	D.2 Geology, Paleontology, and Minerals
3.12 Public Health Safety	C.4 Hazardous Materials Management C.5 Health and Safety C.11 Transmission Line Safety and Nuisance C.13 Waste Management C.14 Worker Safety and Fire Protection
3.13 Recreation	C.6 Land Use, Recreation, and Wilderness
3.14 Social Economics	C.8 Socioeconomic and Environmental Justice
3.15 Soils Resources	C.9 Soil and Water Resources
3.16 Special Designations	C.6 Land Use, Recreation, and Wilderness
3.17 Transportation and Public Access – OHV	C.10 Traffic and Transportation
3.18 Vegetation Resources	C.2 Biological Resources
3.19 Visual Resources	C.12 Visual Resources
3.20 Water Resources	C.9 Soil and Water Resources
3.21 Wild Horse and Burros	Not applicable
3.22 Wildland and Fire Ecology	C.2 Biological Resources
3.23 Wildlife Resources	C.2 Biological Resources C.14 Worker Safety and Fire Protection
Chapter 4: Environmental Consequence	C. Environmental Analysis
4.01 Introduction	Not applicable
4.02 Impacts on Air Resources	C.1 Air Quality

PA/FEIS Chapter	SA/DEIS Chapter
4.03 Impacts to Global Climate Change	C.1 Air Quality
4.04 Impacts on Cultural Resources	C.3 Cultural Resources and Native American Values
4.05 Impacts on Environmental Justice	C.8 Socioeconomic and Environmental Justice
4.06 Impacts on Lands and Realty	C.6 Land Use, Recreation, and Wilderness
4.07 Impacts on Mineral Resources	D.2 Geology, Paleontology, and Minerals
4.08 Impacts on Multiple Use Classes	C.6 Land Use, Recreation, and Wilderness
4.09 Impacts on Noise	C.7 Noise and Vibration
4.10 Impacts on Paleontological Resources	D.2 Geology, Paleontology, and Minerals
4.11 Impacts on Public Health Safety	C.4 Hazardous Materials Management C.5 Health and Safety C.11 Transmission Line Safety and Nuisance C.13 Waste Management C.14 Worker Safety and Fire Protection
4.12 Impacts on Recreation	C.6 Land Use, Recreation, and Wilderness
4.13 Social and Economic Impacts	C.8 Socioeconomic and Environmental Justice
4.14 Impacts on Soils Resources	C.9 Soil and Water Resources
4.15 Impacts on Special Designations	C.6 Land Use, Recreation, and Wilderness
4.16 Impacts on Transportation and Public Access - Off-Highway Vehicle Resources	C.10 Traffic and Transportation
4.17 Impacts on Vegetation Resources	C.2 Biological Resources
4.18 Impacts on Visual Resources	C.12 Visual Resources
4.19 Impacts on Water Resources	C.9 Soil and Water Resources
4.20 Impacts on Wildland and Fire Ecology	C.2 Biological Resources
4.21 Impacts on Wildlife Resources	C.2 Biological Resources C.14 Worker Safety and Fire Protection
Chapter 5 Consultation Coordination	F. List of Preparers

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A. Figures

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A. Figures (continued)

EXECUTIVE SUMMARY

ES.1 Background and Organization

In August 2007, the United States Bureau of Land Management (BLM) California Desert District and the California Energy Commission (CEC) and entered into a Memorandum of Understanding (MOU) to jointly develop the environmental analysis documentation for solar thermal projects which are under the jurisdiction of both agencies. Consistent with that MOU, the BLM and the CEC prepared a joint environmental compliance document to address the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) for the Genesis Solar Energy Project (GSEP). Specifically, a Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) was prepared and was circulated for agency and public review and comment between April 9, 2010, and July 8, 2010. The SA/DEIS is incorporated by reference in this Plan Amendment/Final Environmental Impact Statement (PA/FEIS).

The BLM and the CEC prepared separate final documents for compliance with NEPA and CEQA, respectively. Specifically, the BLM prepared this PA/FEIS for the GSEP. The SA/DEIS was the primary reference used in preparing this FEIS. The SA/DEIS is incorporated by reference in this FEIS. The comments received on the DEIS are addressed in this PA/FEIS. After the publication of this PA/FEIS, the BLM will prepare a Record of Decision (ROD) regarding the Proposed Action (Agency Preferred Alternative). The publication of the ROD in the Federal Register is the final step required of the BLM to meet the requirements of NEPA for the GSEP.

ES.2 Lead Agencies’ Roles and Approvals

The BLM’s authority for the Proposed Action includes the Federal Land Policy and Management Act (FLPMA) of 1976, Section 211 of the Energy Policy Act, and BLM’s Solar Energy Development Policy. The FLPMA authorizes the BLM to issue right-of-way (ROW) grants for renewable energy projects. BLM’s authority also extends to the BLM lands in the Palm Springs/South Coast Field Office, which are governed by the California Desert Conservation Area Plan (1980, as amended) (CDCA Plan). Because the CDCA Plan would need to be amended to allow the GSEP on the proposed site, BLM would also oversee that CDCA Plan amendment process for the project.

The CEC has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants in California which generate 50 or more MW. The CEC certification is in lieu of any permit required by State, regional, or local agencies. The CEC must review power plant Applications for Certification (AFCs) to assess potential environmental impacts and compliance with applicable laws, ordinances, regulations, and standards (LORS). The CEC analyses regarding the BSPP in the SA/DEIS were prepared in accordance with the requirements of CEQA.

ES.3 Purpose and Need

BLM Purpose and Need

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

The BLM's purpose and need for the GSEP is to respond to Genesis Solar, LLC's application under Title V of FLPMA (43 U.S.C. 1761) for a ROW grant to construct, operate, maintain and decommission a solar thermal facility on public lands in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to Genesis Solar, LLC for the proposed GSEP. The BLM's action will also include consideration of amending the California Desert Conservation Area Plan (CDCA) 1980, as amended concurrently. The CDCA, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not identified in that plan be considered through the land use plan amendment process. If the BLM decides to approve the issuance of a ROW grant, the BLM will also amend the CDCA as required.

In conjunction with FLPMA, BLM authorities include:

1. Executive order 13212, dated May 18, 2001, which mandates that agencies act expediently and in a manner consistent with applicable laws to increase the "production and transmission of energy in a safe and environmentally sound manner."

2. The Energy Policy Act 2005 (EPAct), which sets forth the "sense of Congress" that the Secretary of the Interior should seek to have approved non-hydropower renewable energy projects on the public lands with a generation capacity of at least 10,000 MW by 2015.

3. Secretarial Order 3285A1, dated March 11, 2009 and amended on Feb 22, 2010, which "establishes the development of renewable energy as a priority for the Department of the Interior."

Department of Energy Purpose and Need

The Applicant submitted an application to DOE on June 4, 2010 for a Federal loan guarantee for the GSEP in response to a DOE competitive solicitation, "Commercial Technology Renewable Energy Generation Projects Under the Financial Institution Partnership Program." This solicitation was issued under section 1705, Title XVII, of the Energy Policy Act of 2005 (EPAct). Section 406 of the American Recovery and Reinvestment Act of 2009 (the "Recovery Act") amended EPAct, adding section 1705, designed to address the current economic conditions of the Nation, in part, through eligible renewable projects to generate electricity, to commence construction no later than September 30, 2011. DOE is carrying out a detailed financial, technical, and legal evaluation of the project in response to that solicitation, and is in the course of negotiating the terms and conditions of a possible federal loan guarantee pursuant to its procedures set out at 10 CFR Part 609. DOE is a cooperating agency on this EIS pursuant to a Memorandum of Agreement between DOE and BLM signed in January 2010, and would use this EIS to meet its NEPA requirements in making a determination of funding.

Title XVII of the Energy Policy Act of 2005 (EPAct), P.L. 109-58 as amended by section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the “Recovery Act”), established a Federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII authorizes the Secretary of Energy to make loan guarantees for various types of projects, including those that “avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued.” Section 406 of the Recovery Act added section 1705, which is designed to address the current economic conditions of the nation, in part, through eligible renewable and transmission projects to commence construction no later than September 30, 2011. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and state and local fiscal stabilization. The purpose and need for DOE action would be to comply with its mandate by selecting eligible projects that meet the goals of EPAct and the Recovery Act.

Energy Commission Project Objectives

The CEQA guidelines require a clearly written statement of objectives to guide the lead agency in developing a reasonable range of alternatives and aid decision-makers in preparing findings or a statement of overriding considerations. CEQA specifies that the statement of objectives should include the underlying purpose of the project (Section 15126.6(a)). After considering the objectives set out by the applicant, the Energy Commission identified the following basic project objectives, which are used to evaluate the viability of alternatives in accordance with CEQA:

1. To construct a utility-scale solar energy project of up to 250 MW and interconnect directly to the CAISO Grid while minimizing additions to electrical infrastructure; and

2. To locate the facility in areas of high solar insolation.

3. In addition, when considering retention or elimination of alternative renewable technologies, in addition to evaluating the likelihood of reducing or eliminating the potential impacts of Genesis Solar Energy Project at its proposed site, staff evaluated whether alternative technologies could meet the following key project objectives:

4. To provide clean, renewable electricity and to assist Southern California Edison (SCE) in meeting its obligations under California’s Renewable Portfolio Standard Program (RPS);

5. To assist SCE in reducing its greenhouse gas emissions as required by the California Global Warming Solutions Act; and

6. To contribute to the achievement of the 33% renewables RPS target set by California's governor and legislature

7. To complete the review process in a timeframe that would allow the applicant to start construction or meet the economic performance guidelines by December 31, 2010 to potentially qualify for the 2009 ARRA cash grant in lieu of tax credits for certain renewable energy projects.

ES.4 Proposed Action and Plan Amendment

Genesis Solar, LLC, (Applicant) proposes to construct, operate, maintain and decommission the GSEP or Proposed Action which includes a 250 MW solar generating facility, 230-kV transmission line (gen-tie) and ancillary facilities (access road and natural gas pipeline) on BLM-administered land, approximately 25 miles west of the city of Blythe and five miles north of the Interstate-10 freeway (see Figure 1-1). The Applicant is seeking a right-of-way (ROW) grant for approximately 4,640 acres. Construction and operation of the GSEP would disturb a total of about 1,808 acres. Remaining acreage that would not be disturbed may not be part of the ROW grant.

The GSEP would include the construction and operation of two adjacent, independent, nearly identical power block units (Units) of 125 MW nominal capacity each for a total nominal capacity of 250 MW commercial solar parabolic trough generating station and ancillary facilities (see Figure 2-1 and Figure 2-2). The GSEP would be constructed in two phases. Each phase is designed to build one Unit to provide a approximately 125 MW of electricity and would occupy an estimated 900 acres. The GSEP would be connected to Southern California Edison's planned Colorado River Substation, which would be located approximately 11 miles southeast of the GSEP area, via the proposed gen-tie line, a 230 kV transmission line.

The Applicant did not request a CDCA Plan amendment directly. Nonetheless, the BLM has determined that a CDCA Plan amendment would be required if a ROW were granted for a solar power generating facility on the proposed site. Regardless of whether the proposed project is approved, the BLM could elect to amend the CDCA Plan. Consequently, the following range of outcomes of the BLM's potential CDCA Plan amendment process is as follows:

PA1 – The CDCA (1980, as amended) would be amended to approve this site for development of this facility And all other types of solar energy development. (This is the proposed land use plan amendment.)

PA2 – The CDCA Plan (1980, as amended) would not be amended. (This is No Action Alternative A, discussed in Table ES-1.)

PA3 – The CDCA Plan (1980, as amended) would be amended to identify the GSEP application area as unsuitable for any type of solar energy development. (This is a no project alternative called "No Action Alternative B" and is discussed in Table ES-1.)

PA4 – The CDCA Plan (1980, as amended) would be amended to identify the GSEP application area as suitable for any type of solar energy development. (This is a no project alternative called "No Action Alternative C" and is discussed in Table ES-1.)

ES.5 Ancillary/Connected/Cumulative Actions

Telecommunications and Telemetry

Telecommunications services would be provided by a local provider via either fiber optic cable or microwave. Fiber optic cable would be buried in a shallow trench or strung on the power distribution line or gen-tie line, or a combination of both methods within the disturbed areas of the other linear facilities. (See Figure 2-8)

Natural Gas Pipeline

A new eight-inch diameter, 6.5-mile long natural gas pipeline would be constructed to connect the project to an existing Southern California Gas (SCG) pipeline situated south of I-10. The line would be buried with a minimum three feet of cover depending on location.

Construction of the gas pipeline would be built to SCG standards and would take approximately three to six months. Most major pieces of pipeline construction equipment would remain along the pipeline ROW during construction with storage and staging of equipment and supplies located at the site or other acceptable site selected by SCG at the time construction is underway. Excavated earth material would be stored within the construction ROW.

Distribution Line

Construction power would be provided by the local distribution system and routed to the site along wood poles within the 230 kV ROW (see Figure 2-8).

Colorado River Substation Expansion

This Proposed Action involves expanding the already approved, but not yet constructed, 500 kV SCE switchyard by approximately 65 acres into a full 500/220 kV substation on approximately 90 acres of land.

Cumulative Scenario

There are a large number of renewable energy and other projects proposed throughout the California desert that were identified as potentially contributing to cumulative environmental impacts. Those cumulative projects are discussed in detail in Section 4.1.4, Cumulative Scenario Approach.

ES.6 Alternatives to the Proposed Action

Table ES-1 summarizes the GSEP, the Agency Preferred Alternative, as well as the other Alternatives evaluated in this PA/FEIS. The GSEP is the originally Proposed Action. All of these Alternatives are described in detail in Chapter 2, Proposed Action and Alternatives.

TABLE ES-1
SUMMARY OF ALTERNATIVES EVALUATED IN THE PA/FEIS

Alternative	Comments
Proposed Action 250 MW; 1,807 acres disturbed BLM amends CDCA Plan for GSEP	This is the GSEP and was the original Proposed Action.
Dry Cooling Alternative 250 MW; 1,807 acres disturbed BLM amends CDCA Plan for GSEP	This is an alternative that would use dry cooling technology to generate the same energy output using the same footprint, but would reduce water consumption by 87%; it also is the Agency Preferred Alternative.
Reduced Acreage Alternative 125 MW (50 percent of MW of the GSEP); 1,012 acres disturbed (795 acres less than the GSEP) BLM amends CDCA Plan for Reduced Acreage Alternative	This is a reduced project that would develop only one of the two Units proposed under the GSEP. The same solar trough technology would be used as for the GSEP.
No Action Alternative A BLM does not approve the ROW Grant for the GSEP BLM does not amend the CDCA Plan	This No Action Alternative was evaluated in the SA/DEIS under both CEQA and NEPA.
No Project Alternative B BLM does not authorize the ROW grant for the GSEP; BLM amends the CDCA Plan to make the project site unavailable for any type of solar energy development.	This No Project Alternative was evaluated in the SA/DEIS under NEPA only. This is not a typical "No Project" Alternative because the BLM would take action to amend the CDCA Plan under this Alternative. However, it was evaluated because it provided an opportunity for the BLM to consider the effects of not approving the ROW grant application and also amending the CDCA Plan to make the specific GSEP site unavailable for future solar development.
No Project Alternative C BLM does not authorize the ROW grant for the GSEP; BLM amends the CDCA Plan to make the project site available for any type of solar energy development.	This No Project Alternative was evaluated in the SA/DEIS under NEPA only. This is not a typical "No Project" Alternative because the BLM would take action to amend the CDCA Plan under this Alternative. However, it was evaluated because it provided an opportunity for the BLM to consider the effects of not approving the ROW grant application and also amending the CDCA Plan to make the specific GSEP site available for future solar development.

ES.7 Affected Environment

The GSEP would be located on public land managed by the BLM approximately six miles north of the I-10 freeway and 25 miles west of the City of Blythe, California. The Proposed Action includes a 230-kilovolt (kV) transmission line that would interconnect with the regional grid at Southern California Edison's (SCE) planned Colorado River Substation about 11 miles southeast the plant site. The Applicant has applied for a right-of-way (ROW) grant from BLM for approximately 4,640 acres of flat desert terrain. Within these 4,640 acres, construction and operation would disturb approximately 1,808 acres. Remaining acreage that would not be disturbed would not be part of the ROW grant.

The Genesis Solar Energy Project (GSEP) would be located within the northeastern portion of Chuckwalla Valley, an area east of Palm Springs. The range of the Chuckwalla Valley is from 400 feet above mean sea level at Ford Dry Lake to approximately 1,800 feet above mean sea level along some of the bajadas that occur west of Desert Center, California with the surrounding mountains rising to over 3,000 above mean sea level (GSEP 2009a). Depending on the published reference, the GSEP site is located in either the southeastern portion of the Mojave Desert geomorphic province (CGS 2002a), or the northeastern quarter of the Colorado Desert geomorphic province (Norris and Webb 1990), in the Mojave Desert of Southern California near the Arizona border.

The GSEP area supports four major upland natural communities. The majority of the GSEP Disturbance Area supports Sonoran creosote bush scrub; the eastern portion of the GSEP Disturbance Area also supports stabilized and partially stabilized desert dunes. A small amount of playa and sand drifts over playa occur within the GSEP Disturbance Area along the margins of Ford Dry Lake. The larger surveyed area, the GSEP area, supports chenopod scrub, and desert wash woodland in addition to the two vegetation communities mentioned above (GSEP 2009a). All of these communities except the Sonoran creosote bush scrub are considered sensitive according to the NECO plan. Additionally, the southern linear facility route was determined by the applicant to support wash-associated, microphyll riparian woodland communities (GSEP 2009f, BIO-DR-70). Dry desert wash woodland and microphyllous riparian vegetation are described in detail in the section on Ephemeral Washes/ Waters of the State. A variety of wildlife occupies the habitats on and in the vicinity of the project site.

The GSEP Site lies on a broad, relatively flat, southward sloping surface dominantly underlain by alluvial deposits derived from the Palen Mountains to the north and the McCoy Mountains to the east. The alluvial deposits have created two distinct landform types and several discernable landform ages. The deposits immediately adjacent to the mountains have formed alluvial fans from multiple identifiable sources, and multiple fan surfaces have coalesced into a single bajada surface that wraps around each of these mountain fronts. Between the bajada surfaces from each mountain chain is a broad valley-axial drainage that extends southward between the mountains and drains to the Ford Dry Lake playa, located about 1 mile south of the Site (WPAR 2009a).

ES.8 Environmental Consequences

Table ES-2 summarizes the environmental impacts that would occur as a result of the GSEP and Alternatives by environmental parameter. Appendix G, Conditions of Certification, identify the mitigation measures, project features, and other measures included to avoid or substantially reduce adverse impacts. The unavoidable adverse impacts that would remain after mitigation are also discussed at the end of each section in Chapter 4.

TABLE ES-2
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Air	• *Construction*: NOx=182 tons/yr; VOC=46 tons/yr; CO=363 tons/yr; PM10=41 tons/yr; PM2.5=16 tons/yr; and Sox=0.47 tons/yr • *Operations*: NOx= 3 tons/yr; VOC=16 tons/yr; CO=7 tons/yr; PM10=21 tons/yr; PM2.5=7; tons/yr; and Sox=0.02 tons/yr • *Decommissioning*: Comparable in type and magnitude, but likely to be lower than, the construction emissions	Slightly higher construction emissions; 3.8-tons per year reduction in operational particulate emissions; slightly lower operational emissions.	Similar to the Proposed Action	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Short term: no impact Long term: Similar to Proposed Action
Global Climate Change	• *Construction*: GHG: 52,974 CO_2-Equivalent and loss in carbon uptake of about 2,584 MT of CO_2 per year due to vegetation removal • *Operations*: 4,133 CO_2-Equivalent • *Decommissioning*: Comparable in type and magnitude, but likely to be lower than, the construction emissions	Slightly reduced from the Proposed Action	Approximately 50% less than the Proposed Action	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Similar to the Proposed Action
Cultural	• 27 sites considered to be significant (12 prehistoric and 15 historic) • Possibly additional resources yet to be discovered during construction • The integrity of setting and integrity of feeling of two potential archaeological/historic landscapes	Same as Proposed Action	Impacts are reduced to 20 known sites.	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.
Environ-mental Justice	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Lands and Realty	• Minimal and mitigable impacts to designated corridors and Interstate 10 from overhead gen-tie power line and underground pipeline crossing. • No impacts to existing uses.	Similar to the Proposed Action	Similar to the Proposed Action	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.
Livestock Grazing	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

TABLE ES-2 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

	ALTERNATIVES					
Resource	**Proposed Action**	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Minerals	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Multiple Use Classes	• *Construction*: 1800 acres of MUC Class M (Moderate) affected. • *Operations*: restriction of multiple use opportunities on the site to a single dominant use.	Same as Proposed Action	Approximately 50% less than the Proposed Action	No Impact; similar impacts if other utility-scale solar power facilities built in future.	No Impact.	Same as Proposed Action.
Noise	• *Construction*: short-term elevated noise levels at the prisons nine miles from the GSEP site would occur associated with high pressure steam blow. • *Operations*: No impact; no sensitive noise receptors within 5 miles; at 5 miles, noise levels would be approximately 30 dBA.	Similar to the Proposed Action, though slightly reduced.	Similar to the Proposed Action as there are no noise sensitive receptors in the vicinity.	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action
Paleonto-logical	• *Construction*: Damage and/or destruction of paleontological resources; possible net gain to the science of paleontology depending on fossils found. • *Operations*: No Impact. • *Decommissioning*: No Impact.	Same as Proposed Action	Approximately 50% less than the Proposed Action	No negative impact or potential benefits to science of paleontology. Long term impacts likely similar to Proposed Action.	No negative impact or potential benefits to science of paleontology. Impacts similar to the Proposed Action likely to occur in other locations.	Similar but reduced/increased proportionate to size of future development.
Public Health & Safety	• *Construction*: Risks to public health and contamination associated with construction equipment; safety risk of encountering unexploded munitions; risks of encountering abandoned mined lands. • *Operations*: large quantities of natural gas and Therminol VP1 would be used; no short- or long-term adverse human health effects are expected; risks of encountering abandoned mined lands; transmission line safety and nuisance hazards; traffic and transportation safety, including aviation safety; impacts to public and private airfields; and worker safety and fire protection impacts; and impacts associated with geologic hazards.	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action

TABLE ES-2 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	Dry Cooling Alternative	Reduced Acreage Alternative	No Action Alternative	No Project Alternative B	No Project Alternative C
Recreation	• *Construction*: impacts from noise, fugitive dust, and truck and other vehicle ingress and egress to the construction site. • *Operations*: site not available for recreational use; minimal impacts to other lands in the vicinity of the proposed site due to increased usage; site viewable by users in nearby elevated areas. • *Decommissioning*: dust and noise impacts similar to construction; after decommissioning area would be reclaimed for recreational use.	Operation, maintenance, and closure similar to Proposed Action.	Approximately 50% less than the Proposed Action	Similar to the Proposed Action.	Potential impacts could range from no impact to greater impact, depending on future site use.	Similar but reduced/increased proportionate to size of future development.
Social & Economics	• *Construction:* Employment of 646 workers (average) and 1,085 workers (peak). Most, if not all, expected to live within two hours of site. • Any temporary lodging demand met by existing housing or lodging. No new housing or motel development induced. • Total direct construction spending benefits of $165 million on labor and $14.5 million on materials. • Additional total indirect and induced spending benefits of $136.8 million and 358 jobs. • *Operations:* Annual employment of 65 workers of which at least 50% expected to live within two hours of site. • Any in-migration housing demand met by existing housing. No new housing growth induced. • Annual direct spending benefits of $6 million on labor and $0.5 million on materials. • Additional total indirect and induced spending benefits of $3.9 million and 32 jobs. • *Decommission:* Temporary spending and employment benefit from deconstruction and site restoration work. Subsequent long term adverse impact from lost project jobs and spending.	Same as Proposed Action	Similar but reduced proportionate to size of alternative	Similar to the Proposed Action	No Impact	Similar to the Proposed Action

TABLE ES-2 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Soils	• *Construction*: total earth movement of approximately 1 million cubic yards. Wind erosion generated soil loss of 29.7 tons per acre per year, reduced from 72.88 tons per acre per year without the GSEP. Water erosion generated soil loss of 21.95 tons per acre per year, increased from 1.53 tons per acre per year without the GSEP. • *Operations*: Wind erosion generated soil loss of 1.25 tons per acre per year, reduced from 72.88 tons per acre per year without the GSEP. Water erosion generated soil loss of 6.93 tons per acre per year, increased from 1.53 tons per acre per year without the GSEP.	Similar to Proposed Action	Peak construction: same as Proposed Action. Long term construction: less than Proposed Action. Operation: less than Proposed Action. Aeolian erosion and transport would be reduced to near zero. Similarly, the impacts on the Chuckwalla and Palen-McCoy sand corridors or the eastern wash complex would be removed.	No impact; potential for similar impacts in other locations.	No impact; potential for similar impacts in other locations.	Similar to Proposed Action
Special Designations	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Transpor-tation and Public Access – Off Highway Vehicle Resources	• *Construction*: temporary disturbance to motorized vehicles on local routes; traffic hazards from construction worker commuting and parking; increased traffic from construction activities; damage to roadways. Temporary closure of up to five OHV routes during construction of linears. • *Operations*: increased opportunities for vandalism, illegal cross-county use and other disruptive behavior from off-highway vehicles (OHV). • No impact to overall access for wilderness recreation; some impact to sightseeing and day use touring by OHV users.	Similar to Proposed Action.	Similar to Proposed Action	No impact to OHV routes and values; similar impacts to transportation.	No impact to OHV routes and values; similar impacts to transportation.	Similar impacts as Proposed Action.

TABLE ES-2 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Vegetation	1,773 acres vegetation communities lost; 90 acres ephemeral drainages lost; 196.5 acres sand dune habitat lost; 4 special status plant species impacted	Same as the Proposed Action in acreage, though indirect effects on vegetation may be reduced by reduction in groundwater pumping.	1,039 acres vegetation communities lost; 88 acres ephemeral drainages lost; 127.5 acres sand dune habitat lost; 4 special status plant species impacted. Indirect impacts on vegetation from groundwater use reduced by 50%. Eastern sand transport corridor not impacted.	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action
Visual	• *Construction*: Mitigable short-term impacts from construction lighting and visible dust plumes; minor to moderate effects from large-scale visual disturbance in the landscape. • *Operations*: Short-term adverse and unavoidable impacts from glint and glare. Minor to moderate long-term impacts for ground-level viewers. Long-term adverse and unavoidable impacts in the cumulative scenario for dispersed recreational viewers in surrounding mountains. • *Decommissioning*: Mitigable short-term impacts prior to successful restoration.	Similar to the Proposed Action; but dry cooling alternative would slightly increase the visual contrast of the GSEP from KOP-1.	Similar to the Proposed Action; the visual contrast remains the same for KOP-3, but would be slightly reduced from KOPs 1 and 2, as well as elevated viewpoints.	No Impact	No Impact	Future solar energy development could be expected to affect visual resources to the same degree and extent as referenced in the Proposed Action.
Water	• *Construction and Operation:* Groundwater extraction of up to 1,368 acre feet per year for 3 years of construction, and 1,644 acre feet per year for operation from the Chuckwalla Valley Groundwater Basin. A fraction of this water could be drawn indirectly from induced flows from the Colorado River. • Mitigable alteration of stormwater flows and drainage, including re-routing of existing flowpaths. • Mitigable surface water quality effects including use of detention basis, spreading fields, drainage channels, and spill cleanup facilities during operation.	Similar to the Proposed Action, although the operational use of groundwater is reduced to 218 acre feet per year.	Approximately 50% less than Proposed Action for groundwater consumption, similar to the Proposed Action for all others.	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action

TABLE ES-2 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Water (cont.)	• *Decommissioning*: Mitigable water quality effects due to use of heavy machinery and re-grading of site to match adjacent topography.					
Wild Horse & Burros	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Wildland Fire Ecology	Increase in threat of wildland fires in area during construction (due to increased vehicle use) and during operation (due to increased likelihood of invasive annual plant spread).	Similar to Proposed Action	Similar to Proposed Action	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action
Wildlife	• *Construction*: 1,774 acres wildlife habitat lost; 9 special status wildlife species impacted • *Operations*: disruption of migratory patterns; death or injury to individuals from striking powerlines, mirrors, arrays, poles or being struck by vehicles; increased predation.	Same as the Proposed Action in acreage, though indirect effects on vegetation and related resources for wildlife may be reduced by reduction in groundwater pumping.	*Construction*: 1,039 acres wildlife habitat lost; 9 special status wildlife species impacted on 50% fewer acres than Proposed Action *Operations*: Similar to Proposed Action	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action

ES.9 Areas of Controversy and Issues for Resolution

Based on input received from agencies, organizations, Native Americans and Tribal Governments, and members of the general public during the scoping for the SA/DEIS and in comments on the SA/DEIS, several areas of controversy related to the GSEP are:

- Opposition to the placement of a large solar project on essentially undisturbed desert land
- Support for locating renewable energy projects in urban or previously-developed areas
- Concern regarding the impacts of this large project on biological and cultural resources
- Concern regarding GHG emissions and climate change
- Concern regarding groundwater use
- Concern regarding the range of alternatives considered

Extensive comments were received during the scoping process for the GSEP. The scoping process and public input received during that process are provided in detail in Appendix C, Results of Scoping.

ES.10 Organizations and Persons Consulted

In addition to the scoping and SA/DEIS public review processes, the BLM has been consulting and coordinating with public agencies who may be requested to take action on the GSEP. Consultation and coordination is summarized below.

Native American Consultation and Coordination

A key part of a cultural resources analysis under NEPA, CEQA and Section 106 of the National Historic Preservation Act of 1966 (NHPA) is to determine which of the cultural resources that a proposed or alternative action may affect are important or historically significant. In accordance with 36 CFR Part 800.14(b), Programmatic Agreements (PAs) are used for the resolution of adverse effects for complex project situations and when effects on historic properties or resources eligible for or listed in the National Register of Historic Places (National Register) cannot be fully determined prior to approval of an undertaking. The BLM is preparing a PA in consultation with the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Officer (SHPO), the CEC, interested tribes (including tribal governments as part of government-to-government consultation), and other interested parties. The PA will govern the continued identification and evaluation of historic properties (eligible for the National Register) and historical resources (eligible for the California Register of Historic Places), as well as the resolution of any effects that may result from the GSEP. The consultation with the ACHP, SHPO and Native American Tribal Governments for the GSEP is ongoing.

United States Fish and Wildlife Service

The BLM permit, consultation, and conferencing with the United States Fish and Wildlife Service (USFWS) required for the GSEP is to comply with the Federal Endangered Species Act (ESA) for potential take of the Desert tortoise (*Gopherus agassizii*). Because Federal agency action has been identified for the GSEP project, ESA Section 7 consultation/conferencing between the BLM and USFWS is required prior to any take authorization for the GSEP from the USFWS. The BLM has submitted a Biological Assessment (BA) for take of this species to the USFWS for the GSEP. The process of consultation with USFWS for the GSEP is ongoing.

California Department of Fish and Game

Consultation with the California Department of Fish and Game (CDFG) is anticipated for possible impacts to waters of the State. It is possible CDFG will determine that a Lake and Streambed Alteration Agreement may be required for the GSEP for the impacts to jurisdictional State waters. The process of consultation with CDFG for the GSEP is ongoing.

ES.11 Public Participation

Scoping activities were conducted by the BLM in compliance with the requirements of NEPA for the GSEP. Many of these scoping activities were conducted jointly with the CEC. The BLM's scoping activities are described in detail in the Results of Scoping, which is provided in Appendix C. The scoping report documents the Notice of Intent, the scoping meetings, workshops, and the comments received during scoping.

ES.12 Comments and Responses

The BLM and CEC distributed the joint SA/DEIS for the GSEP for public and agency review and comment between April 9, 2010, and July 8, 2010. Fourteen comment letters were received. PA/FEIS Appendix H includes all of the written comment letters received by the BLM in response to the NOA. Section 5.5, Public Comment Process, provides responses to common and individual comments.

CHAPTER 1
Introduction and Purpose and Need

The Staff Assessment /Draft Environmental Impact Statement (SA/DEIS) was a joint document published by the California Energy Commission (CEC) and the Bureau of Land Management (BLM), U.S. Department of Interior. On April 7, 2010 both the CEC and BLM determined that they would develop and publish separate final documents. The BLM's document is called the Proposed Land Use Plan Amendment/Final Environmental Impact Statement (PA/FEIS).

Although BLM and the CEC are no longer publishing a joint document, the CEC and BLM continue to share staff expertise, information and documentation in order to promote intergovernmental coordination at the local, state, and federal levels.

This PA/FEIS analyzes the impacts of the Genesis Solar, LLC, (Applicant) Genesis Solar Energy Plant (GSEP) (formerly known as NextEra Ford Dry Lake Solar Power Plant).[1] The application for this project was filed with BLM as an Application for a Right-of-Way (ROW) Grant on public land (CACA 048810). Subsequent applications for a transmission line/access road (CACA 51198) and a natural gas pipeline (CACA 51203) have been filed. The Regional Context is shown in Figure 2-4 (See Appendix A for all figure references in the PA/FEIS) the Proposed Site Layout and Solar Unit Detail is shown in Figures 2-2, 2-6 and 2-7. This PA/FEIS presents the potential effects of the GSEP and five alternatives on BLM-administered and other affected lands and resources. In this analysis, 26 alternatives to the proposed GSEP were developed and evaluated. These include six alternative sites, solar and renewable technologies, generation technologies using different fuels, and conservation/demand-side management[2]. Of the 26 alternatives, two action alternatives were determined to be potentially feasible by the BLM: aReduced Acreage Alternative that would generate half the power of the Proposed Action (i.e., 125 MW), and the Dry Cooling Alternative that is the Proposed Action modified to utilize dry cooling. Additionally, a no action alternative and two plan amendment-only alternatives (no project) were also analyzed.

A Notice of Availability (NOA) of this Proposed PA/FEIS to be published by the Evironmental Protection Agency in the *Federal Register* will initiate a 30-day protest period on the Proposed PA. All protests on the Proposed PA must be filed with the Director of the BLM. Following resolution of any protests a Record of Decision (ROD) with respect to the Plan Amendment and the Project Application will be issued.

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1 Genesis Solar, LLC is a wholly-owned subsidiary of NextEra Energy Resources, LLC.

2 A variety of different technologies were considered and are described in detail in Section 2.6. They included different solar power technologies that have reduced water consumption, linear frensel technology, wind energy, geothermal energy, biomass energy, tidal energy, wave energy, natural gas, coal, and nuclear energy.

1.1 Purpose and Need

1.1.1 BLM Purpose and Need

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

The BLM's purpose and need for the GSEP is to respond to Genesis Solar, LLC's application under Title V of FLPMA (43 U.S.C. 1761) for a ROW grant to construct, operate, maintain and decommission a solar thermal facility on public lands in compliance with FLPMA, BLM ROW regulations, and other applicable Federal laws. The BLM will decide whether to approve, approve with modification, or deny issuance of a ROW grant to Genesis Solar, LLC for the proposed GSEP. The BLM's action will also include consideration of amending the California Desert Conservation Area Plan (CDCA) 1980, as amended concurrently. The CDCA, while recognizing the potential compatibility of solar generation facilities on public lands, requires that all sites associated with power generation or transmission not identified in that plan be considered through the land use plan amendment process. If the BLM decides to approve the issuance of a ROW grant, the BLM will also amend the CDCA as required.

In conjunction with FLPMA, BLM authorities include:

1. Executive order 13212, dated May 18, 2001, which mandates that agencies act expediently and in a manner consistent with applicable laws to increase the "production and transmission of energy in a safe and environmentally sound manner."

2. The Energy Policy Act 2005 (EPAct), which sets forth the "sense of Congress" that the Secretary of the Interior should seek to have approved non-hydropower renewable energy projects on the public lands with a generation capacity of at least 10,000 MW by 2015.

3. Secretarial Order 3285A1, dated March 11, 2009 and amended on Feb 22, 2010, which "establishes the development of renewable energy as a priority for the Department of the Interior."

1.1.2 DOE Purpose and Need

Title XVII of the Energy Policy Act of 2005 (EPAct), P.L. 109-58 as amended by section 406 of the American Recovery and Reinvestment Act of 2009, P.L. 111-5 (the "Recovery Act"), established a Federal loan guarantee program for eligible energy projects that employ innovative technologies. Title XVII authorizes the Secretary of Energy to make loan guarantees for various types of projects, including those that "avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases; and employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued." Section 406 of the Recovery Act added section 1705, which is designed to address the current economic conditions of the nation, in part, through eligible renewable and transmission projects to commence construction no later than September 30, 2011. The primary purposes of the Recovery Act are job preservation and creation, infrastructure investment, energy efficiency and science, assistance to the unemployed, and state and local fiscal stabilization. The purpose and need for DOE action would be to comply with its mandate by selecting eligible projects that meet the goals of EPAct and the Recovery Act.

Pursuant to provisions of section 1705, on October 7, 2009, DOE competitively solicited applications for a requirement titled, “Commercial Technology Renewable Energy Generation Projects Under the Financial Institution Partnership Program.” In response to that solicitation, the Applicant submitted an application to DOE on June 4, 2010, for a Federal loan guarantee for the GSEP. DOE is carrying out a detailed financial, technical, and legal evaluation of the project submitted by the loan applicant, and is in the course of negotiating the terms and conditions of a possible Federal loan guarantee pursuant to its procedures set out at 10 CFR Part 609. DOE is a cooperating agency on this EIS pursuant to a Memorandum of Agreement between DOE and BLM signed in January 2010, and would use this EIS to meet its NEPA requirements in making a determination of funding.

1.2 General Location and Map

The proposed GSEP is a concentrated solar thermal electric generating facility with two adjacent, independent, and identical units of 125 megawatt (MW) nominal capacity each for a total nominal capacity of 250 MW. The GSEP would be located approximately 17 miles east of the unincorporated community of Desert Center and 25 miles west of the Arizona-California border city of Blythe in Riverside County, California (see Figure 1-1).

As reflected in the applications filed with BLM(CACA 48880 for ROW, CACA 51198 for transmission/access, and CACA 51203 for a natural gas pipeline), the GSEP would be located entirely on BLM-administered land, in Township 6 South, Ranges 18 and 19 East, San Bernardino Meridian, in the Chuckwalla Valley in Riverside County, California. The applicant is seeking a ROW grant for approximately 4,640 acres. The GSEP would consist of the onsite solar generating fields and ancillary facilities (approximately 1,800 acres), and offsite ancillary facilities including a 230 kV transmission line, access road and drainage features (approximately 90 acres). Remaining acreage that would not be disturbed would not be part of the ROW, should the GSEP be approved and a grant issued.

1.3 Major Authorizing Laws and Regulations

The primary agency-specific authorizing laws and regulations are summarized as follows:

1.3.1 BLM

The BLM’s authority and policy guidance for making a decision related to the Proposed Action flows from the Federal Land Policy and Management Act (FLPMA) of 1976 [43 United States Code (U.S.C.) 1701 et seq.], Section 211 of the EPAct (119 Stat. 594, 600), and BLM’s Solar

Energy Development Policy of April 4, 2007. FLPMA authorizes BLM to issue ROW grants for systems for generation, transmission, and distribution of electric energy. Section 211 of the Energy Policy Act of 2005 states that the Secretary of the Interior should seek to have approved a minimum of 10,000 megawatts of renewable energy generating capacity on public lands by 2015.

1.3.2 California Energy Commission

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

1.3.3 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction to protect threatened and endangered species under the Endangered Species Act (ESA) [16 U.S.C. Section 1531 et seq.]. Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally-listed species. This consultation will be initiated through a request by the BLM to initiate formal consultation and the submittal of a Biological Assessment (BA).

1.3.4 California Department of Fish and Game

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

CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA). When appropriate, the applicant will be required to file an Incidental Take Permit application with CDFG. The requirements of the Incidental Take Permit will be included as a recommended mitigation.

1.3.5 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE reviews proposed projects to determine whether they may impact such resources, or are subject to a Section 404 permit. Throughout the PA/FEIS process, the BLM has provided information to the USACE to assist them in making a determination regarding their jurisdiction and need for a Section 404 permit. The USACE has determined that the project would be in closed basins and thus not regulated per Section 404.

1.4 Relationship of Proposed Action to BLM Policies, Plans, and Programs, and Land Use Plan Conformance Determination

The land use plan for the proposed project area is the CDCA of 1980, as amended. In the CDCA, the location of the proposed GSEP facility includes land that is classified as Multiple-Use Class M (Moderate Use). The Plan states that solar power facilities may be allowed within Moderate Use areas after NEPA requirements are met. This PA/FEIS will act as the mechanism for complying with those NEPA requirements. Because solar power facilities are an allowable use of the land as classified in the CDCA Plan, the Proposed Action does not conflict with the CDCA. However, Chapter 3, “Energy Production and Utility Corridors Element” of the CDCA also requires that newly proposed power facilities that are not already identified in the CDCA be considered through the Plan Amendment process. The proposed GSEP facility is not currently identified within the CDCA, and therefore a Plan Amendment is required to include the facility as a recognized element within the CDCA.

1.4.1 Planning Criteria (BLM)

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

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

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

> ***Category 1***, for proposed changes that will not result in significant environmental impact or analysis through an EIS;

> ***Category 2***, for proposed changes that would require a significant change in the location or extent of a multiple-use class designation; and

Category 3, to accommodate a request for a specific use or activity that will require analysis beyond the Plan Amendment Decision.

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

1.4.2 Statement of Plan Amendment

The Implementation section of the Energy Production and Utility Corridors Element of the CDCA lists a number of Category 3 amendments that have been approved since adoption of the CDCA in 1980. An additional amendment is proposed to be added to this section of the CDCA, and would read “Permission granted to construct solar energy facility (proposed GSEP Project).”

Plan Amendment Process

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

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

Decision Criteria for Evaluation of Proposed Plan Amendment

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

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

The BLM Desert District Manager will base the rationale for these determinations on the principles of multiple use, sustained yield, and maintenance of environmental quality as required in FLPMA.

Decision Criteria for Evaluation of Application

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

1. Minimize the number of separate rights-of-way by utilizing existing rights-of-way as a basis for planning corridors;
2. Encourage joint-use of corridors for transmission lines, canals, pipelines, and cables;
3. Provide alternative corridors to be considered during processing of applications;
4. Avoid sensitive resources wherever possible;
5. Conform to local plans whenever possible;
6. Consider wilderness values and be consistent with final wilderness recommendations;
7. Complete the delivery systems network;
8. Consider ongoing projects for which decisions have been made; and
9. Consider corridor networks which take into account power needs and alternative fuel resources.

1.5 General Laws, Ordinances, Regulations and Standards (LORS)

TABLE 1-1
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Applicable LORS	Description
GENERAL	
Federal	
Federal Land Policy and Management Act of 1976 (FLPMA) (43 United States Code [USC] Section 1701, 1761; 43 Code of Federal Regulations [CFR] parts 1600 and 2800.	Establishes public land policy; guidelines for administration; and provides for the management, protection, development, and enhancement of public lands. In particular, the FLPMA's relevance to the proposed project is that Title V, Section 501, establishes BLM's authority to grant rights-of-way for generation, transmission, and distribution of electrical energy (FLPMA 2001).
Bureau of Land Management – California Desert Conservation Area (CDCA) Plan, 1980 as Amended	The 25 million-acre CDCA contains over 12 million acres of public lands spread within the area known as the California Desert, which includes the following three deserts: the Mojave, the Sonoran, and a small portion of the Great Basin. The 12 million acres of public lands administered by the BLM are half of the CDCA. The CDCA Plan is a comprehensive, long-range plan with goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA, and it is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The plan's goals and actions for each resource are established in its 12 elements. Each element provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern and a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.
Northern and Eastern Colorado Desert (NECO) Coordinated Management Plan	The NECO plan is a landscape-scale planning effort for most of the California portion of the Sonoran Desert ecosystem. The planning area encompasses over five million acres. The NECO Plan amended the CDCA plan in 2002 and is currently undergoing evaluation for further amendment. The CDCA Plan/NECO is

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
GENERAL (cont.)	
Federal (cont.)	
	related to the Draft Solar Energy Programmatic Environmental Impact Statement which is expected to be issued in 2011 and could give guidance as to how and where solar projects can be built on BLM lands.
Wild and Free-Roaming Horse and Burro Act (1971) (BLM 2009h)	The BLM protects, manages, and controls wild horses and burros under the authority of the Wild Free-Roaming Horses and Burros Act of 1971 (Act) to ensure that healthy herds thrive on healthy rangelands. The BLM manages these animals as part of its multiple-use mission under the 1976 Federal Land Policy and Management Act. One of the BLM's key responsibilities under the Act is to determine the "appropriate management level" (AML) of wild horses and burros on the public rangelands.
State	
California Environmental Quality Act (CEQA) (PRC Section 21000 et seq.); CEQA Guidelines (14 CCR Section 15000 et seq., Appendix G)	Requires public agencies in California to consider adverse direct, indirect and cumulative impacts on the environment before carrying out, authorizing or approving projects that could have such impacts, and to avoid or reduce significant environmental impacts when it is feasible to do so.
Local	
Riverside County General Plan and Vision	The Land Use Element designates the general distribution, location, and extent of land uses, such as housing, business, industry, open space, agriculture, natural resources, recreation, and public/quasi-public uses.
Land Use Element	The Land Use designation of the project area is "Open Space Rural."
Open Space-Rural	The Open Space Rural land use designation is applied to remote privately owned open space areas with limited access and a lack of public services.
Policies:	
LU 20.1	Require that structures be designed to maintain the environmental character in which they are located.
LU 20.4	Ensure that development does not adversely impact the open space and rural character of the surrounding area
Land Use Designation	The project area is designated rural desert.
Multipurpose Open Space- LU Policies LU.20.1 and 20.4 noted above would also apply	Require that structures be designed to maintain the environmental character in which they are located. Ensure that development does not adversely impact the open space and rural character of the surrounding area
Riverside County Land Use Ordinance	Assigns zones to land within unincorporated areas in the County, describes land uses allowed in each zone, and generally includes direction for implementing the County General Plan.
Riverside County Airport Land Use Compatibility Plan	The Riverside County Airport Land Use Commission (RCALUC) reviews major land use projects within the Airport Influence Area to determine if they are consistent with the Compatibility Plan adopted by the RCALUC for the airports environs.
AIR QUALITY	
Federal	
40 CFR Part 52	Nonattainment New Source Review (NSR) requires a permit, Best Available Control Technology (BACT) and Offsets. Permitting and enforcement is delegated to the Mojave Desert Air Quality Management District (MDAQMD). Prevention of Significant Deterioration (PSD) requires major sources or major modifications to major sources to obtain permits for attainment pollutants. The GSEP is a new source that does not have a rule listed emission source; thus, the PSD trigger levels are 250 tons per year for NOx, VOC, SOx, PM10, PM2.5 and CO.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
AIR QUALITY (cont.)	
Federal (cont.)	
40 CFR Part 60	New Source Performance Standards (NSPS), Subpart Dc Standards of Performance for Small Industrial-Commercial-Institutional Steam Generation Units. Establishes recordkeeping and reporting requirements for natural gas-fired steam-generating units. Subpart IIII Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. Establishes emission standards for compression-ignition internal combustion engines, including emergency generator and fire water pump engines.
40 CFR Part 93	General Conformity requires a determination of conformity with the State Implementation Plan for a project that requires a Federal approval if the project's annual emissions are above specified levels.
State	
California Health and Safety Code (HSC) Sections 40910-40930	Permitting of source needs to be consistent with Air Resource Board (ARB) approved Clean Air Plans.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.
Title 17 California Code of Regulations (CCR) Section 93115	Airborne Toxic Control Measure for Stationary Compression Ignition Engines limits the types of fuels allowed, establishes maximum emission rates, and establishes recordkeeping requirements on stationary compression ignition engines, including emergency generator and fire water pump engines.
Local (Mojave Desert Air Quality Management District, MDAQMD)	
Rule 201 and 203 Permits Required	Requires a Permit to Construct before construction of an emission source occurs. Prohibits operation of any equipment that emits or controls an air pollutant (such as XX) without first obtaining a permit to operate.
Rules 401, 402, and 403 Nuisance, Visible Emissions, Fugitive Dust	Limits visible, nuisance, and fugitive dust emissions and would be applicable to the construction period of the project.
Rule 404 Particulate Matter - Concentration	Limits the particulate matter concentration from stationary source exhausts.
Rule 406 Specific Contaminants	Prohibits sulfur compound emissions in excess of 500 ppmv.
Rule 407 Liquid and Gaseous Air Contaminants	Prohibits carbon monoxide emissions in excess of 2,000 ppmv.
Rule 409 Combustion Contaminants	Limits the emissions from fossil fuel combustion.
Rule 431 Sulfur Content of Fuels	Limits the sulfur content of liquid fuels to no more than 0.5% by weight.
Rule 900 Standard of Performance for New Stationary Source	Incorporates the Federal NSPS (40 CFR 60) rules by reference.
Rule 1303 New Source Review	Specifies BACT/Offsets technology and requirements for a new emissions unit that has potential to emit any regulated pollutants.
Rule 1306 Electric Energy Generating Facilities	Describes actions to be taken for permitting of power plants that are within the jurisdiction of the CEC.
BIOLOGICAL RESOURCES	
Federal	
Federal Endangered Species Act (16 USC 1531 et seq.; 50 CFR Parts 17 and 402	Designates and protects Federally threatened and endangered plants and animals and designated critical habitats.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
BIOLOGICAL RESOURCES (cont.)	
Federal (cont.)	
Clean Water Act (33 USC Sections 1251-1376; 40 CFR Section 330.5(a)(26))	Requires the permitting and monitoring of all discharges to surface water bodies. Section 404 requires a permit from the U.S. Army Corps of Engineers (USACE) for a discharge of dredged or fill materials into waters of the U.S., including wetlands. Section 401 requires that an applicant for a Federal license or permit to conduct an activity that could result in a discharge to waters of the United States must provide the Federal agency with a certification from the applicable regional water quality control board (RWQCB) that any such discharge will comply with the Clean Water Act, including state and Federal water quality standards.
Eagle Act (50 CFR Section 22.26)	Would authorize limited take of bald eagles (Haliaeetus leucocephalus) and golden eagles (Aquila chrysaetos) under the Eagle Act, where the take is compatible with the preservation of the bald and golden eagle; necessary to protect an interest in a particular locality; associated with but not the purpose of the activity; and (1) for individual instances of take, the take cannot practicably be avoided; or (2) for programmatic take, the take is unavoidable even though advanced conservation practices are being implemented
Eagle Act (50 CFR Section 22.27)	Would provide for the intentional removal or relocatoin of eagle nests where (i) necessary to alleviate a safety emergency; (ii) necessary to ensure public health and safety; (iii) the nest prevents the use of a human–engineered structure, or; (iv) the activity, or mitigation for the activity, will provide a clear and substantial benefit to eagles. Only inactive nests would be allowed to be removed or relocated except in the case of safety emergencies.
Bald and Golden Eagle Protection Act (16 USC Section 668)	Protects bald eagles and golden eagles by prohibiting, except under certain specified conditions, the take, possession, and commerce of such birds. The 1972 amendments increased penalties for violating provisions of the Act or regulations issued pursuant thereto and strengthened other enforcement measures. Rewards are provided for information leading to arrest and conviction for violation of the Act.
Northern and Eastern Colorado Desert Coordinated Management Plan (NECO)	A regional amendment to the CDCA Plan approved in 2002, NECO protects and conserves natural resources while simultaneously balancing human uses in the northern and eastern portion of the Colorado Desert.
California Desert Protection Act of 1994 (CDPA)	An Act of Congress which established 69 wilderness areas, the Mojave National Preserve, expanded Joshua Tree and Death Valley National Monuments and redefined them as National Parks. Lands transferred to the National Park Service were formerly administered by the BLM and included substantial portions of grazing allotments, wild horse and burro Herd Management Areas, and Herd Areas.
Migratory Bird Treaty (16 USC Sections 703-711)	Makes it unlawful to take or possess any migratory nongame bird (or any part of such migratory nongame bird) as designated in the Migratory Bird Treaty Act.
Executive Order 11312	Prevents and controls invasive species.
Wild Free-Roaming Horse and Burro Act (Public Law 92-195)	Protects wild horses and burros from capture, branding, harassment, and death, and manages them with the intent to achieve and preserve the natural ecological balance on public lands.
California Desert Conservation Area Plan	The California Desert Conservation Area (CDCA) comprises one of two national conservation areas established by Congress at the time of the passage of the Federal Land Policy and Management Act (FLPMA), which outlines how the BLM will manage public lands. Congress specifically provided guidance for the management of the CDCA and directed the development of the 1980 CDCA Plan.
Desert Tortoise (Mojave Population) Recovery Plan (USFWS 1994) and Draft Revised Recovery Plan (USFWS 2008a)	Describes a strategy for recovery and delisting of the desert tortoise.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
BIOLOGICAL RESOURCES (cont.)	
State	
California Endangered Species Act of 1984 (Fish and Game Code Sections 2050-2098)	Protects California's rare, threatened, and endangered species.
Protected furbearing mammals (14 CCR Section 460)	Prohibits the take at any time of fisher, marten, river otter, desert kit fox and red fox.
14 CCR Sections 670.2 and 670.5	Lists the plants and animals of California that are declared rare, threatened, or endangered.
Fully Protected Species (Fish and Game Code Sections 3511, 4700, 5050, and 5515)	Designates certain species as fully-protected and prohibits the take of such species or their habitat unless for scientific purposes (see also California Code of Regulations Title 14, section 670.7).
Nest or Eggs (Fish and Game Code Section 3503)	Protects California's birds by making it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird.
Birds of Prey (Fish and Game Code Section 3503.5	Protects birds of prey by making it unlawful to take, possess, or destroy any birds in the orders Falconiformes and Strigiformes or to take, possess, or destroy the nest or eggs of any such bird.
Migratory Birds (Fish and Game Code Section 3513)	Protects California's migratory birds by making it unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame birds.
Nongame mammals (Fish and Game Code Section 4150)	Makes it unlawful to take or possess any non-game mammal or parts thereof except as provided in the Fish and Game Code or in accordance with regulations adopted by the Fish and Game Commission.
Significant Natural Areas (Fish and Game Code Section 1930 et seq.)	Designates certain areas such as refuges, natural sloughs, riparian areas, and vernal pools as significant wildlife habitat.
California Environmental Quality Act (CEQA) (California Public Resources Code Section 21000 et seq.); CEQA Guidelines (14 CCR Section 15380)	CEQA defines rare species more broadly than the definitions for species listed under the state and Federal Endangered Species Acts. Under CEQA Guidelines Section 15830, species not protected through state or Federal listing but nonetheless demonstrable as "endangered" or "rare" under CEQA should also receive consideration in environmental analyses. Included in this category are many plants considered rare by the California Native Plant Society (CNPS) and some animals on the CDFG's Special Animals List.
Streambed Alteration Agreement (Fish and Game Code Section 1600 et seq.)	Regulates activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California designated by CDFG in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit. Impacts to vegetation and wildlife resulting from disturbances to waterways are also reviewed and regulated during the permitting process.
California Native Plant Protection Act of 1977 (Fish and Game Code Section 1900 et seq.)	Designates state rare, threatened, and endangered plants.
California Desert Native Plants Act of 1981 (Food and Agricultural Code Section 80001 et seq.; California Fish and Game Code Sections 1925-1926)	Protects non-listed California desert native plants from unlawful harvesting on both public and private lands in Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego counties. Unless issued a valid permit, wood receipt, tag, and seal by the commissioner or sheriff, harvesting, transporting, selling, or possessing specific desert plants is prohibited.
Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.)	Regulates discharges of waste and fill material to waters of the State, including "isolated" waters and wetlands.
Local	
Riverside County General Plan	Protection and preservation of wildlife for the maintenance of the balance of nature.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
CULTURAL RESOURCES	
Federal	
Antiquities Act of 1906 16 USC Sections 431–433	Establishes criminal penalties for unauthorized destruction or appropriation of “any historic or prehistoric ruin or monument, or any object of antiquity” on Federal land; empowers the President to establish historical monuments and landmarks.
Archaeological Resources Protection Act of 1979 (ARPA) 16 USC 470aa et seq.	Protects archaeological resources from vandalism and unauthorized collection on public and Indian lands.
National Historic Preservation Act of 1966 (NHPA)16 USC Section 470	Directs Federal agencies to take into account the effects of their undertakings on properties included in or eligible for inclusion in the National Register of Historic Places. Sets inventory, nomination, protection and preservation responsibilities for Federally-owned cultural properties.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) 25 USC Sections 3001–3013	Provides for the protection of Native American human remains, funerary objects, sacred objects and objects of cultural patrimony on Federal land. Establishes procedures for determining ownership of such remains and objects under Federal jurisdiction.
GEOLOGY AND PALEONTOLOGY	
Federal	
Antiquities Act of 1906 (16 USC Sections 431-433; 43 CFR Part 3)	The proposed GESP site is located entirely on land currently administered by the BLM. Although there is no specific mention of natural or paleontologic resources in the Act itself, or in the Act’s uniform rules and regulations, ‘objects of antiquity’ has been interpreted to include fossils by the Federal Highways Act of 1956, the National Park Service (NPS), the BLM, the Forest Service (USFS), and other Federal agencies.
National Environmental Policy Act of 1970 (NEPA) (42 USC Section 4321 et. seq.)	Established the Council on Environmental Quality (CEQ), which is charged with preserving ‘important historic, cultural, and natural aspects of our national heritage’.
Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC Sections 1701-1784)	Authorizes the BLM to manage public lands to protect the quality scientific, scenic, historical, archeological, and other values, and to develop ‘regulations and plans for the protection of public land areas of critical environmental concern’, which include ‘important historic, cultural or scenic values’.
Paleontologic Resources Preservation Act (PRPA) (Public Law 111-011)	Authorizes Departments of Interior and Agriculture Secretaries to manage the protection of paleontologic resources on Federal lands.
National Historic Preservation Act of 1966 (NHPA) (16 USC 470)	Establishes policies for the ‘preservation of the prehistoric and historic resources of the United States’,.
State	
California Building Code (CBC), 2007	Includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control).
Alquist-Priolo Earthquake Fault Zoning Act (California Public Resources Code [PRC], Sections 2621–2630)	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. Portions of the site and proposed ancillary facilities are located within designated Alquist-Priolo Fault Zones. The proposed site layout places occupied structures outside of the 50-foot setback zone.
Seismic Hazards Mapping Act (PRC Sections 2690–2699)	Identifies areas that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC Sections 5097.5 and 30244	Regulates removal of paleontologic resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
GEOLOGY AND PALEONTOLOGY (cont.)	
State (cont.)	
Warren-Alquist Act (PRC Sections 25527 and 25550.5(i))	Requires the CEC to “give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…” With respect to paleontologic resources, the CEC relies on guidelines from the Society for Vertebrate Paleontology, indicated below.
Society for Vertebrate Paleontology (SVP), 1995	The “Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures” is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontologic resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.
Local	
Riverside County General Plan 2000, Safety Element	Adopts the Uniform Building Code (UBC) (1997), which provides design criteria for buildings and excavations. The UBC is superseded by the CBC (2007). Requires mitigation measures for geologic hazards, including seismic shaking, surface rupture (adopts Alquist-Priolo Earthquake Fault Zoning Act), liquefaction, unstable soils and slopes, and flooding.
Riverside County General Plan 2000, Multipurpose Open Space Element	Provides for ‘preservation of cultural, historical, archaeological, paleontologic, geologic and educational resources’. Also provides a map showing paleontologic sensitivity in the county.
HAZARDOUS MATERIALS MANAGEMENT	
Federal	
Superfund Amendments and Reauthorization Act of 1986 (42 USC Section 9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
Clean Air Act of 1990 (CAA) (42 USC 7401 et seq., as amended)	Establishes a nationwide emergency planning and response program and imposes reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC Section 112(r))	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.802	Contains the U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
Oil Pollution Prevention Regulation (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
49 CFR Part 190	Outlines gas pipeline safety program procedures.
49 CFR Part 191	Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
49 CFR Part 192	Addresses transportation of natural and other gas by pipeline and minimum Federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
HAZARDOUS MATERIALS MANAGEMENT (cont.)	
State	
Interim Final Rule (6 CFR Part 27)	A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the Department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
8 CCR Section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
HSC Section 41700	Requires that “No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) (HSC Section 25249.5 et seq.)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
Hazardous Material Business Plan (HSC Sections 25500-25541; 19 CCR Sections 2720-2734	Requires the submittal of a chemical inventory and planning and reporting for management of hazardous materials.
Hazardous Substance Information and Training Act, 8 CCR Section 339; Section 3200 et seq., 5139 et seq., and 5160 et seq.	8 CCR Section 339 lists hazardous chemicals relating to the Hazardous Substance Information and Training Act; 8 CCR Section 3200 et seq. and Section 5139 et seq. address the control of hazardous substances; 8 CCR Section 5160 et seq. addresses hot, flammable, poisonous, corrosive, and irritant substances. Together, these sections require the listing and implementation of specified control measures for the management of hazardous substances.
HSC Sections 25270- 25270.13	Requires the preparation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan if 10,000 gallons or more of petroleum is stored on-site. The regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Authority (CUPA).
Process Safety Management (8 CCR Section 5189)	Requires facility owners to develop and implement effective process safety management plans when toxic, reactive, flammable, or explosive chemicals are maintained on site in quantities that exceed regulatory thresholds.
Local	
Riverside County Fire Code, Riverside County Code Chapter 8.32: Ordinance No. 787	Adopts the California Fire Code, 2007 Edition, with some of its appendices, into Riverside County regulations.
Disclosure of Hazardous Materials and the Formulation of Business Emergency Plans: Riverside County Ordinance 651	Requires disclosure where businesses handle hazardous materials and requires the development of response plans; designates Riverside County Department of Environmental Health as responsible for administration and enforcement of local codes.
PUBLIC HEALTH AND SAFETY	
Federal	
Clean Air Act Section 112 (42 USC Section 7412)	Requires new sources of air pollution that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
PUBLIC HEALTH AND SAFETY (cont.)	
State	
California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) (HSC Section 25249.5 et seq.)	Establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
HSC Section 41700	States that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
Air Toxics Hot Spots Program (HSC Section 44300 et seq.)	Requires participation in the inventory and reporting program at the District level.
Air Toxics Hot Spots Information and Assessment Act (HSC Sections 44360– 44366)	Requires that, based on results of a Health Risk Assessment (HRA) conducted per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels.
PRC Section 25523(a); 20 CCR Sections 1752.5, 2300–2309 and Div. 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, HSC Section 39650, et seq.	Requires a quantitative HRA for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
Mojave Desert Air Quality Management District (MDAQMD) Rule 402	Prohibits the discharge of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to the public; endanger the comfort, repose, health or safety of the public; or cause injury or damage to business or property.
MDAQMD Regulation X Emission Standards for Additional Specific Air Contaminants	Provides notice to the regulated community that California Air Toxic Control measures (ATCMs) are enforceable by the MDAQMD within its jurisdiction and Federal maximum achievable control technology (MACT) and NESHAPS are adopted by reference and enforced by the MDAQMD.
MDAQMD Rule 1320	Requires the use of best available control technology (BACT) and best available control technology for toxics (T-BACT) at certain projects and the preparation of an HRA.
MDAQMD Rule 1520	Implementation of HSC Section 44300 et seq., Air Toxics “Hot Spots” Information and Assessment Act.
SOCIOECONOMICS AND ENVIRONMENAL JUSTICE	
Federal	
Emergency Economic Stabilization Act of 2008 (PL 110-343) Business Solar Investment Tax Credit (Internal Revenue Code Section 48)	Extends the 30 percent investment tax credit (ITC) for solar energy property for eight years through December 31, 2016. The bill allows the ITC to be used to offset both regular and alternative minimum tax (AMT) and waives the public utility exception of current law (i.e., permits utilities to directly invest in solar facilities and claim the ITC). The five-year accelerated depreciation allowance for solar property is permanent and unaffected by passage of the eight-year extension of the solar ITC.
State	
California Revenue and Taxation Code Section 73	Allows property tax exclusion for certain types of solar energy systems.
California Education Code Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code Sections 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
TRANSMISSION LINE SAFETY AND NUISANCE (TLSN)	
Federal (Aviation Safety)	
Objects Affecting the Navigable Air Space (14 CFR Part 77)	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, "Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" form (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Federal (Interference with Radio Frequency Communication)	
47 CFR Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication and requires mitigation of any interference by the owner of the source.
State (Interference with Radio Frequency Communication)	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Local (Audible Noise)	
Riverside County General Plan, Noise Element	Establishes policies and programs to ensure that noise levels are appropriate to land uses.
Riverside County Noise Ordinance	Establishes performance standards for planned residential or other noise-sensitive land uses.
State (Hazardous and Nuisance Shocks)	
Rules for Overhead Electric Line Construction (CPUC GO-95)	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
High Voltage Safety Orders (8 CCR Section 2700 et seq.)	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code (i.e. National Fire Protection Association [NFPA] 70E)	OSHA adopted the NESC/NFPA 70E which specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards (Hazardous and Nuisance Shocks)	
Institute of Electrical and Electronics Engineers (IEEE) 1119, "IEEE Guide for Fence Safety Clearances in Electric-Supply Stations"	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
State (Electric and Magnetic Fields)	
Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California (CPUC GO-131-D)	Specifies application and noticing requirements for new line construction including electromagnetic fields (EMF) reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency EMF.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
TRANSMISSION LINE SAFETY AND NUISANCE (TLSN) (cont.)	
Industry Standards (Electric and Magnetic Fields)	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring EMF from an operating electric line.
State (Fire Hazards)	
Fire Prevention Standards for Electric Utilities (14 CCR Sections 1250-1258)	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.
VISUAL RESOURCES	
Federal	
California Desert Conservation Area (CDCA) Plan	The GESP is located within the California Desert Conservation Area Plan, which is the BLM Resource Management Plan applicable to the GESP site (USDOI, 1980, as amended). The CDCA Plan did not include Visual Resource Management (VRM) inventory or management classes. However, a BLM-approved Visual Resource Inventory (VRI) was conducted in 2005 for the Devers-Palo Verde 2 Transmission Line Project EIS/EIR, which covers the site of the proposed action. The GESP site is classified in the CDCA Plan as Multiple-Use Class (MUC) M (Moderate Use). Management of MUC M lands is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources, which permitted uses may cause. Table 1 of the CDCA Plan illustrates the types of allowable land uses by MUC Class. The table specifically includes Electrical Power Generation Facilities including Wind/Solar facilities. Guidance provided under this section allows for the authorization of such facilities within MUC M lands in compliance with NEPA requirements. New major electric transmission facilities may be allowed only within designated utility corridors. Existing facilities within designated utility corridors may be maintained and upgraded or improved in accordance with existing rights-of-way or amendments to right-of- way grants.
State	
State Scenic Highway Program (California Streets and Highways Code Sections 260-263)	The California State Department of Transportation (Caltrans) identifies a state system of eligible and designated scenic highways which, if designated, are subject to various controls intended to preserve their scenic quality. Interstate 10 within the project viewshed is not listed as an eligible State Scenic Highway.
Local	
Riverside County Integrated Plan LU-4 Relating to Project Design	*LU 4.1*: Requires that new developments be located and designed to visually enhance, not degrade the character of the surrounding area through consideration of the following concepts: c. Require that an appropriate landscape plan be submitted and implemented for development projects subject to discretionary review. d. Require that new development utilize drought- tolerant landscaping and incorporate adequate drought-conscious irrigation systems. l. Mitigate noise, odor, lighting, and other impacts on surrounding properties.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
VISUAL RESOURCES (cont.)	
Local (cont.)	
Riverside County Integrated Plan LU-4 Relating to Project Design (cont.)	m. Provide and maintain landscaping in open spaces and parking lots. n. Include extensive landscaping. o. Preserve natural features, such as unique natural terrain, drainage ways, and native vegetation, wherever possible, particularly where they provide continuity with more extensive regional systems. p. Require that new development be designed to provide adequate space for pedestrian connectivity and access, recreational trails, vehicular access and parking, supporting functions, open space, and other pertinent elements.
	LU 4.2: Require property owners to maintain structures and landscaping to a high standard of design, health, and safety through the following: c. Promote and support community and neighborhood based efforts for the maintenance, upkeep, and renovation of structures and sites.
County Scenic Corridors	*LU 13.1*: Preserve and protect outstanding scenic vistas and visual features for the enjoyment of the traveling public. *LU 13.3*: Ensure that the design and appearance of new landscaping, structures, equipment, signs, or grading within Designated and Eligible State and County scenic highway corridors are compatible with the surrounding scenic setting or environment. *LU 13.7*: Require that the size, height, and type of on-premise signs visible from Designated and Eligible State and County Scenic Highways be the minimum necessary for identification. The design, materials, color, and location of the signs shall blend with the environment, utilizing natural materials where possible. *LU 13.8*: Avoid the blocking of public views by solid walls.
The following policies apply to properties designated as Open Space-Rural on the area plan land use maps.	*LU 20.1*: Require that structures be designed to maintain the environmental character in which they are located. *LU 20.2*: Require that development be designed to blend with undeveloped natural contours of the site and avoid an unvaried, unnatural, or manufactured appearance. *LU 20.3*: Require that adequate and available circulation facilities, water resources, sewer facilities, and/or septic capacity exist to meet the demands of the proposed land use. *LU 20.4*: Ensure that development does not adversely impact the open space and rural character of the surrounding area.
WASTE MANAGEMENT	
Federal	
Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.) (42 USC Section 6901 et seq.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: Generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; Waste labeling practices and use of appropriate containers; Use of a manifest when transporting wastes;

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
WASTE MANAGEMENT (cont.)	
Federal (cont.)	
Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.) (42 USC Section 6901 et seq.) (cont.)	Submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and Corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the Federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
Comprehensive Environmental Response, Compensation and Liability Act (Superfund) (42 USC Section 9601 et seq.)	Establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: Reporting requirements for releases of hazardous substances; Requirements for remedial action at closed or abandoned hazardous waste sites, and brownfields; Liability of persons responsible for releases of hazardous substances or waste; and Requirements for property owners/potential buyers to conduct “all appropriate inquiries” into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site, and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA “all appropriate inquiries” requirements.
40 CFR Subchapter I – Solid Wastes	Implements the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. Part 258 addresses the criteria for municipal solid waste landfills. Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the Federal level. However, California is an RCRA-authorized state, so most of the solid and hazardous waste regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Hazardous Materials Regulations (49 CFR Parts 172 and 173)	Address the U.S. Department of Transportation (DOT) established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with 40 CFR Section 262.20.
Clean Water Act (33 USC Section 1251 et seq.)	The Clean Water Act governs the discharge of wastewater to surface waters of the U.S.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
WASTE MANAGEMENT (cont.)	
State	
Hazardous Waste Control Act of 1972, as amended (HSC Section 25100 et seq.)	Creates the framework under which hazardous wastes are managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the Federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than Federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Environmental Health Standards for the Management of Hazardous Waste (22 CCR Div. 4.5, Section 66001 et seq.)	Establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and Federal RCRA. As with the Federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers; prepare manifests before transporting the waste off site; and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a Federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by 22 CCR include: Identification and Listing of Hazardous Waste (Ch. 11, Section 66261.1 et seq.). Standards Applicable to Generator of Hazardous Waste (Ch. 12, Section 66262.10 et seq.). Standards Applicable to Transporters of Hazardous Waste (Ch. 13, Section 66263.10 et seq.). Standards for Universal Waste Management (Ch. 23, Section 66273.1 et seq.). Standards for the Management of Used Oil (Ch. 29, Section 66279.1 et seq.). Requirements for Units and Facilities Deemed to Have a Permit by Rule (Ch. 45, Section 67450.1 et seq.). The Title 22 regulations are established and enforced at the state level by DTSC. Some generator and waste treatment standards are also enforced at the local level by CUPAs.
Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program) (HSC Ch. 6.11, Sections 25404–25404.9)	Consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. Aboveground Petroleum Storage Act requirements for Spill Prevention, Control, and Countermeasure (SPCC) Plans. Hazardous Materials Release and Response Plans and Inventories (Business Plans). California Accidental Release Prevention (CalARP) Program. Hazardous Materials Management Plan / Hazardous Materials Inventory Statements. Hazardous Waste Generator / Tiered Permitting Program. Underground Storage Tank Program. The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified Program.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
WASTE MANAGEMENT (cont.)	
State (cont.)	
Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (27 CCR Div. 1, Subdiv, 4, Ch. 1, Section 15100 et seq.)	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. Article 9 – Unified Program Standardized Forms and Formats (Sections 15400–15410). Article 10 – Business Reporting to CUPAs (Sections 15600–15620).
California Integrated Waste Management Act of 1989 (CIWMA) (PRC Div. 30, Section 40000 et seq.)	Establishes mandates and standards for management of solid waste in California. The law addresses solid waste landfill diversion requirements; establishes the preferred waste management hierarchy (source reduction first, then recycling and reuse, and treatment and disposal last); sets standards for design and construction of municipal landfills; and addresses programs for county waste management plans and local implementation of solid waste requirements.
California Integrated Waste Management Board (14 CCR Div, 7, Section 17200 et seq.)	Implement the provisions of the CIWMA and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. Chapter 7 – Special Waste Standards. Chapter 8 – Used Oil Recycling Program. Chapter 8.2 – Electronic Waste Recovery and Recycling.
Hazardous Waste Source Reduction and Management Review Act of 1989 (HWSRMRA) (HSC Div. 20, Ch. 6.5, Art. 11.9, Section 25244.12 et seq.)	Expands the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (approximately 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four-year cycle, with a summary progress report due to DTSC every fourth year.
Hazardous Waste Source Reduction and Management Review (22 CCR Section 67100.1 et seq.)	Implement the provisions of the HWSRMRA. The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.
23 CCR Div. 3, Ch. 16 and 18	Relate to hazardous material storage and petroleum UST cleanup, as well as hazardous waste generator permitting, handling, and storage. The DTSC Imperial County CUPA is responsible for local enforcement.
Local	
County of Riverside General Plan, Safety Element: Policy S 6.1	Describes the County's policies and siting criteria identified in the County of Riverside Hazardous Waste Management Plan including coordination of hazardous waste facility responsibilities on a regional basis through the Southern California Hazardous Waste Management Authority
Riverside County Code Title 8 Chapters 8.60, 8.84, and 8.132, Health and Safety	Establishes requirements for the use, generation, storage, and disposal of hazardous and non-hazardous materials and wastes within the County.
Riverside County Code, Chapter 8.32, Ordinance No. 787, Fire	Adopts the 2007 California Fire Code.

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
WORKER SAFETY AND FIRE PROTECTION	
Federal	
Occupational Safety and Health Act of 1970 (29 USC Section 651 et seq.)	Mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC Section 651).
Occupational Safety and Health Administration Safety and Health Regulations (29 CFR Sections 1910.1- 1910.1500)	Define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR Sections 1952.170-1952.175	Provide Federal approval of California's plan for enforcement of its own Safety and Health requirements, in lieu of most of the Federal requirements found in 29 CFR sections 1910.1 to 1910.1500.
State	
Cal/OSHA regulations (8 CCR)	Require that all employers follow these regulations as they pertain to the work involved, including regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components, fire safety, and hazardous materials use, storage, and handling.
24 CCR Section 3 et seq.	Incorporate the current edition of the Uniform Building Code.
HSC Section 25500 et seq.	Present Risk Management Plan requirements for threshold quantities of listed acutely hazardous materials at a facility.
HSC Sections 25500-25541	Require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local	
Riverside County Ordinance 457	Adopts specific building, mechanical, plumbing, and electrical codes from sources such as the California Building Standards Commission with county-specific modifications.
Riverside County Ordinance 787	Adopts the 2007 edition of the California Fire Code and portions of the 2007 edition of the California Building Code with county-specific modifications.
Riverside County Ordinance 615	Establishes requirements for the use, generation, storage and disposal of hazardous materials within the County.
Riverside County Dept. of Environmental Health, Hazardous Materials Releases	Adopts State requirements and guidelines to govern hazardous materials release response plans and inventories.
Chapter 22 of the 2007 California Fire Code	Addresses requirements for Motor Fuel-Dispensing Facilities and Repair Garages. It has been adopted by Riverside County and will apply to the fuel depot at the site.
NFPA 30a	This is the NFPA code for Motor Fuel Dispensing Facilities and Repair Garages (2008 Edition) and is the industry standard for fuel depots.
NOISE	
Federal	
Occupational Safety & Health Act (OSHA): 29 U.S.C. Section 651 et seq.	Protects workers from the effects of occupational noise exposure.
State	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. Section 651 et seq., Cal. Code Regs., tit. 8, Sections 5095-5099	Protects workers from the effects of occupational noise exposure. Note, These standards are equivalent to federal OSHA standards

TABLE 1-1 (Continued)
GENERAL LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS	Description
NOISE (cont.)	
Local	
Riverside County General Plan, Noise Element	Establishes goals, objectives, and procedures to protect the public from noise intrusion. Land use compatibility defines the acceptability of a land use in a specified noise environment. For residential land uses, these guidelines categorize noise levels of up to 60 dBA day/night average sound level (Ldn) or CNEL as “normally acceptable” and up to 70 dBA Ldn or CNEL as “conditionally acceptable.”
Riverside County Noise Ordinance, Ordinance 847	Section 4 of Ordinance No. 847 (Regulating Noise) limits noise on any property that causes the exterior noise level on any other occupied property to 55 dBA during the daytime hours and 45 dBA during the nighttime hours, for noise-sensitive receptors[3] within a very low density rural area, such the area surrounding the site. Also limits the hours of construction activities to the hours of 6:00 a.m. to 7:00 p.m., June through September, 6:00 a.m. to 6:00 p.m., October through May, Mondays through Fridays, and to 9:00 a.m. to 5:00 p.m. on Saturdays.

Also see Appendix B, which describes the Federal Laws, Regulations and Executive Orders that apply to BLM-administered lands in the action area.

1.6 Relationship of Proposed Action to non-BLM Policies, Plans, and Programs

The CEC and BLM seek comments from and work closely with other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include as applicable, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, State Historic Preservation Officer, California Department of Fish and Game, and the Mojave Desert Air Quality Management District. On December 21, 2009, the CEC staff sent the GSEP AFC to all local, state, and federal agencies that might be affected by or have an interest in the proposed project.

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

[3] A sensitive noise receptor, also referred to as a noise-sensitive receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

1.7 Scoping

The Notice of Intent to prepare an environmental impact statement for this proposed project was published in the *Federal Register* on November 23, 2009. On December 11, 2009, BLM held its Scoping Meeting at the University of California-Riverside, Palm Desert Campus. A draft scoping report was released for public review and comment in January 2010. (See Appendix C Results of Scoping).

BLM gave a presentation at and participated in the CEC's January 25, 2010 Informational Hearing in Blythe, California and Site Visit for GSEP. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials were similarly notified of the hearing and site visit.

CHAPTER 2
Proposed Action and Alternatives

On January 31, 2007, the BLM Palm Springs-South Coast Field Office received an application to construct, operate, maintain and decommission a project identified as the NextEra Ford Dry Lake Solar Power Plant on BLM-administered land in Eastern Riverside County, California. In June 2009, the Applicant notified BLM that the company name was being changed to Genesis Solar, LLC, and the Proposed Action became known as the Genesis Solar Energy Project (GSEP or Proposed Action). The Proposed Action would be located approximately 27 miles east of the unincorporated community of Desert Center and 25 miles west of the Arizona-California border city of Blythe in Riverside County, California (refer to Figure 1-1).

This section provides a description of the proposed GSEP and five alternatives on BLM-administered lands. Two of the five are action alternatives: the Reduced Acreage Alternative that would generate 125 megawatts (MW) rather than the 250 MW Proposed Action, and the Dry Cooling Alternative which is being analyzed as an alternative to the wet cooling process proposed in the GSEP. These alternatives include a plan amendment to make the project area suitable for solar energy development. Additionally, there is a no action alternative and 2 additional plan amendment only (no project) alternatives. Alternatives considered but eliminated from detailed analysis are also described.

Both action alternatives have a common description of equipment, systems, processes, resource inputs, operations, closure plans and general location. As such, in order to avoid redundancy, this section will present a single project description that identifies the elements that are common to all alternatives and then separately identify the elements that are unique to each alternative.

2.1 Proposed Land Use Plan Amendment Decisions

Potential LUP amendment decisions:

> ***PA1*** – The CDCA (1980, as amended) would be amended to approve this site for development of this facility And all other types of solar energy development. (This is the proposed land use plan amendment.)
>
> ***PA2*** – The CDCA Plan (1980, as amended) would not be amended. (This is No Action Alternative A, discussed in Table ES-1.)
>
> ***PA3*** – The CDCA Plan (1980, as amended) would be amended to identify the GSEP application area as unsuitable for any type of solar energy development. (This is a no project alternative called “No Action Alternative B” and is discussed in Table ES-1.)

PA4 – The CDCA Plan (1980, as amended) would be amended to identify the GSEP application area as suitable for any type of solar energy development. (This is a no project alternative called "No Action Alternative C" and is discussed in Table ES-1.)

2.2 Action Alternatives Including the Proposed Action

2.2.1 Introduction

This section describes all three action alternatives: the Proposed Action, the Reduced Acreage Alternative, and the Dry Cooling Alternative. A number of scoping comments requested that the Proposed Action be reconfigured or reduced in size to avoid sensitive resources and to consider technologies that would reduce impacts to water use. Scoping comments suggested including the disturbed lands in the vicinity of the Proposed Action in the project footprint to make up for any loss in acreage of the reduced acreage alternative. The scoping comments are addressed in the alternatives described herein. Table 2-1 provides the total acres of permanent and temporary disturbance associated with the action alternatives.

Table 2-1
Proposed Action and Alternatives: Acres of Temporary and Permanent Disturbance

	Proposed Action (acres)	Reduced Acreage Alternative (acres)	Dry Cooling Alternative (acres)
Temporary Disturbance			
Transmission Line			
Construction laydown/assembly areas	0.46	0.46	0.46
Conductor Pulling Area	4.02	4.02	4.02
Crossing Structures	1.84	1.84	1.84
Pole Pad Construction Areas	2.91	2.91	2.91
Pole Pad Construction Areas (at Colorado River Substation	.057	.057	.057
Gas Line			
Construction Right-of-Way	36.36	36.36	36.36
Roads			
Site Access Road Construction	15.76	15.76	15.76
Total Temporary Disturbance	61.41	61.41	61.41
Permanent Disturbance			
Transmission Pole Pads	0.05	0.05	0.05
Transmission Pole Pads (at Colorado River Substation	0.0008	0.0008	0.0008
Spur Roads	1.90	1.90	1.90
Site Access Road	23.64	23.64	23.64
Project Footprint	1,720	924	1,720
Total Approximate Permanent Disturbance	**1,746**	**950**	**1,746**

Proposed Action

Genesis Solar, LLC, (Applicant) proposes to construct, operate, maintain and decommission the GSEP or Proposed Action which includes a 250 MW solar generating facility, 230-kV transmission line (gen-tie) and ancillary facilities (access road and natural gas pipeline) on BLM-administered land (see Figure 2-1). The applicant is seeking a right-of-way (ROW) grant for approximately 4,640 acres of land and a LUP Amendment as described above in Section 2.1. Construction and operation of the Proposed Action would disturb a total of about 1,800 acres within the site boundaries, and approximately 90 acres for linear facilities and drainage features outside the site boundaries. Any difference between the total acreage listed in the right-of-way application (4,640) and the total acreage required for construction of the Proposed Action and operation (approximately 1,800) would not be part of the ROW grant or LUP Amendment, should BLM authorize the Proposed Action.

The Applicant proposes to construct the GSEP in two phases which would be designed to generate a combined total of approximately 250 MW of electricity. Phase 1 would consist of the Unit 1 (western) powerblock, access road, natural gas pipeline, and electric transmission line, and Phase 2 would consist of the Unit 2 (eastern) powerblock.

The GSEP would consist of two independent solar electric generating facilities with a nominal net electrical output of 125 MW each, resulting in a total net electrical output of 250 MW. The Proposed Action would be designed to utilize solar parabolic trough technology to generate electricity.

With solar parabolic trough technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola. A heat transfer fluid (HTF) is heated to high temperature (740°F) as it circulates through the receiver tubes. The heated HTF is then piped through a series of heat exchangers where it releases its stored heat to generate high pressure steam. The steam is then fed to a traditional steam turbine generator where electricity is produced.

The overall site layout and generalized land uses are characterized as follows:

1. 250-MW facility (see Figure 2-2), including solar generation facilities; on-site switchyard (substation); administration, operations and maintenance facilities: approximately 1,800 acres;

2. Two evaporation ponds: up to 30 acres each (located within the 1,800-acre site);

3. The generated electrical power from the Proposed Action switchyard would be transmitted through a generation-tie (gen-tie) line that would be routed in a southeasterly ROW eventually connecting to the Southern California Edison (SCE) 500-230 kV Colorado River substation via the existing Blythe Energy Project Transmission Line (BEPTL) between the Julian Hinds and Buck substations.

4. Additional linear facilities off-site would include a 6.5 mile access road, telecommunication lines, and natural gas pipeline;

5. Surface water control facilities for storm water flow and discharge; and

6. Temporary construction laydown area(s) within the larger site footprint. No additional laydown areas outside the eventual project footprint are contemplated.

Access to the site would be via a new 6.5 mile long, 24 foot wide (approximately 18.9 acres) paved access road extending north and west from the existing Wiley's Well Road. Wiley's Well Road is accessible by both eastbound and westbound traffic off Interstate 10 (I-10) at the Wiley's Well Road Interchange (see Figure 3.12-1). The new access road would be constructed entirely on BLM-administered land.

The Proposed Action is a ROW grant and LUP Amendment describing the following BLM-administered land:

San Bernardino Base and Meridian

Township 6 South, Range 18 East,

section 1, S½;
section 2, S½;
section 3, S½;
section 4.

Township 6 South, Range 19 East,

section 4; S½;
section 5;
section 6, SE¼
section 7, N½NE¼.
section 8; NE¼, N½NW¼;
section 9, N½;
section 10;
section 11, W½SW¼;
section 13, W½;
section 14; N½N½;
section 15, N½N½;
section 24, NW¼.

Location of the Proposed Action

The Proposed Action would be south of the Palen/McCoy Wilderness Area and north of Ford Dry Lake, and about 6 miles north of Interstate 10 (see Figure 2-3). The Proposed Action area would be located in a remote section of east central Riverside County, where land use is characterized predominantly by open space and conservation and wilderness areas (see Figure 2-4 and Figure 2-5). The western portion of the county accounts for most of the developed area of the county, including urban areas and agricultural areas. The southeastern corner of the county to the east of the Proposed Action also contains limited agricultural areas and rural development (Riverside County, 2003).

The area designated within Riverside County's Palo Verde Valley Area Plan occurs to the east of the Proposed Action and encompasses the developed and agricultural area in eastern Riverside County. The portion of the Palo Verde Valley Area Plan in the vicinity of the Proposed Action consists mainly of sparsely populated desert and mountain areas. The more populated and agricultural areas occur farther east of the GSEP in the vicinity of Blythe.

The Proposed Action is also located within the CDCA Plan area (BLM, 1980). The CDCA Plan establishes a number of conservation areas under the Wilderness Review Program. The Proposed Action is located adjacent to the southern boundary of the Palen/McCoy Wilderness Area. The Chuckwalla Mountains and Little Chuckwalla Mountains Wilderness Areas are also located farther south-southwest of the Proposed Action.

2.2.2 Structure and Facilities

The following sections describe the site arrangement and the processes, systems, and equipment that constitute the generation facilities. All generating facilities would be located within the fence line of each of the alternatives considered. Linear facilities (approximately 6.5 miles in length) related to the Proposed Action located outside the project fence line would include a new 230-kV transmission line, access road and 8-inch natural gas pipeline. The plant would consist of a conventional steam Rankine-cycle power block, two parabolic trough solar fields, an HTF and steam generation system, as well as a variety of ancillary facilities, such as conventional water treatment, electrical switchgear, administration, warehouse, and maintenance facilities.

Major Components of the Proposed Action

Overall onsite facilities of the Proposed Action include the following major components:

1. Solar field(s);
2. Power block;
3. Internal access roads;
4. Office and parking;
5. LTU (Land Treatment Unit) for bioremediation of HTF-contaminated soil;
6. Maintenance buildings and laydown area; and,
7. Onsite transmission facilities including switchyard.

Each 125 MW power plant (one for the eastern solar field (see Figure 2-6) and one for the western solar field (see Figure 2-7) would consist of:

1. STG (Steam Turbine Generator);
2. SSG (Servicing Scenario Generator) heat exchangers;
3. Surface condenser;
4. Feedwater pumps;
5. Feedwater heaters;
6. Wet cooling tower;
7. Evaporation ponds;
8. Natural gas-fired boilers; and,
9. Solar thermal collection field.

Power Plant Civil/Structural Features

The following describes the civil/structural features of the GSEP (see Figure 2-2).

SSG System, STG and Associated Equipment

The SSG system design is similar to any “kettle boiler” shell and tube heat exchanger in that the hot HTF is circulated through tubes and the steam is produced on the shell side. The SSG system includes heat exchangers for preheating the condensate, superheating the steam, and reheating steam, in addition to the boiler vessels.

The SSG system, STG, and condenser would be located outdoors and supported on reinforced concrete mat foundations. The STG foundation would include a reinforced concrete pedestal that supports the STG above the surface condenser. The one step-up transformer and generator step-up transformer (GSUT) would be supported on reinforced concrete mat foundations. Balance-of-plant (BOP) mechanical and electrical equipment would be supported on individual reinforced concrete pads. BOP components/materials include piping, valves, cables, switches, etc. not included with major equipment and generally would be installed or erected onsite.

Solar Collector Assemblies (SCA)

The Proposed Action’s SCAs are oriented north-south to rotate east-west to track the sun as it moves across the sky throughout the day. The SCAs collect heat by means of linear troughs of parabolic reflectors, which focus sunlight onto a straight line of heat collection elements (HCEs) welded along the focus of the parabolic “trough”.

Parabolic Trough Collector Loop

Each of the collector loops consist of two adjacent rows of SCAs, each row is about 1,300 feet long. The two rows are connected by a crossover pipe. HTF is heated in the loop and enters the header, which returns hot HTF from all loops to the power block where the power generating equipment is located.

Mirrors

Low-iron glass mirrors are mounted on the SCA. These mirrors are reliable components that have shown no long-term degradation in reflective quality. Twenty-year-old mirrors can be cleaned and brought back to like-new reflectivity. Long-term endurance of the mirror, as measured by the experience at Solar Electric Generating Station (SEGS), indicates mirror life of 30 years or more can be expected for the Proposed Action. Flexible mirror reflectivity monitoring procedures using demineralized water for mirror washing is critical. The periodic monitoring of mirror reflectivity provides a valuable quality control tool for mirror washing and helps to optimize wash labor.

Solar Array Support Structures

Each solar collector array would be supported by structures (stands) that connect the parabolic troughs to the drive mechanism. Each array would be supported by multiple individual foundations with a foundation located approximately every 40 feet along the array.

HTF Freeze Protection Heat Exchanger

The HTF freezes at temperatures below 54 °F. To eliminate the problem of HTF freezing, steam-fed shell and tube heat exchangers would be used to keep the HTF above 100 °F whenever the facility is offline. As discussed above, the auxiliary boilers would supply the heat for this process as well as performing the function of a startup boiler. This dual-use configuration reduces the number of individual emission sources.

HTF Expansion Tank

Expansion tanks are required to accommodate the volumetric change that occurs when heating the HTF to the operating temperature. Nitrogen would be used to blanket the headspace of the tanks. The nitrogen purge prevents oxidation or contamination of the HTF by reducing its exposure to atmospheric air.

HTF Ullage/Flash System

During plant operation, HTF would degrade into components of high and low boilers (substances with boiling points higher and lower than the HTF). The low boilers are removed from the process as vapors through the system. The high boilers are removed from the process as liquid and sediment through the HTF flash system.

Auxiliary Boiler

The auxiliary boiler would be fueled by natural gas and would provide steam for maintaining steam cycle equipment vacuum over night and for startup. Sealing steam is used to prevent air from entering the steam turbine while the condenser is under vacuum. This method reduces startup time for the plant compared to relying on solar-generated steam as the sealing steam source. Unlike a gas-fired power plant, a solar thermal plant must wait for the sun to rise in the morning to start generating steam and has a finite time to generate electricity (i.e., the number of sunlight hours). If the plant does not have a secondary source of steam, plant startup is delayed (and thus total daily electrical generation reduced), while solar heat alone generates sealing steam and vacuum is established in the condenser. Once the plant begins generating electricity for delivery to the electrical grid, the fired auxiliary boiler is no longer needed and is held in stand-by mode until auxiliary heat is again required after plant shutdown. The maximum estimated natural gas usage for the auxiliary boiler is expected to be 60 million standard cubic feet per year, for a maximum of 60,000 British thermal units per year.

Lighting System

The Proposed Action's lighting system would provide operations and maintenance personnel with illumination in both normal and emergency conditions. The system would consist primarily of AC lighting, but would include DC lighting for activities or emergency egress required during an outage of the plant's AC electrical system. The lighting system would also provide AC convenience outlets for portable lamps and tools.

Buildings

The GSEP would include a common administration building and warehouse between the two 125 MW power plants. A control building would be located in each power block. Other plant site "buildings" would include the water treatment building, as well as a number of pre-engineered enclosures for mechanical and electrical equipment. The total square footage of the various Proposed Action buildings and pre-engineered enclosures (*e.g.*, control rooms, administration building, warehouse, electrical equipment enclosures, fire pumps, and diesel generators) is approximately 39,000 square feet (0.9 acre).

Fire Protection

Fire protection systems are provided to limit personnel injury, property loss, and downtime resulting from a fire. The systems include a fire protection water system and portable fire extinguishers.

Each 125 MW power plant's fire protection water system would be supplied from a dedicated 360,000-gallon portion of the 500,000-gallon raw water storage tank located on the plant site. One electric and one diesel-fueled backup fire water pump, each with a capacity of 3,000 gallons per minute, would deliver water to the fire protection water-piping network for each plant. A smaller electric motor-driven jockey pump would maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, the diesel fire pump starts automatically.

The piping network would be configured in a loop so a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. The piping network would supply fire hydrants located at intervals throughout the power plant site, a sprinkler deluge system at each unit transformer, HTF expansion tank and circulating pump area, and sprinkler systems at the STG, and in the operations and administration buildings. Portable fire extinguishers of appropriate sizes and types would be located throughout the plant site.

Fire protection for the solar field would be provided by zoned isolation of the HTF lines in the event of a rupture that results in fire. As vegetation or other combustible materials would not be allowed in the solar field, the HTF would be allowed to extinguish itself naturally, since the remainder of the field is of nonflammable material (aluminum, steel, and glass).

Water Storage Tanks

There would be a number of covered water tanks on site for each 125 MW power plant. For each plant, there would be a 500,000-gallon raw water storage tank for short-term backup cooling water supply, with a portion (360,000 gallons) dedicated to the plant's fire protection water system; a 1,250,000-gallon treated water storage tank; and a 250,000 waste water storage tank. There also would be a 40,000-gallon storage tank for storage of demineralized water. Please also refer to the discussion on "Water Supply and Consumptive Requirements" found in Section 2.2.4, for more detail on water storage and consumption.

Roads, Fencing, and Security

The GSEP site is located in a remote section of eastern Riverside County, about six miles north of I-10, and approximately 25 miles west of Blythe. All vehicular traffic approaching the site would use I-10. Only a small portion of the overall plant site would be paved, estimated at 10 acres, which would consist primarily of the site access road and portions of each power block (paved parking lot and roads encircling the STG and SSG areas). The entire site would be fenced appropriately to restrict public access during construction and operations.

Site Drainage

As discussed in the Water Resources section (Section 3.21) under the Drainage Erosion and Sediment Control Plan (DESCP), natural drainage across the site is episodic, shallow, and occurs over a broad area primarily as sheet flow or in shallow washes.

The main drainage channels and associated diversion berms of the GSEP would divert flows downstream of the site following their existing drainage paths.

Earthwork

Solar fields have fairly stringent grading requirements as parabolic troughs must be almost level along their troughs, and grades perpendicular to the troughs are generally benched to 2% or less. Under pre-developed conditions, each 125 MW module generally slopes from the northeast to the southwest. Grading for post-developed conditions would slightly modify the existing contours to provide a surface level appropriate for the parabolic troughs. Grading would be balanced and no importing or exporting of materials would be required.

The DESCP includes the finished grade elevations and preliminary contour lines across the entire site. The total site earth work quantities for the Proposed Action site, including the evaporation and retention pond excavations and protective berm fill placement, will result in a balanced cut-and-fill earthwork of approximately 1,000,000 cubic yards of cut and one million cubic yards of fill, based on the preliminary site design and layout (Genesis Solar, LLC, 2010).

Transmission Facilities

Interconnection to GSEP Switchyard (Substation)

The GSEP switchyard would contain three breakers and three line takeoff structures. It would have space for a future breaker and line takeoff structure. Air insulated structures would be utilized giving the switchyard a size of approximately 270 feet by 400 feet (approximately 2.48 acres). The switchyard and interconnections would be built for 230 kV and would operate at that nominal voltage. The switchyard arrangement is shown in the power block layout general arrangement for Unit 2 (see Figure 2-7).

The generated electrical power from the GSEP switchyard would be transmitted through a gen-tie line that would be routed in a southeasterly ROW eventually connecting to the Southern California Edison (SCE) 500-230 kV Colorado River substation via the existing Blythe Energy Project Transmission Line (BEPTL) between the Julian Hind and Buck substations.

Interconnection Design Considerations

The gen-tie line would be constructed for operation at 230 kV, the nominal operating voltage of the regional transmission system. The use of 230 kV as the targeted design voltage is consistent with the industry use of the 230 kV term to describe the nominal voltage for this class of system. Each circuit would be supported by mono-pole structures at approximately 800-foot intervals with heights ranging in height between 70 and 145 feet.

Ancillary Actions

Fiber Optics

Telecommunications services would be provided by a local provider via either fiber optic cable or microwave. Fiber optic cable would be buried in a shallow trench or strung on the power distribution line or gen-tie line, or a combination of both methods within the disturbed areas of the other linear facilities such as the access road under or adjacent to the gen-tie line. (See Figure 2-8)

Power Distribution Line

Construction power would be provided by the local distribution system and routed to the site along wood poles within the 230 kV ROW. (See Figure 2-8)

Connected Actions

Colorado River Substation Expansion

This Proposed Action involves expanding the already approved, but not yet constructed, 500 kV SCE switchyard into a full 500/220 kV substation on approximately 90 acres of land. The expansion project would involve site preparation by clearing existing vegetation and grading, and may involve redirecting surface flows around one side of the substation. An approximate 10-acre staging area adjacent to the expansion site may be necessary for construction. Although detailed engineering, grading and drainage plans are not yet available, it is estimated that the total area subject to permanent disturbance for the substation expansion would be approximately 65 acres (45 acres for substation grading, 20 acres for drainage/side slopes), plus temporary disturbance resulting from a 10-acre staging area.

Transmission System Upgrades

The Proposed Action will require an interconnection upgrade and telecommunication service at the Colorado River Substation. The California Independent System Operator (CAISO) and SCE have completed both phases of an Interconnection Study report for the Eastern Bulk System Transition Cluster which includes the GSEP. This study defines the impacts on the transmission system and system upgrades that are needed and attributable to all projects in the Eastern Bulk System planning area. SCE and the Applicant will enter into a Large Generator Interconnect Agreement in accordance with the CAISO's tariff.

Transmission Downstream

The Genesis cluster Phase I Interconnection study indicated that the Proposed Action interconnection to the grid would not result in downstream transmission impacts. Transmission reliability impacts and appropriate mitigation have now been fully identified through the Phase II Interconnection study of projects in the Transition Cluster, including the Genesis project. The Phase II studies indicate that upgrades or replacements of circuit breakers and other equipment will be necessary at 22 downstream substations in the Transition Cluster. If upgrades and mitigations are completed in a timely manner, full deliverability of the project is possible without overloading the system.

2.2.3 Construction

This section describes construction of the 1) Power Generation Facility, 2) Civil Works, 3) Generation Transmission Line and 4) Natural Gas Pipeline.

Major milestones of the Proposed Action construction schedule are as follows:

1. Begin construction Unit 1: Month 1
2. Startup and test Unit 1: Month 21
3. Commercial operation Unit 1: Month 25
4. Begin construction Unit 2: Month 12
5. Startup and test Unit 2: Month 33
6. Commercial operation Unit 2: Month 39

Construction for the Proposed Action is expected to occur over a total of 39 months. Proposed Action construction would require an average of 650 employees over the entire construction period, with labor requirements peaking at approximately 1,100 workers in Month 23 of construction.

The construction workforce would consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel. Total number of workers that would be needed for GSEP construction during the peak month (Month 23) are shown in Table 2-2:

Power Generation Facility

Temporary construction laydown and parking areas would be provided within the power plant site. Construction power would be provided by the local distribution system and routed to the site along wood poles within the 230 kV ROW. Due to the size of the plant site, the solar field laydown area would be relocated periodically as the solar field is built out. The construction sequence for power plant construction includes the following general steps:

> **Site Preparation:** this includes detailed construction surveys, mobilization of construction staff, grading, and preparation of drainage features. Grading for the solar field, power block, and rerouted wash would be completed during the first nine months of the construction schedule.

TABLE 2-2
GSEP CONSTRUCTION WORKFORCE

Trade	Total # of Workers for GSEP Construction by Craft – Month 23
Insulators	24
Operating Engineers	60
Laborer	96
Teamsters	38
Painter	15
Carpenter	44
Solar Field Craft	305
Pipe Fitter	200
Electrician	105
Cement Mason	4
Ironworker	70
Millwright	22
Construction Staff	92

Foundations: this includes excavations for large equipment (STG, SSG, GSUT, cooling tower, etc.) footings for the solar field and ancillary foundations in the power block.

Major Equipment Installation: once the foundations are complete, the larger equipment would be installed. The solar field components would be assembled in an on-site erection facility and installed on their foundations. Equipment and materials would be delivered to the GSEP plant site by truck; large components (e.g., STG) would be brought by rail to a rail siding in the town of Blythe and then are expected to be trucked to the site on I-10.

Balance of Plant (BOP): with the major equipment in place, the remaining field work would be piping, electrical, and smaller component installations.

Testing and Commissioning: testing of subsystems would be done as they are completed. Major equipment would be tested once all supporting subsystems are installed and tested.

Civil Works

The construction sequence for civil works includes the following general steps:

Site Disturbance: Once all areas are appropriately staked and signed and access to the site has been established, grading activities would occur over an extensive portion of the site. Grading would commence with rough grading activities, including grubbing, clearing, moisture conditioning, bulk grading, and initial compaction. The first ground-disturbing activities to take place would be the initial clearing and grading to prepare the site for the storm water drainage, construction, and equipment foundation pads.

Site Grading: The solar pad grading of the site would have an average slope of one to three percent on the north-south direction. Drainage diversion channels and protective berms would also be developed with a balance of cut and fill earthwork.

Site Drainage: The post-development sediment/retention basin at the discharge points would provide storm water pollution prevention BMP controls, along with retention time to reduce the peak off-site discharge to match pre-development conditions.

Internal Road System: A primary access road would be constructed to the power block area. This road would be 24 feet wide and paved with approximately 3,000 tons of imported asphalt concrete material. Auxiliary roads would be 24 feet wide and use compacted native materials or gravel surface; if applied, gravel would have a minimum depth of 6 inches. A driveway off the primary access road will be constructed to access a second entrance (emergency access gate) to the site.

Restoration of Temporary Disturbance: All temporarily disturbed areas would be restored to their preconstruction conditions, as required by the BLM. Temporary access roads used during construction will also be regraded and restored to pre-existing function and grade. BLM-approved seed mixes will be applied to temporarily disturbed areas, as required. No fertilizer will be used during stabilization or rehabilitation activities unless authorized by the BLM. No vegetation will be restored or encouraged within the solar field because of the fire hazard. Vegetation within the LTU area will be controlled to prevent containment from being compromised. When construction of storm water management structures is complete, contours will be carefully restored to the extent feasible.

Construction Water: Initial construction water will be provided by well TW2 which is located approximately 6.5 miles southeast of the GSEP site. It is anticipated that this well will have capacity to provide water for pre-construction actives as well as some of the onsite construction activities.

Generator Tie Line

The gen-tie line would be constructed with crews working continuously along the ROW, with construction of the entire gen-tie line requiring a peak workforce of approximately 34 workers. Gen-tie line construction would include the following activities:

1. Preparation of marshalling yards
2. Access road and spur road construction
3. Clearing and grading of pole sites
4. Foundation preparation and installation of poles
5. Conductor installation
6. Cleanup and site reclamation

Various construction activities would occur during the construction process with several construction crews operating simultaneously at different locations. The following subsections describe in more detail the construction activities associated with the GSEP gen-tie line.

Marshalling Yards: Construction staging/laydown and parking areas are proposed for two locations: 1) within the GSEP site, and 2) at the Wiley Well Rest area. Construction materials such as concrete, wire and cable, fuels, and small tools and consumables would be delivered to the staging/laydown areas by truck. Mobile trailers or similar suitable facilities (for example, modular offices) would be used for construction offices to be located at the GSEP staging/laydown areas.

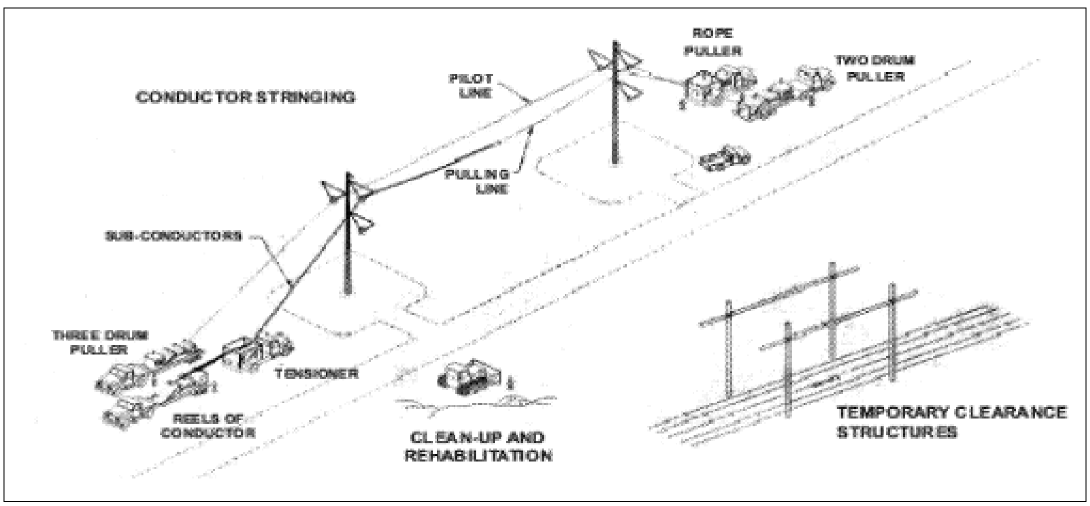
Road Work: The construction, operation, and maintenance of the proposed gen-tie line would require that heavy vehicles access structure sites along the road. The GSEP proposes to use the newly constructed site access road and Wiley Well Road for all construction, operation, and maintenance activities associated with the gen-tie line. If required, new spur roads, approximately 14 feet wide and averaging 70 feet in length (approximately 0.02 acre), would be constructed from the access roads to the structure sites. Each spur road would lead to a construction pad for a pole structure.

Pole Pads: At each site, a work area would be required for the structure footing location, structure assembly, and the necessary crane maneuvers.

Pole Erection: Transmission line pole structure foundation excavations would be made with power drilling equipment. A vehicle-mounted power auger or backhoe would be used to excavate for the structure foundation. Although not expected, in some instances blasting could be necessary because of specific geologic conditions.

Conductor Installation: Typical conductor stringing activities are illustrated below. Crossing structures would consist of H-frame wood poles placed on either side of an obstacle. Equipment for erecting the crossing structures would be the same as the equipment discussed above for transmission pole installation. Crossing structures may not be required for small roads or other areas where suitable safety measures such as barriers, flagmen, or other traffic controls could be used.

Pilot lines would be pulled (strung) from structure to structure and threaded through the stringing sheaves at each structure. Following the pilot lines, a larger diameter stronger line would be attached to the conductors to pull them onto the structures. This process would be repeated until the ground wire or conductor is pulled through all sheaves.



SOURCE: AFC, page 3-30.

Pulling Sites: The shield wire and conductors would be strung using powered pulling equipment at one end and powered braking or tensioning equipment at the other end, spaced approximately one mile apart. Tensioners and/or pullers, line trucks, wire trailers, and tractors needed for stringing and anchoring ground wire or conductor would be necessary at each pulling site. The tensioner, in concert with the puller, would maintain tension on the shield wires or conductors while they would be pulled through the structures. There would be approximately 25 pulling sites required to install the conductors along this segment of the gen-tie line. The sites would be accessed from the GSEP access roads or Wiley's Well Road.

Clean up and Site Reclamation: Construction sites, material storage yards, and access roads would be kept in an orderly condition throughout the construction period.

The post-construction ROW would be restored as required by the BLM.

Natural Gas Pipeline

Construction of the gas pipeline would be the responsibility of Southern California Gas (SoCalGas) and is expected to take 3 to 6 months with a peak workforce of approximately 46 workers. Provisions for construction contractor employee parking for the pipeline construction would be accommodated by GSEP at the plant site, except for those supervisory contractor employee and agency inspection vehicles which must be temporarily parked along the route while construction takes place. Most major pieces of pipeline construction equipment would remain along the pipeline ROW during construction with storage and staging of equipment and supplies either located at the GSEP plant site or other acceptable site selected by SCG at the time construction is underway. Excavated earth material would be stored within the construction ROW.

Trenching: The optimal trench would be approximately 48 inches wide and 4 to 10 feet deep. With loose soil, a trench up to eight feet wide at the top and three feet wide at the bottom may be required. The trench depth would provide a minimum cover of 36 inches.

Stringing: The pipeline components would be staged along the trench on wooden skids in preparation for installation.

Installation: Installation consists of bending, welding, and coating the weld-joint areas of the pipe after it has been strung, padding the ditch with sand or fine spoil, and lowering the pipe string into the trench following non-destructive testing of all welds.

Backfilling: consists of returning spoil back into the trench around and on top of the pipe, ensuring the surface is returned to its original grade or level.

Trenchless construction methods may be used for short crossings under existing water lines or other buried pipelines. Boring pits would be dug on each side of the crossing to accommodate the process.

2.2.4 Operation and Maintenance

The GSEP would be operated in conformance with public health and safety, environmental and other applicable regulations, guidelines, and conditions adopted or established by:

1. the CEC and specified in the written decision on the Application for Certification;

2. terms and conditions of any approved Right-of-Way (ROW) grant, including the approved Plan of Development (POD); or
3. as otherwise required by law.

The Proposed Action would have a moderate sized workforce during operation. Specifically, it is estimated that a permanent workforce of 40 to 50 full time equivalent personnel would be needed to staff the facility 24 hours per day/seven days per week.

The plant's power cycle is the Rankine-with-reheat thermodynamic cycle. The thermal input is via heated HTF from the parabolic trough solar field at a temperature of approximately 740^{o}F.

Overall annual availability for each 125 MW facility is expected to be between 96 to 98 percent of possible operating hours (between 3,000 and 3,200 hours per year). Each plant's capacity factor would depend on the local solar insolation, but has been estimated to be approximately 27 percent, or approximately 300,000 MWh/year. Each 125 MW plant would use the Rankine thermodynamic cycle with reheat described as follows:

> **Process 1:** The working fluid (water) is pumped from low to high pressure. During this process, steam extracted from the STG is used to preheat the water prior to entering the SSG system, which increases overall cycle efficiency.
>
> **Process 2:** The high pressure liquid enters the SSG system where it is heated theoretically at constant pressure by the HTF to become superheated steam.
>
> **Process 3:** The superheated steam expands through the high pressure section of the steam turbine, turning the generator to produce electricity. This steam is then reheated in different vessels that are part of the SSG system and sent to the reheat section of the steam turbine. The reheat exhausts into the low pressure (LP) section of the steam turbine.
>
> **Process 4:** The wet steam from the LP section then enters the surface condenser where it is cooled at a constant low pressure to become a saturated liquid. The condensed liquid returns to Process 1.

As the HTF is circulated from the SSG to the solar field, it absorbs solar energy and provides a high temperature (740^{o}F) energy source for the Rankine cycle. Waste heat is rejected in Process 4. As the turbine exhaust is condensed, the heat is transferred to the cool circulating water. The warm circulating water carries the heat to the wet cooling tower to be rejected.

Power Generation Process

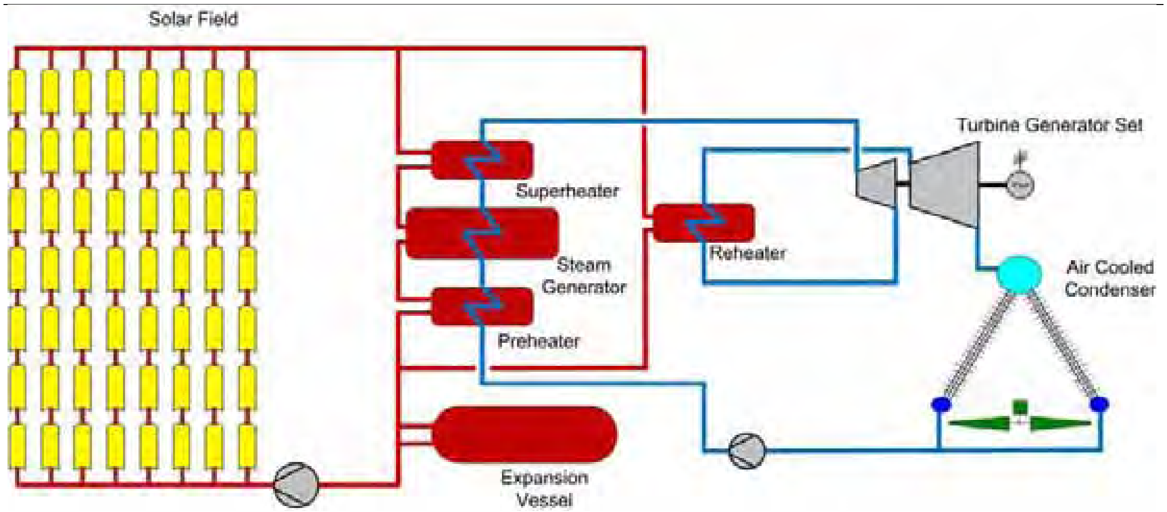
The power generating facility is composed of the following major components:

1. Deaerator;
2. Feedwater pumps;
3. Feedwater heaters;
4. SSG;
5. Steam superheater;

6. Steam reheater;
7. STG;
8. ACC; and
9. Between 850 acres and approximately 1,700 acres of parabolic trough solar collection fields, and HTF piping, pumping, and conditioning system – depending on alternative.

The thermodynamic cycle is illustrated in **Inset 2-1** below and described in the steps that follow:

INSET 2-1
THE THERMODYNAMIC CYCLE



Red lines on the diagram represent HTF piping. Hot HTF flows from top to bottom in the figure, arriving from the solar fields (having captured the sun's energy) and transferring this heat from the sun to the superheater and reheater; from where it then moves the heat energy to the steam generator; and, lastly the HTF flows to the preheater before returning to the solar fields to be heated once again in a continual cycle of renewable, clean energy. The blue lines represent steam and water piping. Feedwater, the portion of the blue line between the ACC and the preheater, is heated in a series of feedwater heaters by steam turbine extractions at various pressure levels.

Major Electrical Systems and Equipment

This section describes the major electrical systems and equipment. Roughly 10 percent of the STG output would be used on-site for plant auxiliary loads such as motors, heaters, control systems, and general facility loads including lighting and heating, ventilation, and air conditioning (HVAC). Some of the power needed for on-site uses would be converted from alternating current (AC) to direct current (DC) for power plant control systems and emergency backup systems. The descriptions of the major electrical systems and equipment provided in the following subsections reflect AC power unless otherwise noted. All electrical facilities equipment will be designed in accordance with applicable codes and standards.

Power would be generated by the STG (size and generation voltage is depending on the final generator selection) and stepped up by a fan-cooled generator step-up transformer (GSUT). Start-up power would be back-fed through the GSUT. Once the STG is running, it would supply the plant auxiliary power through a generator bus tap and the unit auxiliary transformer (UAT).

Grounding

The electrical system is susceptible to ground faults, lightning, and switching surges that can pose hazards to site personnel and electrical equipment. The station grounding system provides an adequate path to ground to permit the dissipation of current created by these events.

Electrical Generation

The Proposed Action's STGs would tie into a 230 kV on-site switchyard. The STGs generate electricity at 13.8 kV that would connect to the switchyard at 230 kV via a generator circuit breaker (GCB) and a GSUT.

The plant site switchyard would be located near the Unit 2 power blocks, as shown in Figure 2-7, and would require an overhead 795 thousand circular mils (kcmil) size, steel-reinforced, aluminum conductor unit tie line for the connection to both unit's GSUTs.

Fuel Supply and Use

The auxiliary boilers would be fueled by natural gas supplied from a new 6.5 mile, 8-inch pipeline connected to an existing SoCalGas pipeline located north of I-10. Natural gas delivered to the GSEP site would flow through a revenue quality flow meter, pressure regulation station, and filtering equipment, and would provide gas to the auxiliary boilers for each 125 MW power plant. The estimated natural gas usage for each auxiliary boiler is 30 million British thermal units per hour (MMBtu/hr) or a total of 60 MMBtu/hr for the Proposed Action. The maximum annual natural gas usage is expected to be 60 million standard cubic feet per year (MMSCF/yr) for a maximum of 60,000 MMBtu/year.

Heat Transfer Fluid

Therminol™ (VP-1), an aromatic hydrocarbon, biphenyl-diphenyl oxide manufactured by Solutia, is currently being considered as the HTF for the Proposed Action. Therminol is a special high-temperature oil that has an excellent operating history and is used in many heat transfer processes. Dowtherm A, an essentially chemically identical product manufactured by Dow, is being considered as an alternative to Therminol™ (VP-1).

Water Supply and Consumptive Requirements

The GSEP's various water uses include makeup for the circulating water system, makeup for the SSG, water for solar collector mirror washing, service water, potable water, and fire protection water.

Water Treatment

The raw water, circulating water, process water, and mirror washing water all require on-site treatment, and this treatment varies according to the quality required for each of these uses. The power plant's design consists of a pre-treatment system upstream of the cooling tower, and a post-treatment system downstream of the cooling tower. Please see the Water Resources section (Section 4.21) for more detailed analysis of this subject.

Water is cycled in the cooling tower until the concentration of chemical constituents rises to levels where it becomes unusable and it is blown down as a waste stream. Circulating water will be modified with chemical treatment to prevent the growth of bacteria, formation of scale, and minimization of corrosion of the wet surface air cooler (WSAC) system. These chemicals include a biocide, scale inhibitor, and corrosion inhibitor.

> **Biocide:** An open recirculating cooling system provides a favorable environment for biological growth. If this growth is not controlled, severe biological fouling and accelerated corrosion can occur. Sodium hypochlorite is the most common chemical used for controlling the biological growth, slime, and algae. Sodium hypochlorite is used because is it safer to handle and less likely to precipitate than other chlorine or bromine compounds.
>
> **Scale Inhibitors:** Anti-scalants are surface-active materials that interfere with the precipitation reactions by either threshold inhibition, crystal modification, or dispersion. This enables higher cooling water cycles of concentration and permits operation at "supersaturated" conditions.
>
> **Corrosion Inhibitors:** Corrosion inhibitors may be added to the circulating water to reduce the rate of corrosion of metals or alloys in contact with the water. Circulating water can range from scale-forming to scale-dissolving (corrosive). Changes in the pH and constituents of concern can impact whether or not scale will form and to what extent the water will be corrosive. Corrosion inhibitors such as phosphate and zinc may be added to help reduce corrosion rates.

Pre-treatment of the makeup water to remove concentrations of calcium is desirable to reduce the quantity of makeup water required. The pre-treatment design for the Proposed Action takes into account the relatively high concentrations of chloride and sodium present in the makeup water to the site. There are several tanks on site which would contain the raw water, treated water, and wastewater, which would have the following capacity:

1. Raw Water/Fire Water Storage Tank: 500,000 gallons
2. Treated Water Storage Tank: 1,250,000 gallons
3. Wastewater Storage Tank: 250,000 gallons

Water Source and Quality

GSEP water for the GSEP would come from pumping groundwater from wells to be installed at the GSEP site. These wells would pump groundwater from the Bouse Formation and/or underlying Fanglomerate within the Chuckwalla Valley Groundwater Basin. Please refer to

Sections 3.20 and 4.19 for detailed discussion of current groundwater basin conditions and impacts of the Proposed Action on groundwater basins.

Steam Cycle Process Water

Makeup water for the steam cycle must meet stringent specifications for suspended and dissolved solids. To meet these specifications, water from the treated water storage tank is sent to a deionized makeup water tank, and then processed through a demineralized water makeup system consisting of mixed-bed demineralizers and a 40,000 gallon demineralized water storage tank. Water produced by this system would also be used for the mirror washing described below. Additional conditioning of the condensate and feedwater circulating in the steam cycle is provided by means of a chemical feed system.

Solar Mirror Washing Water

To facilitate dust and contaminant removal, deionized (demineralized) water from the demineralized water storage tank is used to spray clean the solar mirrors on a periodic basis, determined by the reflectivity monitoring program. This operation is generally done at night and involves a water truck spraying deionized water on the mirrors in a drive-by fashion. The deionized water production facilities, already in place for SSG makeup water, would be sized to accommodate the additional solar mirror washing demand of about 2 acre-feet per year and is shown on the water balance diagrams. Water from the washing operation is expected to mostly evaporate on the mirror surface with no appreciable runoff.

Potable Water

A package water treatment system would be used to treat the water to meet potable standards. Water supply would come from the (reverse osmosis (RO)) treatment system, and sanitary wastewater would be discharged to an onsite septic system.

Cooling Systems

Each power plant includes two cooling systems: 1) the steam cycle heat rejection system (*e.g.*, cooling tower); and 2) the closed cooling water system (equipment cooling), each of which is discussed below.

Steam Cycle Heat Rejection System

The cooling system for heat rejection from the steam cycle consists of a surface condenser, circulating water system, and wet cooling tower. The surface condenser receives exhaust steam from the LP section of the STG and condenses it to liquid for return to the SSG. The surface condenser is a shell-and-tube heat exchanger with wet, saturated steam condensing on the shell side and circulating water flowing through the tubes to provide cooling. The warmed circulating water exits the condenser and flows to the cooling tower to be cooled and reused.

The circulating water is distributed among multiple cells of the cooling tower, where it cascades downward through each cell and then collects in the cooling tower basin. The mechanical draft cooling tower employs electric motor-driven fans to move air through each cooling tower cell. The cascading circulating water is partially evaporated, and the evaporated water is dispersed to the atmosphere as part of the moist air (plume) leaving each cooling tower cell. As discussed in the Visual Resources section (Section 4.14), because of climatic conditions at the site, visible moisture plumes are expected to occur relatively infrequently and largely in winter months, and no need is expected for a plume-abated cooling tower.

The circulating water is cooled primarily through partial evaporation and secondarily through heat transfer with the air. The cooled circulating water is pumped from the cooling tower basin back to the surface condenser and auxiliary cooling water system.

Auxiliary Cooling Water System

The auxiliary cooling water system uses water from the cooling tower for the purpose of cooling equipment including the STG lubrication oil cooler, the STG generator cooler, steam cycle sample coolers, large pumps, etc. The water picks up heat from the various equipment items being cooled and rejects the heat to the cooling tower.

Waste Management

GSEP wastes include wastewater, non-hazardous solid waste, and hazardous solid and liquid waste. Detailed descriptions of GSEP waste streams and management details are discussed in the Soil & Water Resources and Waste Management sections of this document.

Wastewater

Wastewater would be segregated into two separate collection systems, one for industrial streams and one for sanitary wastes. Industrial wastewater from both the pre-treatment and post-treatment systems would be piped to two, 30-acre evaporation ponds for disposal. There would be three primary and one occasional waste streams discharging into the evaporation ponds:

1. Pre-cooling tower water treatment multi-media filter (MMF) waste stream;
2. Post-cooling tower water treatment MMF waste stream;
3. Post-cooling tower water treatment; and,
4. 2nd stage Reversed Osmosis (RO) waste stream.

Occasionally, storm water may accumulate in the proposed Land Treatment Unit (LTU) that would be used to treat soil affected by spills of HTF, and would be transferred to the evaporative ponds.

On an annual average, blowdown to the evaporation ponds would be approximately 90,000 gallons per day for each unit, increasing to approximately 140,000 gallons per day for each unit during peak summer conditions.

The GSEP's sanitary system would collect wastewater from sanitary facilities such as sinks and toilets. This waste stream would be sent to an on-site sanitary waste septic system.

Non-Hazardous Solid Waste

Construction, operation, and maintenance of the GSEP would generate non-hazardous solid wastes typical of power generation or other industrial facilities. These wastes include scrap metal and plastic, insulation material, paper, glass, empty containers, and other miscellaneous solid wastes.

Hazardous Solid and Liquid Waste

Small quantities of hazardous wastes would be generated during GSEP construction and operation. Hazardous wastes generated during the construction phase would include substances such as paint and primer, thinners, and solvents. Hazardous solid and liquid waste streams generated during GSEP operations include substances such as used hydraulic fluids, oils, greases, filters, etc., as well as spent cleaning solutions and spent batteries. To the extent possible, both construction and operation-phase hazardous wastes would be recycled. Hazardous materials that would be used during construction include gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints.

Evaporation Ponds

The two ponds are planned to allow plant operations to continue in the event a pond needs to be taken out of service for some reason, *e.g.*, needed maintenance. Each pond would have enough surface area so the evaporation rate exceeds the cooling tower blowdown rate at maximum design conditions and annual average conditions. The average pond depth would be eight feet.

On-site Bioremediation Land Treatment Unit (LTU)

The Proposed Action would include a bioremediation LTU to treat soil impacted by incidental spills and leaks of HTF at various concentrations. The LTU would cover an area of approximately 600 feet by 725 feet (approximately 9.98 acres), including the staging area, and would accommodate both 125 MW units. The LTU would be constructed with a prepared base consisting of 2 feet of compacted, low permeability, lime treated material and be surrounded on all sides by a minimum 2-foot high compacted earthen berm with slopes of approximately 3:1 (horizontal:vertical). Based on available operation data from other sites, it is anticipated approximately 740 cubic yards (on average) of HTF-affected soil may be treated per year. Larger or smaller quantities could be generated during some years, depending on the frequency and size of leaks and spills.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the Proposed Action.

Air Emissions Control and Monitoring

Operation of the Proposed Action would result in emissions to the atmosphere of both criteria and toxic air pollutants from the proposed auxiliary boilers, fire pump engines, emergency generator engines, and cooling towers, and fugitive losses from the HTF system. Construction-related emissions would be associated with site disturbance resulting from site preparation and with the typical emissions and associated construction-related activities encountered at any construction site.

Plant Auxiliary Systems

The following-described plant auxiliary systems control, protect, and support the power plant and its operation.

Distributed Control System

The Distributed Control System (DCS) provides control, monitoring, alarm, and data storage functions for power plant systems.

The DCS is a microprocessor-based system. Redundant capability is provided for critical DCS components such that no single component failure would cause a plant outage.

The DCS is linked to the control systems furnished by the STG supplier and the solar field controls. These data links provide STG control, monitoring, alarm, and data storage functions via the control operator interface and control technician workstation of the DCS.

Cathodic and Freeze Protection Systems

Cathodic protection systems protect against electrochemical corrosion of underground metal piping and structures. Underground metal piping structures would have cathodic protection as necessary based on soil conditions. Freeze protection systems (heat tracing) would be employed to protect small water and condensate piping systems that cannot be easily drained. Also due to the high freezing temperature of the solar field’s HTF (54°F), steam-fed HTF freeze protection heat exchangers would be provided to protect the system during the night hours and colder months.

Service Air and Instrument Air Systems

The service air system supplies compressed air to hose connections located at intervals throughout the power plant. Compressors deliver compressed air at a regulated pressure to the service air-piping network. The instrument air system provides dry, filtered air to pneumatic operators and devices throughout the power plant. Air from the service air system is dried, filtered, and pressure regulated prior to delivery to the instrument air-piping network.

HTF Leak Detection

Leak detection of HTF would be accomplished in a combination of ways. Small leaks, possibly at ball joints or other connections, would be located based on daily inspection of the solar field. Those small leaks can then be corrected via repacking of joints or valves or by minor repairs if needed. The ability to isolate loops and sections of the field would allow for quick repairs. In order to identify and react to larger sudden leaks quickly, a combination of remote pressure sensing equipment and remote operating valves would be put in place for isolation of large areas. Please see the Hazardous Materials section of this document for more details.

2.2.5 Decommissioning

The planned operational life of the GSEP and duration of the ROW grant is 30 years, but the facility conceivably could operate for a longer or shorter period depending on economic or other circumstances. If the GSEP remains economically viable, it could operate for more than 30 years. However, if the facility were to become economically non-viable before 30 years of operation, permanent closure could occur sooner. In any case, WorleyParsons developed and docketed a *Draft Decommissioning and Closure Plan* (February 22, 2010) on behalf of the Applicant to be put into effect when permanent closure occurs. If approved, the solar energy ROW authorization would include a required "Performance and Reclamation" bond to ensure compliance with the terms and conditions of the ROW authorization, consistent with the requirements of 43 CFR 2805.12(g). The "Performance and Reclamation" bond will consist of three components. The first component will be hazardous materials, the second component will be the decommissioning and removal of improvements and facilities, and the third component will address reclamation, revegetation, restoration and soil stabilization. The CEC's COCs including the decommissioning can be found in Appendix G.

Temporary Closure

If a temporary closure occurs, security would be maintained 24 hours per day at the GSEP. The BLM and other responsible agencies would be notified. Temporary closure activities would differ depending on whether or not a release of hazardous materials is involved.

If there is no actual or threatened release of hazardous materials, a contingency plan would be implemented for the temporary halting of facility operations. The contingency plan would be developed before operations and its purpose is to ensure compliance with all applicable laws, ordinances, regulations, and standards (LORS) and appropriate protection of public health, safety, and the environment. Depending on the expected duration of the temporary shutdown, the contingency procedures implemented may include draining and properly disposing of chemicals from storage tanks and other facility equipment, safe shutdown of all facility equipment, and other measures as needed to ensure protection of onsite workers, the public, and the environment.

If the temporary closure does involve an actual or threatened release of hazardous materials, the procedures followed would be those provided in the Hazardous Materials Business Plan that would be developed for the proposed action. Procedures would include, at a minimum:

1. Measures to control the release of hazardous materials;
2. Notifications required to the appropriate agencies and the public;
3. Emergency response procedures; and
4. Training requirements for GSEP personnel in hazardous materials release response and control.

When all issues related to the hazardous materials release have been resolved, temporary closure would proceed as described above for temporary closure without a hazardous materials release.

Permanent Closure

The procedures provided in the Draft Decommissioning and Closure Plan are developed to ensure compliance with applicable LORS, and to ensure public health and safety and protection of the environment. The Draft Decommissioning and Closure Plan was submitted to the CEC and BLM for review. A final version will also be developed and submitted for review and approval prior to a planned closure.

Security for the GSEP would be maintained on a 24-hour basis during permanent closure. In general, the Final Decommissioning and Closure Plan will address: decommissioning measures for the GSEP and all associated facilities; activities necessary for site restoration/revegetation if removal of all equipment and facilities is needed; recycling of facility components, collection and disposal of hazardous and non-hazardous wastes, and resale of unused chemicals to other parties; decommissioning alternatives other than full site restoration; costs associated with the planned decommissioning activities and where funding would come from for these activities; and conformance with applicable LORS (Solar Millennium 2009a, p. 3-2).

It is assumed that the number and type of workers required for closure and decommissioning activities would be similar to those described above for construction of the GSEP. Also, it is assumed the closure and decommissioning workforce would be drawn from the regional and local area of potential effect. Furthermore, it is assumed that the regional area of potential effect would continue to offer a high number of transient lodging opportunities to serve decommissioning construction employees. Closure and decommissioning of the GSEP would likely require further environmental impact evaluation to determine fiscal and non-fiscal impacts to the action area.

Upon closure the owner of the GSEP shall implement a final Decommissioning and Reclamation Plan. The Decommissioning and Reclamation Plan shall include a cost estimate for implementing the proposed decommissioning and reclamation activities subject to review and revisions from the CPM in consultation with BLM, USFWS and CDFG.

Reclamation Plan

A plan for reclamation and cost estimate must meet 43 CFR 3809.55 et. seq. Page 5 of BLM’s Instructional Memo for Oregon/Washington BLM Policy for 43 CFR 3809 Notice and Plan-level Occupations, 43 CFR 3715 Use and Occupancy and Reclamation Cost Estimates (BLM 2009b) lists the requirements for a reclamation plan as follows:

(c) Reclamation Plan. A plan for reclamation to meet the standards in 43 CFR 3809.420 with a description of the equipment, devices, or practices proposed for use including, where applicable, plans for:

- (i) drill-hole plugging;
- (ii) regrading and reshaping;

(iii) mine reclamation, including information on the feasibility of pit backfilling that details economic, environmental, and safety factors;

(iv) riparian mitigation;

(v) wildlife habitat rehabilitation;

(vi) topsoil handling;

(vii) revegetation;

(viii) isolation and control of acid-forming, toxic, or deleterious materials;

(ix) removal or stabilization of buildings, structures, and support facilities; and

(x) post-closure management."

Page 3 of the Instructional Memo also explicitly requires an estimate of the costs of reclamation, as follows:

> "Reclamation Cost Estimate. An estimate of the cost to fully reclaim disturbances created during the proposed operations as required by 43 CFR 3809.552. The reclamation cost estimate must be developed as if the BLM were to contract with a third party to reclaim the operations according to the reclamation plan."

Design Features and Best Management Practices (BMPs)

General Design Features

Solar Facilities

1. The power plant would be designed in conformance with 2007 California Building Code and the applicable wind and seismic criteria for site location.

2. Sensitive Proposed Action facilities (*e.g.,* power block, evaporation pond) would be placed at specific on-site locations that avoid mapped fault zones.

3. The design and construction of the administration building and warehouse would be consistent with normal building standards.

4. Building columns would be supported on reinforced concrete mat foundations or individual spread footings and the structures would be placed on reinforced concrete slabs.

5. Foundation design for solar array support structures would be based on site-specific geotechnical conditions to ensure the solar array stands would be able to support all loading conditions (including wind loading) at the GSEP site.

6. Water storage tanks would be vertical, cylindrical, field-erected steel tanks supported on foundations consisting of either a reinforced concrete mat or a reinforced concrete ring wall with an interior bearing layer of compacted sand supporting the tank bottom.

7. Facility lighting would be designed to provide the minimum illumination needed to achieve safety and security objectives and would be shielded and oriented to focus illumination on the desired areas and minimize additional nighttime illumination in the site vicinity.

Earthwork and Drainage

1. Channels and diversion berms would be:

    a. designed to allow passage of anticipated 100-year stormflows and entrained sediment volumes;

    b. armored as necessary for erosion protection using natural gravel derived during site grading activities; and

    c. maintained periodically or after major storm events as needed to sustain their proper function.

2. A comprehensive site drainage plan was developed in consultation with other public agencies which resulted in a determination on jurisdiction of waters of the U.S.

3. Channels and diversion berms would be designed to:

    a. prevent interaction between off-site storm and on-site storm water;

    b. allow natural groundwater recharge of the off-site storm water with no contact with the changed flow conditions of the on-site water;

    c. protect the site infrastructure from flash flood events;

    d. control treatment of the on-site flows from the solar collector array (location of HTF within the solar parabolic troughs);

    e. protect the site from upstream sediment loading; and

    f. control on-site flows in detention basins to ensure there is no increase in post developed flow discharging from the site and minimize the impact on downstream drainage features (lake playas, etc).

4. On-site storm water management, through use of source control techniques, site design, and treatment, would employ a comprehensive system of management controls, including site-specific Best Management Practices (BMPs), to minimize storm water contact with contaminants and thus minimize pollutants in storm water. Management includes, but is not limited to, control of erosion, sediment, and wind erosion, minimizing non-storm water discharge; monitoring and maintenance of the stormwater control system; and waste management.

5. Preliminary grading is designed to ensure that run-off from solar fields is directed into the appropriate drainage channel and that the power block, evaporation ponds, and land farm units are protected in the 100-year, 24-hour storm event.

Power Generation, Interconnection and Transmission

1. Instrument transformers (current and capacitive voltage transformers) would be included for protection.

2. Shield wires and lightning arrestors would be included to protect substation equipment and personnel against lightning strikes.

3. Conductors would be insulated from the poles using porcelain insulators engineered for safe and reliable operation at a worst-case voltage of 241.5 kV (nominal, plus five percent).

4. Shield wires would be included along the length of the lines to protect against lightning strikes (see the Transmission Line Safety Nuisance and Transmission System Engineering sections of this document).

5. Pole designs would be engineered to provide conceptual design limits for purposes of the electromagnetic field (EMF) studies and in accordance with the current Blythe-Julian Hinds structures.

Construction

Civil Works

1. Temporary drainage ditches and berms would be designed around construction work areas, soil stockpile areas, and excavation areas to minimize the amount of potential pollutant or sediment-laden surface water runoff.

2. Each solar pad would be graded with the intent of balancing the cut-and-fill as much as possible to minimize earth movement on the site.

3. The road berms would be constructed to provide site protection from storm water run-on during a 100-year return interval storm event.

4. If necessary, the "toe" of the western protective berm slope would be armored with soil cement cover and rip rap to provide to protect against slope erosion during a heavy storm event.

Transmission Line

1. Work area for the pole pads would be cleared of vegetation only to the extent necessary and the construction pad would be leveled to facilitate the safe operation of equipment such as construction cranes.

2. In the unlikely event blasting would be necessary, conventional or plastic explosives and safeguards such as blasting mats would be used.

3. Crossing structures would be used where necessary to prevent ground wire, conductors, or equipment from falling on an obstacle during construction and would be removed following the completion of conductor installation.

4. Pole erection may be accomplished through the use of helicopters to minimize or otherwise eliminate the need to traverse the ROW along the ground from structure to structure.

Gas Line

1. During nonworking hours, any open trench would be covered with wood or other material of sufficient strength to support wildlife.

2. Backfill would be compacted to protect the stability of the pipe and minimize subsequent subsidence.

3. The gas pipeline would likely be pressure tested with water. However, the contractor may choose to air test with nitrogen if allowed by applicable regulations. The source of the water would be the test well near Wiley's Well rest stop. An estimated 5,000 to 6,000 gallons of water would be used for testing the integrity of the gas line. Once the test is completed, a

small amount of water would be released, and samples would be sent to a lab to analyze for hazardous constituents that sometimes are present as a result of the manufacturing process of the pipeline. If the water contains hazardous constituents above water quality standards, it would be put into a tanker truck and taken off site to an appropriate disposal facility. If water quality is within acceptable discharge standards, it will be distributed on the access road or some other nearby area for dust control in compliance with regulatory standards.

Operations

Site Security

1. Security for the GSEP facility would be maintained 24 hours a day, 7 days a week regardless of whether the plant is in operation (generating power) or not.

2. In order to ensure that the facility site is not the target of unauthorized access, site security measures would be implemented. These measures would provide appropriate levels of security to protect electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks.

Solar Generation Facility

1. No vegetation would be restored or encouraged within the solar field because of the fire hazard.

2. The switchyard station ground grid would be designed for adequate capacity to safely dissipate ground current.

3. The GSUT would rest on a concrete pad with a perimeter berm designed to contain the transformer non-polychlorinated biphenyl l (PCB) insulating oil in the event of a leak or spill.

4. Lightning arresters would be provided in the area of the takeoff towers to protect against surges due to lightning strikes. Tubular aluminum alloy bus would be used in the switchyard.

Gas Line

1. Safety pressure relief valves would be provided downstream of the pressure regulation valves.

Water Storage

1. Water tanks would be sized to provide sufficient water to support operation of the plant during peak operating conditions, as well as provide a 12-hour storage capacity to enable continued operation when a failure interrupts water or wastewater treatment capabilities.

2. Water tanks also allow the plant to "level" the water supply requirements on a 24-hour basis to protect against midday demand peaks.

Waste Management

1. Procedures to be taken in the event of an actual or threatened release of hazardous materials would include, but not be limited to, the following:

   a. measures to control the release of hazardous materials;
   b. requirements for notifying the appropriate agencies and the public;
   c. emergency response procedures; and
   d. training requirements for GSEP personnel in hazardous materials release response and control.

2. Engineered safety features proposed by the applicant for use at the GSEP include:

   a. storage of small quantity hazardous materials in original, properly labeled containers;
   b. construction of secondary containment areas surrounding each of the bulk hazardous materials storage areas, designed to contain accidental releases that might happen during storage or delivery plus the volume of rainfall associated with a 25-year, 24-hour storm;
   c. physical separation of stored chemicals in isolated containment areas in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
   d. installation of a fire protection system for hazardous materials storage areas; and
   e. continuous monitoring of HTF piping system by plant staff and by automatic pressure sensors designed to trigger isolation valves if a leak is detected.

3. Septic system would be designed and permitted in accordance with local building standards, and maintained according to accepted standard procedures.

4. Non-hazardous solid materials would be disposed of by means of contracted refuse collection and recycling services.

5. All hazardous materials used during construction and operation would be stored on site in storage tanks, vessels and containers that are specifically designed for the characteristics of the materials to be stored; as appropriate, the storage facilities would include the needed secondary containment in case of tank/vessel failure. MSDS sheets would be retained onsite for all hazardous materials stored onsite.

Evaporation Ponds and LTU

1. Evaporation ponds would be designed and permitted as Class II Surface Impoundments in accordance with Colorado River Regional Water Quality Control Board (CRRWQCB) requirements, as well as the requirements of the California Integrated Waste Management Board (CIWMB).

2. Residual precipitated solids would be removed approximately every 7 years to maintain a solids depth no greater than approximately 3 feet for operational and safety purposes.

3. Precipitated solids would be sampled and analyzed to meet the characterization requirements of the licensed receiving disposal facility.

4. The LTU would be designed and permitted as a Class II LTU in accordance with CRRWQCB and CIWMB requirements.

5. Vegetation within the LTU area would be controlled to prevent containment from being compromised.

6. A Preliminary Closure and Post-Closure Maintenance Plan for the evaporation ponds and LTU would be submitted to the Colorado River Regional Water Quality Control Board with the application for a Report of Waste Discharge (RoWD).

Clean Up/Restoration

1. Temporary access roads used during construction would be re-graded and restored to pre-existing function and grade.

2. BLM-approved seed mixes would be applied to temporarily disturbed areas, as required.

3. General cleanup would include, but not be limited to, restoring the surface of the ROW by removing any construction debris, grading to the original grade and contour, and re-vegetating or repairing where required.

4. No fertilizer would be used during stabilization or rehabilitation activities unless authorized by the BLM.

5. When construction of storm water management structures is complete, contours would be carefully restored as required by BLM.

6. Any topsoil identified and sequestered during construction and operations would be spread onsite during reclamation.

Closure

Decommissioning and Reclamation Plan

1. Prior to beginning permanent closure activities, a Closure, Decommissioning and Restoration Plan (Plan) would be developed to ensure compliance with applicable LORS, and to ensure public health and safety and protection of the environment. The Plan would be submitted to the CEC and BLM for review and approval prior to a planned closure.

2. The Plan for decommissioning measures for the power plant and all associated facilities constructed as part of the Proposed Action would include, but not be limited to, identifying:

   a. activities necessary for site reclamation;

   b. a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the Proposed Action;

   c. provisions for recycling facility components, collection and disposal of wastes, and resale of unused chemicals back to suppliers or other parties;

   d. costs associated with the proposed decommissioning and reclamation activities and the source of funds to implement these activities; and

   e. conformance with applicable LORS and with local/regional plans.

3. During permanent closure, the BLM, CEC and other responsible agencies would be notified of the decommissioning schedule and plans.

4. Prior to submittal of an amended or revised Closure, Decommissioning and Restoration Plan, a meeting would be held between the GSEP owner, BLM and CEC for the purpose of discussing the specific contents of the plan.

Temporary Closure

1. A Contingency Plan would be developed prior to the beginning of operations to ensure compliance with all applicable Laws, Ordinances, Regulations, and Standards (LORS) and appropriate protection of public health, safety, and the environment in the event of an unplanned shutdown.

2. Depending on the expected duration of a temporary shutdown, the Contingency Plan may include draining and proper disposal of chemicals from storage tanks and other facility equipment; safe shutdown of all plant equipment; and various other measures to protect onsite workers, the public, and the environment.

3. If the evaporation ponds or LTU require closure, either permanent or temporary, the approved Closure and Post-Closure Maintenance Plan would be implemented.

2.2.6 Action Alternatives

Land Use Plan Amendment Alternative-Reduced Acreage Alternative

The Reduced Acreage Alternative would essentially be Unit 1 (or one-half) of the Proposed Action, including a 125 MW solar facility located within the boundaries of the Proposed Action as defined by NextEra. This alternative is analyzed for two major reasons: (1) it eliminates about 50 percent of the proposed Proposed Action area so all impacts would be reduced, and (2) it would reduce the water required for wet cooling by 50 percent. The boundaries of the Reduced Acreage Alternative are shown in Figure 2-3. As with the proposed GSEP, a land use plan amendment to the California Desert Conservation Area (CDCA) Plan of 1980 would be required before BLM could issue the ROW grant for the Reduced Acreage Alternative.

The Reduced Acreage Alternative would have a net generating capacity of approximately 125 MW and would occupy approximately 900 acres of land. This alternative would retain 50 percent of the Proposed Action’s generating capacity, and would affect 50 percent of the land affected by the Proposed Action. Specifically, the alternative would retain the Unit 1 solar field, including the construction parking, construction trailers, and temporary construction laydown area; the administration building and warehouse; the solar collector assembly area; the western evaporation pond area (approximately 24 acres); and the land farm area (approximately 10 acres). The alternative would require relocating the switchyard, from the Unit 2 power block to the Unit 1 power block. The eastern evaporation pond area (approximately 24 acres) that corresponds with Unit 2 would not be included in the Reduced Acreage Alternative. This area could be used for the relocated gas yard if needed.

Similar to the Proposed Action, the Reduced Acreage Alternative would transmit power to the grid through the Colorado River Substation. It would require infrastructure including groundwater wells, a transmission line, road access, an administration building, and evaporation ponds. The required infrastructure and transmission line for the Reduced Acreage Alternative would follow the routes defined for the Proposed Action, even though Unit 2 would not be constructed. The linear facilities would require approximately 90 acres. The gas pipeline would be approximately 1 mile longer than for the proposed Proposed Action.

Dry cooling is being evaluated as an alternative to the Proposed Action, so it could also be used with this 125 MW configuration. However, if wet cooling were used, cooling would require approximately 822 acre-feet of water per year.

According to the Applicant, independent studies have indicated a 250 MW size project is an optimal size where economies of scale and the potential for excess parasitic losses balance out. However, no evidence has been provided to demonstrate this, and solar thermal facilities as small as 20 MW are currently proposed in California. A detailed cost-benefit analysis for a reduced-size project would be required in order to determine the economic feasibility of this alternative. The Applicant also states that there is no substantial environmental advantage to a smaller size project (GSEP 2009a).

Land Use Plan Amendment Alternative-Dry Cooling Alternative

There are two types of dry cooling systems: direct dry cooling and the lesser used indirect dry cooling. In both systems, fans blow air over a radiator system to remove heat from the system via convective heat transfer (instead of once-through cooling or evaporative heat transfer). In the direct dry cooling system, also known as an air-cooled condenser (ACC), steam from the steam turbine exhausts directly to a manifold radiator system that rejects heat to the atmosphere, condensing the steam inside the radiator. Direct dry cooling is analyzed as the alternative to the wet cooling proposed by NextEra for the GSEP (see Figure 2-9).

Cooling Systems

The Dry Cooling Alternative power plant includes two cooling systems: 1) the air-cooled steam cycle heat rejection system, and 2) the closed cooling water system for ancillary equipment cooling, each of which is discussed below.

Steam Cycle Heat Rejection System

The cooling system for heat rejection from the steam cycle consists of an ACC, which receives exhaust steam from the low-pressure section of the STG and condenses it to liquid for return to the SSG.

Auxiliary Cooling Water System

The auxiliary cooling water system uses a WSAC for cooling ancillary plant equipment, including the STG lubrication oil cooler, the STG generator cooler, steam cycle sample coolers, large pumps, and other ancillary equipment. In a WSAC system, warm process fluids or vapors are cooled in a closed-loop tube bundle (the process fluid being cooled never comes in contact with the outside air). Open loop water is sprayed and air is induced over the tube bundle resulting in the cooling effect.

Advantages and Disadvantages of Dry Cooling

Dry cooling is the best choice of cooling technologies for a steam power plant to conserve water and minimize wastewater. However, this technology can create both environmental and economic concerns, depending on the location and specific situation. The following is a summary of the advantages and disadvantages of dry cooling for the GSEP.

Advantages of Dry Cooling Systems

1. Dry cooling allows a power plant location to be less dependent on a water source. It would allow the use of substantially less water and would reduce operation use of water from 800 AFY to approximately 101 AFY per 125 MW power block in a water-constrained environment (GSEP 2009f).

2. Dry cooling minimizes the use of water treatment chemicals.

3. Dry cooling minimizes the generation of liquid and solid wastes.

4. Dry cooling does not generate visible plumes that are commonly associated with wet cooling towers.

5. Impacts to groundwater-dependent biological resources, expected to be substantial under the Proposed Action, would be reduced using dry cooling technology.

6. Potential impacts to other groundwater users in the basin, would be reduced.

7. Dry cooling minimizes the need for disturbance of wetland/aquatic substrate habitat.

8. Dry cooling is consistent with the State's water policy.

Disadvantages of Dry Cooling Systems

1. Dry cooling requires air-cooled condensers that can have negative visual effects.

2. Compared to once-through cooling, dry cooling requires the disturbance of a larger area for the air-cooled condensers than that required for cooling towers. However, at the GSEP site the air-cooled condensers would be located entirely within the previously disturbed project footprint so would not require any additional ground disturbance.

3. Dry cooling can have noise impacts that are greater than once-through or wet cooling systems because of the number of fans and the considerably greater total airflow rate.

4. Using dry cooling, the power plant steam cycle efficiency and output can be slightly reduced, depending on site conditions and seasonal variations in ambient conditions. Also, extra power is needed to operate the cooling fans; dry cooling will increase on-site electrical demand by 2% of STG output, resulting in roughly 12% of the STG output being used on-site.

5. Capital costs for building air-cooled condensers are generally higher than capital costs for once-through cooling; however, in this case, the evaluated installed cost difference between wet and dry cooling was less than 1 percent (GSEP 2009f).

Description of the Air Cooled Condensers

In order to compare the performance and impacts of a dry cooling system or ACC with that of the wet-cooled system, the operating conditions at a common design point must be established. The design and operation of an ACC are highly dependent upon the ambient conditions at a specific site.

Size, Configuration, and Layout

The size of an ACC is a function of the heat load from the steam turbine generator and the ambient conditions. The ACC is composed of tube bundles with fins attached to the tubes to enhance heat transfer to the air. These bundles are grouped together and mounted in an A-frame configuration on a steel support structure. These A-frame tube bundles are aligned in rows or bays. Steam is ducted directly from the steam turbine exhaust to the ACC where it enters in a parallel flow into the tubes across the top of the bays. Air is blown from below across the finned tube bundles by a series of large fans, which are located beneath the A-frame tube bundles. Each fan is considered a module. To accommodate the large mass of air required for cooling the steam, the A-frame tube bundles are elevated on top of an open structure. As the steam passes down through the tube bundles, it is condensed and drains by gravity flow into a tank from which it is pumped back to the steam turbine. Since the steam is exhausted directly from the steam turbine generator after it has expanded through the turbine, it is at both a very low pressure and large volume. This condition limits the distance that the ACC can be located from the steam turbine generator, due to the drop in pressure that results during the transport of the steam; this limitation must be taken into consideration when configuring the plant layout.

Figure 2-10 and Figure 2-11 show the approximate size and location of the ACC on the power block layout for Unit 1 and Unit 2, respectively.

Approximately 18 ACC fans would be required for cooling each 125 MW power block when the ambient temperature is above 50 degrees Fahrenheit (GSEP 2009f). The 18 ACC fans described in the GSEP cooling study would have a length of approximately 279 feet, a width of approximately 127 feet, and a height of 98 feet (GSEP 2009f). However, based on the ACC preliminary designs for nearby solar thermal projects in similar ambient temperatures, an additional 11,690 square feet could be required for siting of the fans and the fans would be up to 120 feet in height.

GSEP Construction

The Dry Cooling Alternative construction timeline is slightly less when compared to the Proposed Action (37 months compared to 39 months, respectively). The Dry Cooling Alternative construction is expected to occur over a total of 37 months. The Dry Cooling Alternative construction will require an average of 650 employees over the entire 37-month construction period, with manpower requirements peaking at approximately 1,100 workers in Month 25 of construction. The construction workforce will consist of laborers, craftsmen, supervisory personnel, support personnel, and construction management personnel.

Construction of each 125 MW Unit is expected to take approximately 25 months with each unit being phased by 12 months:

1. Begin pre-construction Unit 1: Month 1
2. Begin Construction Unit 1: Month 4
3. Startup and test Unit 1: Month 24
4. Commercial operation Unit 1: Month 28

5. Begin construction Unit 2: Month 15
6. Startup and test Unit 2: Month 36
7. Commercial operation Unit 2: Month 40

Water Use and Requirements

In addition to the ACC fans, the Applicant would use a small WSAC when needed to provide auxiliary cooling during extremely hot days (GSEP 2009f). The proposed wet cooling towers and associated equipment would occupy an area of about 420 feet long by 60 feet wide. While the ACCs would require about 40 to 50 percent more land area than the proposed wet cooling towers, from the site layout, it appears that such a system would fit in the approximate current location of the cooling tower as there is unused space between the power block and the solar collector assembly (GSEP 2009a). This unused space would be graded as it is designed to be used for construction parking and construction trailers.

Water for WSAC cooling make-up, process water make-up, and other industrial uses such as mirror washing will be supplied from on-site groundwater wells, which will also be used to supply water for employee use (*e.g.*, drinking, showers, sinks, and toilets). A package water treatment system will be used to treat the water to meet potable standards. A sanitary septic system and on-site leach field will be used to dispose sanitary wastewater.

GSEP water blowdown and waste water will be piped to lined, on-site evaporation ponds. Each 125-MW power plant will have an individual, five-acre evaporation pond. The ponds will be sized to retain approximately twenty years worth of solids and will be cleaned out periodically during the life of the plant to ensure the solids do not reach a depth greater than approximately three feet. Dewatered residues from the ponds will be sent to an appropriate off-site landfill as non-hazardous waste. Table 2-3 summarizes the differences between the Proposed Action and the Dry Cooling Alternative with respect to the evaporation ponds.

TABLE 2-3
PROPOSED ACTION AND DRY COOLING ALTERNATIVE
EVAPORATION PONDS

Element	Proposed Action	Dry Cooling Alternative
Evaporation pond size, per power plant (acres)	30	5
Residue (tons per year)	7150	400
Removal frequency (years)	7	20

To prevent the growth of bacteria, formation of scale, and corrosion of the WSAC system, the Applicant would use biocide, scale inhibitor, and corrosion inhibitor chemicals. The quantity of chemicals used, however, would be less than those needed for the Proposed Action.

Table 2-4 below summarizes the expected annual typical water usage for the GSEP Dry Cooling alternative.

TABLE 2-4
TYPICAL WATER USAGE ESTIMATE

Water Use	Annualized Average Rate[a] (gpm)	Estimated Peak Rate[b] (gpm)	Estimated Annual Use (acre-feet)
Plant Operation	125	256	202
Potable water	10	10	16

[a] The estimated groundwater usage in gallons per minute is based on an average daily consumption for (2) 125 MW power plants.
[b] The “peak” rate is the instantaneous maximum for summer usage for (2) 125 MW power plants.

Description of the Water Storage Tanks

1. Raw Water/Fire Water Storage Tank: 700,000 gallons
2. RO Feed Tank: 265,000 gallons
3. Treated Water Storage Tank: 200,000 gallons
4. Demineralized Water Storage Tank: 145,000 gallons
5. Wastewater Storage Tank: 155,000 gallons

Tanks were sized to provide sufficient water to support operation of the plant during peak operating conditions, as well as provide a 12-hour storage capacity to enable continued operation when a failure interrupts water or wastewater treatment capabilities. The tanks also allow the plant to levelize water supply requirements on a 24-hour basis and eliminate midday demand peaks. The Raw Water/Fire Water Storage Tank provides water for plant operation and fire protection.

Wastewater is segregated into two separate collection systems, one for industrial streams and one for sanitary wastes. Industrial wastewater from both the wastewater treatment systems will be piped to evaporation ponds for disposal. The evaporation ponds make up a total combined area of five acres for each 125 MW unit (10 acres of pond for both 125 MW units). There are three primary and one occasional waste streams discharging into the evaporation ponds:

1. Wastewater treatment microfilter waste stream
2. Wastewater treatment RO waste stream
3. Wastewater from the service water users oil/water separator
4. Occasionally, storm water accumulated in the proposed LTU that will be used to treat soil affected by spills of HTF

On an annual average, discharge into the evaporation ponds will be approximately 43,000 gallons per day for each unit, increasing to approximately 44,000 gallons per day for each unit during peak summer conditions.

Economic Feasibility

As stated above, a NextEra project objective was to use a site that would allow wet cooling in order to optimize power generation efficiency and reduce project cost. Wet-cooling maximizes power plant fuel efficiency by providing a continuous source of effective cooling for the plant's steam condensers. Dry cooling will typically provide less effective cooling of the condensers, reducing the efficiency of the steam cycle portion of the power plant, and thus the overall fuel efficiency of the facility. However, on July 12, 2010, NextEra formally accepted the Dry Cooling Alternative as a viable alternative for the development of the GSEP (NextEra 2010).

2.3 No Action Alternatives

BLM's alternatives related to the No Action Alternative and the Plan Amendment are the following:

No Action Alternative A

Under this No Action Alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA (1980, as Amended) would not be amended.

Land Use Plan Amendment Alternative - No Action Alternative B

Under this No Action Alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA (1980, as Amended) would be amended to identify the Proposed Action application area as unsuitable for any type of solar energy development.

Land Use Plan Amendment Alternative - No Action Alternative C

Under this No Action Alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA (1980, as Amended) would be amended to identify the Proposed Action application area as suitable for any type of solar energy development.

2.4 Comparison of Impacts by Alternative

See Table 2-5 below.

2.5 Preferred Alternative

The BLM has selected the Dry Cooling Alternative as the agency's Preferred Alternative because the Dry Cooling Alternative would reasonably accomplish the purpose and need for the Proposed Action while fulfilling BLM's statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. The only difference between the Proposed Action and the Dry Cooling Alternative is the cooling method employed. Impacts will be the same or similar for most environmental resources with the exception of a substantial decrease in water consumption for the Dry Cooling Alternative compared to the Proposed Action.

TABLE 2-5
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Air	• *Construction*: NOx=182 tons/yr; VOC=46 tons/yr; CO=363 tons/yr; PM10=41 tons/yr; PM2.5=16 tons/yr; and Sox=0.47 tons/yr • *Operations*: NOx= 3 tons/yr; VOC=16 tons/yr; CO=7 tons/yr; PM10=21 tons/yr; PM2.5=7; tons/yr; and Sox=0.02 tons/yr • *Decommissioning*: Comparable in type and magnitude, but likely to be lower than, the construction emissions	Slightly higher construction emissions; 3.8-tons per year reduction in operational particulate emissions; slightly lower operational emissions.	Similar to the Proposed Action	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Short term: no impact Long term: Similar to Proposed Action
Global Climate Change	• *Construction*: GHG: 52,974 CO_2-Equivalent and loss in carbon uptake of about 2,584 MT of CO_2 per year due to vegetation removal • *Operations*: 4,133 CO_2-Equivalent • *Decommissioning*: Comparable in type and magnitude, but likely to be lower than, the construction emissions	Slightly reduced from the Proposed Action	Approximately 50% less than the Proposed Action	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Similar to the Proposed Action
Cultural	• 27 sites considered to be significant (12 prehistoric and 15 historic) • Possibly additional resources yet to be discovered during construction • The integrity of setting and integrity of feeling of two potential archaeological/historic landscapes	Same as Proposed Action	Impacts are reduced to 20 known sites.	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.
Environ-mental Justice	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Lands and Realty	• Minimal and mitigable impacts to designated corridors and Interstate 10 from overhead gen-tie power line and underground pipeline crossing. • No impacts to existing uses.	Similar to the Proposed Action	Similar to the Proposed Action	Likely delayed impact similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.	No impact, or impact specific to a future use other than solar energy generation.	Similar to the Proposed Action. Required acreage could be less, approximately the same, or more than the Proposed Action.
Livestock Grazing	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action

TABLE 2-5 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES Proposed Action	Dry Cooling Alternative	Reduced Acreage Alternative	No Action Alternative	No Project Alternative B	No Project Alternative C
Minerals	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Multiple Use Classes	• *Construction*: 1800 acres of MUC Class M (Moderate) affected. • *Operations*: restriction of multiple use opportunities on the site to a single dominant use.	Same as Proposed Action	Approximately 50% less than the Proposed Action	No Impact; similar impacts if other utility-scale solar power facilities built in future.	No Impact.	Same as Proposed Action.
Noise	• *Construction*: short-term elevated noise levels at the prisons nine miles from the GSEP site would occur associated with high pressure steam blow. • *Operations*: No impact; no sensitive noise receptors within 5 miles; at 5 miles, noise levels would be approximately 30 dBA.	Similar to the Proposed Action, though slightly reduced.	Similar to the Proposed Action as there are no noise sensitive receptors in the vicinity.	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action
Paleonto-logical	• *Construction*: Damage and/or destruction of paleontological resources; possible net gain to the science of paleontology depending on fossils found. • *Operations*: No Impact. • *Decommissioning*: No Impact.	Same as Proposed Action	Approximately 50% less than the Proposed Action	No negative impact or potential benefits to science of paleontology. Long term impacts likely similar to Proposed Action.	No negative impact or potential benefits to science of paleontology. Impacts similar to the Proposed Action likely to occur in other locations.	Similar but reduced/increased proportionate to size of future development.
Public Health & Safety	• *Construction*: Risks to public health and contamination associated with construction equipment; safety risk of encountering unexploded munitions; risks of encountering abandoned mined lands. • *Operations*: large quantities of natural gas and Therminol VP1 would be used; no short- or long-term adverse human health effects are expected; risks of encountering abandoned mined lands; transmission line safety and nuisance hazards; traffic and transportation safety, including aviation safety; impacts to public and private airfields; and worker safety and fire protection impacts; and impacts associated with geologic hazards.	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action	Similar to the Proposed Action

TABLE 2-5 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Recreation	• *Construction*: impacts from noise, fugitive dust, and truck and other vehicle ingress and egress to the construction site. • *Operations*: site not available for recreational use; minimal impacts to other lands in the vicinity of the proposed site due to increased usage; site viewable by users in nearby elevated areas. • *Decommissioning*: dust and noise impacts similar to construction; after decommissioning area would be reclaimed for recreational use.	Operation, maintenance, and closure similar to Proposed Action.	Approximately 50% less than the Proposed Action	Similar to the Proposed Action.	Potential impacts could range from no impact to greater impact, depending on future site use.	Similar but reduced/increased proportionate to size of future development.
Social & Economics	• *Construction:* Employment of 646 workers (average) and 1,085 workers (peak). Most, if not all, expected to live within two hours of site. • Any temporary lodging demand met by existing housing or lodging. No new housing or motel development induced. • Total direct construction spending benefits of \$165 million on labor and \$14.5 million on materials. • Additional total indirect and induced spending benefits of \$136.8 million and 358 jobs. • *Operations:* Annual employment of 65 workers of which at least 50% expected to live within two hours of site. • Any in-migration housing demand met by existing housing. No new housing growth induced. • Annual direct spending benefits of \$6 million on labor and \$0.5 million on materials. • Additional total indirect and induced spending benefits of \$3.9 million and 32 jobs. • *Decommission:* Temporary spending and employment benefit from deconstruction and site restoration work. Subsequent long term adverse impact from lost project jobs and spending.	Same as Proposed Action	Similar but reduced proportionate to size of alternative	Similar to the Proposed Action	No Impact	Similar to the Proposed Action

TABLE 2-5 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Soils	• *Construction*: total earth movement of approximately 1 million cubic yards. Wind erosion generated soil loss of 29.7 tons per acre per year, reduced from 72.88 tons per acre per year without the GSEP. Water erosion generated soil loss of 21.95 tons per acre per year, increased from 1.53 tons per acre per year without the GSEP. • *Operations*: Wind erosion generated soil loss of 1.25 tons per acre per year, reduced from 72.88 tons per acre per year without the GSEP. Water erosion generated soil loss of 6.93 tons per acre per year, increased from 1.53 tons per acre per year without the GSEP.	Similar to Proposed Action	Peak construction: same as Proposed Action. Long term construction: less than Proposed Action. Operation: less than Proposed Action. Aeolian erosion and transport would be reduced to near zero. Similarly, the impacts on the Chuckwalla and Palen-McCoy sand corridors or the eastern wash complex would be removed.	No impact; potential for similar impacts in other locations.	No impact; potential for similar impacts in other locations.	Similar to Proposed Action
Special Designations	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Transpor-tation and Public Access – Off Highway Vehicle Resources	• *Construction*: temporary disturbance to motorized vehicles on local routes; traffic hazards from construction worker commuting and parking; increased traffic from construction activities; damage to roadways. Temporary closure of up to five OHV routes during construction of linears. • *Operations*: increased opportunities for vandalism, illegal cross-county use and other disruptive behavior from off-highway vehicles (OHV). • No impact to overall access for wilderness recreation; some impact to sightseeing and day use touring by OHV users.	Similar to Proposed Action.	Similar to Proposed Action	No impact to OHV routes and values; similar impacts to transportation.	No impact to OHV routes and values; similar impacts to transportation.	Similar impacts as Proposed Action.

TABLE 2-5 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

Resource	ALTERNATIVES					
	Proposed Action	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Vegetation	1,773 acres vegetation communities lost; 90 acres ephemeral drainages lost; 196.5 acres sand dune habitat lost; 4 special status plant species impacted	Same as the Proposed Action in acreage, though indirect effects on vegetation may be reduced by reduction in groundwater pumping.	1,039 acres vegetation communities lost; 88 acres ephemeral drainages lost; 127.5 acres sand dune habitat lost; 4 special status plant species impacted. Indirect impacts on vegetation from groundwater use reduced by 50%. Eastern sand transport corridor not impacted.	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action
Visual	• *Construction*: Mitigable short-term impacts from construction lighting and visible dust plumes; minor to moderate effects from large-scale visual disturbance in the landscape. • *Operations*: Short-term adverse and unavoidable impacts from glint and glare. Minor to moderate long-term impacts for ground-level viewers. Long-term adverse and unavoidable impacts in the cumulative scenario for dispersed recreational viewers in surrounding mountains. • *Decommissioning*: Mitigable short-term impacts prior to successful restoration.	Similar to the Proposed Action; but dry cooling alternative would slightly increase the visual contrast of the GSEP from KOP-1.	Similar to the Proposed Action; the visual contrast remains the same for KOP-3, but would be slightly reduced from KOPs 1 and 2, as well as elevated viewpoints.	No Impact	No Impact	Future solar energy development could be expected to affect visual resources to the same degree and extent as referenced in the Proposed Action.
Water	• *Construction and Operation:* Groundwater extraction of up to 1,368 acre feet per year for 3 years of construction, and 1,644 acre feet per year for operation from the Chuckwalla Valley Groundwater Basin. A fraction of this water could be drawn indirectly from induced flows from the Colorado River. • Mitigable alteration of stormwater flows and drainage, including re-routing of existing flowpaths. • Mitigable surface water quality effects including use of detention basis, spreading fields, drainage channels, and spill cleanup facilities during operation.	Similar to the Proposed Action, although the operational use of groundwater is reduced to 218 acre feet per year.	Approximately 50% less than Proposed Action for groundwater consumption, similar to the Proposed Action for all others.	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action

TABLE 2-5 (Continued)
SUMMARY OF IMPACTS BY ALTERNATIVE

	ALTERNATIVES					
Resource	**Proposed Action**	**Dry Cooling Alternative**	**Reduced Acreage Alternative**	**No Action Alternative**	**No Project Alternative B**	**No Project Alternative C**
Water (cont.)	• *Decommissioning*: Mitigable water quality effects due to use of heavy machinery and re-grading of site to match adjacent topography.					
Wild Horse & Burros	No Impact	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action	Same as Proposed Action
Wildland Fire Ecology	Increase in threat of wildland fires in area during construction (due to increased vehicle use) and during operation (due to increased likelihood of invasive annual plant spread).	Similar to Proposed Action	Similar to Proposed Action	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action
Wildlife	• *Construction*: 1,774 acres wildlife habitat lost; 9 special status wildlife species impacted • *Operations*: disruption of migratory patterns; death or injury to individuals from striking powerlines, mirrors, arrays, poles or being struck by vehicles; increased predation.	Same as the Proposed Action in acreage, though indirect effects on vegetation and related resources for wildlife may be reduced by reduction in groundwater pumping.	*Construction*: 1,039 acres wildlife habitat lost; 9 special status wildlife species impacted on 50% fewer acres than Proposed Action *Operations*: Similar to Proposed Action	Short term: no impact Long term: Similar to Proposed Action	No Impact	Short term: no impact Long term: Similar to Proposed Action

2.6 Alternatives Considered but Eliminated From Detailed Analysis

In accordance with 43 C.F.R. 2804.10, the BLM worked closely with the project proponent during the pre-application phase to identify appropriate areas for their proposed project before filing an application with the BLM. BLM discouraged the applicant from including in their application alternate BLM locations with significant environmental concerns, such as critical habitat, Areas of Critical Environmental Concern, Desert Wildlife Management Areas, designated off-highway vehicle areas, wilderness study areas, and designated wilderness areas or other sensitive resources. BLM encouraged the Applicant to locate its project on public land with the fewest potential conflicts.

Other alternative sites and various renewable and nonrenewable generation technologies were considered but eliminated from detailed analysis under NEPA. These alternatives were eliminated from detailed analysis because one or more of the following criteria from the *BLM NEPA Handbook H-1790-1* (BLM 2008) apply:

1. It is ineffective (it would not respond to the BLM project purpose and need)
2. It is technologically or economically infeasible
3. It is inconsistent with the basic policy objectives for the management of the area (not conforming to the CDCA plan)
4. Its implementation is remote or speculative
5. It is substantially similar in design to an alternative that is analyzed
6. It would have substantially similar effects to an alternative that is analyzed.

Not all of these criteria from the BLM Handbook were used in eliminating alternatives from consideration as described in Table 2-6. Alternative sites, technologies, and methods were considered as alternatives to the GSEP but not carried forward for detailed analysis. The process for eliminating these alternatives from detailed analysis complies with 40 CFR 1502.14(a) and is described briefly in Table 2-6.

TABLE 2-6
ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternative	Rationale for Elimination
McCoy (see Figure 2-12)	An alternative site on BLM-administered land with a pending application for another project is not considered a reasonable alternative to the Proposed Action for purposes of alternatives analysis. Therefore, an alternative site on BLM-administered land with a pending application, such as the McCoy Alternative, would not be a reasonable alternative for the proposed GSEP project unless that other application is rejected or withdrawn.
Desert Center 1 (see Figure 2-12)	Desert Center 1 region was in an area that would potentially be subsumed in expansions of the Joshua Tree National Park and/or the McCoy Wilderness. In the fall of 2008, the BLM rejected the application for ROW grant for the use of this area.
Mule Mountain (see Figure 2-12)	According to California Natural Diversity Data Base (CNDDB) records, the site would support Desert Tortoise, Harwood's Milk Vetch, Cave Myotis, and California leaf-nosed bat (GSEP, 2009f). Both the proposed GSEP site and Mule Mountain site would have a large footprint and require extensive grading, potentially resulting in erosion and runoff. The Mule Mountain site is crossed by two large desert washes, potentially increasing the sediment flow in and around the site. Given the size required for solar power plants and the approximately 30-feet tall solar trough structures, visual impacts would be considerable. These adverse impacts would not be considerably less than the analyzed alternatives
Black Hill (see Figure 2-12)	NextEra applied for a right-of-way grant for the Black Hill Alternative but after additional examination including environmental concerns, road access, conflicting uses, and transmission option, the application was withdrawn (GSEP 2009a). Impacts to land use and recreation at the Black Hill Alternative would potentially be considerable as it is located adjacent to the Big Maria Mountains Wilderness and is crossed by three designated open routes (NECO Plan). The Black Hill Alternative site is crossed by ephemeral waters and washes that would likely be rerouted. Given that these environmental concerns would likely result in a similar degree of impact compared to the analyzed alternatives BLM eliminated this from further consideration.
Private Land Alternative (see Figure 2-12)	BLM has no decision making authority to select an alternative when BLM has no jurisdiction over the land(s) and/or resources. Therefore this is an unreasonable alternative for BLM to analyze. The Private Land Alternative is not considered further in this EIS because its implementation is remote and speculative and is ineffective in responding to the BLM's purpose and need to construct, operate, and decommission a solar thermal facility on public lands. Development of private land would depend upon the ability of a developer to acquire multiple, contiguous private land holdings covering a large area, which is not likely to be feasible in the project area.
Western ROW Alternative	There is concern regarding impacts to sand transport by wind from the two aeolian corridors (west along the Chuckwalla Valley parallel with I-10 and south down the Palen-McCoy valley), and water-based sand transport down the multiple alluvial fan channels that the site intersects. The western portion of the ROW would not accommodate a 125 MW solar field as configured for the proposed GSEP. Use of the western ROW would require longer linear infrastructure.
Reclaimed Water Alternative	Sufficient reclaimed water is not available and would not substantially reduce impacts to the water accounting system for the groundwater basin
Stirling Dish Technology (see Figure 2-13)	This solar energy technology would not substantially reduce impacts of the GSEP. BLM has no authority to require an applicant to use different technology then the applicant proposes. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore this is an unreasonable alternative for BLM to analyze.
Solar Power Tower Technology	This solar energy technology would reduce water use but would not substantially reduce impacts of the GSEP. BLM has no authority to require an applicant to use different technology then the applicant proposes. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore this is an unreasonable alternative for BLM to analyze.

TABLE 2-6 (Continued)
ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternative	Rationale for Elimination
Linear Fresnel Technology (see Figure 2-14)	BLM has no authority to require an applicant to use different technology than the applicant proposes. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore this is an unreasonable alternative for BLM to analyze.
Solar Photovoltaic Technology – Utility Scale (see Figure 2-14)	This solar energy technology would reduce water use but not substantially reduce impacts of the GSEP. BLM has no authority to require an applicant to use different technology then the applicant proposes. Also, this technology is not within the area of expertise of the applicant, and therefore would not likely be technically or economically feasible for them to implement. Therefore this is an unreasonable alternative for BLM to analyze.
Distributed Solar Technology	While it will very likely be possible to achieve 250 MW of distributed solar energy over the coming years, the limited numbers of existing facilities make it difficult to conclude with confidence that this much distributed solar would be available within the same timeframe as the proposed GSEP. Barriers exist related to interconnection with the electric distribution grid. Also, solar PV is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, and additional technologies like solar thermal generation, would also be required. BLM has no authority to require an applicant to use different technology then the applicant proposes. This alternative was eliminated because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement.
Wind Energy	While there are substantial wind resources in Riverside County, environmental impacts could also be substantial so wind would not reduce impacts in comparison to the GSEP. Also, wind is one of the components of the renewable energy mix required to meet the California Renewable Portfolio Standard requirements, so additional technologies like solar thermal generation, would also be required. BLM has no authority to require an applicant to use different technology then the applicant proposes. This alternative was eliminated because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement.
Geothermal Energy	Despite the encouragement provided by Renewable Portfolio Standards and ARRA funding, few new geothermal projects have been proposed in the Imperial Valley and no geothermal projects are included on the Renewable Energy Action Team list of projects requesting ARRA funds. Therefore, the development of 250 MW of new geothermal generation capacity within the same timeframe as the proposed GSEP is considered speculative. BLM has no authority to require an applicant to use different technology then the applicant proposes. This alternative was eliminated because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement. In addition, it would likely be economically infeasible for the Applicant to implement due to the need for multiple siting and environmental review processes to achieve the same output of energy.
Biomass Energy	Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW) and therefore could not meet the project objectives related to the California Renewable Portfolio Standard. In addition, between 25 and 80 facilities would be needed to achieve 250 MW of generation, creating substantial adverse impacts. BLM has no authority to require an applicant to use different technology then the applicant proposes. This alternative was eliminated because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition, it would likely be economically infeasible for the Applicant to implement. In addition, it would likely be economically infeasible for the Applicant to implement due to the need for multiple siting and environmental review processes to achieve the same output of energy.

TABLE 2-6 (Continued)
ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Alternative	Rationale for Elimination
Tidal Energy	Tidal fence technology is commercially available in Europe. However, it has not been demonstrated or proven at the scale that would be required to provide the same output as the Proposed Action, particularly with Pacific tides. BLM has no authority to require an applicant to use different technology then the applicant proposes. Tidal technology was eliminated from detailed analysis because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition it would likely be economically infeasible, and remote and speculative, for the Applicant to implement.
Wave Energy	Wave energy is unproven technology at the scale that would provide the same output as the Proposed Action. BLM has no authority to require an applicant to use different technology then the applicant proposes. Tidal technology was eliminated from detailed analysis because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. In addition it would likely be economically infeasible, and remote and speculative, for the Applicant to implement.
Natural Gas	Natural gas would not attain the objective of generating renewable power meeting California's renewable energy needs. BLM has no authority to require an applicant to use different technology then the applicant proposes. This fossil fuel technology was eliminated from detailed analysis because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. Additionally, it is inconsistent with BLM's and the State of California's guidance concerning renewable energy.
Coal	Coal would not attain the objective of generating renewable power meeting California's renewable energy needs and is not a feasible alternative in California. BLM has no authority to require an applicant to use different technology then the applicant proposes. This fossil fuel technology was eliminated from detailed analysis because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. Additionally, it is inconsistent with BLM's and the State of California's guidance concerning renewable energy.
Nuclear Energy	The permitting of new nuclear facilities in California is not currently allowable by law. BLM has no authority to require an applicant to use different technology then the applicant proposes. Nuclear technology was eliminated from detailed analysis because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand. Additionally, because it is currently prohibited in California, its implementation is remote and speculative.
Conservation and Demand-side Management	Conservation and demand-management alone are not sufficient to address all of California's energy needs, and would not provide the renewable energy required to meet the California Renewable Portfolio Standard requirements. This alternative was eliminated from detailed analysis because it Is ineffective in responding to the BLM's purpose and need to respond to the application at hand.

CHAPTER 3
Affected Environment

3.1 Introduction

Chapter 3 describes the environmental components of BLM-administered lands in the vicinity of the GSEP that would potentially be affected by implementation of the Proposed Action and Alternatives. The Proposed Action would be south of the Palen/McCoy Wilderness Area and north of Ford Dry Lake, about 6 miles north of Interstate 10 in Riverside County. The Project Area is located in a remote section of east central Riverside County, where land use is characterized predominantly by open space and conservation and wilderness areas. This chapter is organized alphabetically and discusses resources, resource uses, special designations, public health and safety, social and economic considerations, and environmental justice conditions. Resources include air, soil, water, vegetative communities, wildlife, special status species, wildland fire ecology and management, and cultural, paleontological, and visual resources. Resource uses include livestock grazing management, minerals, recreation management, transportation and public access, and lands and realty. Special designations include Areas of Critical Environmental Concern (ACECs), wilderness areas (WAs), wilderness study areas (WSAs), and wilderness characteristics.

Information sources and analysis data utilized to prepare this chapter were obtained from the CDCA 1980, as amended, and various other BLM planning and NEPA documents. Information and data were also collected from many other related planning documents and research publications prepared by various federal and state agencies as well as from private publications pertaining to key resource conditions and resource uses found within the Project Area. The purpose of this chapter is to provide a description of affected resources and BLM program areas within the existing environment of the Project Area, which will be used as a baseline to evaluate and assess the impact of the five alternatives described in Chapter 2. Descriptions and analyses of the impacts are presented in Chapter 4, Environmental Consequences.

3.1.1 Mitigation Measures Included in the Analysis

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

1. Measures that have been proposed by the applicant;

2. Conditions of Certification (COC's) proposed by the California Energy Commission;
3. Regulatory requirements of federal, state, and local agencies;
4. USFWS terms and conditions identified in the Biological Opinion; and
5. Additional BLM-proposed mitigation measures and standard right-of-way (ROW) grant terms and conditions.

These requirements are generically referred to as "Mitigation Measures" throughout this FEIS. Because these Mitigation Measures are derived from a variety of sources, they also are required, and their implementation regulated, by the various agencies. In general, most of these Mitigation Measures are required by agencies other than BLM, and although their application and expected effectiveness in addressing impacts are discussed in this FEIS, they would not be included within BLM's required conditions of approval in the Record of Decision (ROD) for this proposed project.

The BLM recognizes the Energy Commission COC's that are not within BLM's jurisdiction to implement and the COC's that are requirements originating in other State regulations. The BLM adopts those COC's that are within our jurisdiction and that are requirements for the BLM Plan of Development of the project. Appendix G contains a list of COC's and denotes those measures that will be monitored and managed by the CEC, and those that have been adopted for joint administration between BLM and CEC. The individual measures that were developed by BLM will be monitored and managed by the BLM. In some instances, BLM has identified potential impacts that would not be addressed by the other requirements. In those cases, mitigation measures were developed by BLM for inclusion as terms and conditions in the Record of Decision (ROD) for this proposed project. In addition, the standard terms and conditions presented in the text will be enforced by BLM as part of any ROD and ROW grant approved for the project.

3.1.2 Terms and Conditions Found in FLPMA and BLM ROW Regulations

Title V of the Federal Land Policy and Management Act of 1976 addresses the issuance of ROW authorizations on public land. BLM has identified all the lands that will be occupied by facilities associated with the ISEGS project that are needed for construction, operation and maintenance purposes. Safeguards have been put in place that are necessary to protect public safety including security fencing and on site personnel. The analysis of impacts identifies impacts and provides a wide range of mitigation measures that would be implemented by Federal and State authorities such that the project will not create unnecessary damage to the environment. The FEIS identifies significant impacts to several resources and recommends mitigation that requires the applicant to prepare plans for construction, operation, termination and decommissioning of the proposed ROW area prior to disturbing the site.

Specifically, the FEIS identifies recommended mitigation measures that would:

1. Require compliance with Mojave Desert Air Quality Management District State regulations, reduce carbon emissions, and minimize dust;

2. Require planning and compliance with Federal, State and local agency requirements for Drainage, Erosion and Sediment Control, wastewater management, groundwater use and monitoring, and stormwater control and monitoring;

3. Require measures to protect public health and safety including traffic control, transmission line standards, and worker safety plans; and

4. Require biological resource mitigation and cultural resources mitigation to protect sensitive environmental resources and cause the least damage to the environment and protect the public interest, while allowing the project to be constructed.

All BLM right-of-way grants are approved subject to regulations contained at 43 CFR 2800. Those regulations state:

> § 2805.15 What rights does the United States retain?
>
> (e) Change the terms and conditions of your grant as a result of changes in legislation, regulation, or as otherwise necessary to protect public health or safety or the environment.

The BLM will monitor conditions and review any ROW grant issued for the GSEP to evaluate if future changes to the grant terms and conditions are necessary or justified under this provision of the regulations to further minimize or reduce unnecessary or unexpected impacts resulting from the project.

3.2 Air Quality

This section describes air quality conditions for criteria pollutants and the federal and state ambient air quality standards. A discussion regarding global climate change and greenhouse gasses can be found in Section 3.3. The GSEP is within the Mojave Desert Air Basin (MDAB). Elevation is approximately 450 feet above sea level. Relatively high daytime temperatures; large variations in relative humidity; large and rapid diurnal temperature changes; occasional high winds; and sand, dust, and thunderstorms characterize the climate. The aridity of the region is influenced by a sub-tropical high-pressure system typically off the coast of California and topographical barriers that effectively block the flow of moisture to the region. The Colorado Desert experiences two rainy seasons per year. The first occurs during the winter, and the second is the summer monsoon.

The monthly average high temperature in Blythe is 109°F in July and the lowest average monthly temperature is 39°F in January and December (WC 2009). Total rainfall in Blythe averages just less than four inches per year with about 50 percent of the total rainfall occurring from December through March, and about 30 percent occurring during the August/September summer monsoon season.

Wind data from the Blythe Airport for the years 2002 to 2004 and 2006 to 2008 indicate the April to November winds are predominately out of the west and southwest while the November to March winds are mostly from the northeast. This is due to the proximity of the MDAB to coastal and central regions of the state and the blocking nature of the Sierra Nevada Mountains to the north. The mountain passes are the main channels for the air masses (MDAQMD 2009). Mixing heights in the area, which represent the altitudes where different air masses mix together, are estimated to be on average 230 feet (70 meters) in the morning to as high as 5,250 feet (1,600 meters) above ground level in the afternoon.

3.2.1 Ambient Air Quality

The Federal Clean Air Act and the California Clean Air Act both require the establishment of standards for ambient concentrations of air pollutants, called Ambient Air Quality Standards (AAQS). The state AAQS, established by the California Air Resources Board, are typically lower (more protective) than the federal AAQS, which are established by the United States Environmental Protection Agency (U.S.EPA). The Mojave Desert Air Quality Management District (MDAQMD) is the responsible permitting authority for air pollutants in the Project Area. The state and federal air quality standards are listed in Table 3.2-1. The times over which the various air quality standards are measured range from one hour to an annual average. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per a volume of air, in milligrams or micrograms of pollutant in a cubic meter of air (mg/m^3 or $\mu g/m^3$, respectively).

Currently the ambient air quality within the MDAB is classified in the nonattainment category for ozone and fugitive dust PM10 criteria. According to the Northern & Eastern Colorado Desert Coordinated Management Plan, the ozone standard is exceeded due to long distance transport of

TABLE 3.2-1
FEDERAL AND STATE AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Federal Standard	California Standard
Ozone (O_3)	8 Hour	0.075 ppm[a] (147 µg/m^3)	0.070 ppm (137 µg/m^3)
	1 Hour	—	0.09 ppm (180 µg/m^3)
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m^3)	9.0 ppm (10 mg/m^3)
	1 Hour	35 ppm (40 mg/m^3)	20 ppm (23 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm (100 µg/m^3)	0.03 ppm (57 µg/m^3)
	1 Hour	0.100 ppm[b]	0.18 ppm (339 µg/m^3)
Sulfur Dioxide (SO_2)	Annual		—
	24 Hour		0.04 ppm (105 µg/m^3)
	3 Hour	0.5 ppm (1300 µg/m^3)	—
	1 Hour	0.075 ppm (195 µg/m^3)	0.25 ppm (655 µg/m^3)
Particulate Matter (PM10)	Annual	—	20 µg/m^3
	24 Hour	150 µg/m^3	50 µg/m^3
Fine Particulate Matter (PM2.5)	Annual	15 µg/m^3	12 µg/m^3
	24 Hour	35 µg/m^3	—
Sulfates (SO_4)	24 Hour	—	25 µg/m^3
Lead	30 Day Average	—	1.5 µg/m^3
	Rolling 3-Month Average	0.15 µg/m^3	—
	Calendar Quarter	1.5 µg/m^3	—
Hydrogen Sulfide (H_2S)	1 Hour	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride (chloroethene)	24 Hour	—	0.01 ppm (26 µg/m^3)
Visibility Reducing Particulates	8 Hour	—	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.

NOTES:
[a] The 2008 standard is shown above, but as of September 16, 2009 this standard is being reconsidered. The 1997 8-hour standard is 0.08 ppm.
[b] The U.S. EPA is in the process of implementing this new standard, which became effective April 12, 2010. This standard is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations.

SOURCE: CEC Genesis RSA, June 2010 (Table 2)

pollutants from the Los Angeles Basin, while the PM10 standard is due to natural sources found in a desert environment and various land uses. These uses include off-highway vehicle use, mining and livestock grazing.

In general, an area is designated as attainment if the concentration of a particular air contaminant does not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that contaminant standard is violated. In circumstances where there is not enough ambient data available to support designation as either attainment or non-attainment, the area can be designated as unclassified. An unclassified area is normally treated by the EPA the same as an attainment area for regulatory purposes. An area could be attainment for one air contaminant while non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same air contaminant.

The MDAB is under the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The Riverside County portion of the MDAB is designated as non-attainment for the state ozone and PM10 standards. This area is designated as attainment or unclassified for all federal criteria pollutant ambient air quality standards and the state CO, NO_2, SO_2, and PM2.5 standards. Table 3.2-2 summarizes the site area's attainment status for various applicable state and federal standards.

TABLE 3.2-2
FEDERAL AND STATE ATTAINMENT STATUS
GSEP SITE AREA WITHIN RIVERSIDE COUNTY

	Attainment Status[a]	
Pollutant	**Federal**	**State**
Ozone	Attainment[b]	Moderate Nonattainment
CO	Attainment	Attainment
NO_2	Attainment[c]	Attainment
SO_2	Attainment	Attainment
PM10	Attainment[b]	Nonattainment
PM2.5	Attainment	Attainment

NOTES:
a Attainment = Attainment or Unclassified, where Unclassified is treated the same as Attainment for regulatory purposes.
b Attainment status for the site area only, not the entire MDAB.
c Nitrogen dioxide attainment status for the new federal 1-hour NO_2 standard is scheduled to be determined by January 2012.

SOURCE: CEC Genesis RSA, June 2010, Table 3.

Ambient air quality monitoring data for ozone, PM10, PM2.5, CO, NO_2, and SO_2, compared to most restrictive applicable standards for the years between 2004 through 2009 at the most representative monitoring stations for each pollutant, are shown in Table 3.2-3; and the 1-hour and 8-hour ozone, and 24-hour PM10 and PM2.5 data for the years 1999 through 2009 (2008 for PM10 and PM2.5), collectively “1998-2009 Historical Ozone and PM Air Quality Data,” are shown below. Ozone data are from the Blythe-445 West Murphy Street monitoring station, PM10, PM2.5, NO_2, and CO data are from the Palm Springs Fire Station monitoring station, and SO_2 data are from the Victorville-14306 Park Avenue monitoring station.

3.2.2 Ozone

Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between directly emitted nitrogen oxides (NOx) and hydrocarbons (Volatile Organic Compounds [VOCs]) in the presence of sunlight. Pollutant transport from the South Coast Air Basin (Los Angeles Area) is one source of the pollution experienced in the eastern Riverside County portion of the MDAB (SCAQMD 2007 as cited in the CEC RSA June 2010).

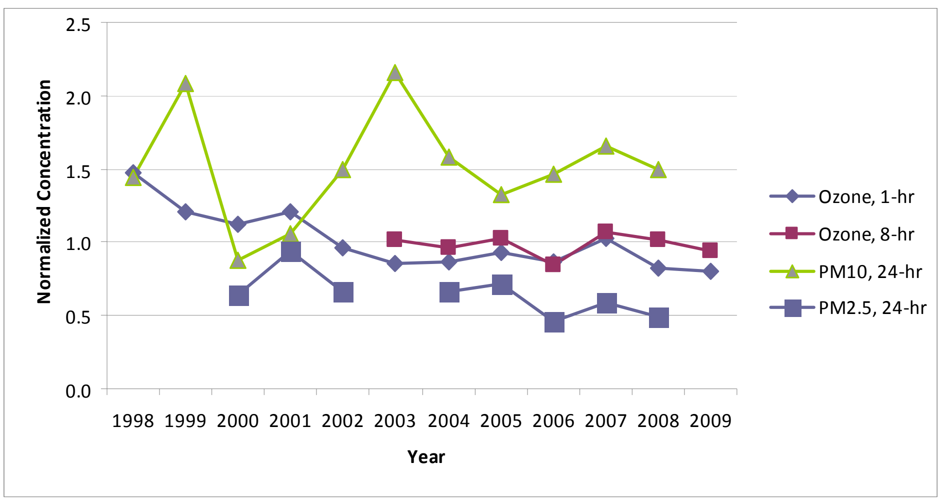
TABLE 3.2-3
CRITERIA POLLUTANT SUMMARY MAXIMUM AMBIENT CONCENTRATIONS (PPM OR µG/M³)

Pollutant	Averaging Period	Units	2004	2005	2006	2007	2008	2009	Limiting AAQS[c]
Ozone	1 hour	ppm	0.078	0.084	0.078	0.092	0.074	0.072	0.09
Ozone	8 hours	ppm	0.067	0.072	0.059	0.075	0.071	0.066	0.07
PM10[a,b]	24 hours	µg/m³	79	66	73	83	75	--	50
PM10[a,b]	Annual	µg/m³	26.4	25.9	24.5	30.5	23.2	--	20
PM2.5[a]	24 hours	µg/m³	23.3	25	15.9	20.5	17.1	--	35
PM2.5[a]	Annual	µg/m³	9.0	8.4	7.7	8.7	7.2	--	12
CO	1 hour	ppm	2.1	2.1	2.3	1.5	1.3	2.3	20
CO	8 hours	ppm	0.8	0.8	0.85	0.79	0.54	0.67	9.0
NO_2	1 hour	ppm	0.066	0.059	0.093	0.063	0.049	0.048	0.18
NO_2	Annual	ppm	0.013	0.012	0.01	0.01	0.009	0.008	0.03
SO_2	1 hour	ppm	0.011	0.012	0.018	0.009	0.006	0.028	0.075
SO_2	3 hour	ppm	0.007	0.008	0.012	0.005	0.006	0.006	0.5
SO_2	24 hours	ppm	0.003	0.003	0.005	0.005	0.002	0.005	0.04

NOTES:
a Exceptional PM concentration events, such as those caused by wind storms are not shown where excluded by U.S.EPA; however, some exceptions events may still be included in the data presented.
b The PM10 data source is in the Coachella Valley that is classified as a serious PM10 nonattainment area.
c The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

SOURCE: CEC Genesis RSA, June 2010 (Table 4).

INSET 3.2-1
1998-2009 HISTORICAL OZONE AND PM AIR QUALITY DATA
BLYTHE AND PALM SPRINGS MONITORING STATIONS, RIVERSIDE COUNTY[a,b,c]



NOTES:
a The highest measured ambient concentrations of various criteria air contaminants were divided by their applicable standard and provided as a graphical point. Any point on the chart that is greater than one means that the measured concentrations of such air contaminant exceed the standard, and any point that is less than one means that the respective standard is not exceeded for that year. For example the 24-hour PM10 concentration in 2008 is 75 µg/m³/50 µg/m³ standard = 1.5.
b All ozone data are from Blythe-445 West Murphy Street monitoring station. 8-hr ozone data was not available for this station before 2003.
c All PM data are from Palm Springs monitoring station. 24-hr PM2.5 data was not available for this station before 2000.

SOURCE: CEC Genesis RSA, June 2010.

The 1-hour and 8-hour ozone concentrations measured at the eastern border of Riverside County have been very slowly decreasing over time. The collected air quality data (not shown) indicate that the ozone violations occurred primarily during the sunny and hot periods typical during May through September.

3.2.3 Nitrogen Dioxide

The entire MDAB is classified as attainment for the state 1-hour and annual and federal annual NO_2 standards. The nitrogen dioxide attainment standard could change due to the new federal 1-hour standard, although a review of the air basin-wide monitoring data suggest this would not occur for the MDAB.

Approximately 90% of the NOx emitted from combustion sources is nitric oxide (NO), while the balance is NO_2. NO is oxidized in the atmosphere to NO_2, but some level of photochemical activity is needed for this conversion. The highest concentrations of NO_2 typically occur during the fall. The winter atmospheric conditions can trap emissions near the ground level, but lacking substantial photochemical activity (sun light), NO_2 levels are relatively low. In the summer the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions disperse pollutants, preventing the accumulation of NO_2. The NO_2 concentrations in the GSEP area are well below the state and federal ambient air quality standards.

3.2.4 Carbon Monoxide

MDAB is classified as attainment for the state and federal 1-hour and 8-hour CO standards. The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. The GSEP area has a lack of significant mobile source emissions and has CO concentrations that are well-below the state and federal ambient air quality standards.

3.2.5 Particulate Matter (PM10) and Fine Particulate Matter (PM2.5)

PM10 can be emitted directly or it can be formed many miles downwind from emission sources when various precursor pollutants interact in the atmosphere.

MDAB is classified as non-attainment for state PM10 standards and unclassified for the federal PM10 standard. Table 3.2-3 and Inset 3.2-1 shows recent PM10/PM2.5 concentrations. The figures show fluctuating concentrations patterns, and show clear exceedances of the state 24-hour PM10 standard. It should be noted that exceedance does not necessarily mean violation or nonattainment, as exceptional events do occur and some of those events, which do not count as violations, may be included in the data. The MDAB is designated as nonattainment for the state PM10 standard.

Fine particulate matter, or PM2.5, is derived mainly either from the combustion of materials, or from precursor gases (SOx, NOx, and VOC) through complex reactions in the atmosphere.

PM2.5 consists mostly of sulfates, nitrates, ammonium, elemental carbon, and a small portion of organic and inorganic compounds.

The entire MDAB is classified as attainment for the federal standard and, in the GSEP area, is designated unclassified for the state PM2.5 standards. This divergence in the PM10 and PM2.5 concentration levels and attainment status indicates that a substantial fraction of the ambient particulate matter levels are most likely due to localized fugitive dust sources, such as vehicle travel on unpaved roads, agricultural operations, or wind-blown dust.[1]

3.2.6 Sulfur Dioxide

The entire air basin is classified as attainment for the state and federal SO_2 standards.

Sulfur dioxide is typically emitted as a result of the combustion of a fuel containing sulfur. Sources of SO_2 emissions within the MDAB come from a wide variety of fuels: gaseous, liquid and solid; however, the total SO_2 emissions within the eastern MDAB are limited due to the limited number of major stationary sources and California's and U.S. EPA's substantial reduction in motor vehicle fuel sulfur content. The GSEP area's SO_2 concentrations are well below the state and federal ambient air quality standards.

1 Fugitive dust, unlike combustion source particulate and secondary particulate, is composed of a much higher fraction of larger particles than smaller particles, so the PM2.5 fraction of fugitive dust is much smaller than the PM10 fraction. Therefore, when PM10 ambient concentrations are significantly higher than PM2.5 ambient concentrations this tends to indicate that a large proportion of the PM10 are from fugitive dust emission sources, rather than from combustion particulate or secondary particulate emission sources.

3.3 Global Climate Change

3.3.1 EPA Regulatory Initiatives on Greenhouse Gases

On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the U.S. Supreme Court found that greenhouse gases (GHGs)[1] are air pollutants under the federal Clean Air Act. The Court held that the EPA must determine whether emissions of GHGs from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the EPA was required to follow the language of Section 202(a) of the CAA. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) filed by more than a dozen environmental and renewable energy organizations and other entities (EPA 2009b).

After a thorough examination of the scientific evidence on the causes and effects of current and future climate change, as well as other effects of GHGs, the EPA concluded that the science compellingly supports a positive endangerment finding for both public health and welfare. The EPA relied heavily upon the major findings and conclusions from recent assessments of the U.S. Climate Change Science Program and the Intergovernmental Panel on Climate Change. The EPA made this endangerment finding after considering both observed and projected future effects of climate change, key uncertainties, and the full range of risks and effects to public health and welfare occurring within the United States.

In response, the EPA issued a final rule on May 13, 2010 to apply Prevention of Significant Deterioration (PSD) requirements to new facilities whose carbon dioxide-equivalent emissions exceed 100,000 tons per year (EPA, 2010). The GHG emissions for the GSEP are expected to fall below this amount. See Section 3.2 for estimated emissions for the proposed action. Moreover, GHG reductions will be realized by this project. By displacing fossil fuel-based energy generation with renewable energy generation, GHG production will be avoided. See Section 4.3 for GHG emissions and reductions associated with the proposed action and alternative actions.

In addition to the new PSD requirements, on September 22, 2009, the EPA issued the Final Mandatory Reporting of Greenhouse Gases Rule. Under this rule, suppliers of fossil fuels or industrial GHG, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions are required to submit annual reports to the EPA. The gases covered by the proposed rule are CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and other fluorinated gases, including nitrogen trifluoride and hydrofluorinated ethers (EPA 2009c). This rule requires that facilities classified as general stationary fuel combustion sources, including electricity services (North American Industry Classification System [NAICS] Code 221) report emissions if annual rates equal or exceed 25,000 metric tons of GHG. However, the rule does not set specific reporting requirements for electric power generation from solar resources (NAICS Code 221119).

1 The terms greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably. Global climate change is the result of GHGs, or air emissions with global warming potentials, affecting the global energy balance, and thereby, the climate of the planet. GHGs inherently are a cumulative impacts issue, and so are discussed as such in this EIS.

3.3.2 Other Federal Guidance on Greenhouse Gases and Climate Change

From the White House, Executive Order (EO) No. 13514 expands energy reduction and environmental performance requirements for Federal agencies identified in EO No. 13423. The goal of the EO is to establish an integrated strategy towards sustainability in the Federal Government and to make reduction of GHG emissions a priority for Federal agencies.

From the Department of the Interior (DOI), Secretarial Orders 3226 and 3285 direct bureaus and offices within the Department to provide leadership by responding in a timely manner to climate change issues and make development of renewable energy a priority. On September 14, 2009, Secretary of the Interior, Ken Salazar issued Order No. 3289, addressing the impacts of climate change on domestic water, land, and other natural and cultural resources. The Order establishes an approach for increasing understanding of climate change and responding to potential climate change related impacts as relevant to the resources that the Department of the Interior (DOI) manages. The document specifically identifies potential impact areas including potential changes in flood risk and water supply, sea level rise, changes in wildlife and habitat populations and their migration patterns, new invasions of exotic species and increased threat of wildland fire. The Order includes Climate Change Response Planning Requirements, which require each bureau and office within the DOI (including BLM) to consider and analyze potential climate change impacts when undertaking long range planning exercises, setting priorities for scientific research and investigations, developing multi-year management plans, and making major decisions regarding potential use of resources under DOI's purview.

3.3.3 California State Guidance on Greenhouse Gases and Climate Change

The State of California has demonstrated a clear willingness to address global climate change, as shown by regulatory and other actions taken by the California Energy Commission, the Air Resources Board (ARB), the Legislature, and the Governor. For example, in 1998, the California Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p. 5). In 2003, the Energy Commission recommended that the state require applicants to report GHG emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2005, Governor Schwarzenegger issued Executive Order S-3-05, which established a goal of reducing GHG emissions 80 percent below 1990 levels by 2050.

In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). AB 32 mandates that the state report and verify its GHG emissions in order to reduce GHG emissions statewide to 1990 levels by the year 2020. To facilitate this, CARB is required to adopt a statewide emissions limit, adopt regulations to reduce the amount of GHG emissions, and monitor compliance. CARB is the lead agency for implementing AB 32, which set the major milestones for establishing the program.

Although CO_2 is the largest contributor to climate change, AB 32 references five additional GHGs: CH_4, N_2O, SF_6, HFCs, and PFCs. Key elements of California's recommendations for reducing its GHG emissions to 1990 levels by 2020 include the following:

1. Setting targets for transportation-related GHG emissions for regions throughout California and pursuing policies and incentives to achieve those targets;
2. Adopting and implementing measures pursuant to existing state laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard;
3. Imposing targeted fees on high global warming potential (GWP) gases;
4. Implementing additional measures to address emissions from industrial sources. These proposed measures would regulate fugitive emissions from oil and gas recovery and transmission activities; and
5. Imposing a high GWP mitigation fee, which is anticipated to promote the development of alternatives to GWP chemicals and improve recycling and removal of these substances when older units containing them are dismantled.

In recognition of the critical role local governments will play in the successful implementation of AB 32, CARB recommended a GHG reduction goal for local governments of 15 percent below current levels by 2020 to ensure that their municipal and community-wide emissions match the state's reduction target. AB 32 establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of GHGs. It also makes CARB responsible for monitoring and reducing GHG emissions and continues the existing Climate Action Team to coordinate statewide efforts. Additional requirements for CARB include the following:

1. Establishing a statewide GHG emissions cap for 2020 based on 1990 emissions;
2. Adopting mandatory reporting rules for significant sources of GHGs;
3. Adopting a plan that indicates how emission reductions would be achieved from significant GHG sources via regulations, market mechanisms, and other actions;
4. Adopting regulations to achieve the maximum technologically feasible and cost-effective reductions in GHGs, including provisions for using both market mechanisms and alternative compliance mechanisms;
5. Convening an Environmental Justice Advisory Committee and an Economic and Technology Advancement Advisory Committee to advise CARB;
6. Evaluating several factors prior to imposing any mandates or authorizing market mechanisms, including, but not limited to, impacts on California's economy, the environment, and public health; equity between regulated entities; electricity reliability and conformance with other environmental laws, as well as ensuring that the rules do not disproportionately impact low-income communities;

7. Adopting a list of discrete, early action measures to be implemented before January 1, 2010; and

8. Ensuring public notice and opportunity for comment on all CARB actions.

The CARB adopted early action GHG reduction measures in October 2007, mandatory reporting requirements and the 2020 statewide limit in December 2007,[2] and a Statewide scoping plan in December 2008 to identify how emission reductions will be achieved from major sources of GHG via regulations, market mechanisms, and other actions. CARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (See, e.g., CARB 2010). The regulations must be effective by January 1, 2011 and mandatory compliance is to commence on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities with a nameplate capacity equal or greater than 1 megawatt (MW) if their emissions exceed 2,500 metric tons (MT) per year.

In addition, the Climate Change Scoping Plan, the state's roadmap to reaching GHG reduction goals, considers the following key strategies:

1. **Cap-and-Trade Program:** Broad-based to provide a firm limit on emissions; covers 85 percent of California's emissions: electricity generation, large industrial sources, transportation fuels, and residential and commercial use of natural gas, and provides regional linkage with the Western Climate Initiative, allowing greater environmental and economic benefits.

2. **Transportation:** GHG emission standards for cars, low-carbon fuel standard (10 percent by 2020), better land-use planning (Senate Bill 375), and more efficient delivery trucks, heavy duty trucks, and goods movement.

3. **Electricity and Energy (imported included):** Improved appliance efficiency standards and other aggressive energy efficiency measures, 33 percent renewables by 2020, increased use of efficient "combined heat and power", million solar roofs, solar hot water heating, green buildings, and water efficiency.

4. **Industry (including cement):** Audit of the 800 largest emission sources in California to identify GHG reduction opportunities; regulations on refinery flaring and fugitive emissions; considerations for cement to address "leakage."

5. **High GWP Gases:** Capture refrigerants and other high GWP gases already in use; reduce future impact through leak-resistant equipment, restrictions on use, and fees.

6. **Forestry:** Preserve forest sequestration and voluntary reductions possible from forestry projects.

7. **Agriculture:** More efficient agricultural equipment, fuel use, and water use through transportation and energy measures; reductions from manure digesters; fewer impacts on productivity of crops and livestock.

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[2] The 1990 emissions level, and thus the 2020 emissions limit, adopted by ARB is 427 million metric tonnes of carbon dioxide equivalent (MMTCO2e).

8. **Waste and Recycling:** Reduce CH_4 emissions from landfills and move toward high recycling and zero waste.

Also in 2006, the State enacted SB 1368 (Public Utilities Code Section 8340 *et seq*.), which limits California utilities' long-term investments in base load[3] generation to power plants that meet an emissions performance standard (EPS) of 0.500 MT CO_2 per megawatt-hour (1,100 pounds CO_2/MWh). The EPS applies only to carbon dioxide; it does not apply to emissions of other GHGs converted to carbon dioxide equivalent. The Energy Commission and the California Public Utilities Commission (CPUC) jointly established the EPS, which applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[4] If a project, in-State or out of State, plans to sell base load electricity to a California utility, the utility will have to demonstrate that the project meets the EPS. As a renewable electricity generating facility, the GSEP is determined by rule to be compliant with the SB 1368 EPS.[5]

3.3.4 Greenhouse Gases and Climate Change

Climate change refers to any significant change in measures of climate (temperature, precipitation, or wind) that lasts for an extended period (e.g., decades or longer). Climate change may be affected by a number of factors, including natural cycles (e.g., changes in the sun's intensity or earth's orbit around the sun), natural processes within the climate system (e.g., changes in ocean circulation), and human activities that change the atmosphere's composition (e.g., burning fossil fuels) or land surface (e.g., deforestation, reforestation, urbanization, and desertification).

California is a substantial contributor to global GHG emissions as it is the second largest contributor in the U.S. and the sixteenth largest in the world (CEC 2006). GHGs include:

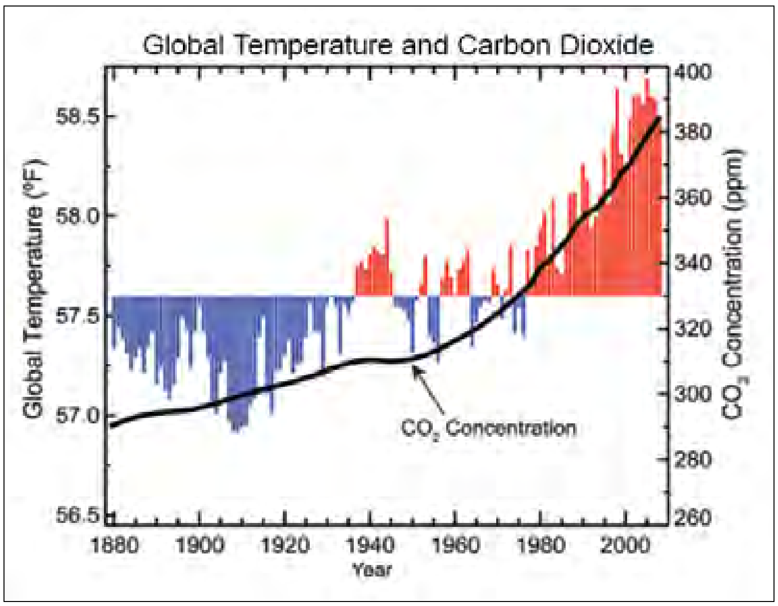
1. Carbon dioxide (CO2)
2. Methane (CH4)
3. Nitrous oxide (NOx)
4. Hydrofluorocarbons (HFCs)
5. Perfluorocarbons (PFCs)
6. Sulfur hexafluoride (SF6)

Electricity generation can produce GHGs with the criteria air pollutants that traditionally have been regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). Other sources of GHG emissions include sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high global warming potentials.

3 *Base load* units are defined as units that operate at a capacity factor higher than 60 percent.
4 CPUC 2007
5 See Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903(b)(1).

According to the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, increased atmospheric levels of CO_2 are correlated with rising temperatures; concentrations of CO_2 have increased by 31 percent above pre-Industrial levels since 1750 (Inset 3.3-1). Climate models show that temperatures will probably increase by 1.4 degrees Celsius (°C) to 5.8 °C between 1990 and 2100. Much of the uncertainty in this increase results from not knowing future CO_2 emissions, but there is also some uncertainty about the accuracy of climate models. The IPCC concluded in a statement released February 2, 2007, that "the widespread warming of the atmosphere and ocean, together with ice-mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone" (IPCC 2007).

INSET 3.3-1
RELATIONSHIP BETWEEN
GLOBAL TEMPERATURE AND CARBON DIOXIDE (IPCCD 2007)



GWP is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming and is devised to enable comparison of the warming effects of different gases. It is a relative scale that compares the gas in question to that of the same mass of CO_2. CO_2 equivalence (CO_2e) is a measure used to compare the emissions from various GHGs based on their GWP, when measured over a specified timescale (generally 100 years). CO_2e is commonly expressed as million metric tons (MMT) of carbon dioxide equivalents ($MMTCO_2e$). The CO_2e for a gas is obtained by multiplying the mass (in tons) by the GWP of the gas. For example, the GWP for CH_4 over 100 years is 25. This means that the emission of one MMT of CH_4 is equivalent to the emission of 25 MMT of CO_2, or 25 $MMTCO_2$ e.

3.3.5 Potential Effects of Climate Change

In November 2004, the California Climate Action Team (CAT) was formed, comprising 14 agencies and 11 subgroups to assist CARB with the Climate Change Scoping Plan. According to the 2006 California CAT Report, the following climate change effects, based on the IPCC trends, can be expected in California over the next century:

1. A diminishing Sierra snowpack, declining by 70 to 90 percent, threatening the state's water supply;
2. Increasing temperatures from 0.5 °F to 5.8 °F under the higher emission scenarios, leading to a 25 percent to 35 percent increase in the number of days ozone pollution levels are exceeded in most urban areas;
3. Increased vulnerability of forests due to pest infestation and increased temperatures; and
4. Increased electricity demand, particularly in the hot summer months.

3.3.6 Existing Greenhouse Gas Emissions

Statewide emissions of GHG from relevant source categories in 1990 and later years are summarized in Table 3.3-1. Specific contributions from air basins such as MDAB are not currently specified as part of the state inventory. Emissions of CO_2 occur largely from combustion of fossil fuels. The major categories of fossil fuel combustion CO_2 sources can be broken into sectors for residential, commercial, industrial, transportation, and electricity generation. Other GHG emissions, such as CH_4 and N_2O, are also tracked by state inventories but occur in much smaller quantities.

TABLE 3.3-1
CALIFORNIA GREENHOUSE GAS EMISSIONS (MMTCO$_2$E)

Emission Inventory Category	1990	2000	2001	2002	2003	2004	2005
Residential Fuel Combustion (CO_2)	29.7	30.25	27.21	27.32	26.40	27.86	--
Commercial Fuel Combustion (CO_2)	14.4	15.63	12.04	17.84	15.06	12.1	--
Industrial Fuel Combustion (CO_2)	103.0	76.17	80.48	71.53	65.47	67.2	--
Transportation Fuel Combustion (CO_2)	150.7	181.68	182.49	190.19	180.64	187.95	--
Electricity Generation, in-State (CO_2)	49.0	55.87	61.35	47.78	45.92	55.10	49.0
Methane (all CH_4 shown as CO_2e)	--	26.32	26.62	27.07	27.49	27.80	--
Nitrous Oxide (all N_2O shown as CO_2e)	--	31.43	30.76	34.48	33.85	33.34	--
Electricity Transmission and Distribution (SF_6 shown as CO_2e)	2.6	1.14	1.10	1.04	1.01	1.02	--
Total California GHG Emissions without Electricity Imports	**371.1**	**440.47**	**446.35**	**444.86**	**423.20**	439.19	--
Electricity Imports (CO_2e)	61.6	40.48	47.37	51.73	56.44	60.81	--
Total California GHG Emissions with Electricity Imports	**433.29**	**480.94**	**493.72**	**496.59**	**479.64**	500.00	--

SOURCE: CPUC 2008

3.4 Cultural Resources

Cultural resources are categorized as buildings, sites, structures, objects, and districts under both federal law [for the purposes of the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA), § 106] and under California state law [for the purposes of the California Environmental Quality Act (CEQA)]. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the human occupation and use of California prior to prolonged European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource-collecting areas, ceremonial sites, value-imbued landscape features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. In general, under federal and state historic preservation law, cultural resources must be at least 50 years old to have sufficient historical importance to merit consideration of eligibility for listing in the National Register of Historic Places (NRHP) or in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

The information about cultural resources in this chapter is based primarily upon information in the Application for Certification (AFC) (GSEP 2009a) and the Data Adequacy Supplements provided by the Applicant (GSEP 2009c, TTEC 2010c). Most of the key information for this analysis was submitted under confidential cover in Appendix D and three separate versions of the Archaeological Technical Report entitled *Draft Class II and Class III Cultural Resources Inventories for the Genesis Solar Energy Project, Riverside County, California* (August 2009, November 2009, and March 2010). In order for these known sensitive archaeological sites to be protected from disturbance, archaeological site content and location information are kept confidential by prohibiting the provision of information to unauthorized individuals and inclusion in publicly distributed documents (California Government Code Section 6354.10). These confidential documents contain site location maps, archaeological site forms for both previously recorded and newly recorded sites, and copies of archaeological technical reports describing other archaeological mitigation in the region. Other important information sources included the applicant's *Preliminary Report of Ancient Shorelines in Ford Dry Lake* (TTEC 2010e).

3.4.1 Environmental Setting

Identifying the kinds and distribution of resources necessary to sustain human life in an environment, and the changes in that environment over time is central to understanding whether and how an area was used during prehistory and history. During the time that humans have lived in California, the region in which the proposed GSEP is located, the Mojave Desert, has undergone several climatic shifts. These shifts have resulted in variable availability of vital resources, and that variability has influenced the scope and scale of human use of the vicinity of the GSEP site. Consequently, it is important to consider the historical character of local climate change, or the paleoclimate, and the effects of the paleoclimate on the physical development of the area and its ecology.

Paleoclimate and Paleoecology

Over the last 20 years studies of pack-rat middens and lake-level studies have provided a picture of the paleoclimate and paleoecology of the Mojave and Colorado Deserts. During prehistoric times, this region fluctuated between cool-and-moist and warm-and-dry periods. These fluctuations in temperature and moisture were crucial to the human occupation of the region. Environmental changes also had important implications for the GSEP vicinity specifically, because of the proximity of Ford Dry Lake. During cool, wet times the regional lakes filled and the necessary resources for human occupation were available. During warm, dry times the lakes dried and the region became a difficult place to live and traverse.

Recent environmental studies suggest that during the Late Pleistocene (18,000 to 8000 cal BC[1]), when humans first occupied North America, conditions in the Mojave Desert were cool and wet (West et al. 2007). Vegetation in the region was dominated by juniper and pinyon woodland, and the freshwater lakes of the region were permanent. This period was followed by the Early Holocene (8000 to 6000 cal BC), which was relatively wet and characterized by regular lake-refilling episodes. This wet environment continued to support the woodland. In contrast, the Middle Holocene (6000 to 4500 cal BC) was significantly dryer with shallow, rapidly oscillating lake levels. During this period the vegetation began to transition to desert scrub. The drying trend continued between 4500 and 1900 cal BC, resulting in persistently dry lake beds and the complete transition to the creosote biotic communities of the modern Mojave and Colorado Deserts, by approximately 4900 cal BC. From 1900 cal BC to the present, the dry pattern has been dominant, with lakes filling periodically for short periods (Sutton et al. 2007, pp. 231–233).

[1] There are two kinds of radiocarbon (C14) dates: uncalibrated and calibrated dates. Uncalibrated dates are not identical to calendar dates because the level of atmospheric radiocarbon (C14) has not been constant over time. Uncalibrated ages can be converted to calendar dates by means of calibration curves based on comparison of raw radiocarbon dates of samples independently dated by other methods, such as tree ring dating and stratigraphy. Such calibrated dates are expressed as cal AD or BC, where “cal” indicates “calendar years” or “calibrated years.”

Geology

The Mojave Desert has undergone a complex geologic history that includes sedimentation, volcanic activity, folding, faulting, uplift, and erosion. The GSEP footprint and linear facilities corridor is underlain by Quaternary[2] alluvial fill. This fill includes Holocene to Pleistocene alluvial fan and stream deposits, as well as lake (lacustrine) and ephemeral lake (playa) deposits. These sediments consist of gravel, sand, silt, and clay, with the coarser deposits located near the valley edges and the finer deposits near the center of the basin. The Quaternary deposits are underlain by the Pliocene Bouse Formation. This formation includes marine and estuary deposits from an arm of the proto-Gulf of California, or alternatively, a closed brackish basin. No descriptions of this formation come from the Chuckwalla Valley, but in other locations it is a basal limestone (marl) overlain by interbedded clay, silt, sand, and tufa. The Bouse Formation is irregularly underlain by pebbles cemented in a sandy matrix, representing composite alluvial fans (called a fanglomerate). It is likely Miocene-age, but may also be Pliocene-age. Bedrock beneath the GSEP site consists of metamorphic and igneous intrusive rocks of greater than 63 million years of age (GSEP 2009a, p. 5.5-2).

Geomorphology

Geomorphology is the scientific study of landforms and the processes that shape them. Geomorphologists seek to understand why landscapes look the way they do, to understand landform history and dynamics, and to predict future changes through a combination of field observation, physical experiment, and modeling. Archaeologists use geomorphology to understand how archaeological sites were formed and to predict where sites of various types can be found. Over time, objects, sites and other man-made objects are moved, buried, or exposed by wind, water, plant growth, animal activity, and other natural processes. Geomorphology is a technique that helps archaeologists interpret physical clues in order to understand the specific nature of the changes that have taken place over time. In the case of the current project, geomorphology can be used to predict the location of buried sites, to estimate their current condition, and to estimate the relative age of various geological or archaeological features.

Two geomorphological investigations were completed by the applicant for the proposed GSEP vicinity (Farmer et al. 2009, app. C; TTEC 2010e). Both investigations included a review of existing literature and a site visit to ground-check information from the documentary sources. Kenney (TTEC 2010e) also conducted shallow test excavations (1.5 feet in depth), drew cross-sections of the existing stratigraphy, and estimated the age of the local geologic units.

Kenney (TTEC 2010e) determined the minimum age of the site geologic units in both numerical and relative terms. Relative ages were assigned by stratigraphic position of the sedimentary layers. Numerical ages for sedimentary units were assigned by careful examination of the soil profiles. Desert soils are typically dated utilizing the Soil Development Index (SDI) method. With an SDI value, a soil in question may be compared to other regional soils evaluated with the same

[2] The Quaternary period is the youngest *period* of the *Cenozoic era* in the *geologic time scale*, spanning 2.588 +/- 0.005 million years ago to the present. It includes two geologic *epochs*: the *Pleistocene* (1.8 million–10,000 years ago) and the *Holocene* (the current epoch, 10,000 years ago to the present).

method and dated with absolute techniques such as carbon[14]. For this study, numerical ages for sediments were arrived at by correlating site soil profiles with known dated soils in the Coachella Valley (TTEC 2010e, p. 2).

One of the geomorphic hallmarks of the Basin and Range Geomorphic Province is that streams terminate in local or regional valley sinks and not the Pacific Ocean or Sea of Cortez. A central feature of the proposed GSEP vicinity is one of these sinks, Ford Dry Lake. Two kinds of lakes form in these kinds of conditions: pluvial and playa lakes. Pluvial or perennial lakes formed during Pleistocene glacial maximums that existed for thousands of years. Playa lakes, formed during the Holocene, are quite ephemeral, with life cycles of one to a few tens of years. Each type of lake would have supported different kinds of plants and animals, and as such, would have been attractive to humans in different ways. The sediments of these two types of lakes are also distinct. Pluvial lakes deposit sediments are: green, yellow, or olive-brown in color; consist of sand and clay; form thin, distinct layers; contain aquatic fossils; and lack saline layers. Playa lakes deposit sediments are: orange or brown in color; consist of silt and sand; do not form distinct layers; do not contain aquatic fossils; and contain saline layers. Geological bore samples from Ford Dry Lake show that it contains playa lake deposits to depths of approximately160 meters (TTEC 2010e, p. 3).

Field mapping within the GSEP vicinity yielded a local stratigraphy of only six units. These included stream deposits, both active and dormant sand deposits, alluvial deposits, and lake deposits. These six units, their distribution across the GSEP site footprint, their estimated age and approximate depths, are described in detail below (TTEC 2010e).

1. Qw sediments are active stream wash deposits composed of loose very fine to very coarse light brown to yellowish brown sand with small gravel. This unit is confined within the active washes and is typically 1 to 6 inches thick, but may be greater than 2 feet thick in some of the larger washes. This unit was identified but not recorded in this study.

2. Qs deposits are active, dormant, and relict aeolian sand deposits. They consist of fine, yellowish brown sand sheets up to 1 foot thick. These deposits are scattered across the GSEP site footprint on the modern ground surface of Ford Dry Lake.

3. Qal sediments consist of Quaternary alluvium composed of fine to coarse brown sand mixed with small gravels averaging 1 foot thick. Gravel surfaces similar to desert pavement can form. This alluvium is present across most of the GSEP site footprint and linear facilities corridor, usually overlaying older alluvium above elevation 374 feet, lake deposits below elevation 374 feet (approximate elevation of latest Pleistocene shoreline). This sediment can be divided into two soil types, the upper which ranges in age from 1,000 to 3,000 years old, and the lower which ranges in age from 7,000 to 8,000 years old. Unit Qsr typically overlays this alluvium.

4. Qsr consists of a relict sand sheet and highly degraded small coppice dune deposits. These sediments were deposited within wind transport and depositional areas during the Holocene that are no longer active. Deposits consist of fine brown sand ranging between 4 and 8 inches thick. Coarse sand and gravel surfaces similar to desert pavement can form. Soil horizons in the upper 2 to 6 inches of this unit range in age from 1,000 to 7,000 years old. Unit Qsr is the most common unit exposed on the surface and typically overlies unit Qal.

5. Qoaf consists of older alluvial fan deposits likely created by Pleistocene glaciers. It is composed of yellowish red fine to coarse silty sand with small to medium gravels. These deposits are ubiquitous across the site near to the surface except for below elevation 374 feet (old shore line) where it may exist below several layers of lake deposits (Ql). This sediment can be divided into multiple soils, the youngest of which is 12,000 to 20,000 years old. The average depth of this unit was not determined, but extended beyond the bottom of most of the test units (deeper than 1.5 feet).

6. Ql sediments are lake deposits associated with the ancient playa Ford Dry Lake (see Figure 3.4-1). They consist of light yellowish brown fine to medium sandy silt with iron oxide staining. No fossils were noted. Multiple layers of this unit were noted at distinct elevations. Deposits between 377 and 380 feet were found beneath unit Qoaf indicating they were formed during the Pleistocene at least 12,000 years ago but more likely between 15,000 and 20,000 years ago. All other Ql deposits were above Qoaf indicating that they were formed during the Holocene, at least 12,000 years ago. Deposits between 373 and 374 feet are estimated to 12,000 years old, those between 367 and 370 feet in elevation to be between 8,000 and 12,000 years old, and those at 364 feet in elevation to be between 5,000 and 12,000 years old. The most recent shoreline is located at 360 feet in elevation and appears to have been created during the late Holocene. Ql sediments tend to be overlain by Qal alluvium or Qs sand dunes. These deposits are located mainly in the southwest edges of the GSEP site footprint.

An assessment of archaeological sensitivity for each of these units is presented below.

1. The Qw active stream wash deposits have a moderate potential for containing buried archaeological artifacts. However, the moderate-to-high-energy movement of water through these sediments would not be conducive to the preservation of archaeological materials and the spatial associations among them.

2. The Qs late Holocene-age, wind-deposited sand sheets are most commonly found to the south of the proposed GSEP site footprint often overlaying lake deposits (Ql). This stratigraphic unit is considered to have a moderate-to-high potential for containing buried archaeological deposits associated with human utilization of resources associated with Ford Dry Lake. Relatively low-energy alluvial and aeolian movement of sediments would be conducive to the preservation of archaeological materials and the spatial associations among them. Poorer preservation of these spatial associations is expected in sites located in the valley between the McCoy Mountains and Palen Mountains where steeper slopes result in higher-energy sheet wash.

3. The Qal alluvium was deposited across most of the GSEP site footprint between 1,000 and 8,000 years ago, well within the human occupation of the region. This approximately 1-foot-thick layer was laid down by low-to-moderate-energy sheet wash and flood events. It is often covered by sand sheets 4 to 8 inches thick (Qsr). This stratigraphic unit is considered to have a moderate–to-high potential for containing buried deposits. The potential for buried deposits is expected to increase with proximity to the lake. Deposits formed by low- and moderate-energy sheet wash would be conducive to the preservation of archaeological materials and the spatial associations among them. Poorer preservation of these spatial associations is expected in sites located in the valley between the McCoy Mountains and Palen Mountains where steeper slopes result in higher-energy sheet wash.

4. The ancient Qsr sand sheets were deposited between 1,000 to 7,000 years ago, within the human occupation of the region. This stratigraphic unit is common on the surface of the site footprint overlaying unit Qal in a layer 4 to 8 inches thick. This stratigraphic unit is considered to have a moderate-to-high potential for containing buried deposits. The potential for buried deposits is expected to increase with proximity to the lake. Relatively low-energy alluvial and aeolian movement of sediments would be conducive to the preservation of archaeological materials and the spatial associations among them. Poorer preservation of these spatial associations is expected in sites located in the valley between the McCoy Mountains and Palen Mountains where steeper slopes result in higher-energy sheet wash.

5. The distinctly red Qoaf Pleistocene alluvial fan deposits were created between 12,000 and 20,000 years ago. They are present within 1 to 2 feet of the modern ground surface across most of the proposed GSEP site footprint. This stratigraphic unit is considered to have a low to moderate potential for archaeological materials on its upper surface. Because these deposits were formed prior to the human occupation of the region, the potential for containing buried cultural materials is considered low. The low-to-moderate-energy sheet wash and flood events on the surface of this stratigraphic unit would be moderately conducive to the preservation of archaeological materials and the spatial associations among them. Poorer preservation of these spatial associations is expected in sites located in the valley between the McCoy Mountains and Palen Mountains where steeper slopes result in higher-energy sheet wash.

6. The Ql stratigraphic unit can be divided into two distinct groups, those deposited above the Qoaf alluvium and those deposited below the Qoaf alluvium. The lake deposits below the Qoaf alluvium were formed more than 12,000 years ago, prior to the human occupation of the area. As a result, these lake sediments are not expected to contain cultural materials. Lake deposits above the Qoaf alluvium were formed during the human occupation of the area (Holocene period) and may contain cultural materials on the surface or buried by other lake deposits, Qal alluvium, or Qs sand dunes. Relatively low-energy alluvial movement of sediments would be conducive to the preservation of archaeological materials and the spatial associations among them. Poorer preservation of these spatial associations is expected in sites located in the valley between the McCoy Mountains and Palen Mountains where steeper slopes result in higher-energy sheet wash. Preservation may also be poor due to high-energy wave action along the eastern shoreline as a result of strong winds from the west.

Several of the ancient shorelines have been associated with estimated dates, potentially giving clues to the ages of the sites that cluster along their edges. One of the latest Holocene shorelines is located at 373 and 374 feet in elevation and is estimated to be 12,000 years old. The shoreline between 367 and 370 feet in elevation appears to be between 8,000 and 12,000 years old, and the shoreline at 364 feet is estimated to be between 5,000 and 12,000 years old. The most recent shoreline is located at 360 feet and appears to have been created during the past few thousand years.

Overall, the majority of the proposed site footprint is covered in deposits of Holocene age. These deposits are considered to have a moderate-to-high potential to contain well-preserved, buried cultural materials. However, these materials would be expected within approximately 2 feet of the modern ground surface, in sediments stratigraphically above the Qoaf alluvium. The potential for artifacts within the Qoaf alluvial deposits, in consideration of the apparent Pleistocene age of those deposits, is considered slight. The highest density of sites is expected in association with ancient lakeshores reflecting human utilization of plant and animal resources flourishing near this desert water source. These sites are also expected to be the best preserved since the gentle slope would result in low-energy sheet wash. The exception is those sites located in the McCoy-Palen Mountain valley, where moderate-energy sheet wash may have caused disturbance and potentially more deeply buried sites. Some of these sites may be dated by their association with particular shorelines. These patterns indicate that the areas of highest archaeological sensitivity are located in the southeastern part of the GSEP site footprint near the ancient shores of Ford Dry Lake.

Prehistoric Background

Human populations have occupied the California desert for at least 10,000 years (Moratto 1984). Stratified sites that would aid in providing temporal controls and help establish a cultural chronology are virtually unknown in the study area. The earliest explorations of the Mojave and Colorado Deserts took place in the 1930s and 1940s (Campbell 1931, 1936; Campbell and Campbell 1935; Campbell et al. 1937; Rogers 1939, 1945). During this time a basic cultural-historical outline was established, which has formed the foundation for subsequent efforts (Arnold et al. 2002, pp. 46–48; Love and Dahdul 2002; Schaefer 1994; Warren 1984). However, these early attempts were based on surface scatters and inference rather than large-scale data recovery projects or regional surveys.

Numerous cultural resource management projects have resulted in dramatic increases in our understanding of the prehistory of the region. Two of the most notable synthetic works include the BLM's large-scale cultural resources inventory of the Central Mojave and Colorado Desert Regions (Gallegos et al. 1980) and Crabtree's (1980) overview. It was not until the late 1990s that any archaeological site was excavated and reported in the literature within 100 kilometers of the GSEP APEs. Jones and Klar's (2007) recent review of California archaeology builds from where these earlier authors left off, including the results of recent data recovery projects (Schaefer and Laylander 2007; Sutton et al. 2007). The following discussion and culture-historical sequence primarily follows the sources listed above.

Paleo-Indian Period (about 10,000–8000 BC)

The Paleoindian Period occurs during the first half of the Early Holocene. Isolated fluted projectile points, assignable to the Western Clovis Tradition have been recovered from the Pinto Basin, Ocotillo Wells, Cuyamaca Pass, and the Yuha Desert (Dillon 2002, p. 113; Moratto 1984, pp. 77, fig. 3.1, 87; Rondeau et al. 2007, pp. 64–65, fig. 5.1, table 5.1). All are surface finds, and have no associations with extinct fauna.

Lake Mojave Complex (8000–6000 BC)

The Lake Mojave complex, also known as the Western Pluvial Lakes/Western Stemmed Tradition (Beck and Jones 1997; Erlandson et al. 2007; papers in Graf and Schmitt 2007; Schaefer 1994, pp. 63–64; Sutton et al. 2007; papers in Willig et al. 1988), occurs during the second half of the Early Holocene. It is characterized by Great Basin Stemmed Series projectile points (Lake Mojave and Silver Lake types), abundant bifaces, steep-edged unifaces, crescents, and occasional cobble tools and ground stone tools. These artifacts often occur in undated surface contexts. Assemblage composition and site structure suggest highly mobile foragers, often traveling considerable distances. Little reliance upon vegetal resources is evidenced. The value of wetland habitats remains unclear. Lake Mojave lifeways may result from relatively rapidly changing climate and habitats during the Early Holocene. This would have produced unpredictability in resource distribution and abundance, producing a high degree of residential mobility.

Pinto Complex (8000–3000 BC)

The Pinto complex spans portions of the Early and Middle Holocene. Toolstone use, based on sites attributed to this complex, focus upon materials other than obsidian and cryptocrystalline silicate (CCS). Pinto Series points are stemmed with indented bases, and display high levels of reworking. Bifacial and unifacial cores/tools are common. Ground stone tools are moderately to very abundant, indicating greatly increased use of plant resources. Pinto sites occur in a broad range of topographic and environmental settings, especially within remnant pluvial lake basins. Moderate to large numbers of people, practicing a collector subsistence strategy, occupied large residential base camps for prolonged periods. Logistical forays into surrounding resource patches probably were made from these sites.

Deadman Lake Complex (7500–5200 BC)

Currently, the Deadman Lake complex appears confined to the Twentynine Palms area. Sites usually are surficial and located on old alluvial pediments. Artifacts include small-to-medium-size contracting stemmed or lozenge-shaped points, large concentrations of battered cobbles and core tools, and abundant bifaces, simple flake tools, and ground stone tools. The abundance of cobble tools suggests an emphasis upon plant processing. The Deadman Lake and Pinto complexes may represent two different human populations practicing different seasonal/annual rounds, or Deadman Lake may represent a component of the overall Pinto complex adaptation.

Possible Abandonment (3000–2000 BC)

Beginning roughly at this time, conditions in the Mojave Desert were warmer and drier. Few archaeological sites date to this period. This suggests population densities were very low. It is possible some areas were largely abandoned. This period corresponds in part to the latter part of the proposed “Altithermal Abandonment,” recognized by some prehistorians as characterizing portions of the Great Basin (see Kelly 1997, pp. 8–9).

Gypsum Complex (2000 BC–200 AD)

The Gypsum complex, spanning most of the Early Late Holocene, is characterized by the presence of corner-notched Elko Series points, concave-base Humboldt Series points, and well-shouldered contracting-stemmed Gypsum Series points. Numerous bifaces also occur. Manos and metates are relatively common. During the early portion of the Gypsum complex, settlement-subsistence appears focused near streams. At this time, increased trade and social complexity apparently occurred. Gypsum components are smaller, more abundant, and occur over a more diverse suite of settings than those dating previously. Evidence for ritual activities include quartz crystals, paint, split-twig animal figurines, and rock art. Gypsum sites are uncommon in the southern and eastern Mojave Desert.

Rose Spring Complex (200 AD–1000 AD)

Cultural systems profoundly changed in the southern California deserts during Late Late Holocene with the introduction of the bow and arrow, represented by Rosegate Series points. During this time, a major increase in population is thought to have occurred, possibly resulting from a more productive environment and a more efficient hunting technology. Sites often are located near springs, along washes, and sometimes along lakeshores. Intensive occupation is indicated by the presence of wickiups, pit houses, and other types of structures. Well-developed middens have yielded artifact assemblages containing knives, drills, pipes, bone awls, various ground stone tools, marine shell ornaments, and large amounts of obsidian. Obsidian procurement and processing apparently significantly structured settlement-subsistence.

Late Prehistoric Period (1000 AD–1700 AD)

During the Late Prehistoric period, horticultural practices and pottery were introduced (most likely from the Hohokam area in southern Arizona or from northern Mexico), having its greatest impact along the Lower Colorado River (McGuire and Schiffer 1982; Schaefer 1994, pp. 65–74; Schaefer and Laylander 2007, pp. 253–254). Ceramic artifacts began to appear in the Colorado Desert approximately 1000 AD, assigned to the Lowland Patayan (Lower Colorado Buff Ware) and Tizon Brown Ware traditions (Lyneis 1988; Waters 1982a, 1982b).

A complex cultural landscape composed of rock art, trails, and geoglyphs[3] developed during the Late Prehistoric period. Trade and exchange were elaborated, with an emphasis on links between coastal southern California and the Southwest. In addition to pottery, artifact assemblages include Desert Series projectile points, shell and steatite beads, and a variety of milling tools. Obsidian use declines significantly, with CCS becoming the dominant toolstone.

Prehistory of the Chuckwalla Valley

Singer (1984) presents a lithic quarry-oriented prehistoric settlement model for the Chuckwalla Valley and environs. Over 200 prehistoric sites occur in the region. Past peoples inhabiting the area appear to have been very mobile, especially during late prehistoric and early historic times. During early historic times, native peoples inhabited towns/hamlets located along the Colorado River, within the Coachella Valley, and at major desert springs/oases.

[3] Geoglyphs, also known as intaglios, were created on desert pavements by rearranging and/or clearing pebbles and rocks to form alignments, clearings, and/or figures. Rock alignments are present throughout this region, while representational figures only occur close to the Lower Colorado River. It is assumed that they played some role in sacred or ritual activities.

The Chuckwalla Valley was a relatively closed resource exploitation zone. It served as an east-west oriented trade route/corridor between the Pacific Ocean and the Colorado River/greater Southwest. An extensive network of trails is present within the Chuckwalla Valley. Given its orientation and location, the valley may have been neutral territory (i.e., a buffer zone), unclaimed by neighboring native peoples. Quarry sites probably were "owned" by tribal groups. The distribution of particular types of toolstones may have corresponded to a group's territorial boundaries, and a toolstone type may not have occurred beyond the limits of a group's specific territory.

Within the Chuckwalla Valley, prehistoric sites are clustered around springs, wells, and other obvious important features/resources. Sites include villages with cemeteries, occupation sites with and without pottery, large and small concentrations of ceramic sherds and flaked stone tools, rock art sites, rock shelters with perishable items, rock rings/stone circles, geoglyphs, and cleared areas, a vast network of trails, markers and shrines, and quarry sites. Possible village locations are present at Ford Dry Lake, McCoy Spring, Palen Lake, Granite Well, and Hayfield Canyon.

A cluster of temporary habitation and special activity (task) sites occurs around a quarry workshop in the Chuckwalla Valley. The Chuckwalla Valley aplite quarry workshop complex probably was used throughout the Holocene. During this period, Chuckwalla Valley most likely was occupied, abandoned, and reoccupied by a succession of ethnic groups. In the Early Holocene (i.e., Lake Mohave complex times), the area may have been relatively densely inhabited. During the Middle Holocene (i.e., Pinto and Gypsum complexes period) it may only have been sporadically visited. The subsequent Late Holocene Rose Spring and Late Prehistoric periods probably witnessed reoccupation of the valley by Yuman and Numic-speaking peoples.

Research Topics

Research topics commonly appearing in the Colorado Desert archaeological literature include toolstone procurement, ceramic traditions, horticulture, trade and exchange, and cultural landscapes.

Toolstone Procurement

The geology of the Colorado Desert provided prehistoric peoples with a variety of lithic materials for artifact production (Schaefer and Laylander 2007, pp. 252–253). These included obsidian, cryptocrystalline silicates (chert), crystalline volcanics (basalt, rhyolite), quartz, and plutonic, metamorphic, and sedimentary rocks.

Coso obsidian was the dominant source of obsidian used by Colorado Desert peoples prior to 1000 AD. Other obsidian sources, from the southern Mojave Desert, include Bristol Mountains and Devil Peak (Shackley 1995). Approximately a dozen sources located in Baja California, extreme northwest Sonora, and western Arizona may also have been used (Shackley 1988, 1995, 2005). During the last thousand years, however, Obsidian Butte was the principal obsidian used in the Colorado Desert and coastal southern California (Hughes 1986; Hughes and True 1983; Laylander and Christenson 1988; Schaefer and Laylander 2007, p. 251). Obsidian Butte, located near the southern edge of the Salton Sea, was inaccessible when Lake Cahuilla rose to inundate it (130 feet below sea level).

Several topics relating to prehistoric quarrying and tool manufacturing/use have been identified, including: distinction between formal versus the expedient procurement of toolstone (Wilke and Schroth 1989); lithic reduction strategies and transport of toolstone (Bamforth 1990, 1992); scales of production at ground stone tool quarries (Schneider et al. 1995); and differences in tools/toolstones by gender (Walsh 2000).

Bamforth (1990, 1992) considers Holocene settlement, raw material, and lithic procurement at several quarry sites in the central Mojave Desert. He suggests that quarry use was conditioned upon mobility strategies, regional quality and abundance of toolstone, as well as quarry location. Bamforth suggests that an emphasis on transporting prepared cores during the period 2000 BC–500 AD may have resulted from the formation of relatively large and stable communities in areas with concentrated plant resources.

Singer (1984) studied two quarry workshop sites located in Chuckwalla Valley. Core production and reduction from locally available aplite was emphasized. This yielded flakes and bifaces, which appear to have been exported from the quarries for final reduction at other sites. Few formed tools were observed. Those that were present were choppers and scrapers, possibly used to manufacture wooden digging or prying sticks and shafts. The quarry sites appeared to have experienced long-term occupation and use.

Manufacturing efforts appear to have been directed towards production of expedient, rapidly discarded cutting/scraping/pounding/milling tools from locally available toolstone(s) (Ludwig 2005; Schaefer and Laylander 2007, pp. 252–252; Singer 1984). Specialized tool manufacturing included production of sandstone metates along the western side of the Colorado Desert, projectile point (arrow) workshops at seasonal task sites situated around playas, and large quarries at volcanic outcrops within the Lower Colorado and Gila River Valleys, where mortars and pestles were made (Schaefer and Laylander 2007, p. 252).

Ceramic Traditions

Schaefer and Laylander (2007, pp. 252–253) note that buffware pottery occurring within the Colorado Desert was initially assigned to the Hakataya ceramic series (Schroeder 1958, 1979). Subsequent studies (Waters 1982a, 1982b, 1982c) place it within the Lowland Patayan Ceramic Tradition. Both typologies are based on surface collections of sherds, with little data resulting from stratigraphic excavations, or associated radiocarbon dates. Schroeder focuses upon details of temper, inclusions, and surface treatment, while Waters emphasizes rim form. Both attempt to define geographic limits of production for each type. Difficulties in applying typology and problems with stratigraphic integrity, archaeological contexts, and anomalous associated radiocarbon dates, have allowed only gross chronological estimates and have limited identification of manufacturing regions.

In the Salton Basin, some sites dating between about 350 and 1200 AD contain pottery (Love and Dahdul 2002). This evidence suggests pottery was not introduced or rarely used prior to about 1000 AD. Earlier dates from the preceding 200 years suggest Lake Cahuilla may have attracted Colorado River peoples (and their pottery). Early ceramic dates from the Colorado Desert correspond closely with the inception of widespread use of Tizon Brownware pottery in the Peninsular Ranges and along the Pacific Coast (Lyneis 1988; Griset 1986), although some dates suggest initial introduction of ceramics by 1200 BC, if not before.

Viewed regionally, pottery use within the Late Prehistoric of the Colorado Desert can be divided into three periods (Arnold et al. 2002, pp. 46–47; Love and Dahdul 2002, pp. 72–73; Waters 1982a, 1982b, 1982c). Patayan I times, about 1200–950 BC, witnessed the inception of several ceramic traditions. During Patayan II times, 950–500 BC, increased local manufacture and use of pottery occurred. Patayan III, 500–240 BC, saw the introduction of “Colorado Buff” pottery, and the westerly spread of ceramics to coastal southern California.

With respect to social and cultural factors governing pottery adoption and use within the Colorado Desert, recent analyses of pottery from the Mojave Desert and surrounding areas provide models focused on behavioral implications regarding its manufacture and function. One concern has been with determining if ceramic vessels were locally made (Eerkens 2001; Eerkens et al. 1999, 2002a; Griset 1996). Neutron activation analysis and petrographic studies have been used to identify chemical and material signatures (Eerkens et al. 2002b). Pottery manufacture does not appear to have been organized at a higher regional level. Instead, pots generally appear to have been locally produced and used, with limited exchange of pots between different groups. Production appears to have been organized at an individual or family level, emphasizing production of largely utilitarian wares.

Pottery from sites in the northern Mojave is characterized by a relatively high number of elemental signatures suggesting higher levels of mobility (Eerkens et al. 2002b). In addition to a higher degree of residential mobility, Eerkens (2003b) suggests people inhabiting the northern Mojave Desert produced a fairly large numbers of pots. The combination of high mobility and a fairly high level of pottery production is seen as leading to caching pots near lowland wetlands, which were fixed in the landscape, development of pottery attributes promoting fuel consumption, and a high degree of standardization of largely utilitarian ceramics.

Sedentism in the Owens Valley, northeast of the GSEP Area, appears to have developed concurrently with, or immediately prior to, an emphasis on resource storage, at approximately 500 AD. Small seed intensification appears to have occurred about 700–600 BC, at the time brownware pottery became widely used. He concludes that social models, such as those suggesting the activities of aggrandizers or the stabilization of long-distance exchange networks, do not explain these developments. The role played by decrease(s) in population-to-resource balance(s), resulting from increased population pressure, remains unclear.

Eerkens (2003c; 2004) suggests the significant increase in small seed use and the advent of brownware pottery around 700–600 BC are linked. People focused upon seeds because they could easily be privatized. That is, they could be individually owned and thus would not be subject to unrestricted sharing. Pots were a critical component of small seed intensification, because they generally were individually made and owned and could be used within houses, allowing food preparation and consumption to occur in private. Privatization of small seeds may have resulted from increased population size yielding more potential “freeloaders,” new community kinship structures, and the creation of resource surplus.

Horticulture

At the time of initial Euroamerican contact, 240 years ago, native peoples living along the Lower Colorado River and the Colorado Delta were growing a wide variety of domesticates and wild grasses, which provided 30–50 percent of their subsistence economy (Bean and Lawton 1973; Castetter and Bell 1951; Schaefer and Laylander 2007, pp. 253–254). Annual flooding of the floodplains along the Colorado rejuvenated the soil and provided enough moisture to sustain crops. Lower Colorado River agriculture is presumed to have begun around 700 AD. It probably spread either from the Hokokam area (to the east), or from northern Mexico (to the southeast) (McGuire and Schiffer 1982).

Horticulture subsequently appears to have spread west from the Colorado River. Desert Tipai peoples practiced floodplain agriculture along the New and Alamo Rivers. They also constructed small dams and ditches along washes to direct irrigation water onto adjacent terraces. Agricultural elements probably reached the Imperial Valley around 300 BC Seed caches and mythological references to cultigens possibly indicate very late prehistoric adoption of agriculture. However, the caches contained both native and Old World cultigens. Thus it is unclear if agriculture penetrated west of the Peninsular Ranges in southern California before Euroamerican contact and the sustained influence that came with the establishment of Spanish missions.

Native cultigens may have reached the western Colorado Desert through trade instead of by local production (Schaefer and Laylander 2007, p. 254). Within the Colorado Desert, several archaeological sites have ceramic jars or rock-lined cache pits containing food remains of native or Old World plants (cf., Bayman et al. 1996; Swenson 1984; Wilke 1978; Wilke and McDonald 1989; Wilke et al. 1977). Pumpkin seeds occur in human coprolites (fossilized feces) from the Myoma Dunes at the north end of Lake Cahuilla, and also in a ceramic jar from the west shore of Lake Cahuilla, north of the Fish Creek Mountains. The latter dated to 580–340 BC (Wilke 1978; Wilke et al. 1977).

Early-to mid-nineteenth-century Cahuilla archaeological sites contain glass beads, flaked glass, domestic animal bones, carbonized maize and tepary beans, and uncarbonized gourds. Abundant evidence exists indicating the Cahuilla practiced irrigated agriculture during the early- and mid-nineteenth century. The paucity of macro- and micro-fossil cultigen remains from prehistoric archaeological deposits in Cahuilla territory strongly suggests agriculture did not play a significant role in the Cahuilla economy until the early nineteenth century. Early historic intensification of agriculture may have resulted from final desiccation of Lake Cahuilla, regional population growth, decreased mobility, and acculturation, including introduction of Euroamerican irrigation techniques.

In the Mojave Desert and environs, in the approximate period from 2000 to 800 BC, agriculture first was practiced in southern Nevada and environs as a consequence of the Anasazi Intrusion (Warren 1984, p. 421, fig 8.25). Maize, squash, beans, grain amaranth, and sunflowers were grown. Agriculture was practiced along with foraging for wild plants and animals. Fields probably were irrigated in some manner. Agriculture appears to have intensified over time.

The Owens Valley Paiute were Great Basin Numic-speaking horticulturalists (Lawton et al. 1976; Liljeblad and Fowler 1986, pp. 417–418; Steward 1930, 1933, 1938, 1941, 1970). Ditch and surface irrigation of blue dicks (*Brodiaea capitata*), yellow nut grass (*Cyperus esculentus*), and spikerush (*Eleocharis* sp.), was practiced. This most likely developed during late prehistoric times, possibly triggered by increased population pressure resulting from climatic change and/or immigration (Bouey 1979).

Yohe (1997) notes aboriginal cultigens, such as melons, squash, and beans, were present at two rockshelters dating to the late nineteenth or early twentieth century in Death Valley. Fowler (1995, pp. 110–112; 1996, pp. 91–98) details garden horticulture among the Southern Paiute and Panamint and Timbisha Shoshone. Stream-irrigated gardens were cultivated, in which corn, beans, squash, sunflowers, and amaranth were grown. These groups also planted gardens near springs, had communal fields with irrigation ditches, and unirrigated stream-bank garden plots. Various land management practices were employed, including intentional burning, clearing, pruning, and coppicing, transplanting and cultivation, and cleaning of water sources.

Winter and Hogan (1986, pp. 125–127, table 1) note that during protohistoric times, agriculture was practiced by the southern California/Nevada Chemehuevi and Ash Meadows, Pahrump, Las Vegas, and Moapa Southern Paiute bands. Among the crops grown were corn, beans, squash, and sunflowers. Forms of plant husbandry directed towards non-domesticates included burning to encourage growth of new plants, broadcast seed sowing, and irrigation of wild stands of bulb and seed plants (Winter and Hogan 1986, pp. 128–129, table 2). These practices are thought to have begun prehistorically, continuing and possibly expanding during early historic times. Wallace(1980) suggests Native American agriculture in the Mojave region was exclusively a historic-period phenomenon.

Trade and Exchange

As Schaefer and Laylander (2007, pp. 254–256) note, prehistoric and ethnohistoric[4] Colorado Desert peoples had a highly developed network of connections linking locations within and beyond the region. High mobility produced considerable cross-cultural interaction and integration in spite of frequent open aggression and warfare between different groups. This integration and interaction occurred between mobile hunter-gatherers and sedentary horticultural peoples. They are archaeologically manifested by the spatial distribution of site types, rock art, artifacts (especially ceramics and shell ornaments), and toolstones (especially obsidian).

[4] "Ethnohistoric" refers to the period during which Euroamerican accounts of Native Americans augment the archaeological record and Native American oral traditions as sources of information on Native Americans. Cultural landscapes, when related to specific ethnic groups, are referred to as "ethnographic landscapes" (Hardesty 2000).

Archaeologists monitor the dynamics of prehistoric trade in the Colorado Desert by analysis of the distributions of artifacts made from various toolstones, shell beads and ornaments, and ceramic types and composition (Schaefer and Laylander 2007, pp. 255–256). As previously stated, with respect to toolstones, obsidian from Obsidian Butte is fairly commonly represented in sites located within montane and coastal southern California (Hughes 1986; Hughes and True 1982; Laylander and Christensen 1988). Obsidian from sources in northern Baja California may have been routed via the Colorado Desert to coastal southern California sites (McFarland 2000). Wonderstone from the Rainbow Rock source is present in western San Diego County and the northern Coachella Valley (Bean et al. 1995; Pigniolo 1995). Material for steatite artifacts found in Colorado Desert sites probably comes from sources in the Peninsular Ranges. Material for argillite artifacts may be from a central Arizona source.

Artifacts made from shellfish species inhabiting the northern Sea of Cortez occur in coastal southern California and the Great Basin (Bennyhoff and Hughes 1987; Fitzgerald et al., 2005) and may have been traded through the Colorado Desert (Schaefer and Laylander 2007, p. 255). Shells from southern California coastal species have been found at a number of Colorado Desert sites and those in the Southwest (Ford 1983). These artifacts may have resulted from direct procurement of shells, or exchange. At the Elmore site, associated with the protohistoric recession of Lake Cahuilla, shell debitage indicates local manufacture of shell beads and ornaments (Rosen 1995). In the Coachella Valley, shell artifacts may reflect close ties to peoples living along the Santa Barbara Channel.

A cache of Lower Colorado Buffware (i.e., Patayan) anthropomorphic figures found in an Orange County site indicates interregional connections (Koerper and Hedges 1996). These also are suggested by the frequency of Lower Colorado Buffware (i.e., Patayan/Hakataya) pottery throughout the Colorado Desert (Bean et al. 1995; Cordell 1997; McGuire and Schiffer 1982; Schaefer and Laylander 2007, p. 255; Schroeder 1979; Shaul and Hill 1998; Waters 1982a, 1982b, 1982c). However, its use occurred among a number of prehistoric peoples practicing divergent settlement and subsistence patterns. Consequently little effort has been made to refine or apply the Patayan tradition as an integrative model.

On a local level, Plymale-Schneeberger (1993) examined pottery from three sites in Riverside County. Petrographic and geochemical analyses allowed quantitative distinction between Tizon Brown Ware and Lower Colorado Buff Ware. The study concluded that Brown Ware was locally produced while Buff Ware was imported. Seymour and Warren (2004) examined proportions of Tizon Brown Ware and Lower Colorado Buff Ware present at sites in Joshua Tree National Park and noted correspondence of pottery types with approximate boundaries of territories occupied by ethnohistorically known native peoples (that is, Cahuilla, Serrano, Chemehuevi).

Davis (1961) and Sample (1950) note that a considerable degree of historic-period trade between Native Americans occurred within and across the Colorado Desert. Trade networks across the Colorado Desert extended to the Yokuts and Chumash. Native peoples living along the Colorado River received and reciprocated goods from many groups living to the west.

Historic Landscapes

In the Colorado Desert, trails, cairns, geoglyphs, cleared circles, rock rings, other desert pavement features, rock art sites, and artifact scatters appear to be elements of prehistoric-ethnohistoric cultural landscapes (Schaefer and Laylander 2007, pp. 254–255; Cleland and Apple 2003). Specific localities include the Pilot Knob Complex, the rock art complex at Palo Verde Point, the Ripley Locality, and the Quien Sabe-Big Maria complex. Lower Colorado River geoglyph and rock art sites may represent prehistoric ceremonial centers, located along a route extending between sacred places, representing the cosmology and iconography of Yuman peoples (Altschul and Ezzo 1995; Cleland 2005; Ezzo and Altschul 1993; Gregory 2005; Hedges 2005; Johnson 1985, 2003; Woods et al. 1986).

Trails

During late prehistoric and ethnohistoric times, an extensive network of Native American trails was present in the Colorado Desert and environs (Heizer 1978; Cleland 2007; Sample 1950, p. 23; Apple 2005; Earle 2005; McCarthy 1993a; Melmed and Apple 2009; Von Werlhof 1986). Segments of many trails are still visible, connecting various important natural and cultural elements of landscape, for example, these trails are often marked by votive stone piles (cairns) and ceramic sherd scatters (pot drops).

A late prehistoric-early historic Native American trail has been reported traversing roughly east/west through the Chuckwalla Valley (Johnson and Johnstone 1957, map 1). Johnson (1980, p. 89-93, fig. 1) identifies this route as part of the Halchedhoma Trail (recorded as CA-Riv-53T) running from San Bernardino through San Gorgonio Pass to the Colorado River at present day Palo Verde Valley. In the vicinity of the Chuckwalla Valley, the trail proceeded roughly east-northeast from Hayfield Dry Lake past the future site of Desert Center to Gruendike Well. From there it went east, south of Palen Dry Lake to Sidewinder Well, then turned east, north of Ford Lake to McCoy Spring. It then headed south, around the south end of the McCoy Mountains, before going northeast towards the Colorado River. Work by McCarthy (1993a, Fig. 10) suggests that offshoots of this trail may have crossed the GSEP site footprint leading to Ford Dry Lake and points to the south and west.

Geoglyphs

Geoglyphs were constructed on desert pavements by rearranging and/or clearing pebbles and rocks to form alignments, clearings, and/or figures (Arnold et al. 2002; Gilreath 2007, pp. 288–289; Solari and Johnson 1982). These rock alignments (Harner 1953) occur throughout the deserts of southeast California and adjacent portions of southern Nevada and western Arizona. Rock alignments are present throughout this region, including two recorded along the western foot of the McCoy Mountains (McCarthy 1993a and b). Representational figures have only been noted in close proximity to the Lower Colorado River.

In the Mojave Desert, large rock alignments are found in Panamint Valley, Death Valley, Eureka Valley, and the Owens River Valley (Davis and Winslow 1965; Gilreath 2007, pp. 288–289; von Werlhof 1987). They have been interpreted as resulting from group ritual(s) (von Werlhof 1987).

Many appear characterized by multiple-use episodes, with portions added through the years as part of ongoing rituals/ceremonies.

Colorado River geoglyphs include the Topock Maze (Rogers 1929) and a few dozen giant ground figures (Harner 1953; Setzler and Marshall 1952), often first observed from the air. During historic times, the Topock Maze was used by Yuman peoples for spiritual cleansing.

Johnson (1985, 2003), von Werlhof (2004), and Whitley (2000) relate the geoglyphs to Yuman cosmology, origin myths, and religion. Cation ratio dating[5] of desert varnish has provided estimated ages of approximately 1200–1000 BC for the Colorado geoglyphs (Dorn et al. 1992; Schaefer 1994, p. 63; von Werlhof 1995), although use of the technique remains controversial (Gilreath 2007, p. 289).

Von Werlhof (1995, 2004) relates these sites to the Yuman creation story. They also may have functioned as focal points for shamanistic activities, vision quests, curing, and group rituals/ceremonies. Symbolic activities also were represented by intentional pot drop distributions along trails near water sources. The importance to Native Americans of water sources for survival during long-distance trips and seasonal rounds is obvious. Water sources also manifested significant spiritual values and often were associated with major rock art complexes (McCarthy 1993a and b; Schaefer 1992).

Ethnographic Background

Currently, it is unclear which historic Native American group or groups occupied or used the region in which the proposed GSEP site is located, but the Chemehuevi, Serrano, Cahuilla, Mojave, Quechan, Maricopa, and Halchidhoma are the most likely.

Singer (1984, pp. 36–38) concluded the Chuckwalla Valley was not clearly assigned to any Native American group on maps depicting group territories. Following Johnson and Johnston (1957), he observed that the west end of the Chuckwalla Valley was near the intersecting boundaries of Cahuilla-Serrano-Chemehuevi territory. Possibly before 800 BC, the Chemehuevi may have expanded into Serrano territory, occupying the Chuckwalla Valley. No evidence suggested that the Cahuilla occupied the area. Given its east-west orientation and location, however, the Chuckwalla Valley may have been neutral territory, occupied by no Native American group in particular, which served as an east-west trade and travel route.

The Cahuilla

A wealth of information exists regarding traditional and historic Cahuilla society and culture (see Bean and Lawton 1967 for a comprehensive bibliography of sources). Primary sources for the Cahuilla include Bean (1972; 1978), Bean and Saubel (1972), Drucker (1937), Gifford (1918), Hooper (1920), James (1960), Kroeber (1908; 1925, pp. 692–708), and Strong (1929, pp. 36–

5 Cation ratios between weathered rock varnish and unweathered rock are used as a relative dating technique to roughly determine the age of prehistoric rock carvings (petroglyphs). The quantity of positively-charged ions within the varnish (a chemically-changed layer built up of calcium and potassium leachate over time) is compared to those within the unweathered rock beneath the varnish.

182). The Cahuilla language, divided into Desert, Pass, and Mountain dialects, has been assigned to the Cupan subfamily of the Takic branch of the Uto-Aztecan linguistic family (Golla 2007; Moratto 1984; Shipley 1978; Munro 1990, p. 218).

Territory traditionally claimed by the Cahuilla was topographically complex, including mountain ranges, passes, canyons, valleys, and desert. Bean (1978:375) described it as, "…from the summit of the San Bernardino Mountains in the north to Borrego Springs and the Chocolate Mountains in the south, a portion of the Colorado Desert west of Orocopia Mountain to the east, and the San Jacinto Plain near Riverside and the eastern slopes of Palomar Mountain to the west." The natural boundaries of the desert, mountains, hills, and plains separated the Cahuilla from surrounding Native American groups. The Cahuilla interacted with surrounding peoples via intermarriage, ritual, trade, and war. The Cahuilla, Cupeno Gabrielino, Serrano, and Luiseño shared common cultural traditions, The neighboring Cupeno were closest linguistically to the Cahuilla.

Cahuilla villages usually were located in canyons or on alluvial fans near water and food patches. The area immediately around a village was owned in common by a lineage. Other lands were divided into tracts owned by clans, families, and individuals. Numerous sacred sites with rock art were associated with each village. Villages were connected by trail networks used for hunting, trading, and social visiting. Trading was a prevalent economic activity. Some Cahuilla were trading specialists. The Cahuilla went as far west as the Channel Islands and east to the Gila River to trade.

Hunting and meat processing were done by men. Game included deer, mountain sheep, pronghorn, rabbits, rodents, and birds. These were pursued by individuals and communal hunting groups. Blinds, pits, bows and arrows, throwing sticks, nets, snares, and traps were used to procure game. Communal hunts with fire drives sometimes occurred.

The Cahuilla had access to an immense variety of plant resources present within a diverse suite of habitats (Barrows 1900; Bean and Saubel 1972). Several hundred plant species were used for food, manufacture, and medicine. Acorns, mesquite and screw beans, pinyon nuts, and cactus fruits were the most important plant foods. They were supplemented by a host of seeds, tubers, roots, bulbs, fruits and berries, and greens. Corn, beans, squash, and melons were cultivated. Over 200 species of plants were used as medicines.

Structures varied in size from brush structures to dome-shaped or rectangular houses, 15–20 feet long, and ceremonial houses. The chief's house usually was the largest. Used for many social, ceremonial, and religious functions, it was located near a good water source. It generally was next to the ceremonial house, which was used for rituals, curing, and recreational activities. Other structures included a communal men's sweathouse and granaries.

Mortars and pestles, manos and metates, pottery, and baskets were used to process and prepare plant and animal foods. Cahuilla material culture included a variety of decorated and plain baskets; painted/incised pottery; bows, arrows, and other hunting-related equipment; clothing, sandals, and blankets; ceremonial and ritual costumes and regalia; and cordage, rope, and mats. Games and music were important social and ritual activities for the Cahuilla.

The Cahuilla had named clans, composed of 3–10 lineages, with distinct dialects, common genitors, and a founding lineage. Each lineage owned particular lands, stories, songs, and anecdotes. Each lineage occupied a village and controlled specific resource areas. Clan territory was jointly owned by all clan members. Territory ownership was established by marked boundaries (rock art, geographic features), and oral tradition. Most of a clan's territory was open to all Cahuilla. Kinship rules determined rights to assets and responsibilities within a lineage. Each lineage cooperated in defense, large-scale subsistence activities, and ritual performance. The founding lineage within a clan often owned the office of ceremonial leader, the ceremonial house, and sacred bundle. Artifacts and equipment used in rituals and subsistence was owned by individuals and could be sold or loaned.

The office of lineage leader usually passed from father to eldest son. He was responsible for correct performance of rituals, care of the sacred bundle, and maintenance of the ceremonial house. The lineage leader also determined when and where people could gather and hunt, administered first-fruits rites, and stored food and goods. He knew boundaries and ownership rights, resolving conflict with binding decisions. The lineage leader met with other lineage leaders concerning various issues. He was assisted in his duties by a hereditary official responsible for arranging details for performance of rituals. Other functionaries included song leaders/ceremonialists, assisted by singers and dancers.

Laws were enforced by ritual, stories, anecdotes, and direct action. Supernatural and direct sanctions were used. Tradition provided authority. The past was the referent for the present and future. Old age provided access to privilege, power, and honor. Reciprocity was a significant expectation. Doing things slowly, deliberatively, and thoughtfully was stressed. Integrity and dependability in personal relations were valued. Secrecy and caution were exercised in dealing with knowledge.

Disputes between Cahuilla villages usually arose over access to resources. Other causes included sorcery, personal insults, kidnapping of women, nonpayment of bride price, and theft. Armed conflict occurred after all other efforts to resolve things had failed. A lineage leader and/or skillful warrior lead a temporary war party. Community rituals were held before and after a fight, which usually involved ambush.

Ritual and ceremony were a constant factor in Cahuilla society. Some ceremonies were scheduled and routine, while others were sporadic and situational. The most important ceremonies were the annual mourning ceremony, the eagle ceremony, rites of passage (especially those associated with birth, naming, puberty, marriage), status changes of adults, and rituals directed towards subsistence resources. The main focus was upon performance of cosmologically-oriented song cycles, which placed the Cahuilla universe in perspective, reaffirming the relationship(s) of the Cahuilla to the sacred past, present, to one another, and to all things.

The Serrano

Sources for the Serrano include Bean and Smith (1978), Benedict (1924,1929), Drucker (1937), Gifford (1918), Johnson (1965), Kroeber (1925, pp. 615–619), and Strong (1929, pp. 5–35). The

Serrano shared many traits and artifacts with the Cahuilla, discussed above. The Serrano spoke a language belonging to the Serean Group of the Takic subfamily of the Uto-Aztecan family (Golla 2007; Moratto 1984; Shipley 1978).

It is nearly impossible to assign definite boundaries to Serrano territory. Territory traditionally claimed by the Serrano included the San Bernardino Mountains east of Cajon Pass, lands in the desert near Victorville, and territory extending east in the desert to Twenty-nine Palms and south to, and including, the Yucaipa Valley.

The Serrano occupied small village-hamlets located mainly in the foothills near water sources. Others were at higher elevations in coniferous forest, or in the desert. The availability of water was a critical determinant of the nature, duration, and distribution of Serrano settlements.

Women gathered, and men hunted and occasionally fished. Topography, elevations, and biota present within the Serrano territory varied greatly. Primary plant foods varied with locality. In the foothills, they included acorns and pinyon nuts. In the desert, honey mesquite, pinyon, yucca roots, and cactus fruits were staples. In both areas they were supplemented by a variety of roots, bulbs, shoots, and seeds, especially chia. Among primary game animals were deer, mountain sheep, pronghorn, rabbits, rodents, and quail. Large game was hunted with bows and arrows. Small game was taken with throwing sticks, traps, snares, and deadfalls. Meat was cooked in earth ovens. Meat and plant foods were parched or boiled in baskets. Plant foods were ground, pounded, or pulverized in mortars and pestles or with manos and metates. Processed meat and plant foods were dried and stored. Occasional communal deer and rabbit hunts were held. Communal acorn, pine nut, and mesquite gathering expeditions took place. These communal activities involved several lineages under a lineage leader’s authority.

Serrano houses were circular, domed, individual family dwellings, with willow frames and tule thatching. They were occupied by a husband and wife along with their children, and often other kin. Houses were mainly used for sleeping and storage. Most daily activities occurred outside, often in the shade of a ramada (a flat-roofed, open-sided shade structure) or other sun cover.

Settlements usually had a large ceremonial house where the lineage leader and his family lived. It was the social and religious center for each lineage/lineage set. The latter was two or more lineages linked by marriage, economic reciprocity, and ritual participation. Other structures included semi-subterranean, earth-covered sweathouses located near water, and granaries.

Serrano material culture was very similar to that of the Cahuilla. Stone, wood, bone, plant fibers, and shell were used to make a variety of artifacts. These included highly decorated baskets, pottery, rabbit skin blankets, bone awls, bows and arrows, arrowshaft straighteners, fire drills, stone pipes, musical instruments, feathered costumes, mats, bags, storage pouches, cordage, and nets.

The clan was the largest autonomous landholding and political unit. No pan-tribal union between clans existed. Clans were aligned through economic, marital, and ceremonial reciprocity. Serrano clans often were allied with Cahuilla clans and Chemehuevi groups. The core of a clan was the linage. A lineage included all men recognizing descent from a common ancestor, their wives, and their descendants. Serrano lineages were autonomous and localized, each occupying and using defined, favored territories. A lineage rarely claimed territory at a distance from its home base.

The head of a clan was a ceremonial and religious leader. He also determined where and when people could hunt and gather. Clan leadership was passed down from father to son. The clan leader was assisted by a hereditary ceremonial official, from a different clan. This official held ceremonial paraphernalia (the sacred bundle), notified people about ceremonies, and handled ceremonial logistics.

Serrano shamans were primarily healers who acquired their powers through dreaming. A shaman cured illness by sucking it out of the sick person and by the administration of herbal medicines. Various phases of an individual's' life cycle were occasions for ceremonies. After a woman gave birth, the mother and baby were "roasted," and a feast held. Differing puberty ceremonies were held for boys (*datura* ingestion used in a structured ceremonial vision quest) and girls ("pit roasting," ingestion of bitter herbs, dietary restrictions, instruction on how to be good wives). The dead were cremated, and a memorial service was held. During the annual seven-day mourning ceremony, the sacred bundle was displayed, the eagle-killing ceremony took place, a naming ceremony for all those born during the preceding year was held, images were made and burned of those who had died in the previous year, and the eagle dance was performed.

The Chemehuevi

Sources for the Chemehuevi include Drucker (1937), Kelly (1934; 1936), Kelly and Fowler (1986), Kroeber (1925, pp. 593–600), Miller and Miller (1967), and Roth (1976; 1977). Carobeth Laird married a Chemehuevi and collected a large corpus of data, primarily on ritual, religion, and myth (Laird 1974a; 1974b; 1975a; 1975b; 1976; 1977a; 1977b; 1977c; 1978a; 1978b; 1984). The Chemehuevi spoke a language belonging to the Southern Group of the Numic subfamily of the Uto-Aztecan family (Golla 2007; Moratto 1984; Shipley 1978). Many traits characterizing Chemehuevi culture are very similar or identical to those of the Mohave, discussed below. The Chemehuevi also shared several traits with the Quechan.

For the territory traditionally claimed by the Chemehuevi, the Colorado River formed the eastern boundary south to the Palo Verde Mountains. The boundary then ran northwest, passing east of the Ironwood Mountains, crossing the Maria Mountains, paralleling the Iron Mountains, and then running between Old Woman Mountain and Cadiz Dry Lake (Kelly 1934; Kelly and Fowler 1986, p. 369, fig. 1). Mohave territory lay to the northeast, and that of the Las Vegas group of Southern Paiute to the north-northwest.

The Chemehuevi lacked any form of overall "tribal" organization. Anthropologists refer to territorial subdivisions among the Chemehuevi as "bands." Each band was composed of a small number of camps/communities/villages. Bands most likely correspond to economic clusters (Kelly 1964). Each group was a geographic unit, associated with a definite territory. In general, each band was economically self-sufficient.

In general, Chemehuevi settlement was mobile and scattered, with residence recurring within a fixed area. Houses were closely grouped. Their occupants usually were related by blood or marriage. Settlement size ranged from 1–2 households to 10–20. Springs often were inherited private property. Married siblings often camped at the same spring.

The Chemehuevi traveled widely. They had amicable contact with the Serrano, Cahuilla, Quechan/Yumans, and other Native American groups. The Chemehuevi sometimes joined with the Mohave/Quechan to fight the Cocopa/Halchidhoma. The Chemehuevi often crossed the Colorado River and hunted deer in Quechan, Yavapai, and Western Walapai territory. They also traded, intermarried, and competed in games with the Yavapai. To the west, the Chemehuevi hunted in the Tehachapi area and went to the Pacific Coast along the Santa Barbara Channel to get abalone shell. Sometimes, a party of 8–10 Chemehuevi men joined men from neighboring groups to make a two-month journey to the Hopi villages (in what is now New Mexico) to trade.

The Chemehuevi apparently did not eat fish, but bighorn sheep, deer, pronghorn antelope, and desert tortoise were among the animal food resources they used (Kelly and Fowler 1986, p. 369). Plant foods in this region included pinyon nuts and mescal. Men inherited rights to hunt large game within certain tracts, defined in songs using geographic references. Women gathered a great variety of plant foods, which were more important in the Chemehuevi diet than game. In addition to pinyon nuts and mescal, agave and seeds were staples. Along the Colorado River, the Chemehuevi practiced floodplain agriculture. They grew corn, squash, gourds, beans, sunflowers, amaranth, winter wheat, grasses, and devil’s claw using techniques similar to Mohave agricultural practices (see below).

Chemehuevi winter houses were conical/subconical structures. They also built earth-covered houses without a front wall, similar to those constructed by the Mohave. During the summer, many Chemehuevi lived outside, often building and occupying armadas and windbreaks.

With respect to material culture, Chemehuevi baskets and cradles were made from plant fibers. Plant fibers also provided materials for rope, string, and cordage nets. Pottery, which followed Mohave patterns and styles, included cooking pots, water jars, seed germination and storage pots, spoons/scoops, and large pots for ferrying children across the Colorado River. Watercraft included log rafts and reed balsas. Clothing consisted of double skin or fiber aprons and sandals for men and women. The Chemehuevi commonly had pierced ears and wore body paint.

Monogamy was the commonest form of marriage among the Chemehuevi, but some men had more than one wife. Women gave birth in a special enclosure, followed by a 30-day period of seclusion for mother, father, and child. Puberty rites for boys and girls were held, with the former focused on acquisition of hunting skills. Cremation of the dead was traditional, replaced by in-ground burial in the historic period.

In general, no central political control existed. Territorial boundaries were not rigid, and some bands were named, while others were not. The basic social and economic unit was the nuclear family and could include other close kin. Groups of individual households moved together on hunting and gathering trips, returning to the same spring or agricultural site. Most large bands had a headman whose leadership was more advisory than authoritative. He was usually succeeded by his eldest son.

The principal role of Chemehuevi shamans was curing illness. They acquired their healing powers through dreams rather than through the use of *datura* or a trance. Chemehuevi families held a mourning ceremony (“cry”), with which several speeches and songs were associated, within the year after the death of a relative. The “cry” was sponsored by the family and included the ceremonial burning of material goods.

The Chemehuevi had deer and mountain sheep song-dances, held for entertainment and hunting success. The Chemehuevi had other songs, as well: bird, salt, quail, and funeral songs. During winter evenings, men narrated a rich body of traditional stories and myths. These performances often included mimicry, song, and audience participation. Oral tradition related people to social norms, their territories, and to the subsistence resources present within them.

The Mohave

Information regarding the traditional lifeways of the Mohave has mainly been drawn from the accounts of early explorers and/or fur trappers who were among the first to encounter native groups, as well as from the later ethnographic accounts of anthropologists, usually well after the influences of Euro-American contact had begun to alter traditional ways of life. The following summary derives mainly from Kroeber (1925) and Stewart (1983a, 1983b).

The name Mohave is a variation on the name Hamakhava, which is what the tribal people called themselves (Kroeber 1925, p. 727). The Mohave language is classified into the Yuman subfamily of the Hokan language family. The Mohave were the northernmost and largest tribe of the River and Delta Yumans, who comprised a series of agricultural tribes that occupied the lower Colorado and Gila Rivers. The traditional ethnographic territory attributed to the Mohave includes the Mojave, Chemehuevi, and Colorado River Valleys along the lower Colorado River at the intersection of the borders of Arizona, Nevada, and California. In pre-contact times, Mohave tribal settlement is reported to have centered in the Mohave Valley where their population densities were observed to be the greatest (Stewart 1983b, p. 55).

The Colorado River served as something of an oasis in the otherwise harsh, dry environment that surrounded the river valleys. The spring overflow of the river, which spread gently over the bottomlands, left behind a rich silt deposit in its recession. It is within these bottomlands that the Mohave cultivated crops, which served as the foundation of their subsistence economy. Their agricultural methods were relatively simple, consisting of planting seeds on the richly silted floodplains and allowing their crops to mature with a minimum of maintenance or effort. Corn was the primary crop, but several varieties of tepary beans, pumpkins, melons, and other plants were also grown. Once harvested, the portions of the harvest that were not immediately consumed were dried in the sun and stored in large basketry granaries. The Mohave supplemented their diet mainly by gathering wild plants and by fishing, which served as their principle source of flesh non-plant food. Hunting played a minor role in the Mohave subsistence economy (Stewart 1983b, pp. 56–59).

Technology of the Mohave was relatively simple, and tools were reported to have been crafted to meet only the minimum requirements of utility (Stewart 1983b, p. 59). According to Kroeber (1925, p. 736), the farming implements consisted of only two items: a heavy wooden staff or digging stick for planting and a spatulate wooden hoe-like implement, whose square edge was pushed flat over the ground to control weeds. Metates, consisting of a rectangular block of stone, were used for grinding corn, wheat, and beans, and both stone and wooden pestles, as well as stone mortars, were also used for food processing (Kroeber 1925, pp. 736–737). Fish were commonly taken with seines, large basketry scoops, sieves, dip nets, and weirs. The bow and arrow and cactus-spine fish hooks were also used for fishing. Mojave basketry was crudely woven, and their pottery was basic and utilitarian (Stewart 1983b, p. 59). Since hunting was of relatively little significance to the Mohave, hunting devices and techniques were not well developed, consisting mainly of snares, nets, bow and arrow, or curved throwing sticks (Stewart 1983b, pp. 59–61).

Mohave political and social organization was very informal, and no one individual or group had significant authority over another. Despite the Mohave's loose division into bands or local groups that were spread out over great distances, their cohesion as a tribe was very strong, and they considered themselves as one people occupying a nation with a well-defined territory (Stewart 1983a, 1983b).

The nuclear family was the basic unit of economic and social cooperation, although the extended family constituted the core of a settlement. Rather than large centralized villages, Mohave settlements were widely distributed along the riverbanks in close proximity to arable lands. Houses were situated on low rises above the floodplain and often separated by as much as a mile or two (Stewart 1983b, p. 57). During most of the year, the Mohave slept under ramadas; however, during the colder season, they occupied more substantial, semi-subterranean, rectangular earth-covered houses.

Warfare was a dominant strain in River Yuman culture, and the Mohave's strong tribal unity served them well in times of warfare. They apparently traveled great distances to do battle, and their principle weapons were bows and arrows and hard wood clubs. According to Kroeber (1925, p. 727), their main motivation was sheer curiosity, as they liked to see other lands and were eager to know the manners of other peoples, but were not heavily interested in trade.

The Mohave were culturally similar to the other River and Delta Yumans: the Quechan, Halichidhoma, Maricopa, and Cocopa. During ethnographic times, the Quechan were considered friends and allies of the Mohave, while the Halchidhoma, Maricopa, and Cocopa were considered to be enemies with whom the Mohave engaged in warfare (Stewart 1983b, p. 56). The Mohave were also friendly with the Upland Yuman tribes of the Yavapai and Walapai of western Arizona, although relations with the Walapai were somewhat mixed.

One of the most important rituals observed by the Mohave centered on death, namely the funeral and subsequent commemorative mourning ceremony. As soon as possible after death, the deceased was cremated upon a funeral pyre along with all of his or her possessions. The house and granary of the deceased were also burned. It was believed that by burning, these things would be transmitted to the land of the dead along with the soul of the deceased (Stewart 1983b, pp. 65-67).

Due to their relatively remote location inland, the Mohave maintained their independence throughout the Spanish period of the sixteenth and seventeenth centuries and were only rarely visited by explorers during that time. The few Spanish accounts of encounters with the Mohave provided similar descriptions of Mohave lifeways as those reported later by ethnographers. It is believed that the ancestors of the Mojave resided in the area for at least 1000 years and the mode of life in prehistoric times is thought to be similar to that observed historically (Stewart 1983b, p. 56).

The Quechan/Yuma

The following summary of the Quechan or Yuma is derived mainly from Bee (1983), Kroeber (1925), and Stewart (1983a).

Quechan is a variation on the names Kwichyan or Kuchiana, which are the names the tribe called themselves, but this group is also commonly known as the Yuma. The Quechan are among the Yuman-speaking tribes who occupied the lower Colorado River where it forms the boundary between California and Arizona. According to Kroeber (1925, p. 782), the Quechan and their neighbors to the north, the Mohave, appear to be virtually identical in terms of their agriculture, manufactures, clothing, hair styles, houses, warfare, and sense of tribal unity.

The ethnographic territory traditionally associated with the Quechan, now divided between the states of California and Arizona, is centered around the confluence of the Colorado and the Gila Rivers, extending several miles north and south along the Colorado and east along the Gila. Quechan legend tells of a southward migration of their ancestors from a sacred mountain; however, it is not known when the ancestors of the Quechan first settled near the confluence (Bee 1983, p. 86). No group of this name was mentioned in the account of Hernando de Alarcón when he passed through the area during an expedition in 1540, and the first reference to this group did not appear in Spanish documents until the late seventeenth century, at which time they were settled around the river confluence area (Bee 1983, p. 86).

In an environment otherwise surrounded by dry desert terrain, the subsistence economy of the Quechan focused on riverine agriculture, which was one of the main sources of food for the tribe. Crops were cultivated in the richly silted river bottomlands following the recession of the spring floods and provided a relatively high yield in exchange for relatively low labor output (Bee 1983, pp. 86–87). The main cultivated crops included corn, tepary beans, pumpkins, and gourds. In post-contact times, watermelons, black-eyed peas, muskmelons, and wheat were introduced by Europeans and brought into cultivation by the Quechan, as well. The Quechan also relied on the gathering of wild foods, the most important of which were mesquite and screw-bean pods, although a variety of other wild plants were also collected (Bee 1983, p. 87; Castetter and Bell 1951, pp. 187–188). Fishing was of minor importance, as there were few species in the lower Colorado River suitable for eating. Among the fish sought were the humpback, white salmon, and boneytail, which were sometimes caught with unfeathered arrows or cactus-spine hooks, but more often taken with traps and nets during floods (Forde 1931, pp. 107–120). Given the low incidence of game available in the area, hunting played a minor role in the overall subsistence economy (Bee 1983, p. 86).

Like the Mohave, Quechan tribal settlements, or rancherias, consisted of extended family groups that were widely dispersed along the riverbanks. Settlements shifted throughout the year, dispersing into smaller groups along the bottomlands during the spring and summer farming seasons and reconvening into larger groups on higher ground, away from the river, during the winter and spring flood periods (Bee 1983, pp. 87–88). The geographic dispersion of the households within the rancheria groups was closely correlated with the condition of the rivers and the technology of riverine agriculture (Bee 1983, p. 89). The warm climate and scant precipitation made substantial housing unnecessary for most of the year, so most people made use of ramadas or dome-shaped arrowweed shelters. Each rancheria typically had one or two large, earth-covered shelters for the rancheria leaders' families, but these shelters also accommodated small crowds during colder weather (Forde 1931, p. 122).

Much like the Mohave, Quechan technology lacked technical or decorative elaboration beyond the demands of minimal utility (Bee 1983, p. 89). Quechan bows did not feature "backed" construction and so lacked power, and their arrows were frequently untipped, so the bow and arrow's range was short and the penetrating power weak. Sharpened staffs served as digging sticks or, when cut in longer lengths, as weapons (Bee 1983, p. 89).

In terms of property, there were no marked gradations in wealth, and social pressure favored the sharing of one's abundance with others who were less fortunate. Land ownership was informal, and people did not show much interest in the accumulation of material goods beyond the immediate needs of the family group or the surplus maintained by local leaders for redistribution to needy families within their rancheria (Bee 1983, p. 89). Lands were not inherited by family members upon the death of an individual; rather, the lands of the deceased were abandoned, and replacement plots were sought by the family members.

Despite the wide distribution of settlements, the Quechan had a strong sense of tribal unity. As with their neighbors and allies, the Mohave, warfare played a major role in Quechan culture, and it was during times of warfare that tribal unity was most prevalent among the individual settlements (Bee 1983, p. 92). Their major enemies were the Cocopa and the Maricopa, and they often allied themselves with the Mohave in strikes against common enemies (Bee 1983, p. 93). Bee (1983, p. 93) suggests that warfare among the riverine peoples may have increased in scale and intensity during the eighteenth and early nineteenth centuries due to new economic incentives, such as the opportunity to trade captives to the Spaniards or to other tribes for horses or goods.

Quechan social and political organization, like that of the Mohave, appears to have been very informal, with no one individual or group having significant authority over others. Two types of tribal leadership have been reported for the Quechan, one for civil affairs and the other for war, but it is questionable how influential these leadership roles may have been. Each rancheria had one or more headmen, but their authority was contingent upon public support and continued demonstration of competence. According to Bee (1983, p. 92), important matters at either the tribal or the rancheria level were always decided by consensus, sometimes after long debates dominated by the better and more forceful speaker.

Another important aspect of Quechan society that was shared with the Mohave concerns the commemoration of the dead, which was an elaborate ceremony involving wailing and the destruction of property and ritual paraphernalia. All possessions of the deceased, including the family home, were destroyed or given away (Bee 1983, pp. 89, 93–94).

The Maricopa and the Halchidhoma

Ethnographic information for the Maricopa and Halchidhoma is meager in comparison to the Mohave and the Quechan. The following brief summary is derived from Harwell and Kelly (1983) and Stewart (1983a).

The Halchidhoma first entered written history in the early seventeenth century with the account of Juan de Oñate, who encountered the “Alebdoma” or “Halchedoma” during a Spanish expedition on the lower Colorado River, below its junction with the Gila River. When later encountered by missionary-explorer Eusebio Francisco Kino in the early eighteenth century, the Halchidhoma (or “Alchedoma,” as they were referred to by Kino) had moved farther north up the Colorado beyond the Gila. The traditional territory attributed to the Halchidhoma lay along the lower Colorado between the Mohave and the Quechan territories. They were later driven from that area under pressure from their hostile Mohave and Quechan neighbors and moved to the middle Gila River area, where some merged with the Maricopa (Stewart 1983a).

The term Maricopa refers to the Yuman-speaking groups who in the early nineteenth century occupied the area along or near the Gila River and its tributaries (in what is now southern Arizona), but who earlier had occupied the lower Colorado River area. The Maricopa language is closely related to Quechan and Mohave, all three of which are classified as members of the River branch of the Yuman language family (Harwell and Kelly 1983, p. 71). The Maricopa call themselves *pi•pa•s*, “the people.” The name Maricopa is an English abbreviation of the name Cocomaricopa, first used by Eusebio Kino in the late seventeenth century (Harwell and Kelly 1983, p. 83).

The Maricopa, who by the early nineteenth century included remnant tribes of the Halyikwamai, Kahwan, Halchidhoma, and Kavelchadom, share common origins and are culturally similar to both the Quechan and the Mohave, the most prominent traits of which included floodwater agriculture and cremation of the dead. Their material culture was also essentially the same (Harwell and Kelly 1983, p. 71). The Colorado River Maricopa lived in low, rectangular, earth-covered houses, but the Maricopa of the Gila River had adopted the round houses of their Piman neighbors. Technology was of little interest to the River Yumans and remained at a low level of development (Stewart 1983a).

Historical Background

The Mojave Desert area, in which the GSEP is located, has remained one of the more sparsely populated regions of the American West. The harsh arid environment and paucity of natural water supply has presented a challenge to the development of trans-desert routes for the movement of people and goods, to the exploitation of resources in the area, and to the establishment of permanent settlement. The major historical themes for the Mojave Desert region and GSEP vicinity, in particular, are centered on the establishment of transportation routes, water access, mineral exploitation, and military uses. The following brief historical background of the Mojave Desert area in eastern Riverside County is derived from the following sources: Bischoff (2000); Castillo (1978); Farmer et al. (2009); GSEP (2009a); von Till Warren et al. (1980); and WESTEC (1982).

The earliest recorded history of the lower Colorado River region began with the expeditions of Spanish explorers, who were lured by rumors of a rich northern Indian civilization. However, due to the Spaniards' failure to find the fabled northern treasures and the remoteness of the region, the Mojave Desert was seldom visited during the Spanish and Mexican periods.

The desert region has produced a variety of mineral deposits, including gold, silver, fluorite, manganese, copper, gypsum, iron and uranium. The 1880s and 1890s were years of relative prosperity for mining regions of eastern Riverside County, and intermittent mining activity has occurred in the area since that time. Early mining activities played a significant role in stimulating early occupation and travel across the arid desert. Following the end of the Mexican period in 1848 and the onset of the California Gold Rush in 1849, a flood of gold-seeking emigrants began to pour into California, many of whom were unprepared and suffered extreme hardships during the overland trek through the desert.

One of the earliest major trans-desert trail/wagon routes established in the vicinity of the GSEP was known as Frink's Route. Frink's Route was established in the mid nineteenth century (prior to 1856), connecting southern California supply points with mines and outposts along the Colorado River. Frink's route appears to have passed south of the GSEP site footprint. Another important stage route was the Bradshaw Trail, an overland stage route pioneered by William Bradshaw in 1862. It began in San Bernardino and passed through San Gorgonio Pass, Palm Springs, and the north shore of the Salton Sea before reaching the Colorado River near Blythe. This route followed traditional Indian trails and was used between 1862 and 1877 to haul miners and other passengers to the gold fields at La Paz, Arizona (now Ehrenberg). Wiley's Well Road, which intersects the GSEP linear facilities corridor, was an offshoot of the Bradshaw Trail. The construction and expansion of the Southern Pacific Railroad between Phoenix and Los Angeles by way of Yuma in the late 1870s also brought travelers and supplies to more remote areas, enabling further development of mines and irrigation.

Around the turn of the last century gypsum was found in the McCoy Mountains. A mining town, Midland, was established here. From 1925 to the 1960s, Midland was a company town owned by the U.S. Gypsum Co. The company had harvested vast amounts of gypsum found in the area. At its peak, the town had a population of approximately 1,000. The Arizona and California Railway, built between 1903 and 1907, was a 50 mile spur rail route connecting Blythe and Midland to the main Santa Fe Railway line at the town of Rice. There were daily trains along this line until the late 1930s. Midland was a thriving mining town until the 1960s when it was entirely abandoned.

Automobile travel across and within the Colorado Desert area first developed using existing wagon roads. By the early twentieth century, the automobile became the preferred means of transportation, and in 1916, Congress approved an Act to identify safe travel routes and ensure protection of available water within the least documented regions of the desert (Brown 1920). The Mecca-Blythe-Ehrenberg route, which approximates the current Interstate 10, is one such route identified under the Act and is located near the southern GSEP boundary. Travelers along these routes relied on natural water sources such as McCoy Spring and wells excavated by wagon road users. Most of the wells in eastern Riverside County were excavated by early prospectors and/or landowners and were often named for the men who dug them. Among the early known wells near the GSEP site footprint and linear facilities corridor include the Hopkins Well, Wiley's Well, and the Ford Well, which appear on the 1920 USGS Water Supply Paper Map, south of the GSEP limits. Portions of Wiley's Well Road, where it passes near McCoy Spring, may have been improved in the 1940s and 1950s to provide access to Midland after rail service ceased.

The GSEP site footprint and linear facilities corridor falls within the limits of Gen. Patton's World War II Desert Training Center/California-Arizona Maneuver Area (DTC/C-AMA), which was in operation from 1942-1944. The area was chosen by Gen. George S. Patton, Jr. to prepare troops for the harsh conditions and environment of combat for the North Africa Campaign. At 12,000,000 acres, the DTC/C-AMA was the largest-ever military training center, stretching from west of Pomona, California, to Yuma, Arizona, and north into Nevada. The valley bordered by the Palen, Little Maria, and McCoy Mountains is considered one of the most extensive maneuver areas in the DTC/C-AMA. After two years in operation and the training of one million troops, the DTC/C-AMA was closed in 1944 as a result of the allied victory in North Africa and the need for trained troops elsewhere. Following the closure of the DTC/C-AMA dismantling and salvage efforts began and the land was ultimately returned to private and government holdings (Bischoff 2000). The remains of the DTC/C-AMA areas consist of rock features, faint roads, structural features, concertina wire, tank tracks, footprints of runway and landing strips, foxholes and bivouacs, concrete defensive positions, refuse, and trails.

Cultural Resources Inventory

This subsection describes the research methods used for each phase and provides the results of the research, including literature and records searches of the California Historical Resources Information System (CHRIS) and local records, archival research, Native American consultation, and field investigations.

Background Inventory Research

A Class I inventory of the proposed GSEP was conducted to compile information on known cultural resources and previously conducted cultural resources studies pertinent to the location of the proposed GSEP location. These records include individual site forms for known archaeological sites and built-environment resources as well as survey and excavation reports from previous investigations. The primary source for the GSEP is the Eastern Information Center (EIC) of the CHRIS, at the Department of Anthropology, University of California, Riverside. The EIC staff conducted a literature and records search of the GSEP site footprint and vicinity (Farmer et al. 2009, p. 46). The search covered the areas proposed for the main GSEP components and the linear facilities corridor with a 1.5-mile buffer. In addition, the EIC staff searched the following resources:

National Register of Historic Places (NHRP);
California Register of Historical Resources (CRHR);
California State Historical Landmarks;
California Points of Historical Interest;
California Inventory of Historic Resources; and
BLM cultural Areas of Critical Environmental Concern (ACEC).

CHRIS Records Search Results

The CHRIS literature and records search identified 30 previous cultural resources investigations within the search area (see Appendix D, Table D1). This included 22 surveys, 6 literature reviews, 1 set of miscellaneous field notes from the region, and 1 project whose nature is undefined. In their review, EIC staff found that 11 of these overlapped with the GSEP archaeological and built-environment Areas of Potential Effect (APEs). Parts of three investigations took place on the GSEP site. The first investigation (IC Report No. RI-220) was an intensive linear survey that cut a 123-meter corridor from southeast to northwest through much of the GSEP site. The second investigation (IC Report No. RI-1249) was a sample survey sponsored by the BLM that covered approximately 64 acres or 4 percent of the 1,800-acre GSEP site. The third survey was part of an earlier stage of the GSEP (Farmer et al. 2009). This BLM Class II survey covered a 20 percent random sample of 1,896 acres, including 520 acres within the proposed GSEP site footprint and linear facilities corridor. After these three projects, approximately 68 percent of the GSEP site remained unsurveyed prior to the preparation for the GSEP. Seven additional surveys, associated with fiber optic lines, geothermal resources, transmission lines, highway improvements, and gas line installation (IC Report Nos. RI-01664, RI-02210, RI-03227, RI-04347, RI-07192, RI-1279, RI-00221), crossed the proposed APE for the GSEP linear alignment. These surveys covered roughly 25 percent of the 90-acre proposed linear facilities corridor (Farmer et al. 2009).

The most extensive previous research in the region was conducted by McCarthy (1993a). He and his volunteers recorded 227 sites along the western flank of the McCoy Mountains. Many of these sites and trails were directly associated with McCoy Spring, an arid-land oasis and major focus of prehistoric use in the region for several millennia. Only two of these sites (trail segments) were included in the CHRIS literature and records search, probably because they are located outside of the GSEP APEs.

In general the previous research in the Chuckwalla Valley suggests that prehistoric archaeological sites are typically located near water (specifically, near springs), on terraces near the shore of the dry lake bed, and in areas where natural resources were utilized. Prehistoric site types in the GSEP site footprint and vicinity include rock shelters, petroglyphs, special use sites, lithic scatters, temporary camps, gathering areas, sacred areas, trails, and isolated finds. Historical archaeological sites in the region are primarily associated with transportation, military maneuvers related to the DTC/C-AMA and Desert Strike, mining, and ranching. Historical archaeological site types for the area include road segments, wells, refuse scatters with domestic and/or military discards, tank tracks, and other isolates.

A total of 312 previously identified cultural resources and 79 isolated finds were identified in the CHRIS records search area (see Appendix D, Table D2). These figures include the results of the Tetra Tech Class II survey and McCarthy's (1993a) survey. Two-hundred and ninety-two of these resources were prehistoric sites and 14 were historic-period sites. Four sites had both prehistoric and historic-period components. Two sites have undetermined time periods. Sixty-nine prehistoric isolates were identified including 59 lithics, 4 ceramics, 4 ground stone, 1 isolate with both lithics and ceramics, and 1 unspecified prehistoric artifact. Ten historic-period isolates were identified during the literature search. They included 7 glass isolates, 2 cans, and 1 metal artifact. As is common practice in cultural resources management, isolated finds were eliminated from consideration.

A total of 9 of the 312 previously identified sites are within the GSEP plant site footprint or linear corridor. Five previously identified prehistoric sites fell within or near the boundary of the GSEP plant site footprint, including 1 large artifact scatter (CA-Riv-9084), three small lithic scatters (CA-Riv-9047, CA-Riv-9048, CA-Riv-9051), and one large temporary camp (CA-Riv-9072). All five of these sites were identified during the recent Tetra Tech Class II survey. Four previously identified sites fell within or near the GSEP linear corridor boundary. These sites include two large prehistoric temporary camps (CA-Riv-0260 and CA-Riv-0663), 1 small historic-era refuse scatter (P33-13598), and 1 medium-sized group of WWII-era foxholes and refuse (P33-13656).

Sites identified by McCarthy:

68 ceramic scatters
41 trail segments
32 artifact scatters
27 activity areas
22 isolates (mostly metates)
14 petroglyphs
6 temporary camps
3 isolated rock clusters
3 isolated rock rings
2 isolated cleared circles
2 geoglyphs
1 cairn
1 historic-period military camp and refuse scatter
2 unknown

Previously known single-component prehistoric sites (including those identified in Tetra Tech's Class II survey):

29 lithic scatters
18 artifact scatters
14 temporary camps
5 ceramic scatters
2 trail segments (also identified by McCarthy)

Previously known single-component historic-period sites (including those identified in Tetra Tech's Class II survey):

10 refuse scatters
1 refuse scatter with features
1 group of WWII era features
1 historic-period well
1 two-track road

Previously known multi-component sites (including those identified in Tetra Tech's Class II survey):

1 prehistoric temporary camp/historic refuse scatter
2 prehistoric artifact scatters/historic refuse scatters
1 prehistoric lithic scatter/historic refuse scatter

Other sites:

1 site that may be either prehistoric rock rings or WWII era foxholes
1 unknown site type

Additional important locations in the region include:

McCoy Spring National Register District (approximately 5 miles north of the proposed linear faculties corridor at Wiley's Rest Area);

Palen Dry Lake, BLM cultural Area of Critical Environmental Concern (adjacent);

North Chuckwalla Mountains Petroglyph District (approximately 10 miles)

Corn Springs, BLM cultural Area of Critical Environmental Concern (approximately 30 miles);

Alligator Rock, BLM cultural Area of Critical Environmental Concern (25 miles);

Camp Young-Desert Training Center, BLM cultural Area of Critical Environmental Concern and State Historical Landmark Riv-985, (marker in Desert Center);

Colorado River Aqueduct Contractor's General Hospital, State Historical Landmark Riv-922, marker in Desert Center); and

1877 Thomas Blythe Canal Intake, State Historical Landmark Riv-948, (marker in Blythe).

Archival and Library Research

Additional archival research on the history of the GSEP site footprint and vicinity was conducted at the BLM State Office Public Records Room where General Land Office (GLO) maps and surveyor field notes were reviewed (Farmer et al. 2009, p. 46). Additional sources of information consulted for built-environment resources (Farmer et al. 2009, app. F, p. 3-1)include:

County of Riverside Transportation Department and Land Management Agency;

Caltrans Bridge Inventory;

San Francisco Public Library;

Los Angeles Public Library;
BLM Palm Springs/South Coast Field Office;
American Automobile Association of Southern California's Archives, Los Angeles; and
On-line maps.

Local Agency and Organization Consultation

To identify the presence of any locally important cultural resources, the following organizations were contacted by mail or email:

City of Blythe Planning Department;
Riverside County Planning Department;
Coachella Valley Historical Society;
Coachella Valley Archaeological Society;
Colorado Desert Archaeology Society;
George S. Patton Memorial Museum;
Imperial County Historical Society Pioneers Museum;
Imperial Valley College Desert Museum;
Indio Chamber of Commerce;
Pioneer Historical Society of Riverside;
Twenty-nine Palms Historical Society; and
Palo Verde Historical Society and Museum.

The majority of these groups did not respond. The City of Blythe, Coachella Valley Archaeological Society, the Riverside County Planning Department, and the Twenty-nine Palms Historical Society all reported a lack of important cultural resources within or near the GSEP site footprint and linear facilities corridor and/or a lack of relevant information (Farmer et al. 2009, p. 46). Thus, no additional information on known cultural resources was obtained from these sources.

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist in identifying cultural resources of concern to California Native Americans. The NAHC's Sacred Lands database has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. The NAHC Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas.

The NAHC was contacted to obtain information on known cultural resources and traditional cultural properties, and to learn of any concerns Native Americans may have about the GSEP. In addition, the NAHC was requested to provide a list of Native Americans who have heritage ties to Riverside County and who want to be informed about new development projects there (Farmer et al. 2009, app. E). The NAHC responded, stating that the Sacred Lands File (SLF) database failed to indicate the presence of Native American cultural resources in the immediate GSEP vicinity. The NAHC also forwarded a list of Native American groups or individuals interested in development projects in Riverside County.

The BLM sent letters to 28 Indian Tribes, including those identified by the NAHC, inviting the Tribes into government-to-government consultation for the proposed GSEP. In addition the letter invited comments or concerns regarding potential impacts to cultural resources or areas of traditional cultural importance within the vicinity of the proposed GSEP. Subsequently, an additional letter was sent to the Agua Caliente Band of Indians and informational copies to 12 groups listed in Appendix D, Table D3, noting the Federal Register publication of the NOI for the proposed GSEP. The letter urged any concerned groups to also utilize the Section 106 process to provide comments or specific concerns.

No responses to the initial 2007 BLM letter were received by the time the final draft of the cultural resources technical report was prepared in November 2009 (Farmer et al. 2009, app. E). However the BLM reports a number of contacts and meetings between November 2007 and December 2009. The details of these contacts are provided in Appendix D, Cultural Resources Tables 3 and 4. A number of tribes—Agua Caliente Band of Cahuilla Indians, Morongo Band of Mission Indians, Cabazon Band of Mission Indians, Torres-Martinez Desert Cahuilla Indians, Pechanga Band of Luiseño Indians, Anza Cahuilla, Ramona Band of Mission Indians, Twentynine Palms Band of Mission Indians, and San Mañuel Band of Mission Indians—attended meetings with BLM staff about various solar energy and transmission line projects in the region. In general the tribes expressed concern over possible damage to cultural resources, cultural landscapes, and traditional cultural properties. In addition they expressed interest in receiving copies of archaeological reports after cultural resources surveys of the GSEP footprint and linear facilities corridors were complete and being informed about the amount of damage to these resources expected to take place. It is unclear which of these groups is specifically interested in GSEP, other than the three tribes discussed below.

Four tribes—the Quechan Tribe, the Agua Caliente Band of Cahuilla Indians, the Cabazon Band of Mission Indians, and the Chemehuevi Tribe—responded to BLM letters about GSEP. Originally, the Agua Caliente Band of Cahuilla Indians stated that they were not interested in consulting about GSEP as it is outside of tribal traditional use areas. More recently, however, they have participated in several meetings organized by the BLM and expressed concern. The Cabazon Band of Mission Indians and the Chemehuevi Reservation expressed general concerns about the potential destruction of cultural resources and traditional cultural properties.

The Quechan Tribe has expressed the most interest in GSEP, and has contacted BLM multiple times. Their concerns have been summarized in a formal letter written in response to the proposed Programmatic Environmental Impact Statement for Solar Energy Development for the six southwestern states. In this letter they consider the area around Blythe, presumably including the GSEP site footprint and linear facilities corridor, to be part of the Quechan Tribe's traditional land. To alleviate potential impacts to cultural resources, spiritual landscapes, or traditional cultural properties (TCPs) they request to be consulted at the inception of the project, prior to any plans being finalized. They further request that the clustering of these large several thousand-acre projects be prohibited, that traditional areas rich in cultural resources be avoided, that projects be placed on land that has already been disturbed, and that existing buildings be favored over undisturbed land for the placement of solar panels. Finally, they emphasize their concern over indirect as well as direct impacts to cultural resources. They request that BLM not “focus exclusively on archaeological site impacts, while failing to fully address impacts to resources such as cultural landscapes and TCPs” (Jackson 2009, p. 3). An additional letter from the Quechan Tribe was sent on February 16, 2010. In this letter President Jackson expresses doubt that the appropriate Section 106 consultation process can be completed within the “fast-track” timeframe that requires a final record-of-decision by September 2010. He further comments that the Tribe does not believe that the “fast-track” projects meet the regulatory criteria for the use of a Programmatic Agreement.

Californians for Renewable Energy (CARE) members expressed several concerns related to cultural resources. Alfredo Acosta Figueroa, a CARE member and member of the La Cuna de Aztlan Sacred Sites Protection Circle notes that the proposed GSEP will “despoil a portion of the desert wilderness” (CARE 2009a, p. 2), which is sacred to the Uto-Aztecan language speakers. Further, he mentions that solar energy projects in general are “antithetical to the sacred sites purpose and appear to be intended to essentially trap the Creator Quetzalcoatl as the deity descends at sun down” (CARE 2009a, p. 2). In particular CARE is concerned about damage to sacred petroglyph sites—one in the Palen Mountains and another at McCoy Spring National Register District—and the ancient trails that run between them. Knowledge of these sites is part of local traditional knowledge and has also been documented by archaeologists including Johnson and Johnstone (1957). According to the descriptions provided by Mr. Figueroa and by the archaeological maps, portions of several prehistoric trails potentially associated with McCoy Spring National Register District appear to pass near to or through the GSEP site footprint and linear facility corridor (McCarthy 1993a, Fig. 10).

Field Inventory Investigations

Six phases of fieldwork were employed to inventory the cultural resources in the GSEP site footprint and linear facilities corridor: two geoarchaeological studies, three intensive field inventories, and one built-environment survey. Class III fieldwork identified 148 new cultural resources.

Results of Class II and Class III Inventories

The archaeologists for the applicant have conducted four intensive pedestrian archaeological surveys of the proposed GSEP site footprint and linear facilities corridor. Class II survey covered 1,896 acres and Class III surveys covered 3,534.3 acres. In total the number of acres surveyed by Tetra Tech for the GSEP is 5,430.3.

The initial survey was a BLM Class II inventory, which was conducted to facilitate decision-making regarding the placement of the GSEP footprint. The results of this sample survey were included in the “CHRIS Results” subsection, above, because this information helped inform the boundaries of the Class III inventory area. During the Class II inventory, 20 percent of the original GSEP site footprint (9,480 acres) was surveyed. To identify locations to survey, this area was divided into 40-acre parcels along eighth-section lines. Forty-eight 40-acre parcels were then randomly selected from a total sample universe of 237 using a random numbers table. In total, 1,896 acres were surveyed.

The second survey was an intensive BLM Class III inventory of the 2,494-acre proposed GSEP facility plus a perimeter buffer of 200 feet. Sites that had been recorded in this area during the initial Class II inventory were briefly revisited during the Class III inventory and updated if necessary.

The third survey was an intensive BLM Class III inventory of the proposed linear facilities corridor. Survey coverage included the proposed linear alignment, plus 75 feet to either side of the center line of the routes. A total of 449.5 acres was surveyed.

The fourth pedestrian survey was an intensive BLM Class III inventory of a number of linear facilities corridor alternatives. Survey coverage included the corridor alternatives, plus 75 feet to either side of the center line of the routes. A total of 590.8 acres was surveyed.

During the second, third, and fourth intensive pedestrian archaeological surveys, 50 new cultural resources and 98 cultural isolates were found within 3,534.3 acres (Farmer et al. 2009). This total only includes sites found in the proposed GSEP facility footprint and linear facilities corridor (and alternatives) areas. Sites found during the Class II survey are discussed in the "CHRIS Results" subsection above. The newly identified archaeological sites consisted of 26 prehistoric, 20 historic-period, and 2 multi-component archaeological sites, and 2 built environment resources. This total includes site P33-17977, which was originally recorded as an isolate. The archaeological isolates consisted of 72 prehistoric items, primarily lithics, with occasional ground stone and ceramics. Twenty-six historic-period isolates were identified, mainly glass and metal. The prehistoric archaeological site types include lithic scatters of stone tool manufacturing and maintenance debris and potential temporary campsites. The historical archaeological site types consist of debris and refuse scatters. Many appear to be temporary camps associated with DTC/C-AMA maneuvers. The isolate types include prehistoric lithics and ceramics as well as historic-period refuse.

Appendix D, Cultural Resources Table 5, summarizes sites found by other projects (n=34), sites found in Tetra Tech's GSEP Class II survey (n=54), and sites found in Tetra Tech's three GSEP Class III surveys (n=50). In total, 138 sites are included in this table. Two-hundred and twenty-four of the sites identified by McCarthy (1993a and b), which are considered to be within the ethnographic APE, were not identified by Tetra Tech and so are not included in Table 5. These additional sites are listed in Appendix D, Table D6.

Results of Survey for Built-Environment Resources

A survey to identify built-environment standing structures was conducted, covering the APE of the linear facilities and a 0.5-mile survey buffer. A built-environment survey was not conducted for the plant facility APE since no historical architectural resources were identified within several miles of the site footprint. Fieldwork resulted in the identification of two linear built-environment resources along the proposed linear facilities corridor. These consisted of portions of the Blythe-Eagle Mountain Transmission Line and Wiley's Well Road.

Summary of Identified Cultural Resources in the APEs and Vicinity

Overall, previous projects and the cultural resources surveys of the applicant have identified a total of 538 cultural resources within the APEs and in the near vicinity. These resources include 362 archaeological sites, 177 archaeological isolates, and 2 linear built-environment resources. One of these sites is of an unspecified type and from an unspecified time period and is therefore not included in the following discussion.

The prehistoric resources include 318 archaeological sites, with 6 additional multi-component sites containing prehistoric components, and 141 isolated artifacts. These sites primarily consist of trails, trail-associated ceramic scatters and petroglyphs, sparse artifact scatters and possible temporary campsites. Ethnographic sources suggest that portions of the Mojave Desert distant from water sources were primarily used for travel and ritual activities rather than for the collection of resources (Cleland 2005). These activities are associated with trails, trail-associated ceramic scatters, and petroglyphs. The sparse artifact scatters are primarily prehistoric flakes and cores. These tend to blend into the prehistoric isolates, which are also predominantly lithics, forming a landscape with regular but diffuse evidence of prehistoric human activities. These activities appear to be related to stone tool manufacturing and maintenance, possibly tied to the collection of wild resources.

Travel-related sites were not present in the proposed site footprint and linear facilities corridor, and are rare in the GSEP vicinity. Ethnographic sources and other archaeological projects in the region mention prehistoric trails leading to McCoy Spring National Historic District, at least four other natural "tanks" within the McCoy Mountains, and along the I-10 corridor (Johnson and Johnstone 1957; McCarthy 1993a and b). Road construction in this corridor may well have destroyed evidence of the prehistoric trail that preceded the modern transportation routes and associated natural gas and electric lines. McCarthy's (1993a) work at McCoy Spring suggests that prehistoric trails potentially crossed the proposed site footprint and linear facilities corridor. However, these trails are easiest to see on landforms with desert pavement, which are rare in the GSEP site footprint. Linear alignments of deliberate "pot drops" (isolated scatters of sherds from a single pot) (Sutton et al. 2007) and artifact scatters consisting of only ceramics (McCarthy 1993a) are both indications of nearby trails. Clear evidence of trails was not identified in the GSEP site footprint, its linear facilities corridor, or its vicinity. However, secondary indications, such as pot drops, were found during archaeological survey, and multiple recorded trails run in the direction of the GSEP site footprint (McCarthy 1993a, Fig. 10).

The 248 trails and trail-associated sites described above may contribute to a potential Prehistoric Trails Network Archaeological Landscape (PTNAL), whose boundaries have yet to be determined but which would include McCoy Spring National Register District, Ford Dry Lake, and the trails leading between them and other important destinations, such as the Colorado River to the east and Corn Springs to the west. Potential contributors to a PTNAL are listed in Appendix D, Cultural Resources Table 7.

Sites with features and the densest concentrations of artifacts appear to be located around the edges of Ford Dry Lake. Most archaeologists have referred to these as temporary camps. Clearly this would have been an attractive place to camp when traveling, an excellent place to collect resources when water was temporarily present, and a possible permanent village location when water was present for long periods. The lack of midden on the surface of any of the recorded sites suggests that these sites had short-term, resource-gathering, resource-processing, and residential functions. As many of these sites have ground stone, the temporary camps appear to date after the Paleo-Indian period. Further, most of the sites also have ceramics, suggesting that they have components from the Late Prehistoric period (Sutton et al. 2007). These lakeside camps are also possible contributors to a potential PTNAL.

The historic-period resources include 34 archaeological sites, with 6 additional multi-component sites containing historic-period components, and 36 isolated artifacts. Most of these sites and artifacts reflect movement through the area by automobile and military maneuvers associated with the DTC/C-AMA. These sites are primarily debris scatters. Some are mainly domestic debris and may have been dumped by passing travelers or off-road vehicle drivers. Others are a mix of domestic military debris, suggesting they are the remains of temporary military camps that were part of the DTC/C-AMA. Occasional military features such as earthen mounds and possible foxholes have also been noted. The historic-period isolates reflect these same kinds of activities. Other known, common historic activities, including mining and ranching, are not well represented.

The World War II-era DTC/C-AMA sites described above would contribute to a World War II Desert Training Center California-Arizona Maneuver Area Historic Archaeological Landscape (DTCHAL) whose boundaries would include all of the proposed GSEP's APEs. Potential contributors to a DTCHAL are listed in Appendix D, Cultural Resources Table 8.

Two linear built-environment resources were identified within the proposed linear facilities corridor: Blythe-Eagle Mountain Transmission Line and Wiley's Well Road. The transmission line is associated with regional population growth during the 1950s. Wiley's Well Road is associated with transportation and regional mining efforts, beginning in the 1860s and continuing until the 1960s.

3.4.2 Determining the Historical Significance of Cultural Resources

A key part of any cultural resources analysis under NEPA and Section 106 of the NHPA is to determine which of the cultural resources that a proposed or alternative action may affect, are historically significant. Subsequent effects assessments are made for those cultural resources that are determined to be historically significant. Cultural resources that can be avoided by construction may remain unevaluated. Unevaluated cultural resources that cannot be avoided are treated as eligible for the National Register of Historic Places under Section 106 when determining effects.

3.4.3 Evaluation of Historical Significance under Section 106

Cultural resources are considered during federal undertakings chiefly under Section 106 of the NHPA through its implementing regulations, 36 CFR Part 800. Properties of traditional, religious, and cultural importance to Native Americans are considered under Section 101(d)(6)(A) of the NHPA.

The Section 106 process requires federal agencies to consider the effects of their undertakings on any district, site, building, structure, or object that is included in or eligible for inclusion in the NRHP and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings (36 CFR § 800.1). Significant cultural resources (historic properties) are those resources, districts, sites, buildings, structures, or objects, that are listed in or are eligible for listing on the NRHP per the criteria listed at 36 CFR § 60.4 and presented below.

Per National Park Service (NPS) regulations[6], 36 CFR § 60.4, and guidance published by the NPS, National Register Bulletin Number 15, *How to Apply the National Register Criteria for Evaluation*, different types of values embodied in districts, sites, buildings, structures, and objects are recognized. These values fall into the following categories:

> *Associate Value (Criteria A and B)*: Properties significant for their association with or linkage to events (Criterion A) or persons (Criterion B) important in our past.
>
> *Design or Construction Value (Criterion C)*: Properties significant as representatives of the man-made expression of culture or technology.
>
> *Information Value (Criterion D)*: Properties significant for their ability to yield important information about prehistory or history.

The quality of significance in American history, architecture, archaeology, engineering and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association. Cultural resources that are determined eligible for listing in the NRHP are termed “historic properties” under Section 106, and are afforded the same protection as sites listed in the NRHP.

NRHP determinations of eligibility have not yet been made for the cultural resources that might be affected by the GSEP under any of the alternatives. These determinations will be made in accordance with a Programmatic Agreement being developed for the GSEP by the BLM in consultation with the California State Historic Preservation Officer, Advisory Council on Historic Preservation, Indian tribes and other interested parties. Until NRHP eligibility determinations are made, the cultural resources potentially affected by the GSEP will be assumed to be eligible for the purpose of assessing effects under all alternatives.

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6 The BLM is complying with Section 106 of the National Historic Preservation Act (NHPA) through the completion of a Programmatic Agreement (PA) with the State Historic Preservation Officer (SHPO) and consulting parties such as Native American Tribes. Stipulations within the PA include evaluation measures which incorporate NPS guidance.

3.5 Environmental Justice

Title VI of the Civil Rights Act of 1964 (Public Law 88-352, 78 Stat.241) prohibits discrimination on the basis of race, color, or national programs in all programs or activities receiving federal financial assistance.

Executive Order 12898, “Federal Actions to address environmental justice in Minority Populations and Low-Income Populations,” focuses federal attention on the environment and human health conditions of minority communities and calls on agencies to achieve environmental justice as part of this mission (59 Fed. Reg. 7629 (Feb. 16, 1994)). The order requires the US Environmental Protection Agency (EPA) and all other federal agencies (as well as state agencies receiving federal funds) to develop strategies to address this issue. The agencies are required to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations.

The Council on Environmental Quality (CEQ) has oversight responsibility for the Federal Government’s compliance with Executive Order 12898 and NEPA. The CEQ, in consultation with the EPA and other agencies, has developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed. According to the CEQ’s “Environmental Justice Guidance Under the National Environmental Policy Act,” agencies should consider the composition of the affected area to determine whether minority populations or low-income populations are present in the area affected by the proposed action, and if so whether there may be disproportionately high and adverse environmental effects (CEQ, 1997).

3.5.1 Minority Populations

According to the CEQ, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population, for the purposes of environmental justice, is identified when the minority population of the potentially affected area is greater than 50 percent or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis (CEQ, 1997).[1]

Figure 3.5-1 shows the distribution of minority populations within a six-mile radius of the center of the GSEP site. As shown, the radius encompasses parts of census block groups 458.00.3, and 458.00.6. The total population of the two block groups within the six-mile radius is 9,761 of which 7,457 are classified as Black or African-American, American Indian (or Alaskan Native), Asian, Native Hawaiian (or other Pacific Islander, some other race (including two or more races), and/or Hispanic or Latino).

1 According to the CEQ guidelines, “Minority” is defined as all persons except non-Hispanic whites. In order words, minority is defined as all racial groups other than white, and all persons of Hispanic origin, regardless of race.

Table 3.5-1 presents the minority population composition of the Census Block Groups within the study area, the nearby city of Blythe, and Riverside County as a whole. Riverside County as a whole exhibits a proportion of minority residents of 49 percent, which is lower than the City of Blythe and both block groups 458.00.6 and 458.00.3. The minority population within both Census Blocks 458.00.6 and 458.00.3 as well as the City of Blythe as the whole are more than 50 percent and therefore both represent a community of concern for the purposed of environmental justice analysis.

TABLE 3.5-1
RACIAL AND INCOME CHARACTERISTICS FOR RESIDENTS WITHIN THE ENVIRONMENTAL JUSTICE STUDY AREA

Geographic Area (Census Block Group)	Total Population	Total Minority (Percentage Minority)	Median Household Income (1999)	Proportion of the Population Living Below the Poverty Level (Percentage Low-Income)
458.00.6	1,453	829 (57.1%)	$27,404	28.3%
458.00.3	8,308	6,628 (79.8%)	(a)	(a)
Blythe	12,155	7,050 (58%)	$35,324	20.9%
Riverside County	1,545,387	756,556 (49%)	$42,887	14.2%

NOTE: The population for Census Block Group 458.00.3 consists of the prison population at Chuckwalla and Ironside State Prisons. No income or poverty data is available for this population.

SOURCE: U.S. Census, 2000.

3.5.2 Low Income Populations

Unlike the CEQ (1997) guidance on minority populations, none of the environmental justice guidance documents contain a quantitative definition of how many low-income individuals it takes to comprise a low-income population. In the absence of guidance, for this analysis the density used to identify minority populations (i.e., 50 percent or greater) was also used as a minimum to identify low-income populations. In addition, a local population is judged to be "meaningfully greater" than the general population if the proportion of individuals living under the poverty line is 100 percent or more that of the general population.

In this analysis, the current below-poverty-level population is based on Year 2000 U.S. Census block group data within a six-mile radius of the GESP site. As shown in Table 3.5-1, the 2000 census data reported that the median household income for Riverside County was $42,887. The block group in which the Project is situated (Census Block Group 458.00.6), has a median household income at $27,404 and the highest proportion of residents below the poverty level– a proportion of low-income residents (28.3 percent) nearly twice that for Riverside County as a whole. However, Census Block Group 458.00.3 consists solely of the inmate population of Chuckwalla and Ironside State Prisons for which no income or poverty data is available.

Consequently, it is conservatively judged that the Census Block Group 458.00.6 is identified as a low income population that represents a community of concern for the environmental justice analysis.

3.6 Lands and Realty

3.6.1 Introduction

BLM manages a diverse combination of lands and resources administered by BLM in eastern Riverside County, including but not limited to, land uses for utility corridors, communication sites, land tenure (disposal, acquisition or easement) issues, land use authorizations (permits and rights-of-way), withdrawals and renewable energy activities. Within the immediate and surrounding areas of the GSEP, there are no communications sites, land use permits, leases or easements of record, nor are any land tenure issues identified in close proximity to or that would be affected by the GSEP. There are, however, utility corridors, rights-of-way, renewable energy activities and a withdrawal application (see Figure 2-5).

3.6.2 Background

Title V of the Federal Land Policy and Management Act of 1976, as amended, (FLPMA), Section 503, required establishment of corridors to the extent practical to minimize adverse environmental impacts and the proliferation of separate rights-of-way. Through its planning efforts, the BLM Palm Springs-South Coast Field Office has designated corridors throughout the Field Office boundaries (generically identified as “locally-designated corridors” and specifically identified by an alphabetical reference).

Additionally, the *Approved Resource Management Plan/Record of Decision for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States* signed January 14, 2009, established corridors (generically identified as “368 corridors”) pursuant to Section 368 of the Energy Policy Act of 2005.

Further, the Department of the Interior and Energy published a Notice of Availability of Maps and Additional Public Scoping for *Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development* (Solar Energy Development PEIS or PEIS) which maps identified Solar Energy Study Areas determined to have high potential for development of solar energy facilities 74 F.R. 31307 (June 30, 2009). In additions, the BLM filed an application for withdrawal with the Secretary of the Interior identifying 676,048 acres of land in Arizona, California, Colorado, Nevada, New Mexico and Utah to be “withdrawn from settlement, sale, location or entry under the general land laws, including the mining laws, on behalf of the BLM to protect and preserve solar energy study areas for future solar energy development.” The Notice of Proposed Withdrawal, published June 30, 2009, in the Federal Register (at 74 F.R. 31308), segregated these certain lands for up to two years to provide time for various studies and analyses in support of a final decision on the withdrawal application. The lands remain open to discretionary actions, such as rights-of-way and land use permits and to the mineral leasing laws.

3.6.3 Existing Situation

There are no existing authorized uses within the proposed boundaries of the GSEP solar generating site.

Most of the land involved with the GSEP (T. 6 S., R. 18 and 19 E., SBBM) lies within the land segregated by the above-referenced withdrawal application (see Figure 3.6-1).

Interstate10 lies within a 368 Designated Corridor as defined by the Energy Policy Act[1] (identified as Corridor 30-52, 2 miles in width) as well as locally-designated Corridor K (two miles in width), both of which lie south of the GSEP site on a generally east-west heading. Numerous other linear rights-of-way also lie within and to the north and south of these two designated corridors. Locally-designated Corridor J (two miles in width) follows a north-south heading to the east of the proposed action but would not be affected by it.

The GSEP solar generating facilities would not be within the designated corridors; however, ancillary facilities associated with the GSEP would. The proposed gen-tie line would cross I-10, and thus Corridors K and 30-52, on a nearly perpendicular path, to connect to the proposed expanded Colorado River Substation southeast of the GSEP area. The proposed gas pipeline would connect to the existing SoCal gas pipeline within the northern portion of the corridors. The pipeline would not cross Interstate 10. See Figure 3.6-2.

Access to the GSEP would be from the I-10 Wiley's Well Interchange and heading north on Wiley's Well Road to a new 24-foot wide access road that would extend west approximately 6.6 miles long to the GSEP site. The existing Wiley's Well Road crosses, on a nearly perpendicular route, the northern portion of Corridors 30-52 and K. See Figure 3.6-2.

In addition to GSEP, four other "fast track" proposed solar generation projects in eastern Riverside County - Blythe, Desert Sunlight, Rice, and Palen – are currently under review. Figure 2-5 identifies these proposed actions by letter: GSEP (O), Blythe (L), Desert Sunlight (V), Rice (R), and Palen (K). The combined total number of acres identified for consideration in these applications, including Genesis, is approximately 32,700 acres. Each of these proposed actions has identified an "action area" that includes more acreage than what would be needed for construction and operation to allow for flexibility in final design. Should one or more ROW grant(s) be authorized, the acreage included in the grant(s) would be only that which is actually needed for an action, not the total number of acres identified in the application(s).

The Devers-Palo Verde No. 1 (DPV1) is an existing 500-kV transmission line which spans approximately 128 miles of land within California paralleling I-10 (see Figure 2-5 Number 4). The transmission line is within Corridors K and 30-52. DPV1 was approved by the California Public Utilities Commission (CPUC) in 1979 and constructed in 1982.

1 Section 368 of the Energy Policy Act directs the Secretaries to designate corridors for oil, gas, and hydrogen pipelines and electric transmission and distribution facilities on federal land in the 11 western states, perform necessary reviews, and incorporate those designations into land use, and resource management plans or equivalent plans.

The Blythe 230-kV Transmission Line Project involves the building of two 230-kV transmission lines spanning approximately 70 miles between the Julian Hinds and Bucks substations, and construction of a new midpoint substation. See Figure 2-5 Letter F. Construction on the transmission line began in February 2009 and was nearly complete as of February 2010. The transmission line lies within the existing federally approved utility corridor along I-10.

The Devers-Palo Verde 2 (DPV2) Transmission Line Project, approved by the CPUC in January 2007, involves the construction of two 500 kV electric transmission lines. See Figure 2-5 Letter D. The proposed route for the DPV2 Transmission Line is along the south side of I-10, parallel to the existing DPV1 transmission line route. BLM anticipates issuance of a ROD in Fall of 2010 for the DPV2 project to address a request for a right-of-way grant from SCE to construct, operate, and maintain DPV2 across BLM-administered land. In 1989, the U.S. Fish and Wildlife Service issued a Certificate of Right-of-Way Compatibility for the portion of the DPV2 route that crosses the Kofa National Wildlife Refuge in Arizona, but a Right-of-Way Permit authorizing construction across the refuge was never issued (CPUC 2006, pg. A-2). The CPUC is modifying its permit to authorize only the California portion of the project and, as discussed above, BLM is preparing a Record of Decision with a final decision likely in July 2010.

The Desert Southwest Transmission Line project consists of an approximately 118 mile 500 kV transmission line and a new substation/switching station. See Figure 2-5, Letter G. The BLM Palm Springs-South Coast Field Office, approved a ROW grant for the construction of the transmission line which crosses public lands between Blythe and the western end of the Coachella Valley. The project is being constructed within an existing federal utility corridor. Plans for development are being finalized with a possible near-term start date for construction.

Two substations are identified as part of the solar generating facilities in the area - the Colorado River substation, which is awaiting issuance of the BLM’s ROD, and the Red Bluff Substation, which is being analyzed with the Desert Sunlight Solar Power Project. The location of the Colorado River Substation is shown in Figure 2-5, Letter E; the location of the Red Bluff Substation is designated “Y” but is has not been finalized. Both substations would interconnect to the DPV1 transmission line, thereby allowing generated solar power to flow to the grid.

3.7 Livestock Grazing

As shown on Map 2-8 of the Approved Northern and Eastern Colorado Desert Coordinated Management Plan (BLM 2002), there are no livestock grazing allotments within or adjacent to the GSEP area or right-of-way application area.

3.8 Mineral Resources

3.8.1 Geologic Environment

Depending on the published reference, the GSEP site is located in either the southeastern portion of the Mojave Desert geomorphic province (CGS 2002a), or the northeastern quarter of the Colorado Desert geomorphic province (Norris and Webb 1990), in the Mojave Desert of Southern California near the Arizona border. The region is more characteristic of the Mojave Desert geomorphic province in terms of geology, structure and physiography. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock Fault on the northwest side. The northwest-striking San Andreas Fault defines the southwestern boundary, beyond which lie the Transverse Ranges and Colorado Desert geomorphic provinces. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with faulting oriented similar to the San Andreas Fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province.

The proposed GSEP site would be situated on a broad alluvial plain within the northwest-trending Chuckwalla Valley between the McCoy Mountains to the northeast, the Palen Mountains to the northwest, and Ford Dry Lake to the south. Overall the proposed site slopes at very shallow grades south and southwest toward the local topographic low at Ford Dry Lake.

Quaternary age alluvial, lacustrine and eolian sedimentary deposits are mapped in the vicinity of the proposed GSEP site (CDMG 1967; USGS 1989; USGS 1990; USGS 2006; GSEP 2009a, c and f). Marine and transitional sediments of the Pliocene Age Bouse Formation are presumed to underlie alluvial fan deposits (USGS 1968; GSEP 2009a, c and f), and metasedimentary bedrock of the McCoy Mountains Formation outcrop in the McCoy and Palen Mountains (Harding and Coney 1985). The local stratigraphy, as interpreted by numerous authors, is presented in Table 3.8-1.

Holocene units, which include eolian sands, younger alluvium, and playa lake deposits, are mapped over nearly the entire GSEP site surface. Eolian sands consist of unconsolidated deposits of well sorted, wind-blown sand in dunes and sheets. Younger alluvium is composed of sand, pebbly sand and sandy pebble-gravel, and is generally coarser grained closer to mountain ranges. Desert varnish is not well developed in the mostly unconsolidated and undissected sediments. Playa lake deposits are also unconsolidated, and are comprised of clay, silt, and sand. Older alluvium is present at the surface along the northern edge of both the western (entire length) and eastern (west end only) portion of the GSEP site. The exposures of older alluvium occur as north-south oriented ridges of material protruding into the site from the north, with the intervening areas occupied by drainages filled with younger alluvium. Older alluvium is composed of consolidated gravel and sand that is moderately dissected with moderately developed desert pavement and varnish.

TABLE 3.8-1
CORRELATION AND AGES OF STRATIGRAPHIC UNITS

Age	Unit/Description	Jennings (CDMG 1967)	Stone and Pelka (USGS 1989)	Stone (USGS 1990)	Stone (USGS 2006)	Worley Parsons (GSEP 2009f)
Holocene	Eolian sands	Qs	Qs	Qs	Qs	Qyma
	Younger alluvium	Qal	Qya	QTa	Qa_6[a]	Qyva
						Qyaf
						Qiaf[b]
	Playa lake deposits	Ql	Qp	Qp	Qp	Qp
Pleistocene	Older alluvium	Qc	Qia	QTa	Qa_3	Qoaf
			Qoa			
Pliocene ± Miocene	Bouse Formation	Pu	Not Mapped	Tbs/Tbt	Tbs, Tbt	Not Mapped
Cretaceous	McCoy Mountains Formation	ms	Km*(x)*, KJm*(x)*	Kjmlu, Km*(x)*	Km*(x)*	Not Mapped

NOTES:
[a] Interpreted as mid-Holocene in age based on suggested age of ancient shoreline, and moderate development of desert varnish and pavement.
[b] Transitional between older, dissected alluvial fan deposits and younger sediments in a depositional setting.

The approximate transition from Pleistocene to Holocene age sediments is marked by the change from older alluvium with an erosional, dissected surface, to a setting in which neither deposition nor erosion is occurring (intermediate alluvium), to areas undergoing active fan deposition (younger alluvium) (GSEP 2009f). A prominent east-west-trending linear feature observed on aerial photos that roughly corresponds to this transitional area is interpreted to be an ancient shoreline. Although the age of the shoreline is not well established, it is postulated in the Geological Resources and Hazards section of the AFC (GSEP 2009a) that the pluvial highstand of Ford Lake could have occurred approximately 4,000 years before present (bp). This suggests a Holocene age of deposition for intermediate alluvium (Qiaf, Unknown Reference, GSEP 2009a), which is shown in areas mapped as younger alluvium by others (Qal, CDMG 1967; Qva, USGS 1989; and Qa6, USGS 2006).

Interbedded clay, silt, sand, limestone and tufa of the Bouse Formation were deposited in a marine to brackish-water environment during the Pliocene epoch in Coachella Valley (USGS 1968; USGS 2006). The sediments were deposited in a marine embayment of the Gulf of California that encroached northward into the Colorado River valley during the late Tertiary. The nearest exposure relative to the GSEP site is mapped at the north end of the Mule Mountains approximately 8 miles southeast of the southeastern end of the GSEP linear facilities (USGS 1968). A geotechnical investigation performed by NextEra indicates that the unit underlies the proposed site at a depth of 245 to 275 feet beneath Quaternary alluvium, and extends several thousand feet (GSEP 2009a). Weakly metamorphosed sandstone and conglomerate, and lesser shale, mudstone and siltstone, of the Cretaceous age McCoy Mountains Formation are the predominant lithologies in the McCoy and Palen Mountains (CDMG 1967; USGS 1968; USGS

1990; USGS 2006). The nearest exposures are located roughly 2.5 miles north of the western portion of the property in the Palen Mountains and 3 miles northeast of the GSEP linears in the McCoy Mountains.

One reverse circulation drill hole was advanced to a depth of 900 feet for the preliminary geotechnical investigation conducted by NextEra (GSEP 2009f). The drill hole was located at the east end of the western portion of the GSEP site, approximately 1.5 miles from the western limit of proposed construction on the eastern portion of the site. The upper 12 feet of the drill hole consisted of gravelly sand with silt that contained 16 to 17 percent fines passing the number 200 sieve. Between 12 and 75 feet (limit of presented data), the soils consisted of interbedded silty sand, clayey sand, sandy lean clay and fat clays interpreted to have been deposited in alternating alluvial and lacustrine environments. Penetration resistance blow counts, obtained by driving a Modified California split spoon sampler at regular intervals in the upper 75 feet of the drill hole, indicate the consistency of the site soils are very dense or very hard (GSEP 2009f). A summary of laboratory testing in the preliminary geotechnical investigation reported plasticity indices for the clay soils that range from 23 to 39, and free swells ranging from 130 to 270 percent (GSEP 2009f). The test results indicate the clay soils are moderately to highly expansive. The upper 12 feet of granular materials is considered to be younger alluvium, and underlying granular and clay soils are interpreted to be older alluvial fan and lacustrine deposits (GSEP 2009f). The depth to older alluvium beneath younger alluvium across the portion of the GSEP site proposed for construction, however, is unknown and likely varies greatly. Shallow excavations encountered weakly carbonate-cemented sediments and soil development, which could be intermediate or older alluvium, at depths just beneath 18 inches below the surface (GSEP 2009f). This suggests that only a thin veneer of younger alluvium may be present locally, or in large areas, across the proposed site.

Geophysical testing, which included seismic refraction, electromagnetic soundings, and surface and down hole shear wave velocity profiles, were also conducted in the vicinity of proposed construction. Depth to ground water and the top of the Bouse Formation, relative density of the alluvial soils, and the GSEP location site class (CBC 2007), were estimated using geophysical methods.

The GSEP site is not crossed by any known active faults or designated Alquist-Priolo Earthquake Fault Zone (EFZ, formerly called Special Studies Zones) (CGS 2002b). A number of major, active faults lie within 62 miles of the site. These faults are discussed in detail under the Geological Hazards section later in this section. Several northwest-striking, south-dipping basement thrust faults are mapped at the extreme south ends of the Palen and McCoy Mountains, and are inferred beneath Quaternary and Tertiary sediments in Chuckwalla Valley (Harding and Coney 1985; CDMG 1967; USGS 1990; USGS 2006). The faults are part of a major Mesozoic terrain-bounding structural zone that was active during late Jurassic time, and are associated with folding and metamorphism of the McCoy Mountains Formation. The basement faults are no longer active, and are not exposed anywhere on the surface of the proposed site.

The site-specific geotechnical investigation performed for the GSEP (GSEP 2009a) estimated a depth to the ground water table of 61 to 81 feet below the surface in the vicinity of proposed construction, based on geophysical methods. Ground water was encountered at approximately 77 feet below ground surface (bgs) in the reverse circulation drill hole 1.5 miles west of proposed construction. Water level monitoring at wells 006S019E28R001S, 006S019E32K001S, and 006S019E32K002S, located 1.5 to 4.5 miles southwest of the eastern portion of the proposed site near Ford Dry Lake, yielded water levels of 81 to 110 bgs feet from 1992 to 2000 (CDWR 2009; USGS 2009). Measured ground water levels at the southeast end of the proposed GSEP linear facilities ranged from 125 to 151 feet bgs between 1979 and 2002 in wells 006S020E33C001S, 006S020E33L001S, and 007S04E33R001S. Water levels beneath the site would vary seasonally and with pumping frequency of nearby irrigation wells.

Existing grade at the GSEP site slopes between 0.5 and 1.5 percent to the south and southwest towards Ford Dry Lake. Site drainage is probably by a combination of infiltration, overland sheet flow and shallow drainages.

3.8.2 Mineral Resources Potential

Lands identified in the Notice of Availability of Maps and Additional Public Scoping for the *Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development* (Solar Energy Development PEIS or PEIS) released by the Departments of the Interior and Energy identified Solar Study Areas determined to have high potential for development of solar energy facilities. As a result of the release of these maps, the BLM filed an application for withdrawal with the Secretary of the Interior identifying 676,048 acres of land in Arizona, California, Colorado, Nevada, New Mexico and Utah to be “withdrawn from settlement, sale, location or entry under the general land laws, including the mining laws, on behalf of the BLM to protect and preserve solar energy study areas for future solar energy development.” The Notice of Proposed Withdrawal, published June 30, 2009 in the Federal Register (Vol. 47 No. 124), segregated certain lands for up to two years to provide time for various studies and analyses in support a final decision on the withdrawal application. The lands remain open to discretionary actions, such as rights-of-way and land use permits and to the mineral leasing laws.

Locatable Minerals

There are no active mining claims within the GSEP area nor is there any locatable minerals activity within the boundaries of the GSEP area. Based on the geological environment and historical trends, the potential for occurrence of locatable minerals is low within the GSEP area.

Leasable Minerals

There are no mineral leases within the GSEP area.

The BLM Prospectively Valuable Maps show that there is no potential for oil and gas. The southern portion of the GSEP (see Figure 3.8-1) is prospectively valuable/medium potential for geothermal resources. This same area is also prospectively valuable for sodium and potassium.

Saleable Minerals/Mineral Materials

Sand and gravel deposits are ubiquitous throughout the GSEP area and the region. The GSEP will have no adverse affect on the availability of mineral materials. There is potential for GSEP to use mineral materials from public lands at or near the site for its own construction needs after proper permitting by GSEP and its contractors for the use of the material.

3.9 Multiple Use Classes

The California Desert Conservation Area Plan (CDCA) (DOI BLM 1980, as amended) developed a classification system that places BLM-administered public lands in the CDCA into one of four multiple-use classes, based on the sensitivity of the resources and types of uses for each geographic area. The CDCA lands in Eastern Riverside County are assigned to the classes in the proportions shown in Table 3.9-1 below.

TABLE 3.9-1
MULTIPLE-USE CLASS DESIGNATIONS

Class	Acreage	% of Total Planning Area Public Lands
C	576,858	38
L	550,087	36
M	399,024	26
I	0	0
U	1,886	0
Total	**1,527,855**	**100**

The Multiple-use Class Guidelines, as delineated in Table 1, pages 15-20 of the CDCA Plan (DOI BLM 1980b), apply to CDCA lands in Eastern Riverside County.

Descriptions of the multiple-use classes are:

Class C: Multiple-use Class C (Controlled) has two purposes. First, it shows those areas which are being “preliminarily recommended” as suitable for wilderness designation by Congress. This process is explained in the Wilderness Element of the CDCA Plan (DOI BLM 1980b). Second, it will be used in the future to show those areas formally designated as “wilderness” by Congress.

The Class C Guidelines are different from the guidelines for other classes. They summarize the kinds of management likely to be used in these areas when and if the areas are formally designated wilderness by Congress. These guidelines will be considered in the public process of preparing the final Wilderness Study Reports. However, the final management decisions depend on Congressional direction in the legislation that makes the formal designation.

Class L: Multiple-use Class L (Limited Use) protects sensitive natural, scenic, ecological, and cultural resource values. Public lands designated as Class L are managed to provide for generally lower-intensity, carefully controlled multiple use of resources, while ensuring that sensitive values are not significantly diminished.

Class M: Multiple-use Class M (Moderate Use) is based upon a controlled balance between higher-intensity use and protection of public lands. This class provides for a wide variety of present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

Class I: Multiple-Use Class I is an “Intensive use” class. Its purpose is to provide for concentrated use of lands and resources to meet human needs. Reasonable protection will be provided for sensitive natural and cultural values. Mitigation of impacts on resources and rehabilitation of impacted areas will occur insofar as possible.

Unclassified Lands: Scattered and isolated parcels of public land in the CDCA that have not been placed within multiple-use classes are “unclassified” land. These parcels will be managed on a case-by-case basis, as explained in the Land Tenure Adjustment Element of the CDCA Plan.

Plan Elements: The CDCA Plan Elements provide specific application of the multiple-use class guidelines for specific resources or activities about which the public has expressed significant concern.

3.10 Noise

The ambient noise regime in the GSEP vicinity consists of aircraft traffic, highway traffic, wind and wildlife. There are no human related noise sensitive receptors within 9 miles of the GSEP site. However, two state prisons are located approximately 9 miles southeast of the GSEP site (GSEP 2009a).

The Palen/McCoy Wilderness Area, immediately north of the site, and a bighorn sheep Wildlife Habitat Management Area (WHMA), approximately four miles north of the GSEP, are sensitive noise receptors. This is due to the presence of breeding wildlife (e.g., migratory birds and Nelson's bighorn sheep). Sensitive bird nesting habitat occurs in the adjacent creosote bush scrub to the south and east of the GSEP site as well as in the desert dry wash woodland approximately one mile east of the GSEP site.

3.10.1 Ambient Noise Monitoring

There are no human related noise sensitive receptors located within nine miles of the GSEP site. Given that there are no noise sensitive receptors located within nine miles of the GSEP site, and that the ambient noise regime in the surrounding area includes highway traffic and aircraft traffic, it is extremely unlikely that the ambient noise at the nearest noise sensitive receptor (more than nine miles away from the GSEP site) would be low enough that attenuated project noise would cause a 5 dBA increase in the ambient noise level.

The construction and operation of any power plant creates noise, or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive receptors combine to determine whether the facility would meet applicable noise control laws and ordinances. In some cases, vibration may be produced as a result of power plant construction practices, such as blasting or pile driving. The groundborne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the GSEP and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations, and standards.

BLM does not establish noise thresholds for public lands, but defers to other Federal, State and Local regulatory agencies. Table 1-1, *Introduction*, lists the laws, ordinances, regulations and standards (LORS) applicable to the relevant area.

3.11 Paleontological Resources

The Paleontological Resources Preservation Act of 2009 requires the BLM to manage and protect paleontological resources on Federal land using scientific principles and expertise. The potential for discovery of significant paleontological resources or the impact of surface disturbing activities to such resources is assessed using the Potential Fossil Yield Classification (PYFC) system. This system includes three conditions: Condition 1 (areas known to contain vertebrate fossils); Condition 2 (areas with exposures of geological units or settings that have high potential to contain vertebrate fossils); and Condition 3 (areas that are very unlikely to produce vertebrate fossils). The PYFC class ranges from Class 5 (very high) for Condition 1 to Class 1 (very low) for Condition 3 (USDI 2007). Please refer to Section 3.8.1 for a description of the geologic environment at the GSEP site.

Information from the Natural History Museum of Los Angeles County (NHMLA) (McLeod, 2009), the University of California Museum of Paleontology at Berkeley (UCMP), and the Riverside County Land Information System (RCLIS 2009 as cited in the CEC RSA June 2010) was reviewed for information regarding known fossil localities and stratigraphic unit sensitivity within the GSEP area. Site-specific information generated by the applicant for the GSEP was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontological resources exist in the general area. The paleontological resources assessment (GSEP 2009a) indicates there are no recorded fossil collection sites within the GSEP boundaries based on reports submitted by the NHMLA or the UCMP. The only known fossil remains on the GSEP site and project linear facilities were observed during a four-day field survey. Fragments of tortoise carapace and bones, which were partly replaced with calcite, gypsum and opaline silica, were found in stream beds. The fragmental condition indicates the specimens were transported a significant distance to their current location, probably post-mortem, and the mineralization suggests an age on the order of several thousand years (GSEP 2009a). Microfossils, including diatoms and ostracods, were also found in sediments during a preliminary field survey. The paleontological assessment report concludes that fossils observed on the GSEP site are indicative of late Pleistocene/early Holocene environment, and that there is only limited potential for the observed specimens to add to the current body of scientific knowledge. A complete pedestrian survey of the entire Project area of potential effect for paleontological resources was considered unnecessary and no subsurface exploration was conducted. A more detailed survey was considered unnecessary because the Project site is located in a lowland, depositional environment consisting of the surface of very recent Holocene alluvium (GSEP 2009a).

Several fossil localities have been documented by the NHMLC in the local region in geological units that may be encountered during construction of the GSEP (McLeod 2009). The nearest is a pocket mouse specimen recovered from lacustrine sediments in the southwest part of Ford Dry Lake, within roughly 4 miles southwest of proposed construction. A site in older alluvium approximately 20 to 25 miles to the northwest has produced fossil remains of tortoise, horse and two species of camel.

Based on the recorded fossil finds, the paleontological resource sensitivity of Quaternary age sediments varies from low in Holocene age younger alluviual, lacustrine and eolian deposits at shallow depths to high as Pleistocene age older alluvium and lacustrine deposits are encountered at deeper depths. The depth to Pleistocene age sediments is unknown and may vary significantly across the site. Older alluvium is mapped at the surface along the northern border of the site, and would likely be buried at progressively deeper depths beneath Holocene sediments southward across the site. The geomorphic reconnaissance report for the GSEP encountered a weathered horizon that may be older alluvium within only two or three feet of the surface beneath younger alluvium (GSEP 2009f). McLeod (2009) indicated that older lacustrine deposits may be encountered in excavations along the southwest margins of the site nearest Ford Dry Lake.

The Riverside County Transportation and Land Management Agency (TLMA) has produced a paleontological sensitivity map of the county (RCLIS 2009 as cited in the CEC RSA June 2010). The mapping indicates that areas underlain by playa lake, eolian and younger alluvial deposits within and around the Ford Dry Lake basin have a high paleontological sensitivity rating. Younger alluvium upslope from the lake-bed has a low sensitivity rating, and older alluvium is assigned an undetermined sensitivity rating, according to the TLMA.

Subsurface older Quaternary age alluvial and lacustrine sediments are considered to be highly sensitive. These units are mapped at the surface or may be present near the surface adjacent to these mapped areas, specifically along the northern and southern (adjacent to Ford Dry Lake) borders of the proposed GSEP site. The depth to Pleistocene age alluvial and lacustrine deposits is undetermined at present for the remainder of the site.

The Pliocene age Bouse Formation is known to have produced fossil specimens in the Colorado River Valley area (USGS 1968). However, the unit is not exposed at the surface of the GSEP site, and a minimum depth of 245 feet below ground surface (bgs) was determined in the project geotechnical investigation (GSEP 2009a). Similarly, bedrock present in the McCoy Mountains Formation is expected to lie at even greater depths beneath the site, and metamorphic rocks are generally considered to have little or no potential for containing significant fossil remains. Therefore, the potential for encountering significant paleontological resources in the Bouse and McCoy Mountains Formations during proposed construction would be minimal.

The probability for significant paleontological resources to be encountered during GSEP site construction activities for the GSEP would be low in Holocene age deposits on most of the GSEP site surface. However, proposed mass grading, deep foundation excavation and utility trenching may penetrate underlying Pleistocene age soils at undetermined depths, particularly in the northern portions of the site. Overall, the potential for exposure of paleontological resources would be considered as high, until determined otherwise by a qualified professional paleontologist. Low and high paleontological sensitivity roughly corresponds to PYFC Condition 3, Class 1 or 2 and Condition 2, Class 4a and 4b, respectively.

3.12 Public Health and Safety

3.12.1 Introduction

The affected environment for Public Health and Safety includes evaluation of several program areas, including hazardous materials/hazardous waste management, unexploded ordnance (UXO), abandoned mined lands (AML), undocumented immigrants (UDI), transmission line safety and nuisance, traffic and transportation (including aviation) safety, worker safety and fire protection, public and private air strips/airfields, and geologic hazards.

3.12.2 Hazardous Materials

Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

1. local meteorology;
2. terrain characteristics;
3. location of population centers and sensitive receptors relative to the project; and
4. existing site contamination.

Meteorological Conditions

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as exposure to associated health risks. When wind speeds are low and the atmosphere stable, dispersion is reduced but could lead to increased localized public exposure. Recorded wind speeds and ambient air temperatures are described in PA/FEIS Section 3.2, *Air Quality*.

Terrain Characteristics

The location of elevated terrain is often an important factor in assessing potential exposure. An emission plume resulting from an accidental release may impact high elevations before impacting lower elevations. The topography of the site is essentially flat (about 370 to 400 feet above sea level). Elevated terrain can be found at about 5-6 miles north and northwest of the site boundary where the Palen and McCoy mountains begin (**Figure 1-1**).

Location of Exposed Populations and Sensitive Receptors

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in the area surrounding a project site may have a major bearing on health risk. There are no sensitive receptors within a

6-mile radius of the project site, and there are no residences or other public receptors within a 4-mile radius of the site. The Chuckwalla Valley and Ironwood State Prisons are located about nine miles south and the nearest schools or medical facilities are in Blythe, about 25 miles away.

Existing Environmental Site Contamination

A Phase I Environmental Site Assessment (ESA), was prepared in 2009 in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs. The Phase I ESA addressed conditions on portions or most of 13 sections in Township 6 South, Range 19 East, and parts of four sections in Township 6 South, Range 20 East. The ESA did not identify any Recognized Environmental Conditions (RECs) in connection with historic or current site operations. A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or in the ground, groundwater, or surface water of the property.

The 1,800 acre project site and 90 acres of linear access road consists of undeveloped BLM land only used for recreation. There are no existing roads, structures on the project site or adjoining lands. In addition, the site is not listed on the Environmental First Search (EFS) Site Information Report (CEC 2010).

3.12.3 Waste Management

The Riverside County Waste Management Department operates six landfills, has a contract agreement for waste disposal with an additional private landfill, and administers several transfer station leases. The six landfills include: Blythe Landfill, Desert Center Landfill, Mecca II Landfill, and Oasis Landfill. Riverside County has a minimum of 15 years of capacity for future landfill disposal (RCWMD 2010).

3.12.4 Unexploded Ordnance (UX0)

The project area was within General Patton’s World War II (WWII) Desert Training Center, California-Arizona Maneuver Area region (1942 to 1944). The region surrounding the project area was considered a suitable location for training troops that would be deployed in the North Africa Campaign. After 2 years in operation and the training of one million troops, the desert training camps were closed in 1944. Military trash scatter including ration containers, military-issue utensils, and one 50-caliber cartridge were identified during the Tetra Tech site visits (CEC 2010).

3.12.5 Abandoned Mined Lands (AML)

The BLM abandoned mined land inventory indicates that there are no abandoned mines or openings on or near the project area.

3.12.6 Undocumented Immigrants (UDI)

There are no known incidents with undocumented immigrants at or near the project area.

3.12.7 Transmission Line Safety and Nuisance

The affected environment analysis focuses on the following issues, taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

1. aviation safety;
2. interference with radio-frequency communication;
3. audible noise;
4. fire hazards;
5. hazardous shocks;
6. nuisance shocks; and
7. electric and magnetic field (EMF) exposure.

Power generated from GSEP would be transmitted to the SCE power grid from a common switchyard using a single-circuit overhead, 230kV line. The point of connection with the SCE grid would be SCE's planned 500/230kV Colorado River Substation approximately 6.5 miles east of the site. Since the planned SCE Colorado Substation would be under the jurisdiction of the CPUC, it would be designed, built, and operated to reflect implementation of related CPUC requirements.

The GSEP area is in an uninhabited open desert land with no existing structures. The proposed transmission line right-of-way would traverse BLM-administered land in a largely uninhabited desert land where there is no residential area within 15 miles.

Aviation Safety

No major airports exist near the Project site. The local Blythe Airport is located about 14 miles east of the Project site; Desert Center Airport is located about 22 miles west of the project site; and Chiriaco Summit Airport is located about 42 miles west of the project site.

Interference with Radio-Frequency Communication

Potential transmission line-related radio frequency interference is a potential indirect effect of transmission line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as *corona discharge*, but is referred to as *spark gap electric discharge* when it occurs within gaps between the conductor and insulators or metal fittings. Because of the power loss from such corona discharges, it is in the interest of each line proponent to employ design, construction and maintenance plans that minimize them. When generated, such corona noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication when the signal is amplitude modulated (AM). Such radio interference is the buzzing and crackling noise one might hear from the speaker of amplitude modulated (AM) broadcast receiver when near a transmission line. The potential for corona-related interference generally becomes a concern for lines of 345 kV and above.

Frequency modulated (FM) signals are normally unaffected as are modern digital signals such as those involved in cellular telephone communication or modern airport and other types of radio communication. Since the level of the AM interference in any given case would depend on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such AM interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas. The FCC requires the line's owner to mitigate such interference in any specific case.

Audible Noise

Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction, or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather.

Fire Hazards

The fire hazards caused by transmission lines are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines. No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. However, safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields. The potential for nuisance shocks around the proposed line would be minimized through standard industry grounding practices specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE).

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows, and exposure to them together is generally referred to as *EMF exposure*. The available evidence as evaluated by various regulatory agencies is that a significant health hazard to humans exposed to such fields has not been established. There are no health-based federal regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

1. Any exposure-related health risk to the exposed individual will likely be small.

2. The most biologically significant types of exposures have not been established.

3. Most health concerns are about the magnetic field.

4. There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

3.12.8 Traffic and Transportation Safety

Access to the GSEP would be off Interstate 10 (I-10) via the Wiley's Well Road Interchange, which can be accessed by both eastbound and westbound traffic, and then north to a new six and half mile paved access road extending north and west from the existing Wiley's Well Road (see **Figure 3.12-1**).

Local Highways and Roads

The following roads are located in the vicinity of the project site, Interstate 10 (I-10), United States 95 (US-95) and Wiley's Well Road (see **Figure 3.12-2**).

Interstate 10 (I-10)

Interstate 10 (I-10) is a four-lane, limited access, divided, east-west interstate highway. The California segment is a major traffic corridor that links the Greater Los Angeles Metropolitan Region eastward through the California desert, Arizona, and ultimately terminates at Jacksonville, Florida. Due to the limited number of interchanges off I-10 in the vicinity, access to the GSEP is provided only from the Wiley's Well Road Interchange, which can be accessed by both eastbound and westbound traffic. According to the Department of Transportation (Caltrans) 2008 average annual daily traffic (AADT) counts, I-10 carried approximately 24,600 vehicles west of Wiley's Well Road and 27,000 vehicles east of Wiley's Well Road.

United States 95 (US-95)

US-95 is a two-lane, north-south highway that traverses from the Canadian border in Idaho to the Mexican border near Yuma, Arizona. According to the Department of Transportation (Caltrans) 2008 average annual daily traffic (AADT) counts, US-95 carried approximately 3,500 vehicles north of I-10. In the vicinity of the GSEP the highway lacks bicycle or pedestrian facilities.

Wiley's Well Road

Wiley's Well Road is a two-lane, arterial road accessed by eastbound and westbound traffic from the I-10 Wiley's Well Road Interchange. This road runs north of I-10 to serve the Department of Transportation (Caltrans) Wiley's Well Road Rest Area and terminates and south of I-10 to the Chuckawalla Valley and Ironwood State Prisons and points south. Access to the GSEP would be via a new six and half mile paved road extending north and west from Wiley's Well Road. The posted speed limit is 20 mph through the Wiley's Well Road Rest Area and the road lacks bicycle or pedestrian facilities.

Rail Service

There is no freight rail service in the GSEP area. The nearest siding to the GSEP within Riverside County, or Vidal, California is located in San Bernardino County.

In addition, no regional passenger railroad serves the project area. The nearest rail passenger service is an Amtrak station in Palm Springs, California or Yuma, Arizona.

3.12.9 Worker Safety and Fire Protection

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. See Table 1-1.

3.12.10 Public and Private Airstrips/Airfields

One airport (Blythe) is located in the general vicinity of the Project site, located at 11710 West Hobsonway approximately 15 miles east of the Project site. The airport is open to the public and averages 69 flights per day. The airport has two runways, which are 6,580 and 5,800 feet long, respectively. Blythe Airport does not have a traffic control tower, so no formal air traffic control services are available. There are no commercial passenger flights operating out of this airport.

The Quail Military Operations Area is located north of Blythe Airport. The Abel Military Operations Area is located southwest of Blythe Airport. The GSEP is not located within any restricted military areas.

3.12.11 Geologic Hazards

The GSEP lies within the Sonoran Desert subprovince, which is a relatively stable tectonic region located in southeastern California, southwestern Arizona, southern Nevada, and northern Mexico. California Department of Conservation's *Map Sheet 49 – Epicenters and Areas Damaged by M>5 California Earthquakes 1800 – 1999* indicates eastern Riverside County did not experience any damaging earthquakes or ground shaking during this period (GSEP, 2009). The nearest fault defined by the State of California as "Sufficiently Active" is located more than 46 miles (74 km) from the GSEP.

Local Faulting and Seismicity

The GSEP site lies within the eastern part of Riverside County in a part of California considered not to be very seismically active. Although there are several bedrock faults off-site in the mountains surrounding Chuckwalla Valley, these do not exhibit recent activity and are presumed to be Tertiary or pre-Tertiary in age (GSEP 2009). In addition, gravity anomalies suggest the presence of several subsurface faults beneath Chuckwalla Valley in the vicinity of the project area (GSEP 2009). The gravity anomalies reflect abrupt changes in basement elevation strongly suggestive of dip-slip movements. In addition, some of these faults may have undergone right-lateral strike slip movements. These faults are presumed Tertiary and likely inactive with very low chance of earthquakes.

The active faults considered most likely to produce large earthquakes potentially affecting the GSEP site are located at a considerable distance to the west and southwest and include the San Andreas, Imperial, and San Jacinto-Anza faults. Other smaller faults are located within approximately 100 kilometers (km) of the GSEP site as summarized in **Table 3.12-1**. These faults are believed to be capable of producing ground shaking with peak ground accelerations exceeding 0.10 times the force of gravity (0.10 g).

Geologic Hazards

Geologic hazards are normally associated with issues such as seismicity (ground shaking), slope instability, subsidence, and expansive soils. Seismic hazards related to ground shaking include ground rupture, slope instability, liquefaction, seismic compaction, tsunamis, and seiches. With the exception of tsunamis and seiches, these hazards are discussed in greater detail below. Because there are no open water bodies located in the vicinity of the GSEP site or the off-site linear facilities associated with the GSEP, tsunami and seiche hazards do not exist.

TABLE 3.12-1
ACTIVE FAULTS WITHIN 100 KILOMETERS OF THE GSEP

Fault Name	Approximate Distance and Direction from Project site	Slip Rate (mm/year)	Maximum Earthquake Magnitude
San Andreas Fault	46 miles (74 km) southwest	>5	7.4
Brawley Seismic Zone	47 miles (76 km) miles southwest	1 to >5	7.2
Pinto Mountain Fault	54 miles (86 km) west-northwest	1 to 5	7.0
Pisgah- Bullion Fault	57 miles (91 km) northwest	0.2 to 1	7.1
Imperial Fault	61 miles (98 km) southwest	>5	7.0
San Jacinto-Anza Fault	61 (98 km) miles southwest	1 to >5	7.2

SOURCE: GSEP, 2009 Table 5.5-2.

Seismic Ground Shaking

Although the GSEP site is not located in a very seismically active area, it may be subjected to ground shaking from movement along one or more of the sufficiently active or well-defined faults in the adjacent, more seismically active areas such as the Salton Trough, the Transverse Ranges, or Central Mojave Block. The California Geological Survey defines a “sufficiently active fault” (previously referred to as an “active fault”) as a fault that has broken the surface in the past 11,000 years. A “well-defined fault” (previously referred to as “potentially active fault”) is defined as a fault whose trace is clearly detectable by a trained geologist as a physical feature at or just below the ground surface.

The Riverside County General Plan, Safety Element indicates the GSEP site and the off-site linear facilities are in an area of moderate ground shaking risk, which means peak ground accelerations may reach 0.1 to 0.2 g (GSEP 2009). A preliminary seismic hazard analysis indicates the peak ground acceleration with a probability of exceedance of 10 percent in 50 years (475 Year Return Period) is 0.14 g. The 0.1 g value is an industry standard for significance in terms of foundation design; however, higher potential accelerations can be routinely managed with proper foundational design and site specific geotechnical investigation.

Based on the available data, the GSEP site is subject to low to moderate seismic ground shaking hazard.

Ground Rupture

The GSEP site is not located within a State of California Earthquake Fault Zone designated by the Alquist-Priolo Special Studies Zone Act of 1972 (formerly known as a Special Studies Zone), an area where the potential for fault rupture is considered probable (GSEP 2009). In addition, no Quaternary, Sufficiently Active, or Well Defined Faults are located under or near the GSEP site.

Slope Stability

The GSEP site and off-site linear facilities associated are not considered to be an area with the potential for permanent ground displacement due to earthquake-induced landslides because surface topography at and near the GSEP site is relatively flat (GSEP 2009). The Riverside County General Plan, Safety Element, indicates that there are areas considered susceptible to earthquake-induced landslides and rockfalls in the Palen and McCoy Mountains; however, these areas are several miles from the GSEP site.

Erosion

Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. See Section 4.15 for a discussion of erosion associated with the GSEP.

Liquefaction

Liquefaction is a soil condition in which seismically-induced ground motion causes an increase in soil water pressure in saturated, loose, uniformly-graded sands, resulting in loss of soil shear strength. As a result, the effects of liquefaction can include loss of bearing strength, differential settlement, ground oscillations, lateral spreading, and flow failures or slumping. Liquefaction occurs primarily in areas where the groundwater table is within approximately 50 feet of the surface (GSEP 2009). The Riverside County General Plan Safety Element indicates the majority of Chuckwalla Valley, including the soils beneath the GSEP site and associated off-site linear facilities, is mapped as having deep groundwater but underlain by soils with an otherwise moderate susceptibility to liquefaction (GSEP 2009). The depth to water beneath the GSEP site is estimated to range from approximately 61 to 94 feet bgs (see Section 3.21). In addition, the sandy soils encountered in the upper 100 feet beneath the GSEP site during geotechnical drilling are generally dense and well graded, and typically contain a significant percentage of fines. Dense, well-graded sands are not generally considered susceptible to liquefaction.

Subsidence

Subsidence, or a lowering of surface elevation due to removal of subsurface support, can result from several causes, and ranges from small or local collapses to broad regional lowering of the earth's surface. Potential causes of subsidence include tectonic movement, seismic compaction, hydrocompaction, consolidation induced by groundwater withdrawal, and consolidation under applied loads. Of greatest concern to structures at the GSEP site is localized or differential settlement that can damage foundations, structures, and surface improvements. More widespread subsidence has regional implications and can be damaging to regional drainage, water conveyance, flood susceptibility, and other factors.

Ground subsidence can occur as a result of water level decline in aquifer systems. When the fluid pressure in an aquifer is reduced as a result of changes in the groundwater level, a shift in the balance of support for the overlying materials causes the “skeleton” of the aquifer system to deform slightly. Reversible deformation occurs in all aquifer systems as a result of the cyclical rise and fall of groundwater levels associated with short and longer term climatic cycles. Permanent ground subsidence can occur when pore water pressures in the aquifer fall below their lowest historical point, and the particles in the aquifer skeleton are permanently rearranged and compressed. Soils particularly susceptible to such consolidation and subsidence include compressible clays in a confined aquifer system. This type of deformation is most prevalent when confined alluvial aquifer systems are overdrafted, resulting in water level declines of tens or hundreds of feet.

Based on the general geology of the Chuckwalla Valley, the Riverside County General Plan, Safety Element designates basin fill sediments in the valley as being susceptible to subsidence. However, subsidence has not been reported in the Valley (GSEP 2009).

Seismically induced settlement can occur during moderate and large earthquakes in soft or loose, natural or fill soils that are located above the groundwater table, resulting in differential settlement. The settlement can cause damage to surface and near-surface structures. The most susceptible soils are clean loose granular soils. Due to the expected dense to very dense nature of the near surface soils, the potential for damage due to seismically-induced settlement is considered to be low at the GSEP site.

Collapsible Soil Conditions

Alluvial soils in arid and semi-arid environments can have characteristics that make them prone to collapse with increase in moisture content and without increase in external loads. Soils that are especially susceptible to collapse or hydrocompaction in a desert environment are loose dry sands and silts, and soils that contain a significant fraction of water soluble salts. In the GSEP site vicinity, this would include aeolian sand, playa evaporite deposits, and potential loose flash flood deposits. Based on surface reconnaissance, review of geologic mapping, and review of aerial photographs, although there are aeolian deposits south of the GSEP site near Ford Dry Lake, no significant aeolian or playa deposits are located within the GSEP site. The near surface soils at the GSEP site are composed primarily of alluvial soils which appear to have been deposited in relatively thin sheet flood and fluvial deposits which have a low potential for hydrocompaction.

Expansive Soil

Expansive soil is predominantly fine-grained and contains clay minerals capable of absorbing water in their crystal structure. It is often found in areas that were historically a flood plain or lake area, but can also be associated with some types of shale, volcanic ash, or other deposits, and can also occur in hillside areas. Expansive soil is subject to swelling and shrinkage, varying in proportion to the amount of moisture present in the soil. As water is initially introduced into the soil (by rainfall or watering), expansion takes place. If dried out, the soil will contract, often leaving small fissures or cracks. Excessive drying and wetting of the soil can progressively deteriorate structures that are not designed to resist this effect, and can lead to differential settlement under buildings and other improvements. The surficial soils at the GSEP site generally consist of predominantly granular soils that do not contain much clay and are not subject to significant expansion hazards.

3.13 Recreation

3.13.1 On-site Allowable Recreational Uses

Recreational uses on public lands at the proposed project site are guided by the California Desert Conservation Area Plan 1980, as amended (CDCA Plan) (BLM, 1980); and the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO).The site is designated in the CDCA and NECO Plans as Multiple Use Class M (Moderate Use). The Class M category is suitable for a range of recreation activities, which generally involve moderate to high user densities, including backpacking, primitive unimproved site camping, hiking, horseback riding, rockhounding, nature study and observation, photography and painting, rock climbing, spelunking, hunting, land sailing on dry lakes, noncompetitive vehicle touring, and events only on "designated open" routes of travel. (BLM 1980; BLM 2002). Recreational opportunities include those permitted in Class L and C (BLM, 2002). Permanent or temporary facilities for resource protection and public health and safety are allowed. (BLM 1980). Recreational vehicle use, including off-highway vehicle (OHV) use, is discussed in FEIS Section 3.18. Primary activities observed on the site by BLM staff include OHV touring and sightseeing, photography, rockhounding, hiking, and hunting. Camping or backpacking is not common. There are no recreation facilities or specific recreational attractions on the site. The BLM has no visitor counts for the site but visitor use is estimated to be low due to the availability and accessibility of recreation opportunities in the surrounding area. Most use is by local residents from Desert Center and Blythe, or visitors stopping for short periods while traveling on Interstate 10.

3.13.2 Recreational Areas and Opportunities in the GSEP Area

The Palo Verde Valley offers myriad outdoor recreational opportunities for boating, water skiing, jet skiing, swimming, fishing, canoeing, camping, rock hounding, hiking, archery, hunting, horseback riding, trapping, trap & skeet shooting, and OHV use. Within the Palo Verde Valley, the City of Blythe provides for year-round sporting activities. The Blythe Parks Department oversees eight parks (approximately 74 acres total), including five neighborhood parks, two community parks, and one regional park. The "Big Foot Skate-board Park" is located at Todd Park. Other recreational opportunities in Blythe include the Blythe Municipal Golf Course; Blythe Skeet & Trap Club (a shooting range and gun club); Blythe Marina; soccer, football, track and volleyball leagues; and indoor racquetball, basketball, aerobic activities, weight room, and summer swimming. Various nearby privately-owned recreational vehicle (RV) parks and campgrounds also provide recreational facilities, including a boat dock, launch ramp, fishing, swimming, horseshoe pits, wildlife observation and other active and passive recreation opportunities (Blythe 2007).

Recreational opportunities along the Colorado River include power boating, canoeing, fishing, hunting and other water sports, among others. In addition, two wildlife preserves border the Colorado River just south of Blythe. First, the Cibola National Wildlife Refuge can be reached from the California side of the Colorado River, just south of Blythe, or, from the Arizona side, south of Quartzsite. This refuge was established in 1964 as mitigation for dam construction on the Colorado

River, and provides important habitat for migratory birds, wintering waterfowl and resident species. Second, the Kofa National Wildlife Refuge is located approximately 30 miles east of Blythe in southern Arizona. Bird-watching and wildlife-viewing occur in each of these preserves.

In addition, the BLM administers wilderness areas, campgrounds, including long term visitor areas (LTVAs), trails, interpretive sites, and an extensive network of backcountry approved travel and OHV routes in the vicinity of the site. Areas of critical environmental concern (ACECs) and wilderness also provide dispersed recreation opportunities in the region. Overall, recreation use on BLM lands in the vicinity of the project is limited to the cooler months of September through May, with little or no use in the summer. Popular recreation activities include car and RV camping, OHV riding and touring, hiking, photography, hunting (dove, quail, deer), sightseeing and visiting cultural sites. Outside of fee collection sites, the BLM has no accurate estimates of visitor use, but staff observations and Ranger patrols indicate the area described in this section received 2,000 to 3,000 visitors per year. Local residents and long-term winter visitors make up the majority of the use. These areas are identified in Table 3.13-1, beginning with the area closest to the site, and are discussed below.

TABLE 3.13-1
RECREATION AREAS AND SPECIAL DESIGNATIONS WITH RECREATIONAL OPPORTUNITIES

Recreation Area	Approximate Distance from the Proposed GSEP Site	Approximate Size
Special Designations Sites with Recreation Opportunities		
Palen/McCoy Wilderness	Abuts the northern boundary	236,488 acres
Chuckwalla Valley Dune Thicket ACEC	Abuts the linear facilities ROW	2,273 acres
Palen Dry Lake ACEC	Abuts the western ROW boundary	3,632 acres
Little Chuckwalla Mountains Wilderness	5 miles south	28,034 acres
Chuckwalla Desert Wildlife Management Area ACEC	5 miles south	352,633 acres
Chuckwalla Mountains Wilderness	7 miles southwest	99,548 acres
Mule Mountains ACEC	12 miles southeast	4,092 acres
Joshua Tree Wilderness	15 miles northwest	594,502 acres
Palo Verde Mountains Wilderness	15 miles southeast	30,605 acres
Desert Lily Preserve ACEC	15 miles northwest	2055 acres
Corn Springs ACEC	15 miles southwest	2467 acres
Alligator Rock ACEC	15 miles west	7754 acres
Developed Recreation Sites		
Mule Mountains LTVA	13 miles south	3,424 acres
Wiley Well Campground	13 miles south	14 units
Bradshaw Trail Back Country Byway	13 miles south	65 miles long
Coon Hollow Campground	15 miles south	28 units

SOURCE: BLM 2009d; BLM 2002; Nelson 2010.

Wilderness Areas

Wilderness Areas are shown in Figure 3.13-1 and described in FEIS Section 3.16. As indicated in Table 3.13-1, five wilderness areas are located in the vicinity of the site: the Palen/McCoy Wilderness, Chuckwalla Mountains Wilderness, Joshua Tree Wilderness, Palo Verde Mountains Wilderness and Little Chuckwalla Mountains Wilderness.

The Wilderness Act limits allowable types of recreation on wilderness lands to those that are primitive and unconfined, depend on a wilderness setting, and do not degrade the wilderness character of the area. Motorized or mechanized vehicles or equipment are not permitted in wilderness. The BLM regulates such recreation on such lands within its jurisdiction in accordance with the policies, procedures and technologies set forth in the Code of Federal Regulations (43 CFR 6300), BLM Manual 8560 (*Management of Designated Wilderness Areas*) (BLM 1983), BLM Handbook H-8560-1 (*Management of Designated Wilderness Areas*) (BLM 1985), and BLM's Principles For Wilderness Management In The California Desert. (BLM 1995). More specifically, camping, hiking, rockhounding, hunting, fishing, non-commercial trapping, backpacking, climbing, and horseback riding are permissible. (BLM 1988; BLM 1983). By contrast, physical endurance contests (such as races, competitive trail rides and survival contests), commercial recreational activities, and the use of motorized or mechanized vehicles (including off-highway vehicles [OHVs], aircraft and motor boats) generally are prohibited. (16 USC 1133(c); BLM, 1995; BLM, 1988; BLM, 1983).

The five wilderness areas in the vicinity of the project have no developed trails, parking/trailheads, or other visitor use facilities. These areas are generally steep, rugged mountains, with no permanent natural water sources, thus limiting extensive hiking or backpacking opportunities. Visitor use within the wilderness areas is very light, though BLM has no visitor use counts. Observations by staff and Law Enforcement Rangers indicate only 100 to 200 hikers per year within the wilderness areas. More popular is vehicle camping along roads that are adjacent to the wilderness areas. RV camping near wilderness areas, with associated hiking, OHV use, photography, sightseeing, etc. accounts for up to 2,000 visitors per year.

Long Term Visitor Areas (LTVAs)

The BLM manages seven Long Term Visitor Areas (LTVAs): five are in California, two are in Arizona. LTVAs accommodate visitors who wish to camp for as long as seven consecutive months. Winter visitors who wish to stay in an LTVA must purchase either a long term permit for $180 that is valid for the entire season or any part of the season (which runs from September 15 through April 15), or a short visit permit for $40 that is valid for 14 consecutive days. Permit holders may move from one LTVA to another within the permitted timeframe without incurring additional fees. Activities in and use of LTVAs are regulated by the rules of conduct set forth in 43 CFR subpart 8365 and the more than 30 supplemental rules that the BLM has determined are necessary to provide for public safety and health and to reduce the potential damage to natural and cultural resources of the public lands.

As indicated in Recreation Table 3.13-1, one LTVA is located in the vicinity of the site, the Mule Mountains LTVA. The Mule Mountains LTVA provides long-term camping opportunities. In addition to long-term camping, recreational opportunities at LTVAs include hiking, OHV use, rockhounding; viewing cultural sites, wildlife and unique desert scenery; and solitude. (BLM LTVA Supplementary Rule 21; BLM 2010 [LaPosa LTVA]; Wildernet 2010). By contrast, the landing or take-off of aircraft, including ultra-lights and hot air balloons, is prohibited in LTVAs. (BLM LTVA Supplementary Rule 25).

Two campgrounds are located within the boundaries of the Mule Mountains LTVA: Wiley's Well and Coon Hollow Campgrounds. Both are year-round facilities with campsites, picnic tables, grills, shade ramadas and handicapped-accessible vault toilets. (BLM 2010 [Trigo Mountains]).

Areas of Critical Environmental Concern (ACECs)

ACECs are shown in Figure 3.13-1 and described in FEIS Section 3.16. As indicated in Recreation Table 3.13-1, seven ACECs are located near the site: the Mule Mountains ACEC, Chuckwalla Valley Dune Thicket ACEC, Palen Dry Lake ACEC, Chuckwalla Desert Wildlife Management Area ACEC, Desert Lily Preserve ACEC, Corn Springs ACEC and Alligator Rock ACEC. Recreation activities allowed in ACECs are determined by the resources and values for which the ACECs were established, and by the associated ACEC Management Plan. Most ACECs allow low-intensity recreation use that is compatible with protection of the relevant values.

The Mule Mountains, Alligator Rock, and Corn Springs ACECs primarily protect cultural resources. The Chuckwalla DWMA and Desert Lily ACECs protect sensitive wildlife and plant species, while Chuckwalla Valley Dune Thicket and Palen Dry Lake ACECs protect both natural and cultural resources. Other than Corn Springs, these ACECs do not have recreation use facilities, but are signed to inform visitors of the special values of the areas and associated protection measures. BLM has no visitor counts for these sites, but observations and patrols indicate very low use, in the hundreds per year.

Other Recreational Areas and Opportunities

The Bradshaw Trail

The Bradshaw Trail is a 65-mile BLM Back Country Byway which begins about 35 miles southeast of Indio, California (see Figure 3.13-1). The trail's eastern end is about 15 miles southwest of the City of Blythe. It was the first road through Riverside County, blazed by William Bradshaw in 1862 as an overland stage route beginning in San Bernardino, California, and ending at Ehrenberg, Arizona. The trail was used extensively between 1862 and 1877 to transport miners and passengers. The trail is a graded dirt road that traverses mostly public land between the Chuckwalla Mountains and the Chocolate Mountain Aerial Gunnery Range. Recreational opportunities include four-wheel driving, wildlife viewing, plant viewing, birdwatching, scenic drives, rockhounding, and hiking. (BLM [Bradshaw]).

3.14 Social and Economic Setting

3.14.1 Social

This section describes the social and demographic background and existing conditions in the proposed action area, which is located in the eastern portion of unincorporated Riverside County. The proposed action area is located approximately 25 miles west of the City of Blythe and 27 miles east of the community of Desert Center. Additionally, this section discusses applicable plans, policies, and regulations that represent the social aspirations, community characteristics, and desired lifestyle, values, and goals of the stakeholders. These plans, policies, and regulations are necessary to understanding social group concerns in the context of renewable energy development. Information in this section is based on regional and national sources as well as input received from members of the public during the scoping process. The primary comments and concerns related to socioeconomic conditions were raised during scoping where the economic effects associated with construction, implementation, and operation of the Genesis Solar Energy Project (GSEP).

Applicable Plans, Policies and Regulations

Riverside County

1. Local goals and policies for Riverside County's future planning are described within the County's General Plan. The following General Plan goals and policies are relevant to evaluating how socioeconomic resources may be affected by the proposed action:

2. *Land Use Policy 1.1*: Allow for the continued occupancy, operation, and maintenance of legal uses and structures that exist at the time of the adoption of the General Plan and become non-conforming due to use, density, and/or development requirements.

3. *Land Use Policy 1.*5: The County shall participate in regional efforts to address issues of mobility, transportation, traffic congestion, economic development, air and water quality, and watershed and habitat management with cities, local and regional agencies, stakeholders, Indian nations, and surrounding jurisdictions.

4. *Land Use Policy 7.*1: Accommodate the development of a balance of land uses that maintain and enhance the County's fiscal viability, economic diversity, and environmental integrity.

5. *Housing Element Goal 1*: To assist in the development of adequate housing to meet the County's fair share of the region's housing needs for all economic segments of the population, with an emphasis on lower income households and households with special needs.

6. *Housing Element Goal 2*: To conserve and improve the condition of the housing stock, particularly affordable housing.

City of Blythe

The main local plans, policies, and goals for the City of Blythe's future community development are described within the City's General Plan and the City's Redevelopment 2005-2009 Implementation Plan. The following General Plan goals are relevant to evaluating how socioeconomic resources may be affected by the proposed action:

1. *Land Use Policy 1*: Preserve the scale and character of established neighborhoods.
2. *Land Use Policy 2*: Encourage new residential growth in the form of neighborhoods.
3. *Land Use Policy 6*: Provide for appropriate relationships between higher density and lower density residential areas, and require buffers of varying size between residential uses and non-residential uses without restricting foot and bicycle access.
4. *Land Use Policy 19*: Ensure that industrial development is compatible with and does not adversely affect the natural environment.
5. *Housing Element Goal 1* (Overall Housing Production): Provide housing to meet the present and future needs of residents in the City of Blythe and to aim at providing a fair share of the area housing needs, within identified governmental, market, economic and natural constraints.
6. *Housing Element Goal 2* (Housing Affordability): Facilitate the development of programs that will provide quality housing for those who otherwise would have difficulty affording such housing at market rates. Specifically, such programs will be directed at low and particularly very low income groups.
7. *Redevelopment Agency Goal 1*: Preserve and enhance the economic prosperity of the community and aid business development and retention.

Social Conditions

The proposed action includes the construction and operation, and ultimately the closure and decommissioning, of a solar energy generating facility located in the Southern California inland desert, approximately 25 miles west of the City of Blythe, in eastern Riverside County, California.

The expected catchment area for the GSEP's construction workers' daily work commuting is a primary determinant for the affected social and economic environment associated with the GSEP. As discussed in more detail in Section 4.13, *Social and Economic Impacts*, the origin of the GSEP workers likely would be a central factor determining the magnitude and extent of the proposed action's potential socioeconomic impacts to the local and regional communities and economy. The direct benefits of employment and higher personal incomes will primarily benefit the communities were workers and their families reside since that would likely be where they spend most of their earnings. Workers' spending for goods and services also would have an indirect effect on the communities and economies where that spending occurs.

If there would be an insufficient number of suitable workers to staff the proposed action locally or in the region, then the GSEP could attract individuals to relocate to the area (either temporarily or permanently), which consequently could result in increased demand for housing and local services.

There is little research and analysis providing guidance for determining the socioeconomic impact area boundaries for power facilities. The widely referenced EPRI analysis (EPRI 1982) is generally cited as research showing that workers may commute as much as two hours each direction from their communities rather than relocate (Blythe 2009). In addition, recent testimony by a representative of the Riverside/San Bernardino Building Trades Council also stated the opinion that construction workers associated with the proposed action could commute daily two to three hours each way (CEC 2010).

However, the common representation of the EPRI study findings may overestimate the likelihood of construction workers commuting *daily* for GSEP-related employment and appears to misrepresent the cited EPRI report findings. The EPRI importantly distinguishes between “daily commuting,” “weekly commuting” and relocation (or in-migration). The EPRI study also acknowledges a prevalence of weekly commuting for power projects and reported 1.42 hours as the average “construction workers maximum daily commuting time” observed amongst its 12 case studies. The study also estimated that the average maximum daily commute distance was 73 miles.[1] The report also identifies other factors (e.g., quality life) determining the amount of commuting (daily and weekly) versus relocation likely to occur.

In addition, from its case studies, the EPRI also determined that “(o)verall, the proportion of in-migrants ranges from 5 to 50 percent for construction workers and 5 to 84 percent for operating staff.” Furthermore the study also observed that: “(1) more in-migration is required in rural, remote areas; (2) the existence of a regional work force experienced in power plant construction reduces in-migration; (3) weekly commuting is more widely practiced in the West, or in rural areas.”

For the purposes of the socioeconomic affected environment and analysis, and as a conservative assumption recognizing the rural nature of eastern Riverside County, a two-hour daily commute radius is used to define the regional study area. Figure 3.14-1 depicts contours from the site up to a two-hour commute shed to show the potential estimated travel time for project workers’ commute to the site.

As can be seen in Figure 3.14-1, and estimated by ESA based on similar analysis by EDAW for the Blythe Solar project, the two-hour commute shed is shown to extend into parts of San Diego, Imperial and San Bernardino Counties in California. The commuter radius also extends into western Maricopa County in Arizona and as far as Banning in Riverside County to the east. The north-eastern boundary for commute radius includes the very small community of Morongo Valley within San Bernardino County just north of its border with Riverside County.

However, given that there are no major populated urban centers located within the Counties of San Diego, Imperial and Maricopa Counties, these areas are not included in the regional study area for the proposed action. The relatively small community of Twentynine Palms is shown to be within the outermost limits of the two-hour radius, given both the relatively poor roadway

1 This estimate was strongly influenced by one project (Laramie River) that reported a maximum daily commute distance of 115 miles.

connection along Route 62 (suggesting that actual commute time may be higher) and the prevalence of other solar projects closer to these communities, it is expected that relatively few if any San Bernardino residents would commute daily to work at the GSEP site. Consequently, for the purposes of the social and economic analysis, the regional study area is determined to consist predominantly of eastern Riverside County in California and La Paz County in Arizona. In addition, the small city of Twentynine Palms, the community of Morongo Valley and their respective nearby unincorporated areas of San Bernardino County.

As required by the BLM Land Use Planning Handbook, Appendix D requirements (BLM 2009), the analysis of a proposed action of this type needs to consider existing socioeconomic conditions and impacts on several geographic scales. An analysis at a local level presents a challenge because the proposed action is in a sparsely populated area, with the largest urban center being the City of Riverside, located approximately 143 miles west of the site.

Based on BLM guidelines, a reasonable study area for localized socioeconomic impacts would, at a minimum, include the three nearest communities: the City of Blythe, California (approximately 25 miles east of the site); the very small community of Desert Center, California; the City of Ehrenburg, Arizona (approximately 30 miles east of the site); and the City of Quartzsite, Arizona (approximately 42 miles east of the site). These cities represent all the major communities located within an hour commute of the site and therefore together represent the local study area for the proposed action.

Population

The current population estimates and recent growth trends for both the regional and local study areas are summarized in Table 3.14-1. All the cities determined to be located within a two-hour commute of the site are shown. In addition, data for Riverside, San Bernardino, and La Paz Counties are presented.

Zip code population estimates were used to estimate the approximate size and location of the residential populations within the unincorporated areas of eastern Riverside County located within the two-hour commute distance of the site. Figure 3.14-1 also shows both the five digit zip code areas and the 2010 estimated population living within each zip code. The unincorporated communities of Cabazon, Desert Center, Mecca, Thermal and Thousand Palms are represented within the unincorporated area population estimates of Riverside County. The unincorporated community of Morongo Valley is also represented within the unincorporated area population estimates of San Bernardino County. While the population estimates for the unincorporated areas are only approximate, Figure 3.14-1 shows that the areas east of Coachella are very sparsely populated and that the most of the population within the regional study area live more than a 90-minute drive from the site. The total population of eastern Riverside County within the regional study is estimated to be 521,707, which represents approximately 24.4 percent of the Riverside County's total population.

TABLE 3.14-1
POPULATION PROFILE OF THE REGIONAL STUDY AREA

	Population		
	Year		
Area	**2000 Population**	**2010 Population**	**Average Annual Growth Rate (2000 – 10)**
Riverside County, CA	1,545,387	2,139,535	3.3%
Blythe	20,465	21,812	0.6%
Coachella	22,724	42,591	6.5%
Indio	49,116	83,675	5.5%
Indian Wells	3,816	5,144	3.0%
La Quinta	23,694	44,421	6.5%
Palm Desert	41,155	52,067	2.4%
Rancho Mirage	13,249	17,006	2.5%
Cathedral City	42,647	52,067	2.0%
Palm Springs	42,805	48,040	1.2%
Desert Hot Springs	16,582	26,811	4.92%
Banning	23,562	28,751	2.00%
Unincorporated Area[a]	64,269	99,322	4.5%
Eastern Riverside County, CA	364,084	521,707	3.6%
San Bernardino County, CA	1,710,139	2,073,149	1.9%
Twentynine Palms[b]	14,764 (est)	16,877	1.4%
Unincorporated Area	5,890	10,580	6.0%
South San Bernardino County, CA	20,654	27,457	2.9%
La Paz County, AZ	19,715	21,616 [c]	0.9%
Ehrenburg	1,357	1,488 [c](est)	0.9%
Quartzite	3,354	3,731 [c]	1.1%
Cibola	172	189 [c] (est)	0.9%
Unincorporated Area[d]	4,226	4,621	0.9%
Western La Paz County, AZ	9,109	10,029	1.0%
Local Study Area[e]	25,176	26,781	0.7%
Regional Study Area	392,908	559,193	3.5%

NOTES: Cities are show (by County) in order of their relative distance from the project site.

[a] Adjusted to remove Chuckwalla and Iron Wood State Prison population.
[b] Estimated population to adjust for Twentynine Palms Military Base.
[c] 2009 Data
[d] Consists of entire remainder of La Paz County except for the population of the City of Parker (3,401) and the estimated Colorado River Reservation population (8,186).
[e] Blythe, CA; Ehrenburg, AZ and Quartzite, AZ.

SOURCE: California Department of Finance, 2010; Arizona Department of Commerce, 2010.

Housing

Current housing conditions for the regional and local study areas are summarized in Table 3.14-2. All the cities determined to be located within a two-hour commute of the site are shown. In addition, data for Riverside, San Bernardino, and La Paz Counties are presented.

In 2010, Riverside County had 784,357 total housing units, with a vacancy rate of 13.0 percent. Also shown in Table 3.14-2, the regional study area contains a high number of housing units, with La Paz County having the highest vacancy rate.

Among the cities in Riverside County relevant to the proposed action,[2] Palm Springs had the highest vacancy rate (33.4 percent), and is behind only Palm Desert in number of housing units, with 33,479. Among the cities in La Paz County relevant to the Project, Cibola had the highest vacancy rate (60.0 percent), but Quartzsite had the highest number of vacant units at 1,336.

Population Projections

The forecasted population trends for Riverside, San Bernardino, and La Paz Counties are shown in **Table 3.14-3**. The projected population growth for eastern Riverside County is estimated based on the county-wide growth projections. Population growth in Riverside County is expected to slow over the next few decades. The growth rate is projected to be 3 percent per year between 2010 and 2020, and then to fall to 2.1 percent per year between 2020 and 2030. The population projections discussed above were made prior to the economic recession that began in 2008, likely explaining the decrease in the 2010 actual population estimate for Riverside County and that previously estimated for the future population growth projections.

Temporary Housing Resources

Rental Homes

As shown above in Table 3.14-2, vacancy rates are high in the study area. Based on reported current vacancy rates for the City of Blythe, approximately 881 vacant housing units are unoccupied in 2010 and may be available for rental (or purchase) by future GSEP workers. Similarly, the data also suggests that up to 1,594 local housing units may be available within the cities of Ehrenburg and Quartzsite, Arizona.

However, the condition, suitability, and availability of the existing housing resources for use as temporary housing for GSEP-related construction workers is unknown. In addition, as shown by the high vacancy rates elsewhere in the region study area, some “vacant” homes may be second homes and, therefore, less likely to be available for use as temporary housing.

[2] The high vacancy rates for the affluent cities of Indian Wells and Rancho Mirage primarily reflect a large proportion of vacation homes and these cities are not expected to provide much of the project workers population.

TABLE 3.14-2
HOUSING PROFILE OF THE REGIONAL STUDY AREA (2010)

Housing		
	Year	
Area	**2010 Total Housing Units**	**2010 Vacancy Rate**
Riverside County, CA	784,357	13.0%
Blythe	5,472	16.1%
Coachella	9,145	4.4%
Indio	28,167	18.0%
Indian Wells	5,025	48.4%
La Quinta	21,491	28.5%
Palm Desert	34,425	30.9%
Rancho Mirage	13,542	38.6%
Cathedral City	21,527	21.5%
Palm Springs	33,603	33.4%
Desert Hot Springs	11,073	16.7%
Banning	11,644	8.4%
Unincorporated Area	36,990 (est)	15.3%
Eastern Riverside County, CA	232,104	23.7%
San Bernardino County, CA	693,712	11.58%
Twentynine Palms	9,228	14.7%
Unincorporated Area	4,650 (est)	28.3%
Eastern San Bernardino County, CA	13,878	19.3%
La Paz County, AZ	16,765 [a]	45.0% [a]
Ehrenburg	824 [b]	34.9% [b]
Quartzite	3,541 [a]	41.9% [b]
Cibola	161 [b]	60.0% [b]
Unincorporated Area[c]	4,262 [a] (est)	49.5% [a]
Western La Paz County, AZ	8,788 [a]	45.3% [a]
Local Study Area[d]	9,837	25.2%
Regional Study Area	219,328	25.0%

NOTES: Cities are show (by County) in order of their relative distance from the project site.

a 2009 Data
b 2000 Data
c Consists of entire remainder of La Paz County except for the population of the City of Parker (3,401) and the estimated Colorado River Reservation population (8,186).
d Blythe, CA; Ehrenburg, AZ and Quartzite, AZ.

SOURCE: California Department of Finance, 2010; Arizona Department of Commerce, 2010.

TABLE 3.14-3
POPULATION PROJECTIONS FOR RIVERSIDE COUNTY AND THE REGIONAL STUDY AREA

	Population			
	Year			
Area	2010 Actual Population	2010 Projected Population	2020 Projected Population	2030 Projected Population
Riverside County, CA	2,139,535	2,239,053	2,904,848	3,507,498
Eastern Riverside County, CA[a]	521,707	545,974	708,322	855,273
San Bernardino County, CA	2,073,149	2,177,596	2,582,777	2,957,744
South San Bernardino County, CA[a]	27,457	28,840	34,207	39,173
La Paz County, AZ	21,544	22,632	25,487	28,074
Western LaPaz County, AZ[a]	10,029	10,535	11,865	13,069
Regional Study Area	559,193	585,349	754,393	907,514

NOTES:
[a] Estimates based on Countywide growth projections.

SOURCE: GSEP 2009a, Tables 5.11-4 and 5.11-5; ESA 2010.

Hotel and Motel Accommodations

In addition to the existing residential units, GSEP construction workers and operational workers could use local lodging facilities as temporary housing. Hotel/motel lodging suitable for potential temporary housing use is typically concentrated in urban areas or near major transportation nodes. For the purposes of this analysis, only those hotels in the communities closest to the proposed action were tabulated under the assumption that construction and operations workers would congregate to this area for commuting ease.

Data compiled by Smith Travel Research for hotels and motels with 15 or more rooms identified 19 hotels with a total of 878 rooms within the local study area in 2008, which presents the most current available data (GSEP 2009a, p. 5.8-5). These hotels were all located in Blythe, which is the only community in California with hotels or motels with 15 or more rooms within one hour's driving distance.

In addition, 120 hotel/motel rooms are located in Ehrenberg and another 22 rooms are located within the City of Quartzite, Arizona (Arizona Department of Commerce, 2010). The extent that the local motel and hotels within the local study area could provide temporary housing for GSEP construction workers would depend both on the then-current room rates and occupancy rates. Typical room rates for most of the hotel/motels are currently relatively inexpensive during the off-season with quoted rates of $60 to $70 per night (not including tax). Provided operators would maintain comparable rates, these local hotel/motel rooms would likely be a possible temporary housing option particularly for workers that might be willing to share accommodations.

The average annual occupancy rate for hotels in Riverside and San Bernardino Counties in 2007 was 70.8 percent (GSEP 2009a, p. 5.8-6). Applying this ratio (70.8 percent) to the total number of hotel rooms identified within the local study are would suggests that, on average, in 2008 a total of 298 unoccupied rooms were available for rent in the local study area. However, given the seasonality of local tourism to the area, it is considered likely that higher occupancy and room rates would apply during the winter season (December to March), while higher vacancy rates lower room rates would apply during the off-season (summer and early fall) when very hot local conditions persist during the summer months.

Considerable additional hotel and motel facilities are available in the other communities within two hours of the GSEP site. Another 57 hotels with a total of 8,285 rooms were identified in communities located from one to 1.5 hours drive from the GSEP site (GSEP 2009a, p. 5.8-6). These communities include Indio, Palm Desert, Indian Wells, and Rancho Mirage. Applying the 2008 average occupancy ratio (70.8 percent) suggests that, on average, 2,419 unoccupied rooms are available for rent within 1.5 hours drive of the GSEP site. Another 129 hotels with 7,541 rooms were identified in communities within 1.5 to two hours drive from the GSEP site (GSEP 2009a, p. 5.8-6). These communities include Palm Springs and Desert Hot Springs.

However, the attractiveness of these temporary housing resources for GSEP construction workers generally would decrease the further they are located from the site. Furthermore, given the size of these hotels and their location within more affluent communities, it is likely that many of these hotels would likely have higher room rates and, therefore, would not be suitable temporary housing for GSEP workers.

Campground/RV Parks

In addition, other housing opportunities are available in the form of recreational vehicle (RV) facilities, mobile home sites, and campgrounds. Under some circumstances, these types of facilities could be usable by GSEP construction workers as temporary housing. Generally their lower cost for overnight use could make them more attractive as a potential temporary housing resource. Particularly for construction workers who may own their own RV or trailers, RV parks with utility hook-ups and other amenities would be more suitable for use during the summer and could serve as a longer-term rental for workers who prefer a weekly commute.

There are at least 10 RV parks located in the vicinity of Blythe, with a combined total of about 800 spaces (GSEP 2009a, p. 5.8-5). RV parks in Blythe tend to be located along the Colorado River and receive higher levels of use during the summer. Research performed on small sample of these RV parks suggests that, while they have a large number of spaces, many are occupied by year-round residents or are privately-owned and, therefore, would not be available for use by construction workers (GSEP 2009a, p. 5.8-6). Additional RV parks are located in Ehrenberg and Quartzsite, Arizona, approximately four miles and 20 miles east of Blythe, respectively. The town of Quartzsite's web site states there are more than 70 campgrounds in the vicinity of the community that are typically occupied between October and March, with visitors attracted to the gem, mineral, and swap meet shows which are popular tourist attractions in the area (GSEP 2009a, p. 5.8-6). Twenty local RV parks are identified by the Quartzite Chamber of Commerce as operating within Quartzite.

BLM operates two primitive campgrounds in the general vicinity of the local study area: Wiley's Well Campground and Coon Hollow Campground, both located south of I-10 on Wiley's Well Road (GSEP 2009a, p. 5.8-6). Except for "special areas" with specific camping regulations, vehicle camping is allowed anywhere on BLM-administered land within 300 feet of any posted Open Route. There are, however, no facilities in these locations and there is a 14-day limit for camping in any one location. After 14 days, campers wishing to stay in the area longer are required to move 25 miles from their original camp site (GSEP 2009a, p. 5.8-6). Long-term camping is available by permit in Long-Term Visitor Areas (LTVAs) on BLM lands. There are two LTVAs located in the vicinity of Blythe and the Project site: Mule Mountain, which includes the Wiley's Well and Coon Hollow campgrounds, and Midland, located north of the City of Blythe. BLM also operates another LTVA within the local study area at La Posa, south of Interstate 10 near Quartzsite, Arizona. LTVAs are intended for recreation use only and workers would generally not be permitted to use these areas (GSEP 2009a, p. 5.8-6). However, BLM may allow temporary LTVAs to be established on site for construction workers for the duration of project construction as temporary lodging facilities.

Affected Groups and Attitudes

This section discusses some of the groups who could be affected by the proposed action. Social effects to these groups and other stakeholders are discussed under Section 4.13, *Social and Economic Impacts*.

Classifying stakeholders into groups by no means implies that other stakeholders who do not fit into a group are being ignored or are outside of the social and environmental review process. Discussion of the affected groups is simply a means to highlight and facilitate issue framing related to the social concerns of some stakeholders who may have a particular local or regional relationship to the host landscape that may potentially be developed to exploit solar energy.

Blythe Area Chamber of Commerce

The Blythe Area Chamber of Commerce provides a forum for local businesses and residents on important community issues. The Chamber of Commerce maintains a directory of all the businesses in Blythe and promotes the city's business economy. The purpose of the Blythe Area Chamber of Commerce is to encourage and facilitate activities that improve the economic viability of this community, provide a forum for guidance and support, provide opportunities to inform, and seek funds necessary for implementing compatible activities that would improve this agricultural community. The Chamber of Commerce strongly supports the proposed project and believes that the project will bring business to the community, including motels and hotels in the City of Blythe.

Blythe/Palo Verde Valley Economic Development Partnership

The Blyth/Palo Verde Valley Economic Development Partnership is a consortium comprised of the community college workforce and economic development leadership within the Blythe/Palo Verde Valley region. The consortium received funding from the California Community Colleges to enhance the consortium's capacity to support economic and workforce development efforts within its rural and remote sub-regions. This partnership consists of representatives from the City of

Blythe, Palo Verde Valley College, Blythe Chamber of Commerce, Riverside County, Palo Verde Unified School District, Palo Verde Irrigation District, and other community and regional representatives. Members of the partnership generally have supportive attitudes towards renewable energy projects, and believe that these types of projects will help the local area's economy.

Environmental Groups

Several national groups have concerns about the siting criteria used for renewable energy projects proposed for development in sensitive biological resource areas. Environmental groups also have concerns regarding impacts on wildlife movement corridors, impacts on special status species associate with the implementation of solar panels (e.g., shading effects on species), and greenhouse gas emission impacts on plants and wildlife (BLM 2010).

Recreational Users

Recreational users include OHV users, hikers, campers and wildlife viewing enthusiasts. The recreational user group has a deep appreciation for the natural high desert landscape, and their social attitudes are participatory and protective of this resource. This group is concerned with the indirect impacts associated with the displacement of recreational lands with solar energy facilities, including the cumulative loss of land available for OHV recreational uses (BLM 2010).

Local Private Land Owners and Residents

In general, local private land owners with properties that are in the vicinity of the proposed action have mostly positive attitudes towards renewable energy development. However, while some area land owners and residents are opposed to major change to the desert environment and concerned about permanent changes to the natural high desert environment and wildlife, others are largely indifferent to the proposed action. Nonetheless, since the area is in the midst of a recession, many residents and landowner are generally supportive of new local employment opportunities and revenues that the new renewable energy development project would bring to the local area.

Project Workers and Suppliers to the Renewable Energy Industry

The proposed action has the potential to affect both local and non-local labor force from surrounding areas and the nation. Construction and operation of the proposed action would require both temporary and permanent workers. Since the area is in the midst of a recession, social attitudes towards future employment opportunities are generally supportive of new local employment opportunities.

3.14.2 Economic

Regional employment statistics by industry sector and county for 2008 are summarized in Table 3.14-4. The government is Riverside County's largest employer. Governmental employment accounts for over 17 percent of the total jobs in the County. Additional important industries in the area include natural resources, mining, and construction; manufacturing; transportation; trade (wholesale and retail); information; financial activities; and services (e.g., professional, business, educational, health). In Riverside County, natural resources, mining and construction, government, and retail trade services are the leading industry groups in terms of employment.

TABLE 3.14-4
EMPLOYMENT BY INDUSTRY GROUP – 2008

Industry Group	Riverside County Employment		San Bernardino County Employment		La Paz County Employment	
	Total	Percent of Total	Total	Percent of Total	Total	Percent of Total
Agriculture	13,800	2.3%	2,967	0.3%	323	5.65%
Natural Resources, Mining, and Construction	55,100	9.3%	57,660	6.5%	289	5.05%
Manufacturing	48,600	8.2%	63,634	7.2%	218	3.81%
Transportation, Warehousing, and Utilities	21,400	3.6%	63,164	7.2%	146	2.55%
Wholesale Trade	20,400	3.4%	40,192	4.6%	n/a	n/a
Retail Trade	84,200	14.2%	106,217	12.1%	1,340	23.43%
Information	7,700	1.3%	8,949	1.0%	n/a	n/a
Financial Activities	22,300	3.8%	29,563	3.4%	515	9.01%
Professional and business services	57,700	9.7%	151,391	17.2%	161	2.82%
Educational and Health Services	58,800	9.9%	96,586	11.0%	n/a	n/a
All Other Services	94,300	15.9%	120,791	13.7%	261	4.56%
Government	110,200	18.5%	139,329	15.8%	2,465	43.11%
Total	**594,500**	**100%**	**880,443**	**100.0%**	**5,718**	**100.00%**

SOURCE: California EDD, 2010a; Bureau of Economic Analysis, 2010.

Labor Force

The labor force of the study area counties and communities is presented in Table 3.14-5. As of May 2010, Riverside County had a labor force of 909,400 workers, of which 782,400 were employed. Consequently, Riverside County's unemployment rate was 14 percent - considerably higher than the State-wide unemployment rate of 11.9 percent. Within Blythe, there is a labor force of 7,100 workers. In addition, the labor force and employment estimates for the unincorporated area within the GSEP's regional study area were based on the County-wide average. As of May 2010, Twentynine Palms had a labor force of 6,200 workers, of which 5,200 were employed (the population of the Twentynine Palms military base has been excluded since those residents would not be available to work at the proposed solar facility). Consequently, Twentynine Palms's unemployment rate was 17 .1 percent – also considerably higher than the State-wide unemployment rate of 11.9 percent.

In Arizona, La Paz County had an estimated labor force of on average 7,875 workers over the first four months of 2010. No 2010 sub-County area labor force data is available. Therefore, labor force estimates for the sub-County areas were based on 2008 data and adjusted for subsequent population growth. The total labor force for the local study area is estimated to be 8,480 workers. The total labor force for the regional study area is estimated to be 238,245 workers.

TABLE 3.14-5
LABOR FORCE AND UNEMPLOYMENT DATA FOR THE REGIONAL STUDY AREA

Jurisdiction	Civilian Labor Force	Total Employment	Number Unemployed	Unemployment Rate	Median Household Income[a]
Riverside County	919,200	780,600	132,600	14.5%	$60,085
Blythe	7,100	5,900	1,200	16.7%	$39,187
Coachella	12,300	9,600	2,700	21.7%	$41,797
Indio	27,200	23,100	4,100	15.1%	$55,598
Indian Wells	1,700	1,600	100	5.0%	$122,983 [b]
La Quinta	14,600	13,500	1,100	7.4%	$81,498
Palm Desert	24,700	22,700	2,100	8.4%	$57,038
Rancho Mirage	6,400	5,600	800	12.5%	$78,284 [b]
Cathedral City	26,100	22,500	3,600	13.7%	$43,411
Palm Springs	26,100	23,200	2,800	10.9%	$46,632
Desert Hot Springs	9,600	7,600	1,900	20.2%	$39,733
Banning	11,700	9,700	1,900	16.5%	$40,849
Unincorporated Area	58,400 (est)	50,200 (est)	8,200 (est)	14.0%	na
Eastern Riverside County, CA	225,900	195,200	30,500	13.5%	na
San Bernardino County, CA	866,500	742,700	123,800	14.3%	$58,440
Twentynine Palms	6,200	5,200	1,100	17.1%	$44,879
Unincorporated Area	3,000 (est)	2,600 (est)	400 (est)	14.3%	na
Southern San Bernardino County, CA	9,200	7,800	1,500	16.3%	na
La Paz County, AZ	7,875	7,150	725	7.6%	$31,812
Ehrenberg	645 (est)	595 (est)	50 (est)	7.6%	$35,330 [b]
Quartzsite	735 (est)	680 (est)	55 (est)	7.6%	$30,165 [b]
Cibola	80 (est)	75 (est)	5 (est)	7.6%	$28,420 [b]
Unincorporated Area	1,685 (est)	1,555 (est)	130 (est)	7.6%	na
Western La Paz County, AZ	3,145	2,905	240	7.6%	na
Local Study Area	8,480	7,175	1,305	15.4%	na
Regional Study Area	238,245	205,905	32,240	13.5%	na

NOTES:
[a] 2005-2007 Census average converted in 2010 dollar values.
[2] 2000 Census data converted in 2010 dollar values.

SOURCE: California EDD, 2010; U.S. Census, 2010; U.S. Census 2000; Arizona Department of Commerce, 2008 and 2010.

Unemployment Rates

The unemployment rate for Riverside County in May 2010 was 14.5 percent. In Riverside County, the community with the highest unemployment rate is the City of Coachella (21.7 percent). Reported unemployment data for the two communities located within the regional study area differed greatly. Mecca's labor force reported a 27.1 percent rate of unemployment for May 2010 while the more affluent community of Thousand Palm's 2,500 labor force had a 9.8 percent rate of unemployment. However, in the absence of more specific information, the Riverside County unemployment rate was used to estimate the current unemployment for the unincorporated areas within Eastern Riverside County.

As discussed above, Twentynine Palm's unemployment rate was 17.1 percent in May 2010 and higher than the San Bernardino County's unemployment rate of 14 percent. In Arizona, the unemployment rate for La Paz County was 7.6 percent over the first four months of 2010. No 2010 sub-county area unemployment data is available. Generally, past unemployment rates for most of the communities within the regional study area have been lower than the County-wide average. However, in the absence of more current information, the La Paz County unemployment rate was used to estimate the current unemployment for the sub-county areas within the County.

The unemployment rate for the local study area is estimated to be 15.4 percent. Given the estimated local study area labor force estimate of 8,480, it is estimated that there are approximately 1,305 unemployed local study area residents. The unemployment rate for the regional study area is estimated to be 12.7 percent. Given the estimated local study area labor force estimate of 238,245, it is estimated that there are approximately 32,240 unemployed regional study area residents.

Labor Force Growth Projections

Table 3.14-6 presents County labor force estimates and projections for those skilled workers (by craft) required for construction and operation of the Project as estimated by the Project proponent. Employment figures for 2006 are provided, as well as employment projections for the selected occupations for 2016. The California Employment Development Department (EDD) groups Riverside and San Bernardino into one statistical area for data presentation purposes. As of 2006, there were relatively high numbers of skilled workers in Riverside and San Bernardino County, including metal workers (19,460), carpenters (28,850), and construction laborers (27,930).

Relevant specialized positions were generally fewer in number, including paving, surfacing, and tamping equipment operators, power plant operators, and construction trade helpers. Employment figures for all occupations presented are anticipated to either remain constant or grow by 2016. The two occupations with the largest anticipated growth are plant and system operators (26.5 percent) and architects, surveyors, and cartographers (25.0 percent). The largest growth by occupation in Riverside and San Bernardino Counties by architects, surveyors, and cartographers (17.6 percent).

TABLE 3.14-6
LOCAL LABOR POOL BY CRAFT – RIVERSIDE AND SAN BERNARDINO COUNTIES

Occupational Title	Annual Average Employment		Employment Change		Average Annual Job Openings		
	2006	2016	Number	Percent	New Jobs	Net Replacements	Total
Construction Managers	4,380	5,110	730	16.7%	135	160	295
Carpenters	28,850	32,390	3,540	12.3%	198	380	578
Cement Masons and Concrete Finishers	4,110	4,690	580	14.1%	38	120	158
Construction Laborers	27,930	32,080	4,150	14.9%	348	236	584
Paving, Surfacing, and Tamping Equipment Operators	630	720	90	14.3%	8	16	24
Operating Engineers and Other Construction Equipment Operators	4,790	5,460	670	14.0%	37	85	122
Electricians	6,740	7,600	860	12.8%	66	336	402
Plumbers, Pipefitters, and Steamfitters	4,630	5,330	700	15.1%	81	249	330
Metal Workers and Plastic Workers	19,460	20,800	1,340	6.9%	0	1024	1024
Helpers – Construction Trades	120	130	10	8.3%	35	169	204
Welders, Cutters, Solderers, and Brazers	3,960	4,640	680	17.2%	48	178	226
Architects, Surveyors, and Cartographers	1,420	1,670	250	17.6%	56	135	191
Engineering Managers	1,370	1,600	230	16.8%	43	170	213
Supervisors, Construction and Extraction Workers	10,990	12,380	1,390	12.6%	95	216	311
Machinists	2,630	2,960	330	12.5%	0	161	161
Total	**122,010**	**137,560**	**15,550**	**12.9%**	**1,188**	**3,635**	**4,823**

SOURCE: Palo Verde I AFC August 2009 Table 5.11-8

Chapter 4 No County-level employment projections for La Paz County are available. Given the small size of available the Arizona labor force within the regional study area, any future growth to the La Paz labor force would have a very minor change in future employment for construction occupations.

3.14.3 Fiscal Resources

A summary of Riverside County's expenses and revenues for the 2007-2008 fiscal year is provided in Table 3.14-7. As the proposed action would be constructed in Riverside County, the County would be the local agency with taxing power and could be expected to receive the majority of the direct impacts from the GSEP in the form of additional expenses or revenues (from taxes, permits, and other sources). The economic benefits of increased income and employment would result in indirect and induced revenue, and potential expenditures in the surrounding three counties; however, these impacts cannot be quantified by County as the distribution of the labor force among these Counties is not known.

TABLE 3.14-7
RIVERSIDE COUNTY EXPENSES AND REVENUES FOR FY 2007-2008

	Amount (Dollars)	Percent
Expenses	$2,717,107,833	100%
General Government	$299,748,199	11.0%
Public Safety	$1,059,121,385	39.0%
Public Ways and Facilities	$146,363,144	5.4%
Health	$340,957,271	12.5%
Public Assistance	$760,500,349	28.0%
Education	$17,907,992	0.7%
Recreation & Cultural	$199,776	0.0%
Debt Services	$77,863,426	2.9%
Transfers Out	$14,446,291	0.5%
Revenue Sources	$2,999,779,907	100%
Special Benefit Assessment	--	--
Property Taxes	$541,147,001	18.0%
Other Taxes	$69,873,595	2.3%
Licenses, Permits, Franchises	$40,960,870	1.4%
Fines, Forfeitures and Penalties	$90,299,415	3.0%
From Use of Money and Property	$106,339,835	3.5%
From Other Governmental Agencies	$1,719,722,101	57.3%
Charges for Current Services	$400,693,092	13.4%
Miscellaneous Revenue	$23,922,463	0.8%
Other Financing Sources	$2,848,266	0.1%
Transfers In	$3,973,269	0.1%

SOURCE: State of California County Controller, 2009

For the fiscal year 2007-2008, tax revenue for Riverside County totaled approximately $3.0 billion, and expenditures totaled $2.7 billion. Riverside's key expenditures were on public assistance, public safety, and health. The County acknowledges that the economic slowdown may result in revenues lower than past projections which may lead to cutbacks in services.

3.15 Soils Resources

The GSEP is located between the communities of Blythe, California (approximately 25 miles east) and Desert Center, California (approximately 17 miles west) and is presented in Figure 1-1.

Depending on the published reference, the GSEP site is located in either the southeastern portion of the Mojave Desert geomorphic province (CGS 2002a), or the northeastern quarter of the Colorado Desert geomorphic province (Norris and Webb 1990), in the Mojave Desert of Southern California near the Arizona border. The region is more characteristic of the Mojave Desert geomorphic province in terms of geology, structure and physiography. The Mojave Desert is a broad interior region of isolated mountain ranges which separate vast expanses of desert plains and interior drainage basins. The physiographic province is wedge-shaped, and separated from the Sierra Nevada and Basin and Range geomorphic provinces by the northeast-striking Garlock Fault on the northwest side. The northwest-striking San Andreas fault defines the southwestern boundary, beyond which lie the Transverse Ranges and Colorado Desert geomorphic provinces. The topography and structural fabric in the Mojave Desert is predominately southeast to northwest, and is associated with faulting oriented similar to the San Andreas Fault. A secondary east to west orientation correlates with structural trends in the Transverse Ranges geomorphic province.

The GSEP Site lies on a broad, relatively flat, southward sloping surface dominantly underlain by alluvial deposits derived from the Palen Mountains to the north and the McCoy Mountains to the east. The alluvial deposits have created two distinct landform types and several discernable landform ages. The deposits immediately adjacent to the mountains have formed alluvial fans from multiple identifiable sources, and multiple fan surfaces have coalesced into a single bajada surface that wraps around each of these mountain fronts. Between the bajada surfaces from each mountain chain is a broad valley-axial drainage that extends southward between the mountains and drains to the Ford Dry Lake playa, located about 1 mile south of the Site (WPAR, 2010).

The elevation of Chuckwalla Valley ranges from under 400 feet at Ford Dry Lake to approximately 1,800 feet above mean sea level (msl) west of Desert Center and along the upper portions of the alluvial fans that ring the valley flanks. The surrounding mountains rise to approximately 3,000 and 5,000 feet msl.

The Site itself is relatively flat and generally slopes from north to south with elevations of approximately 400 to 370 feet msl. It is occupied by a community of low creosote and bursage scrub vegetation.

The Natural Resources Conservation Service (NRCS) is the leading resource for soil surveys that detail soil characteristics of an area. Soil units described by the NRCS are classified as a 2nd Order survey at a scale of 1:20,000 with delineations of 1.5 to 10 acres. Mapping of the soils at the GSEP site was completed by NRCS (see Figure 3.15-1). The Survey classified the soil on site as typical durorthids, loamy-skeletal, mixed, hyperthermic, and shallow (Cherioni series), and typical torripsamments, mixed, hyperthermic (Rositas series). The following are descriptions of the two main soil series at the GSEP site (GSEP, 2009a). Detailed soil descriptions were developed from the Natural Resource Conservation Service Official Series Descriptions. Soil characteristics including depth, texture, drainage, permeability, and erosion hazard of individual soil mapping units are included in Table 3.15-1.

TABLE 3.15-1
SOIL MAPPING UNITS AND DESCRIPTIONS

Map Unit	Description
Rositas	Wasco Series – Fine Sand - Formed in sandy eolian material - Somewhat excessively drained - Slopes range from 0 to 30% with hummocky or dune micro relief - Negligible to low runoff - Rapid permeability - High susceptibility of wind erosion - Capability Subclass VIIe nonirrigated - Taxonomic Class: Mixed, hyperthermic Typic Torripsamments - Used for rangeland and wildlife habitat - Perennial vegetation is creosotebush, white bursage, desert buckwheat, and mesquite
Cherioni	Cherioni Series – Very Gravelly Fine Sandy Loam - Formed in slope alluvium on volcanic bedrock - Somewhat excessively drained - Slopes range from 0 to 70% - Medium to rapid runoff - Moderate permeability - Low susceptibility to wind erosion - Capability Subclass VIIIc nonirrigated - Taxonomic Class: Loamy-skeletal, mixed, superactive, hyperthermic, shallow Typic Haplodurids - Used for livestock grazing and wildlife habitat - Perennial vegetation includes creosotebush, paloverde, saguaro, cholla, ocotillo, triangleleaf bursage, and ratany

SOURCE: CEC Genesis RSA, June 2010.

3.15.1 Sand Migration

Active aeolian sand migration occurs within existing sand migration corridors located south of the Site (the PDL-Chuckwalla Valley Axis Sand Corridor), and east of the Site (the Palen-McCoy Valley Sand Corridor). The vast majority of sand moving within the Palen-McCoy Valley Sand Corridor passes east of the proposed solar array, and a relatively minor component migrates within the easternmost portion of the proposed solar array.

The aeolian sand migration within the eastern-most area of the proposed GSEP solar array has two sources. These include sand derived from the local small ephemeral washes within the footprint of the proposed facility and from southward migrating sand moving down the Palen-McCoy Valley Sand Corridor. Analysis based on field mapping, aerial photograph evaluation, and evidence that the onsite drainages flow infrequently was conducted. Estimates are that onsite drainage flows approximately every 20 years and are likely associated with relatively large El Niño events. Aeolian sand derived from the onsite drainages represents a very small component of the total aeolian sand within the Palen-McCoy Valley Sand Corridor system.

In addition, the amount of wind-blown sand passing through the eastern-most portion of the proposed GSEP solar array represents a very minor component to the total aeolian sand migrating in the Palen-McCoy Valley Sand Corridor. Based on the existing data, it is likely that the component of aeolian sand migrating through, or derived in, the eastern-most portion of the GSEP solar array site is less than 5 percent of the total windblown sand migrating within the Palen-McCoy Valley Sand Corridor system.

3.16 Special Designations

Special designations established through Congressional legislation or Executive Orders include, but are not limited to, National Monuments, National Conservation Areas (NCAs), Wilderness, National Scenic or Historic Trails, Wild and Scenic Rivers, Cooperative Management and Protection Areas, Outstanding Natural Areas, National Recreation Areas, and Forest Reserves. These designations may also be part of the BLM's National Landscape Conservation System (NLCS) as described in Public Law 111-11 Sec. 2002(b). There are five designated wilderness areas in the vicinity of the site. There are no National Monuments, National Conservation Areas, National Scenic or Historic Trails, Wild and Scenic Rivers, Cooperative Management and Protection Areas, Outstanding Natural Areas, National Recreation Areas, or Forest Reserves in the vicinity of the site.

Other special designations may be defined in FLPMA or be established through the BLM's land use planning process. These may include wilderness study areas, Areas of Critical Environmental Concern (ACEC), Scenic or Back Country Byways, watchable wildlife viewing sites, wild horse and burro ranges, and other special designations identified in BLM Handbook H-1601 – Land Use Planning Handbook, Chapter III Wilderness.

Wilderness areas in the vicinity of the site are shown on Figure 3.13-1. Wilderness areas are congressionally designated and are managed pursuant to the federal Wilderness Act of 1964 (16 USC 1131–1136) and the specific legislation establishing the wilderness. BLM is authorized to manage wilderness areas for the public's use and enjoyment in a manner that will leave such areas unimpaired for future use and enjoyment as "wilderness" by providing for their protection and the preservation of their wilderness character, and by gathering and disseminating information about their use and enjoyment. The Wilderness Act defines "wilderness" as an "area where the earth and its community of life are untrammeled by man." A designated wilderness area is defined as having four primary characteristics, including the following:

1. a natural and undisturbed landscape;
2. extensive opportunities for solitude and unconfined recreation;
3. at least 5,000 contiguous acres; and
4. feature(s) of scientific, educational, scenic, and/or historic value (US Code 2009).

Five designated wilderness areas are located in the vicinity of the site and were established by the California Desert Protection Act of 1994 (CDPA) (16 USC Sections 410aaa et seq.). The Palen/McCoy Wilderness abuts the project site to the north; the Chuckwalla Mountains Wilderness is approximately 7 miles southwest; the Little Chuckwalla Mountains Wilderness is approximately 8 miles south; and the Joshua Tree Wilderness is 15 miles northwest, and the Palo Verde Mountains Wilderness is 15 miles southeast. The Palen/McCoy Wilderness Area encompasses approximately 236,488 acres. Within it are the Granite, McCoy, Palen, Little Maria and Arica Mountains, which are five distinct mountain ranges separated by broad sloping bajadas. Because this large area incorporates so many major geological features, the diversity of vegetation and landforms is exceptional. The desert wash woodland found here provides food and cover for burro deer, coyote, bobcat, gray fox and mountain lion. Desert pavement, bajadas, interior valleys, canyons, dense ironwood forests, canyons and rugged peaks form a constantly changing landscape pattern. State Highway 62, near the Riverside County line provides access from the north, and Interstate 10 via the Midland Road near Blythe provides access from the south. The area is accessible by four-wheel drive vehicles only. Mechanized or motorized vehicles are not permitted in a wilderness (USDOI 2010d). Wilderness users on the southern and western slopes are within the viewshed of the proposed action. (BLM 2010a)

The Chuckwalla Mountains Wilderness Area is 99,548 acres and lies south of Interstate 10. Within the area is the Chuckwalla Mountains. Included within the walls of this rock fortress are a variety of landforms, textures, and colors. Steep-walled canyons, inland valleys, large and small washes, isolated rock outcrops and vast desert expanses interact to form a constantly changing panorama. The plant and wildlife species are as uniquely diverse. Bighorn sheep, burro deer, raptors, snakes, coyotes and fox inhabit the area. The southwestern bajada region has been identified as highly crucial habitat for the desert tortoise. Ocotillo, cholla, yucca, creosote and barrel and foxtail cactus cover the landscape and provide seclusion. Hunting, fishing, and non-commercial trapping are allowed. Pets are allowed. Horses are permitted. Camping is permitted, limited to 14 days. Access to the wilderness is from the north via Interstate 10. Eastern access via Corn Springs and Du Pont Roads is provided by the Corn Springs exit on Interstate 10. The Red Cloud Road exit from Interstate 10 provides access from the west, and the Bradshaw Trail provides access to the wilderness from the south. Mechanized or motorized vehicles are not permitted in a wilderness (USDOI2010d). Wilderness users on the northern and eastern slopes are within the viewshed of the proposed GSEP (see Figure 3.19-3)

The Little Chuckwalla Wilderness is 28,034 acres and also lies south of Interstate 10. It includes rugged mountains surrounded by a large, gently sloping bajada laced with a network of washes. To the north, a bajada gently rises to 400 feet, while the rugged mountains crest at 2,100 feet. Habitat for bighorn sheep and desert tortoise can be found in portions of this region, and the southern bajada has been identified as crucial desert tortoise habitat. Several sensitive plant species grow here, including the California snakeweed, Alverson's foxtail cactus and the barrel cactus. Interstate 10 provides northern access to the Little Chuckwalla's via the Ford Dry Lake exit; Graham Pass Road from the west; and Teague Well four-wheel drive route from the east. Both routes access the Bradshaw Trail to the south, which connects to Wileys Well Road. Wilderness users on the northern and eastern slopes are within the viewshed of the proposed GSEP (see Figure 3.19-3).

The Joshua Tree Wilderness is 594,502 acres and is managed by the National Park Service as part of Joshua Tree National Park. The Joshua Tree Wilderness is bordered by the Sheephole Valley Wilderness to the north and the Pinto Mountains Wilderness to the north. It is approximately 10 miles north of Interstate 10 and abuts State Highway 177 to the west. The lower, drier Colorado Desert dominates the eastern half of the wilderness, home to abundant creosote bushes, ocotillo, and the cholla cactus. The slightly more cool and moist Mojave Desert covers the western half of the wilderness, serving as a breeding ground for the Joshua trees. Five fan-palm oases are located in this wilderness area, where surface or near-surface water gives life to palms trees. A diverse variety of desert wildlife species, such as Bighorn sheep, eagles, and kangaroo rats occupy this wilderness. The steep elevations provide views to the south and east which overlook the proposed GSEP. Area photography shows no trails or other established routes within this Wilderness segment.

The Palo Verde Mountains Wilderness is 30,605 acres. Distinguishing this wilderness are twin buttes known as the Flat Tops, which stand out as a landmark against a range of jagged peaks. Palo Verde Peak is the high point of the range rising to 1,800 feet. Dry washes cut across the mountain slopes, supporting such vegetation as palo verde, mesquite and ironwood. Clapp Spring and its palm oasis are unique to this area, offering the only permanent water source to such wildlife species as desert bighorn sheep, desert tortoise and wild burros. Rather than hide among canyon walls as most springs in the desert, Clapp Spring lies in an open landscape. Saguaro cactus dot the southeastern part of the wilderness, a rare plant species in California.

Users of these wilderness areas are seeking opportunities to experience naturalness, solitude and unconfined recreation. The areas have no developments other than sparse trails and any routes that have not been reclaimed since the wilderness designation. Little data exist on the amounts, types, and trends of visitor use experiences such as camping, hiking, or site seeing. Recreation uses are discussed in Section 3.13 and include hunting, fishing, and non-commercial trapping. Pets are allowed. Horses are permitted. Camping is permitted, but is limited to 14 days. After 14 days, campers must relocate at least 25 miles from previous site.

Motorized-vehicle access is prohibited in wilderness except under certain circumstances (i.e., where access is required to private property, to facilitate activities associated with valid mining claims or other valid occupancies, to fulfill fish and wildlife management responsibilities under jurisdiction of the California Department of Fish and Game or the U.S. Fish and Wildlife Service, or to accomplish certain administrative and law enforcement operations, including fire suppression and search and rescue operations.) Opportunities for the general public to stop, park, or base camp with vehicles inside wilderness are not available.

3.16.1 Wilderness Study Areas (WSAs)

The BLM, through Section 603(a) of FLPMA or established by statute, manages 80 WSAs in California, totaling over 1,360,000 acres. Such areas are roadless, are at least 5,000 acres, and consist of islands of public lands that have the wilderness characteristics described above. BLM maintains the wilderness characteristics of each WSA until Congress decides whether it either should be designated as wilderness or should be released for other purposes.

The closest wilderness study areas to the site are the Beauty Mountain Wilderness Study Area, approximately 30 miles west of the city of Temecula in San Diego County, and the Cady Mountain Wilderness Study Area between Barstow and Baker along I-40 in San Bernardino County (USDOI 2010g). Both wilderness study areas are approximately 100 miles from the proposed action.

Maintenance of Wilderness Inventory

The project proposal is on Public Land which was identified as a Wilderness Study Area in the Wilderness Inventory mandated by the Federal Land Policy and Management Act. (BLM, 1979) Those Public Lands were inventoried as part of CDCA Wilderness Inventory Unit 325, which is generally bounded by Highway 177 on the west, Highway 62 and an aqueduct on the north, several roads and a railroad on the east, and several rights of ways paralleling I-10 on the south. The 1979 decision established the Palen/McCoy Wilderness Study Area for those Public Lands determined to have wilderness characteristics. The attributes of the WSA are summarized in the 1990 Wilderness Study Report (WSR, 1990). The California Desert Protections Act of 1994 [CDPA] released the WSA and a wilderness the same name was designated. The boundaries are slightly different, but no part of the proposed project (or any alternative) is within the Palen/McCoy Wilderness.

Changes in conditions since 1979 were analyzed as part of inventory maintenance pursuant to section 201[a] of the FLPMA. The finding is that the 1979 decision that wilderness characteristics were present in the portion of the FLPMA WSA containing the project proposal does not warrant reversal.

3.16.2 Areas of Critical Environmental Concern (ACECs)

ACECs in the vicinity of the site are shown on Figure 3.13-1. ACECs are BLM-specific, administratively-designated areas within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources; or other natural systems or processes; or to protect life and safety from natural hazards. (FLPMA, 43 USC 1702(a); 43 CFR 1601.0-5(a)). By itself, the designation does not automatically prohibit or restrict uses in the area; instead, it provides a record of significant values that must be accommodated when BLM considers future management actions and land use proposals.

There are seven ACECs located in the vicinity of the site. The 4,092 acre Mule Mountains ACEC is located approximately 12 miles southeast of the site. This ACEC bears dual Multiple Use Class designations, M and L, and was established to manage prehistoric resources. The 2,273-acre Chuckwalla Valley Dune Thicket ACEC is located approximately 5 mile south of the site. This ACEC is managed as Multiple Use Class M, for wildlife habitat, specifically that of the desert tortoise. The Palen Dry Lake ACEC abuts the southwest corner of the proposed right of way and was established to protect cultural resources. The 352,633-acre Chuckwalla Desert Wildlife Management Area ACEC was established for recovery of desert tortoise. This ACEC is one mile south of the site and includes M, L and C Multiple Use Class designations. The Desert Lily Preserve ACEC consists of 2055 acres. It is 15 miles northwest of the site and designated as Multiple Use Class L land. The Corn Springs ACEC is 2467 acres. This ACEC is 15 miles southwest of the site and is designated as Multiple Use Class C land. Alligator Rock ACEC consists of 7754 acres. It is located 15 miles west of the site and is designated as Multiple Use Class C land. Recreation uses allowed in ACECs are discussed in FEIS Section 3-13.

3.17 Transportation and Public Access – Off Highway Vehicle Resources

3.17.1 Public Access

Introduction

Recreation and motorized travel opportunities are determined, in part, by the California Desert Conservation Area Plan (CDCA), Multiple Use Class (MUC), and by OHV area designations. The multiple-use class is based on the sensitivity of resources and kinds of uses for each geographic area. Each of the four multiple-use classes describes a different type and level or degree of use which is permitted within that particular geographic area. The BLM is also required to designate all public lands as either open, limited, or closed to off-road vehicles under Executive Orders (E.O. 11644 and E.O. 11989: Use of Off-Road Vehicles on the Public Lands), other authorities, such as the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.)*, BLM planning regulations in 43 CFR 1600 and the BLM Land Use Planning Handbook H-1600-1. For the purpose of this section, the terms *Off-Road Vehicles* and *Off Highway Vehicles* (OHV), are used interchangeably (OHV is the term most used in BLM and other federal land use planning).

Multiple Use Class

The GSEP lands are located in CDCA MUC Class M-Moderate Use. This class is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety or present and future uses such a mining, livestock grazing, recreation, energy, and utility development.

OHV Area and Route Designations

The CDCA Plan and the NECO Plan Amendment state that vehicle access is among the most important recreation issues in the desert. A primary consideration of the recreation program is to ensure that access routes necessary for recreation enjoyment are provided (NECO Section 3.8.2).

For purposes of OHV management, vehicle access in MUC M is directed toward use of approved (“open,” “closed” or “limited”) routes of travel, or “open washes.” This corresponds to OHV Limited Use Areas as defined by 43 CFR 1600 and the BLM Land Use Planning Handbook H-1600-1. Cross country travel off of approved routes or open washes is prohibited. Routes of travel include roads, ways, trails, and washes. Routes of travel, including washes, were evaluated and designated through the NECO Plan for the project area. There are no BLM-designated “open” OHV areas in Riverside County where cross country OHV travel is permitted.

During the CDCA and NECO planning process, the route designation system, along with other land management actions such as establishment of ACECs and wilderness, has determined the OHV recreation opportunities in eastern Riverside County. Under the CDCA Plan, travel routes are classified as *Open*, *Limited* or *Closed* with the following definitions:

1. *Open Route:* Access by all types of motorized vehicles is allowed.

2. *Limited Route:* Access by motorized vehicles is limited to use by number of vehicles, type of vehicle, time or season, permitted or licensed, or speed limits.

3. *Closed Route:* Access by motorized vehicles is prohibited except for authorized use.

As required by the CDCA Plan, the NECO Plan amendment created a detailed inventory of existing routes within the NECO Plan area that were officially designated as *Open, Limited* or *Closed* as part of the NECO routes of travel system. The BLM's Palm Springs-South Coast Field Office (PSSCFO) is currently implementing route signing on the ground. A route has high significance if it provides access to other routes, historical sites, or recreational areas. Recreation uses in the eastern part of Riverside County include back county driving, photography, camping, rock hounding and hiking.

There are three (3) approved "open" routes designated by NECO within the vicinity of the GSEP, but the proposed GSEP site would not be traversed by any open routes. The linear ROW would cross one (1) approved open route. Observations by BLM staff and Law Enforcement Rangers indicate that use is relatively low on routes within the vicinity of the GSEP site, not exceeding 200-300 visits per year. Recreation and vehicle use is generally limited to the cooler months of September through May. Use is nearly non-existent during the summer months. Recreational vehicle use consists of touring in passenger cars, SUVs, motorcycles, and ATVs. Some camping may occur in the vicinity of the site, but most use is of short duration and by local residents. More attractive recreation opportunities occur in areas where BLM has provided facilities such as the Midland Long Term Visitor Area (LTVA), ACECs, or other scenic, natural, or cultural attractions.

Washes Open Zones

Motorized vehicle access in washes was also addressed by the CDCA Plan and further addressed or redefined in the 1982 Amendment to the CDCA Plan and the 2002 NECO Plan Amendment. As part of the land use planning process, Multiple Use Class (MUC) designations were assigned to regions throughout the CDCA Plan area. Areas designated MUC L (limited) and MUC M (moderate) were designated as "washes open zones" unless specifically designated as limited or closed to vehicle use. As stated in the NECO Plan, "all navigable washes not individually inventoried and mapped on public lands would be designated as open as a class except where such washes occur within a washes closed zone" (p. 2-77). The GSEP is within MUC M and is a washes open zone. The BLM has determined that there are no navigable washes identified in the proposed project area.

Major Traffic Routes within the Vicinity of the GSEP

Interstate 10

I-10, the southernmost, east-to-west, coast-to-coast interstate highway in the United States, begins in Santa Monica and ends in Jacksonville, Florida. Access from I-10 to the site is provided through Mesa Drive. At this location, I-10 consists of two lanes in each direction. According to the California Department of Transportation (Caltrans), the average annual daily traffic count for the highway within the vicinity of this interchange in 2008 was 22,500 vehicles (Caltrans 2008a, as cited in the CEC Blythe RSA June 2010).

United States 95 (US-95)

US-95 is a two-lane, north-south highway that traverses from the Canadian border in Idaho to the Mexican border near Yuma, Arizona. According to the Department of Transportation (Caltrans) 2008 average annual daily traffic (AADT) counts, US-95 carried approximately 3,500 vehicles north of I-10. In the vicinity of the GSEP site the highway lacks bicycle or pedestrian facilities.

Existing Traffic Volumes

The level of service (LOS) is defined as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. LOS indicators for the highway and roadway system are based on specific characteristics of traffic flow on designated sections of roadway during a typical day. For mainline freeway and roadway segments, these include overall traffic volume, speed, and density.

Several physical and operational characteristics of the roadway, such as lane configuration, flow speed (typical speed between intersections), and number of intersections per mile, are used to determine the vehicular capacity of the roadway segment. When these two sets of data are compared, a volume-to-capacity ratio is calculated. These factors are then converted to a letter grade identifying operating conditions and expressed as LOS A through F. The *Highway Capacity Manual 2000*[1], published by the Transportation Research Board, Committee on Highway Capacity and Quality of Service, includes six levels of service for roadways or intersections ranging from LOS A (best operating conditions characterized by free-flow traffic, low volumes, and little or no restrictions on maneuverability) —the best operating conditions—to LOS F (forced traffic flow with high traffic densities, slow travel speeds, and often stop-and-go conditions) —the worst.

Table 3.17-1 provides existing traffic volumes and LOS for I-10 that likely would be used for indirect access to the GSEP site. As indicated below, I-10 is classified as LOS A in the GSEP area.

Access Road

A roadway that provides direct access to the GSEP site does not currently exist. Access to the site would be from the Wiley Well Road exit off of Interstate 10 via a proposed all-weather access road that would be constructed as part of the proposed action. The proposed access road would be constructed to meet all Riverside County and local requirements, including those for access of emergency vehicles such as fire trucks and ambulances.

[1] This manual is a common guide used for computing the capacity and quality of service of various highway facilities, including highways, arterial roads, signalized and unsignalized intersections and the effects of mass transit, pedestrians, and bicycles on the performance of these systems.

TABLE 3.17-1
EXISTING TRAFFIC VOLUMES AND LEVEL OF SERVICE

	Existing Conditions			
Roadway/Segment	**Travel Lanes**	**Volume**	**Capacity**	**LOS**
I-10 West of GSEP Site	4	3,278	8,000	A
I-10 East of GSEP Site	4	3,278	8,000	A

NOTES: Baseline information from Caltrans 2009 data. Capacity represents approximate two-way capacity in vehicles per hour.

Wiley Well Road

Wiley's Well Road is a two-lane, arterial road accessed by eastbound and westbound traffic from the I-10 Wiley's Well Road Interchange. This road runs north of I-10 to serve the Department of Transportation (Caltrans) Wiley's Well Road Rest Area and terminates and south of I-10 to the Chuckawalla Valley and Ironwood State Prisons and points south. Access to the project site would be via a new six and half mile paved road extending north and west from Wiley's Well Road. The posted speed limit is 20 mph through the Wiley's Well Road Rest Area and the road lacks bicycle or pedestrian facilities.

Public Transportation Within the Vicinity of the GSEP

Public transportation within the vicinity of the proposed action consists of an airport, rail services, bicycle and pedestrian facilities. Information about those forms of public transportation follows.

Blythe Airport

The nearest airport facility to the GSEP site is the Blythe Airport. Blythe Airport is a public facility located approximately six miles west of the City of Blythe and approximately one mile south and east of the site. The airfield has been open since 1940, when it was known as Bishop Army Airfield. The airport later became a part of Muroc Army Air Field, now known as Edwards Air Force Base.

Blythe Airport has two operating runways, Runway 8-26 (oriented east-west), the primary runway, is 6,562 feet long, 150 feet wide. Runway 17-35 (oriented north-south) is 5,820 feet long, 100 feet wide. Today, Blythe Airport is primarily used for general aviation (i.e., flights other than military and regularly-scheduled airline service and regular cargo flights).

Current Operations

Current operations at Blythe Airport are limited. For the 12-month period ending in 2006, aircraft operations averaged 69 takeoffs or landings per day or more than 25,000 operations per year. Of these, approximately 50 percent were characterized as transient general aviation; approximately 50 percent local general aviation and less than 1 percent military.

According to the *Palo Verde Valley Area Plan*, which is an extension of the Riverside County General Plan, the Blythe Airport is also used as a base for crop spraying operations, airplane rentals, and flight instruction.

Future Operations

To carry out its responsibilities, in 2004 the ALUC published an airport compatibility plan. This compatibility plan is based on the Airport Master Plan adopted by the Riverside County Board of Supervisors in 2001. The plan is based on an assumption of long-range future activity of 58,100 annual aircraft operations, including up to 2,200 airline aircraft operations.

The theoretical ultimate airport activity as envisioned in the plan includes a large number of large jet transport aircraft operations. Accordingly, the Airport Master Plan includes a proposal for extending Runway 8-16 to 3,450 feet westward for a total length of 10,012 feet.

Rail Service

The Arizona & California Railroad Company, which has provided rail service to Blythe, filed a petition to abandon service with the Surface Transportation Board[2] on March 12, 2009. If granted, the petition would allow the railroad to abandon rail service in San Bernardino County and Riverside County. An Offer of Financial Assistance (OFA) stayed the decision until January 13, 2010. On that date, the Surface Transportation Board ruled that the Arizona & California Railroad Company could abandon service in San Bernardino County and Riverside County. Consequently, no rail service is available in Blythe at this time.

In addition, no regional passenger railroad transportation exists in the immediate area. The nearest rail passenger service is an Amtrak Station in Palm Springs (approximately 105 miles to the west) or in Yuma, Arizona (approximately 100 miles to the east). Local bus transportation is provided by the Palo Verde Valley Transit Agency (PVVTA).

Bus Routes

Palo Verde Valley Transit Agency operates three fixed bus routes as well as a dial-a-ride service. National bus service is provided by Greyhound Lines, which has a station in Blythe.

Bicycle and Pedestrian Facilities

Neither bicycle nor pedestrian facilities are located in the vicinity of the GSEP site; such activities are limited to shoulders of rural highways and Country roads.

[2] The Surface Transportation Board is a federal economic regulatory agency charged with resolving railroad rate and service disputes and reviewing proposed rail mergers, rail line purchases, constructions and abandonments.

3.18 Vegetation Resources

3.18.1 Introduction

The Genesis Solar Energy Project (GSEP) would be located within the northeastern portion of Chuckwalla Valley. The range of the Chuckwalla Valley is from 400 feet above mean sea level at Ford Dry Lake to approximately 1,800 feet above mean sea level along some of the bajadas that occur west of Desert Center, California with the surrounding mountains rising to over 3,000 above mean sea level (GSEP 2009a).

Hydrologically, the proposed GSEP site occurs in the Colorado River Basin within the Chuckwalla Valley drainage subbasin. This is an internally drained basin and all surface water flows to Palen Dry Lake in the western portion of Chuckwalla Valley and Ford Dry Lake in the eastern section of Chuckwalla Valley. Palen Dry Lake has been characterized as a “wet playa” since it is thought to support significant groundwater discharge at the ground surface by evaporation. Ford Dry Lake is characterized as a “dry playa” with groundwater sources occurring well below the surface of the dry lake bed and as a result receives occasional inflow of surface water (GSEP 2009a,f). Information used to update this FEIS section is found in an updated Biological Resources Technical Report that includes findings from spring, 2010, surveys (TTEC 2010p).

The 2,273-acre Chuckwalla Valley Dune Thicket ACEC occurs immediately west of the southern terminus of the proposed GSEP transmission line, and is managed for its wildlife habitat use, specifically for birds.

3.18.2 Natural Communities

Upland Natural Communities

The GSEP area supports four major upland natural communities. The majority of the GSEP Disturbance Area supports Sonoran creosote bush scrub; the eastern portion of the GSEP Disturbance Area also supports stabilized and partially stabilized desert dunes. A small amount of playa and sand drifts over playa occur within the GSEP Disturbance Area along the margins of Ford Dry Lake. The larger surveyed area, the GSEP area, supports chenopod scrub, and desert wash woodland in addition to the two vegetation communities mentioned above (GSEP 2009a). All of these communities except the Sonoran creosote bush scrub are considered sensitive according to the NECO plan. These upland communities are discussed in more detail below and acreages are summarized in Table 3.18-1. Additionally, the southern linear facility route was determined by the applicant to support wash-associated, microphyll riparian woodland communities (GSEP 2009f, BIO-DR-70). Dry desert wash woodland and microphyllous riparian vegetation are described in detail in the section on Ephemeral Washes/ Waters of the State.

TABLE 3.18-1
NATURAL COMMUNITIES WITHIN THE GSEP AREA

Natural Community Types within GSEP Area[c]	Solar Power Plant Site (acres)	Linear Facilities (acres)	Buffer Area (acres)[a]	Total Surveyed (acres)[b]
Upland				
Sonoran creosote bush scrub	1,713	60	14,370	16,143
Stabilized and partially stabilized desert dunes	0	7.5	3,903	3,904
Playa and sand drift over playa	14	24	4,781	4,818
Chenopod scrub	0	0	370	370
Total Upland	1,727	91.5	23,424	25,235
Ephemeral Drainages/waters of the state				
Desert Dry Wash Woodland	16	Not available	Not available	Not available
Ephemeral Dry Wash	53	Not available	Not available	Not available
Unvegetated ephemeral dry wash	21	Not available	Not available	Not available
Total Ephemeral Drainages	91+	Not available	Not available	Not available

NOTES:
[a] For the purposes of this table and this Vegetation Resources Section, the portion identified within the buffer area of this table is the difference between the total surveyed area less the sum of plant site acreage and linear facilities acreages.
[b] Includes natural community types observed during field surveys out to one mile buffer from the GSEP ROW and 2,400 feet of linear facilities.
[c] Acreages adjusted to reflect removal of the 41.4 acre “toe” (TTEC 2010o).

Sonoran Creosote Bush Scrub

A total of 1,773 acres of Sonoran creosote bush scrub occurs within the GSEP site; 1,713 acres occur in the solar power plant Disturbance Area and 60 acres occur along the linear Disturbance Area (CEC 2010d, TTEC 2010o). Sonoran creosote bush scrub occurs on well-drained, secondary soils of slopes, fans, and valleys and is the basic creosote scrub community of the Colorado Desert (Holland 1986). Within this community in the GSEP site, soils are generally sandy-loams with scattered areas of fine gravel. The dominant plant species within this community are creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), white ratany (*Krameria grayi*), and cheesebush (*Hymenoclea salsola*).

Stabilized and Partially Stabilized Desert Dunes

Approximately 1 acre of stabilized and partially stabilized desert dunes occurs within the linear Disturbance Area along I-10 (CEC 2010d as cited in the CEC RSA June 2010, TTEC 2010o). These diminute systems are described as accumulations in the desert which are stabilized or partially stabilized by evergreen and/or deciduous shrubs and scattered low grasses. These dunes typically occur lower than active dune systems and retain water just below the sand surface which allows deep-rooted, perennial vegetation to survive during longer drought periods. Shrub cover is lower in this community compared to Sonoran creosote bush scrub community in the GSEP site and shrubs become less sparse the closer to Ford Dry Lake. Where partially stabilized desert dunes intergrade with playas and the margins of Ford Dry Lake, fine sand drifts occur (GSEP 2009a, Appendix C). The dominant plant species associated with this community include four-wing saltbush (*Atriplex canescens*), desert croton (Croton californicus), and Colorado desert buckwheat (*Eriogonum deserticola*).

Playa and Sand Drifts Over Playa

A total of 37 acres of playa and sand drifts over playa occurs within the GSEP site in association with Ford Dry Lake; over 14 acres occur in the plant site Disturbance Area and over 23 acres occur within the linear Disturbance Area (CEC 2010d). There is not a formal description of this natural community according to CDFG, Holland (1986), or Sawyer and Keeler-Wolf (1995). This community occurs in close association with stabilized and partially stabilized desert dunes within the GSEP area and shrub cover continues to decrease towards Ford Dry Lake. There are intermittent, shallow sand drift deposits along the margins of the playa within the GSEP area. Playas and sand drifts over playas provide food and foraging opportunities for many species of wildlife and also provide habitat for several common and special-status plant species.

Chenopod Scrub

A portion of chenopod scrub occurs within the GSEP area; because this vegetation community does not occur within the GSEP Disturbance Area, an acreage was not determined (GSEP 2009f). Holland identifies two types of chenopod scrub, desert saltbush scrub and desert sink scrub. These communities are usually comprised of low-growing, grayish, microphyllous (small-leaved) shrubs and some succulent species. The total vegetative cover is often low with bare ground between widely spaced shrubs. Both types of chenopod scrub occur on poorly-drained soils with high alkalinity or salinity. These communities often occur on the margins of dry lake beds in the Colorado, Sonoran, Mojave, and Great Basin deserts typically below 4,000 feet in elevation (Holland 1986). Chenopod scrub provides dispersal, foraging and cover habitat for many species of common and special-status plants, mammals, and reptiles, especially in association with other upland and desert wash communities.

Ephemeral Drainages/Waters of the State

A formal jurisdictional delineation for regulated waters was conducted by the Applicant to determine the extent of potential jurisdictional waters of the U.S. and/or waters of the State within the GSEP. This includes waters (and/or wetlands) regulated under the federal Clean Water Act and/or streams and associated habitat regulated under the California Fish and Game Code. The Applicant is requesting a jurisdictional determination of isolated waters (non-jurisdictional waters of the U.S.) from the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency and has submitted an application for a Streambed Alteration Agreement (TTEC 2009d). The USACE has not yet completed their jurisdictional determination, although they have tentatively concluded that drainages at the GSEP site would not fall under their jurisdiction as waters of the U.S. (Mace pers. comm.).

The Applicant submitted a Notification of a Lake or Streambed Alteration (TTEC 2009d) in December 2009 to CDFG, and in response to data requests from CEC staff, submitted a revised jurisdictional delineation report and application in January 2010 (TTEC 2010j). The revised delineation also included waters and wash-dependent vegetation downstream of the GSEP footprint that are likely to be indirectly affected by the diversion of waters. CDFG staff conducted a field verification of the delineation of state waters on February 17, 2010, and made some recommendations for adjustments to the boundaries (CDFG 2010).These revised boundaries (TTEC 2010l) encompassed several additional drainages in the western portion of the GSEP, expanded the delineation of the jurisdictional features to encompass the full width of the floodplain, and included features that would be indirectly affected downstream of the engineered channels.

The total area (91 acres) of all waters of the state delineated within the GSEP Disturbance Area includes 16 acres of microphyllous riparian vegetation, also called desert dry wash woodland, and 74 acres of other ephemeral desert washes. A total of 21 acres of jurisdictional state waters, consisting of unvegetated ephemeral dry washes, were delineated downstream of the GSEP Disturbance Area, encompassing the full downstream reach of waters that would likely be indirectly affected by the diversion of waters at the upstream edge of the GSEP Disturbance Area, and then discharged at several points below the GSEP site.

Unvegetated Ephemeral Washes

The majority of washes identified throughout the GSEP area are associated with Sonoran creosote bush scrub habitat. Species such as white bursage are common in some medium to large-sized washes, especially in braided channels that contain slightly elevated areas intermixed with the active flow channels. The larger washes (typically over 6 feet in width) that contain sandy, gravelly substrate and well-defined banks typically include big galleta grass and scattered desert wash tree species such as ironwood and palo verde. Ironwood and palo verde trees are sparsely scattered throughout the GSEP area and are associated with areas of heavier sheet flow.

Desert Dry Wash Woodland/Microphyllous Riparian Vegetation

Desert dry wash woodland is a sensitive vegetation community recognized by the CNDDB and BLM, and is also designated as state waters by CDFG (CDFG 2003, BLM, 2002). Desert dry wash woodland is an open to dense woodland of microphyllous desert riparian trees (Holland 1986). The Applicant has identified a stand of desert dry wash woodland as occurring east of the GSEP area, within the large Palen Wash, but had described this habitat type as absent from the GSEP area (GSEP 2009a). In their revised delineation the Applicant describes areas of microphyllous riparian vegetation occurring in washes along the linear Disturbance Area. The microphyllous vegetation identified in these washes consists of three tree species (palo verde, ironwood, and honey mesquite) and totals 16 acres (TTEC 2010 as cited in the CEC RSA June 2010). Within the proposed GSEP area ironwood and palo verde occur in low densities but one wash along the linear facility route, identified as Wash 24-26 in the jurisdictional delineations report (TTEC 2010l), supports a relatively dense concentration of 270 palo verde trees. Wash 31 consists of honey mesquite and is also relatively dense.

Habitat Function and Value of State Waters

The GSEP area’s ephemeral washes, both vegetated and unvegetated, provide unique habitat that is distinct from the surrounding uplands, providing more continuous vegetation cover and microtopographic diversity than the surrounding uplands, migration corridors, and refuge for a variety of wildlife. Both the wash-dependent and upland vegetation along these washes drive food webs; providing seeds for regeneration, habitat for wildlife, access to water, and creating cooler, more hospitable microclimatic conditions essential for a number of plant and animal species. The vegetation, whether dominated by woodland trees or shrubs and perennial herbs, contributes channel roughness that reduces the velocity of floodwaters and provides organic matter for soil development and nutrient cycling (USEPA 2008).

Because ephemeral and intermittent stream channels have a higher moisture content and more abundant vegetation than the surrounding areas, they are very important to wildlife. Frequently, these streams may retain the only available water in the area (USEPA 2008). The short duration and episodic flood pulses of surface and overbank flow is important as it allows some species to complete important life-history developmental stages. The habitat provided by desert streams contracts and expands dramatically in size due to the extreme variations in flow, which can range from high-discharge floods to periods when surface flow is absent. This spatial variation in habitat or ecosystem size is a fundamental, defining feature of these streams (Smith et al. 1995, USEPA 2008).

Groundwater-Dependent Vegetation Communities in the GSEP Vicinity

Groundwater elevation contour mapping done by Steinemann (1989) suggests that groundwater levels are very close to the ground surface beneath the northwestern 25 percent of Palen Dry Lake (Worley Parsons 2009), approximately three to six miles from the GSEP's proposed groundwater pumping well; and at Ford Dry Lake, near the GSEP, the water table was measured at 80 feet deep, extending to a depth of 200 feet (Worley Parsons 2009). The groundwater-dependent plant communities ("phreatophytes") outside of the GSEP Disturbance Area are included because they are within the Applicant's estimated area of water table drawdown by the end of operation, a 9 to 10-mile radius from the GSEP pumping well, and because these are sensitive communities recognized by the California Natural Diversity Data Base (CDFG 2003) and BLM. Some woody phreatophytes are documented to root to depths of up to 190 feet (Sosebee and Chan 1989 as cited in the CEC RSA June 2010).

Mesquite Bosque and Other Phreatophytes

In the Chuckwalla Valley Groundwater Basin the groundwater is too deep to support shallow marshes, but it does support communities of deeper-rooted, groundwater-dependent phreatophytes, most notably the shrubby "bosques" (groves) of honey mesquite around the open, unvegetated playa. Mesquite bosques are a rare and sensitive community recognized by BLM and the CNDDB (CDFG 2003). They occur in areas with access to permanent and stable groundwater; the deep roots can tap water supplies up 40 feet below the surface, although tap roots as long as 190 feet have been documented (Sosebee & Chan 1989 as cited in the CEC RSA June 2010). When available, mesquite will exploit sources of deep water by growing a taproot. Mesquite can also persist on sites that have little or no ground water by growing lengthy shallow lateral roots. In some parts of their range they are considered "facultative phreatophytes" that function as phreatophytes if unlimited water is available, but are capable of surviving on sites with limited soil water. They also occur as a decumbent or running bush found on coppice dunes (vegetated sand mounds). These adaptations allow honey mesquite to retain most leaves in all but the most severe droughts (Ansley et al 2004). In the GSEP vicinity, they are found along the northwest and southwest margins of Palen Dry Lake on small coppice dunes. They have also been documented elsewhere in Chuckwalla Valley (Evans and Hartman 2007) and observed by CEC staff in aerial photos on the southwest margin of Palen Dry Lake.

Mesquite could provide critical refugia for wildlife during extended droughts due to the mesquite's ability to draw water from deep sources and then create a relatively mesic oasis at the surface (Barrows pers. comm.). The fruit of honey mesquite is valuable forage for wildlife; it is quite predictable, even in drought years, annually providing an abundant and nutritious food source for numerous wildlife species upon ripening in summer (Steinberg 2001). The fruit's pericarp is high in sugars and the seeds contain large amounts of protein. Where they occur, honey mesquite seeds form an important part of the diet of mice, kangaroo rats, ground squirrels, quail, black-tailed jackrabbit, mule deer, and many other wildlife. Quail and many other birds eat mesquite buds and flowers in the spring and seeds during the fall and winter. Western honey mesquite communities often attract large numbers of birds that feed on the mistletoe fruit.

Microphyll Woodland

Other known phreatophytes in the GSEP area include the native trees ironwood, palo verde, and cat’s claw; the invasive exotic salt cedar (tamarisk), and the native chenopod shrub bush seep-weed. Most of the microphyllous trees (ironwood, palo verde, cat’s claw) occur along the many desert washes in the GSEP area. The best examples are described under “Desert Dry Wash Woodland/Microphyllous Riparian Vegetation,” above. However, these deep-rooted trees also occur away from the streams on portions of the bajada (above and below the GSEP) where they have access to deep groundwater. Desert phreatophytes are legendary for their deep-rooting. One mesquite was documented to root to a depth of over 250 feet in a mine shaft, although most are documented to root at depths up to 40 feet (Sosebee & Chan 1989 as cited in the CEC RSA June 2010). They are also observed to occur sporadically around the perimeter of Ford Dry Lake, where the water table is measured at 80 feet. It is unclear at this time whether they are supported by the shallow groundwater table under Ford Dry Lake or by the mountain front aquifer, or surface runoff.

Bush Seep-Weed Alkali Sink Scrub

Other known phreatophytes observed within the zone potentially influenced by GSEP or cumulative groundwater pumping include succulent chenopod scrubs dominated by bush seep-weed, which forms pure stands over large areas around the margins of Palen Dry Lake. It also occurs sporadically around Ford Dry Lake, where it co-occurs with the xerophyte saltbush. Bush seep-weed is a characteristic component of alkali sinks, a phreatophyte (Barbour et al. 2007) occupying fine-textured saline soils on or around the playa margins, and rooting to depths of several meters to access groundwater (Patten et al. 2007).

Sand Transport System

This subsection provides a brief explanation of wind transport of sand relative to the creation, preservation and destruction of sand dunes in the GSEP area. The CEC Genesis Revised Staff

Assessment Soil & Water Appendix A provides a more detailed explanation, as does the “Aeolian Transport Evaluation and Ancient Shoreline Delineation Report, Genesis Solar Energy Project, Riverside County, California” (Worley-Parsons 2010). Movement of sand by wind and water is relevant to sensitive vegetation resources because these geomorphic processes create and maintain habitat for Mojave fringe-toed lizards and other species dependent on fine, wind-blown sand.

Two sand migration corridors occur in the vicinity of the GSEP. The Palen-Dry Lake (PDL) - Chuckwalla Valley Sand Corridor is located immediately to the south of the GSEP site, and is a major aeolian sand transport corridor moving sand east along the Chuckwalla Valley toward the Colorado River (see Plate 5 in Worley Parsons 2010c). This is a regionally-significant geomorphic feature that provides sand to build and support sand dune habitat in the GSEP vicinity. To the east of the GSEP site is the Palen-McCoy Valley Sand Corridor, which moves sand to the south from the valley between the Palen and McCoy mountains. In addition, the regional wind transport system can also be transported locally by washes. These carry sediment from upstream sand corridors and distribute it on the alluvial fan where it is available for wind transport, creating smaller sand corridors around the main washes.

Invasive & Noxious Weeds

Noxious weeds are species of non-native plants included on the weed lists of the California Department of Food and Agriculture (CDFA) (CDFA 2007), the California Invasive Plant Council (Cal-IPC), or those weeds of special concern identified by the BLM. They are of particular concern in wild lands because of their potential to degrade habitat and disrupt the ecological functions of an area (Cal-IPC 2006). Specifically, noxious weeds can alter habitat structure, increase fire frequency and intensity, decrease forage (including for special-status species, such as desert tortoise), exclude native plants, and decrease water availability for both plants and wildlife. Soil disturbance and channeling water create conditions favorable to the introduction of new noxious weeds or the spread of existing populations. Construction equipment, fill, and mulch can act as vectors introducing noxious weeds into an area.

Non-natives species were recorded as a part of GSEP surveys; additional baseline surveys to identify population locations and densities are pending (TTEC 2010g). Four noxious weed species were observed within the GSEP area: Sahara mustard, Russian thistle, salt cedar, and Mediterranean grass. Each of these species is identified on a list of the region’s worst weeds compiled by the Low Desert Management (NRCS 2005). Noxious weeds found in the GSEP area are discussed further below.

Sahara Mustard

Sahara mustard (*Brassica tournefortii*) was widespread throughout the GSEP area, including in Sonoran creosote bush scrub, in and contributed to a relatively large portion of the plant biomass. There were patches of higher concentrations occurring within runnels, along the existing two-track road on the western side of the ROW, and along the linear facility routes (TTEC 2010g). This species is of high concern; it is a BLM weed of special concern and Cal-IPC has declared this plant highly invasive (Cal-IPC 2006) and recommends that it should be eradicated whenever encountered. This species is associated with impacts to habitat for native wildlife as well as for native plants. It promotes the spread of fire by increasing fuel load and competes with native plants for moisture and nutrients. In addition, it increases cover and works to stabilize sand, thereby affecting wildlife species dependent on open sandy habitat (Brossard et al. 2000; Barrows and Allen 2007).

Russian Thistle

Russian thistle (*Salsola* sp.) was common in the dune areas on the east side of the GSEP area and along the linear facilities (TTEC 2010g). Although all invasive plants share the trait of being adapted to disturbed habitat, Russian thistle or tumbleweed particularly tends to be restricted to roadway shoulders and other sites where the soil has been recently disturbed. However, once an area is disturbed this species competes readily and can affect native plant ecosystems and increase fire hazard (Orloff et al. 2008; Lovich 1999). Dune habitat is particularly vulnerable to non-native species, which can stabilize sand or block sand movement, and Russian thistle is considered an invasive species of primary concern in this habitat (CDFG 2007). There is a high potential that Russian thistle could become established in the construction area and this species should be eradicated if observed. Cal-IPC has determined that this plant has a limited invasiveness rating in California (Cal-IPC 2006).

Mediterranean Tamarisk

Mediterranean tamarisk or salt cedar (*Tamarix ramosissima*) is restricted to habitats where there is perennial saturation such as springs and seeps, or runoff from poorly maintained water pipelines or well pumps. It was observed south of the GSEP area on the edge of the dry lake bed (GSEP 2009a) and by CEC staff south of I-10 along the transmission line route. Cal-IPC has declared this plant highly invasive (Cal-IPC 2006). Salt cedar is associated with many ecological impacts including impacts to channel geomorphology, groundwater availability, plant species diversity, and fire frequency (Lovich 1999). Salt cedar can also affect sand dunes by blocking sand movement, a vital part of the natural function of these habitats (CDFG 2007).

Mediterranean Grass

Mediterranean grass (*Schismus arabicus*, *S. barbatus*) is prevalent throughout the GSEP area (TTEC 2010g). Mediterranean grass is an annual that reproduces by seed, and is widespread in arid and semi-arid California landscapes. This species competes effectively with native plants for nutrients and water and can provide cover that prevents native annuals from germinating (VanDevender et al. 1997; Brossard et al. 2000) and contributes to dune stabilization (CDFG 2007). Historically fire was rare in the Colorado Desert; the presence of Mediterranean grass and other annual non-native grasses provides a continuous and increased fuel load, influencing the extent, frequency, and intensity of fire in desert ecosystems (Brooks and Pyke 2001; Brooks et al. 2004). BLM and other agencies recognize that because of the widespread distribution of Mediterranean grass, this species is not considered feasible to eradicate, but is still subject to monitoring and control requirements.

Cacti, Yucca, and Native Trees

The 2009 and 2010 surveys also included an inventory of native cacti, succulents and native trees that are not considered rare (e.g., they are not tracked by CNDDB or included on the CNPS special-status plant lists) but the harvesting of these native plants is regulated under the California Native Plant Protection Act (Fish and Game Codes 1900-1913) and the California Desert Native Plant Act of 1981 (i.e., Food and Agricultural Code 80001, et. seq., and Fish and Game Codes 1925-1926), and prevent unlawful harvesting of non-listed native desert plants of the state.

The Applicant conducted stratified sampling plots for cacti, yucca, and native trees in the GSEP Area and found that two cacti species (beavertail cholla and Wiggins cholla, although the latter is no longer believed to be a valid taxon) and three tree species (palo verde, cat-claw acacia, and ironwood) occur within the GSEP area. Other cacti and native trees identified during field surveys include buckhorn cholla (*Cylindropuntia* [=*Opuntia*] *acanthocarpa*), silver cholla (*C*.[=*Opuntia*] *echinocarpa*), pencil cholla (*C*.[=*Opuntia*] *ramosissima*), ocotillo (*Fouquieria splendens),* fish-hook cactus (*Mammillaria tetrancistra*), honey mesquite (*Prosopis glandulosa*), and smoke tree (*Psorothamnus spinosus*) (GSEP 2009a, Appendix C Biological Resources Technical Report).

Special Status Plants

Special-status plant species are those that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

1. Listed as threatened or endangered or candidates for future listing as threatened or endangered under CESA or FESA;
2. Listed as species of concern by CDFG;
3. Plants considered by the CNPS to be “rare, threatened, or endangered in California” (CNPS List 1A, 1B, and 2) as well as CNPS List 3 and 4 plant species;
4. Plants listed as rare under the California Native Plant Protection Act;
5. Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
6. Any other species receiving consideration during environmental review under CEQA.

The BLM designates sensitive species as those requiring special management considerations to promote their conservation and reduce the likelihood and need for future listing under FESA. BLM Sensitive Species include all Federal Candidate and Federally Delisted species which were so designated within the last 5 years, and CNPS List 1B species that occur on BLM lands. For the purposes of this analysis, CEC staff considers all BLM Sensitive Species as special-status species.

Table 3.18-2 lists all special-status plant species evaluated during the analysis that are known to occur or could potentially occur in the GSEP area and vicinity. Special-status species observed during the 2009 field surveys are indicated by **bold-face type**. Special-status species listed in Table 3.18-2 that were detected or considered likely to occur based on known occurrences in the vicinity and suitable habitat present within the GSEP area are discussed in more detail below. The rest of these species have no or low-to-moderate potential to occur in the GSEP area and are described in Table 3.18-3.

No federal or state-listed plant species occur within the GSEP Disturbance Area but four special-status plants were detected within the GSEP area during spring 2009 and 2010 surveys, including Harwood's milk-vetch, desert unicorn plant, and ribbed cryptantha. Harwood's eriastrum, a California endemic and BLM Sensitive Species, was detected at the Colorado River Substation site and GSEP linear corridor route east of the site during the 2010 spring surveys by Solar Millennium (AECOM 2010d). Harwood's eriastrum has a global distribution restricted to the southeast corner.

of California, and it is known from only 14 documented locations, several of which are historic records that have not been verified.

Abram's spurge, flat-seeded spurge, lobed ground cherry, have moderate to high potential to occur within the GSEP site. They were not detected during spring 2009 and 2010 botanical surveys but may have been missed because they are late season plants that cannot be detected during routine spring surveys.

3.18.3 Special-Status Plant Species

As shown in Table 3.18-2, several special-status plant species have the potential to occur within the GSEP area. Thirteen of these species were either observed during botanical and wildlife field surveys performed during spring 2009 and 2010 and/or considered to have moderate to high potential for occurrence, based on suitable habitat and/or known occurrences in the region, including:

- Harwood's eriastrum
- Harwood's milk-vetch
- Ribbed cryptantha
- Desert unicorn plant
- Abram's spurge
- Las Animas colubrina
- Flat-seeded spurge
- Glandular ditaxis
- California ditaxis
- Lobed ground cherry
- Dwarf germander
- Palmer's jackass clover
- Jackass clover
- Winged cryptantha
- Utah vining milkweed, and a
- New undescribed taxon of saltbush (*Atriplex* sp. nov.)

TABLE 3.18-2
SPECIAL-STATUS PLANT SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE GSEP AREA

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
PLANTS		
Chaparral sand verbena	*Abronia villosa* var. *aurita*	__/__/1B.1/__/BLMS/G5T3T4/ S2.1
Angel trumpets	*Acleisanthes longiflora*	__/__/2.3/__/G5/S1.3
Desert sand parsley	*Ammoselinum giganteum*	__/__/2.3/__/G2G3/SH
Small-flowered androstephium	*Androstephium breviflorum*	__/__/2.2/__/G5/S2
Harwood's milk-vetch	***Astragalus insularis* var. *harwoodii***	**__/__/2.2/__/G5T3/S2.2?**
Coachella Valley milk-vetch	*Astragalus lentiginosus* var. *coachellae*	__/FE/1B.2./S/G5T2/S2.1
California ayenia	*Ayenia compacta*	E/__/2.3/__/G4/S3.3
Pink fairy duster	*Calliandra eriophylla*	__/__/2.3/__/G5/S2.3
Sand evening-primrose	*Camissonia arenaria*	__/__/2.2/__/G4?/S2
Crucifixion thorn	*Castela emoryi*	__/__/2.3/__/G3/S2.2
Abram's spurge	*Chamaesyce abramsiana*	__/__/2.2/__/G4/S1.2
Arizona spurge	*Chamaesyce arizonica*	SR/__/2.3/__/G5/S1.3
Flat-seeded spurge	*Chamaesyce platysperma*	__/__/1B.2/S/G3/S1.2?
Las Animas colubrina	***Colubrina californica***	**__/__/2.3/__/G4/S2S3.3**
Spiny abrojo/Bitter snakeweed	*Condalia globosa* var. *pubescens*	__/__/4.2/__/G5T3T4/S3.2
Foxtail cactus	*Coryphantha alversonii*	__/__/4.3/__/G3/S3.2
Ribbed cryptantha	***Cryptantha costata***	**__/__/4.3/__/G4G5/S3.3**
Winged cryptantha	*Cryptantha holoptera*	__/__/4.3/__/G3G4/S3?
Wiggins' cholla	*Cylindropuntia wigginsii (=Opuntia wigginsii)*	__/__/3.3/__/G3?Q/S1.2?
Utah vining milkweed	*Cynanchum utahense*	__/__/4.2/__/G4/S3.2
Glandular ditaxis	*Ditaxis claryana*	__/__/2.2/__/G4G5/S1S2
California ditaxis	*Ditaxis serrata* var. *californica*	__/__/3.2/__/G5T2T3/S2.2
Harwood's eriastrum	***Eriastrum harwoodii***	**__/__/1B.2/BLMS/G2/S2**
California satintail	*Imperata brevifolia*	__/__/2.1__/G2/S2.1
Cottontop cactus	*Echinocactus polycephalus* var. *polycephalus*	__/__/__/__/__/__
Pink velvet mallow	*Horsfordia alata*	__/__/4.3/__/G4/S3.3
Bitter hymenoxys	*Hymenoxys odorata*	__/__/2/__/G5/S2
Spearleaf	*Matelea parvifolia*	__/__/2.3/__/G5?/S2.2
Argus blazing star[a]	*Mentzelia puberula*	__/__/__/__/__/__
Slender woolly-heads	*Nemacaulis denudata* var. *gracilis*	__/__/2.2/__/G3G4T3?/S2S3
White-margined penstemon	*Penstemon albomarginatus*	__/_ /1B.1/S/G2/S1
Lobed cherry	*Physalis lobata*	__/__/2.3/__/G5/S1.3
Desert portulaca	*Portulaca halimoides*	__/__/4.2/__/G5/S3
Desert unicorn plant	***Proboscidea althaeifolia***	**__/__/4.3/__/G5/S3.3**
Orocopia sage	*Salvia greatae*	__/__/1B.3./S/G2/S2.2
Desert spikemoss	*Selaginella eremophila*	__/__/2.2./__/G4/S2.2?
Cove's cassia	*Senna covesii*	__/__/2.2/__/G5?/S2.2
Mesquite nest straw	*Stylocline sonorensis*	__/__/1A/__/G3G5/SX
Dwarf germander	*Teucrium cubense* ssp. *depressum*	__/__/2.2/__/G4G5T3T4/S2
Jackass clover	*Wislizenia refracta* ssp. *refracta*	__/__/2.2/__/G5T5?/S1.2?

TABLE 3.18-2 (Continued)
SPECIAL-STATUS PLANT SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE GSEP AREA

Common Name	Scientific Name	Status State/Fed/CNPS/BLM/ Global Rank/State Rank
PLANTS (cont.)		
Palmer's jackass clover	*Wislizenia refracta* ssp. *palmeri*	__/__/Proposed 1B/__/__/__
Atriplex sp. nov. ("Palen Lake Atriplex")	*Atriplex* sp. nov J. Andre	__/__/Proposed ?/__/__/__

[a] Proposed new addition to the CNPS Inventory (Andre, pers. comm.)
[b] Proposed new addition to the CNPS Inventory (Silverman, pers comm.)

Status Codes:

Federal

FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC = Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>

State

CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
SE = State listed as endangered
ST = State listed as threatened
CFP = California Fully Protected
WL = State watch list
SR = State-listed rare; Plant species listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901)

California Native Plant Society

List 1B = Rare, threatened, or endangered in California and elsewhere
List 2 = Rare, threatened, or endangered in California but more common elsewhere
List 3 = Plants which need more information
List 4 = Limited distribution – a watch list
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Bureau of Land Management

BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all Federal Candidate species and Federal Delisted species which were so designated within the last 5 years and CNPS List 1B plant species that occur on BLM lands. http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf.

Global Rank/State Rank

Global rank (G-rank) and *State rank (S-rank)* is a reflection of the overall condition of an element throughout its global (or *State*) range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values. *State rank (S-rank)* is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical

G1 or S1 = Critically imperiled; Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals
G2 or S2 = Imperiled; 6-20 EOs OR 1,000-3,000 individuals
G3 or S3 = Rare, uncommon or threatened, but not immediately imperiled; 21-100 EOs OR 3,000-10,000 individuals
G4 or S4 = Not rare and apparently secure, but with cause for long-term concern; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 or S5= Demonstrably widespread, abundant, and secure.

Threat Rank:

.1 = very threatened
.2 = threatened
.3 = no current threats known

SOURCES: CNDDB 2010

Harwood's eriastrum

Harwood’s eriastrum, also known as Harwood’s phlox or woollystar, is a BLM Sensitive spring annual currently known from only 14 documented locations worldwide. It is CNPS List 1B.2 species, which indicates it is rare, threatened, or endangered throughout its range. It is a California endemic with a global range restricted to San Diego, Riverside, and San Bernardino counties, typically in dunes associated with the margins around dry lakes such as Dale, Cadiz, and Soda lakes. Recently, surveys conducted in spring of 2010 for the Blythe Solar GSEP located this plant primarily in the sandy areas south of I-10, where 2,134 plants were located and mapped (AECOM 2010d). All of these plants were identified in the general vicinity of the proposed SCE Colorado River substation. All stabilized and partially stabilized dunes are suitable habitats for this species in the GSEP area.

Occurrence data in the Consortium of California Herbaria was reviewed and 2 occurrences were found that were not in the CNDDB. Both of these are historical records from 1939 and 1958. Of the total of 14 occurrences in California (12 CNDDB plus two additional historic records), three are protected under National Park Service or State Park ownership. A total of three records are historical records. Four of these occurrences have documented threats, including OHV and non-native plant impacts.

Harwood’s Milk-vetch

Harwood’s milk-vetch is a CNPS 2.2 species, meaning that is it fairly threatened in California, but more common elsewhere. It is also a covered species under NECO. It has a CNDDB (NatureServe) Global rank of G5T3/S2.2; which denotes a subspecies that is rare, uncommon or threatened, but not immediately imperiled, and its occurrences in California are threatened. It is an annual herb that mainly occurs in Sonoran desert scrub habitat throughout the Colorado Desert (BLM CDD 2002). This subspecies is found in desert dunes and sandy or gravelly areas throughout the Mojave and Sonoran Deserts covering portions of Imperial, Riverside, and San Diego counties (CNPS 2009). Historic and recent collections include Ogilby Road in Imperial County and three locales west of Blythe, the Pinto Basin, and Chuckwalla Basin in Riverside County. Harwood’s milk-vetch has also been reported from Baja California, Sonora Mexico, and portions of Yuma County, Arizona (Reiser 1994). There are several CNDDB records for this species within the GSEP vicinity (CNDDB 2010).

Occurrence data in the Consortium of California Herbaria was reviewed and 3 occurrences were found that were not in the CNDDB. All of these are historical occurrences. Of the total 46 occurrences in California (CNDDB plus new additional occurrences), 9 are protected under National Park Service or State Park ownership. A total of 11 records are historical records. Sixteen of these occurrences have documented threats including development, OHV, agriculture, transmission lines, road maintenance, and trash dumping.

Preliminary surveys performed during spring 2010 identified several hundred (700+) plants of Harwood’s milk-vetch along the previously unsurveyed areas (TTEC 2010m). In addition, several Harwood’s milk-vetch occurrences were identified in the general vicinity of the proposed SCE

Colorado River substation. Spring 2009 surveys identified twelve plants of Harwood's milk-vetch in the GSEP area, two within solar power plant Disturbance Area and 10 within the linear Disturbance Area.

Ribbed Cryptantha

Ribbed cryptantha is a CNPS 4.3 species, meaning that it has limited distribution in California, but it is not very threatened in California. It typically occurs in loose friable soils in the eastern Mojave and Sonoran Deserts in Imperial, Riverside, San Diego, and San Bernardino counties and into Arizona and south to Baja California, Mexico (CNPS 2009). It commonly occurs in stabilized and partially stabilized desert dunes and sandy areas of Sonoran and Mojavean desert creosote bush scrub. There are 116 records of this species from several locations throughout Riverside, Imperial, San Diego, and Imperial counties in the Consortium of California Herbaria database; the nearest collection is from the Palen Valley approximately three miles east of the Desert Center Airport (CCH 2010).

Spring 2009 surveys identified a single population of a few ribbed cryptantha northwest of the Wiley's Well rest area at approximately 380 feet elevation from an area of mixed sand drifts, hummocks with Patton tank tracks with widely scattered shrubs (GSEP 2009f). Preliminary survey findings from spring 2010 identified large populations (estimated in the tens of thousands) of ribbed cryptantha in the previously unsurveyed areas and buffer area (TTEC 2010m). In addition, another large population of ribbed cryptantha and a large occupied habitat area of this species were identified in the general vicinity of the proposed SCE Colorado River Substation (TTEC 2010o). This area occurs along the southern linear corridor route north of I-10. This species was identified in an area mapped as stabilized and partially stabilized desert dunes during March 2009 surveys and in close association with other areas mapped as playa and sand drifts and Sonoran creosote bush scrub with similar habitat qualities.

Desert Unicorn Plant

Desert unicorn plant is a CNPS List 4.3 plant species, meaning it has limited distribution, but is not very threatened in California. This is a covered species under NECO. This is a low-growing, perennial species that occurs in sandy washes within Sonoran desert scrub habitats in San Bernardino, Imperial, Riverside, and San Diego counties of California. There are 13 records known from the NECO planning area in Milipitas Wash, Chuckwalla Valley, and Chemehuevi Valley (BLM CDD 2002). The blooming period for this species is from May to August (CNPS 2009) although is also known to flower between July and September after substantial summer rains (GSEP 2009a). It has a fleshy root system that can remain dormant in dry years.

As a CNPS List 4 species it is not tracked in CNDDB but there are 36 records in the Consortium of California Herbaria, several of which are from the Chuckwalla Mountains and Desert Center area, including the GSEP area (CCH 2010).

During 2009 spring field surveys, a total of 22 seed pods of this typically summer-blooming perennial were found within the GSEP area, 5 within the solar power plant Disturbance Area and

17 along the linear Disturbance Area (GSEP 2009f). According to the Biological Resources Technical Report, seed pods were found as evidence of this species occurring in the GSEP area (75 seed pods and 1 individual plant) (GSEP 2009a, Appendix C). Preliminary results from spring 2010 surveys identified several hundred seed pods and individual plants of desert unicorn plants along the transmission line and buffer area (TTEC 2010m).

Abram's Spurge

Abram's spurge is a CNPS List 2.2 species meaning it is fairly rare in California but more common elsewhere (CNPS 2009). Habitat consists of sandy flats in creosote bush scrub habitat from approximately 600 to 2,700 feet above mean sea level. This ephemeral desert annual occurs in halophytic scrub flats, playas, and along inlets and floodplains of playas and always seems to prefer the lower floodplain ecotone but can also extend higher up into floodplains where braided drainages nexus with dune-mesquite-saltbush-galleta associations (Silverman, pers. comm.). Based on fourteen Consortium of California Herbaria database records for this species, habitats in Riverside, San Diego, and Imperial counties consist of sandy soil habitats often along dry lake margins, whereas documented occurrences in San Bernardino County occur on coarser, possibly sandy loams. Abram's spurge occurs from San Bernardino County to Imperial and eastern San Diego counties to Arizona, Nevada, Mexico, and Baja California (GSEP 2009f). The CNDDB (CNDDB 2010) lists 15 occurrences of this plant within the Riverside, Imperial, San Bernardino, and San Diego counties in California, east through Nevada to Arizona, and as far south as Baja California, Mexico. Of the total of 15 occurrences in California, seven are protected under National Park Service, CDFG, or State Park ownership. A total of four records are historical records and one of these occurrences has documented threats which include grazing. A recent 2000 CNDDB record is from a location near the GSEP site; approximately 0.50 mile east of Ford Dry Lake on Gasline Road just south of I-10, and reported as a "substantial population" (CNDDB 2010).

The blooming period is identified by CNPS as September through November (CNPS 2009). Since the GSEP site occurs in the Chuckwalla Valley of the Sonoran Desert, an area known for bi-modal rain patterns and late summer/fall rains, this species typically only blooms during summer or fall months following monsoonal rains (>+/- 0.10 inch) (Silverman pers. comm.). On average, August receives the most rainfall, although rainfall is also received during winter months of December, January, and February. Regional botanical experts have concluded that this, and other summer annuals, may be missed if surveys are only conducted within the mid-March through mid-April window, and that a full inventory at multiple temporal windows are necessary in order to capture all appropriate growing conditions (typically following 12 to 18 mm rain events) (CEC 2009d).

Abram's spurge is a late-summer, early-fall blooming plant species and was therefore not targeted or detectable during field surveys which were performed during March and April 2009. Based on preliminary survey results from spring 2010, this species has not been identified within the GSEP area (TTEC 2010m). Given the presence of suitable habitat within the GSEP area, and a recent CNDDB record immediately south of the GSEP Disturbance Area near Ford Dry Lake, Abram's spurge could occur anywhere in the GSEP Disturbance Area in a wet summer but it is most likely to occur in the washes, playa margins, dune swales and other low-lying areas where moisture can collect.

Las Animas Colubrina

Las Animas colubrina is a CNPS List 2.3 species indicating it is not very endangered in California and more common elsewhere (CNPS 2009). This is a covered species under NECO. It is an evergreen to semi-evergreen shrub that occurs in Mojavean and Sonoran desert scrub (creosote bush series) and occurs at elevations from approximately 30 to 3,000 feet. It primarily occurs in dry canyons or headwater reaches of desert washes with gravelly, sandy soils. The distribution of this species includes San Diego, Imperial, and Riverside counties; portions of Arizona; Baja California; and Sonora, Mexico. This species has been reported from isolated desert locales in Joshua Tree National Monument, the Eagle Mountains, and Chuckwalla Mountains (Reiser 1994). There are approximately 27 occurrences primarily from the Chocolate Mountains area (BLM CCD 2002). The nearest CNDDB record is from McCoy Springs in the McCoy Mountains in 1976 from approximately 2,800 feet elevation (CNDDB 2010); however, its occurrence in the McCoy Mountains was recently confirmed during surveys for the Blythe Solar Power Project (Solar Millennium 2009b). This species typically blooms from April through June.

Occurrence data in the Consortium of California Herbaria was searched by CEC staff who detected 12 occurrences that were not in the CNDDB. Of these eight are historical records from between 1930 and 1966; however four of these are more recent occurrences found in the Sonoran (Colorado) Desert. Of the total 36 records in California (CNDDB plus new additional occurrences), six are protected under National Park Service, State Park, or BLM DWMA land ownership. A total of 11 records are historical records. None of these occurrences have documented threats.

One Las Animas colubrina plant was found in the buffer area one mile north of the plant site Disturbance Area (closer to the southern flank of the Palen Mountains) during 2009 field surveys; no additional plants were detected during the spring 2010 surveys. This species is associated with rockier, steeper headwater reaches and not likely to be found in the GSEP Disturbance Area.

Atriplex sp. nov

A potentially new taxon of saltbush (*Atriplex*) was discovered on the saline playa margins of Palen Dry Lake last year by a botanist with the U.C. Reserve System (Andre and La Doux, pers. comm. as cited in the CEC RSA June 2010). Although it resembles the common four-wing saltbush (*Atriplex canescens*)—a common plant of dunes which has very linear leaves—the new taxon has obovate leaves that distinquish it from *Atriplex canescens* and its subspecies. Although plasticity in fruit and vegetative characters hinders description and identification, many of the subspecies have been demonstrated to differ in ploidy level and chemical constituents and thus their taxonomic validities are confirmed, including *Atriplex canescsens* ssp. *linearis* (Sanderson & Stutz 1994).

The undescribed *Atriplex* was first collected in 2005 at the "dry lake" just northeast of the Interstate 15 and Highway 95 junction approx 35 miles east and northeast of Las Vegas, Nevada. The first voucher of it in California was at Palen Lake 2009. There is also potential for it to occur along the I-8 corridor in Imperial County. Although it is distinct from the common

Atriplex canescens in its obovate leaves, it would be easy to overlook the new taxon where they co-occur, even by experienced botanists. The new taxon is more confined to subsaline/saline playa margins, though not necessarily so. Andre (pers. comm.) indicated that it may also have been observed in the Ford Dry Lake area (unconfirmed) and it has been observed in other saline (but non-playa) habitats on remnants of the lower Colorado River floodplain.

Flat-seeded Spurge

Flat-seeded spurge is a CNPS List 1B.2 species meaning it is rare, threatened, or endangered in California and elsewhere; fairly endangered in California. It is a BLM Sensitive Species and CNDDB state rank S1.2. This species occurs in desert dunes and Sonoran desert scrub habitat types, in sandy places or shifting dunes, at elevations from approximately 200 to 300 feet. Some experts speculate that the species may be a “waif” in California, or a species that is not naturalizing, and note that it is more common in Arizona and Mexico (CNDDB 2010) but overall little is known or can be concluded regarding this species (LaDoux pers comm). This ephemeral summer annual blooms February through September (CNPS 2009). There are four CNDDB records of this species for the entire state of California, only one of which is from Riverside County; the closest CNDDB occurrences is a historical record mapped near the City of Thousand Palms during 1926 (CNDDB 2010).

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 1 occurrence that was not in the CNDDB. This occurrence is a historical record from 1933. Of the total five occurrences in California (CNDDB plus additional occurrences), one is protected under State Park ownership. A total of three records are historical records. None of these occurrences have documented threats.

This species was not observed during spring 2009 or spring 2010 (TTEC 2010m) surveys; however, the surveys were not timed to detect this species. Although there are no documented nearby occurrences, the GSEP occurs within its range, suitable habitat is present, and—as an ephemeral summer annual—it may be under-surveyed; its potential to occur cannot be dismissed (LaDoux pers. comm. as cited in CEC RSA June 2010).

Glandular Ditaxis

This is a CNPS List 2.2 species meaning that is it rare, threatened, or endangered in California, but more common elsewhere, fairly endangered in California. It is a CNDDB state rank S1/S2. This plant species grows from sea level to approximately 1,400 feet in Mojavean and Sonoran desert scrub habitat, in the sandy soils of dry washes and rocky hillsides. Glandular ditaxis (an annual or short-lived perennial) blooms from October through March (CNPS 2009); while it can be detected during spring surveys; it is easier to detect in fall following the start of the rainy season (Silverman pers. comm.).

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 3 occurrences that were not in the CNDDB. All of these are historical records from 1932. Of the total 21 occurrences (CNDDB plus new additional occurrences), one is protected on under CDFG land ownership. A total of six records are historical occurrences. One of these has documented threats, including land development, and is likely extirpated.

This species was not observed during spring 2009 field surveys; nor was it detected during the spring 2010 surveys (TTEC 2010m).

California Ditaxis

California ditaxis is a CNPS List 3.2 species (a review list), meaning that its taxonomic status is questionable and more information is needed; however, its occurrences in California are fairly endangered (CNPS 2009). It is a NatureServe (CNDDB) state rank S2.2. This species occupies Sonoran desert scrub habitat, and prefers sandy washes and alluvial fans of the foothills and lower desert slopes, from 100 to 3,000 feet above MSL. Reports of this species are known from San Bernardino, Riverside, Imperial, San Diego, and Sonora, Mexico (CNPS 2009). There are 17 records from the CNDDB (2010) primarily from Riverside.

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected four occurrences that were not in the CNDDB. Three of these are historical records from between 1921 and 1952; however, one more recent occurrence was found at Anza-Borrego Desert State Park near Starfish Cove Canyon. Of the total 21 occurrences in California (CNDDB plus new additional occurrences), two are protected under National Park Service ownership. A total of four records are historical records. Five of these occurrences have documented threats, including, OHV, road grading, and construction of a new power line.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the previously unsurveyed areas (TTEC 2010m).

Lobed Ground Cherry

Lobed ground cherry is a CNPS List 2.3 species, meaning that is rare, threatened, or endangered in California, but more common elsewhere; not very endangered in California. It is a CNDDB state rank S1.3. This species occurs in Mojavean desert scrub on decomposed granite soils, playas, and alkaline dry lake beds. This species occurs from approximately 1,500 feet to 2,400 feet. There are six records from the Consortium of California Herbaria database, all from San Bernardino County (CCH 2010).

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected two occurrences that were not in the CNDDB. Both of these are more recent occurrences, including one from Joshua Tree National Monument and one in the eastern Mojave Desert. Of the total six occurrences in California (CNDDB plus new additional occurrences), none are protected under National Park Service or other agency land ownership. None of these are historical records. None of these occurrences have documented threats.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the GSEP area (TTEC 2010m).

Dwarf Germander

Dwarf germander is a CNPS 2.2 meaning that is it rare, threatened, or endangered in California, but more common elsewhere, fairly endangered in California. It is a CNDDB state rank 2. This species occurs in desert dune, playa margins, and Sonoran desert scrub habitats from approximately 100 feet to 1,200 feet. This species typically blooms from March to May but may also bloom from September through November. This species typically occurs in sandy soils and wash habitats and is known from fewer than 10 occurrences in California (CNPS 2009).

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 occurrences that were not in the CNDDB. Both of these are historic records from 1905 and 1949. Of the total seven occurrences in California (CNDDB plus new additional occurrences), 1 is protected under the BLM DWMA land ownership. A total of three records are historical records. None of these occurrences have documented threats.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the previously unsurveyed areas (TTEC 2010m).

Palmer’s Jackass Clover

Palmer’s jackass clover is a proposed new addition to the CNPS inventory and is likely to be added to CNPS List 2 by the end of 2010 (California Energy Commission, 2010, in draft). Palmer’s jackass clover is a perennial herb that occupies sandy washes, and Sonoran desert scrub habitat from sea level to 650 feet. There are no CNDDB records for this species (CNDDB 2010).

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected seven occurrences that were not in the CNDDB. Four of these are historical records from between 1937 and 1952; however, two more recent occurrences were found in the Chocolate-Chuckwalla Mountains region, one southeast of Palen Dry Lake and one near the Palen Sand Dunes. No information on land ownership or documents of threats is available from the Consortium of California Herbaria.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the previously unsurveyed areas (TTEC 2010m).

Jackass Clover

This is a CNPS List 2.2 Species: rare, threatened, or endangered in California, but more common elsewhere, fairly endangered in California. It is CNDDB state rank 1.2. Jackass clover inhabits desert dunes Mojavean desert scrub, playas, or Sonoran desert scrub. This species is commonly associated with sandy washes, roadsides, or alkaline flats, of elevations from 425 to 2,630 feet.

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 occurrences that were not in the CNDDB. One of these occurrences is a historical record from 1937; however one more recent occurrence was found at the Junction I-5 and Stockdale Highway west of Bakersfield. Of the total 9 occurrences in California (CNDDB plus new additional occurrences), three are protected under National Park Service ownership. A total of three records are historical records. One of these occurrences has documented threats, including development.

This species was not observed during spring 2009 field surveys and based on preliminary survey results from spring 2010 this species was also not observed within the GSEP area (TTEC 2010m).

Utah Vining Milkweed

This twining perennial occurs in sandy or gravelly soils in Mojavean and Sonoran desert scrub habitats or washes from approximately 500 feet to 4,300 feet in elevation (CNPS 2009). The distribution of this species covers San Diego, Imperial, Riverside, and San Bernardino counties and portions of Arizona, Nevada, and Utah. Until recently discovered growing on the Palo Verde Mesa (AECOM 2010d), it was believed that the GSEP was outside of the range of Utah vining milkweed. This species was not observed during spring 2009 field surveys. It was originally thought to be present onsite, but this was due to a misidentification (GSEP 2009f). As a CNPS List 4 species, it is not tracked in CNDDB but there are 58 records of this species from the Consortium of California Herbaria database primarily from San Bernardino and San Diego counties; there is one record from the Big Maria Mountains from wash and stabilized dune habitat at approximately 1,200 feet elevation (CCH 2010).

Winged Cryptantha

This is a spring-blooming annual that occurs in Mojavean and Sonoran desert scrub habitats from 300 feet to approximately 5,000 feet above mean sea level. This CNPS List 4 species blooms from March through April (CNPS 2009). Winged cryptantha is found in the Mojave and Sonoran Deserts within California, Arizona, and Nevada. There are 79 records of this species in the Consortium of California Herbaria database from Riverside, Imperial, San Bernardino, and San Diego counties (CCH 2010). This species has low to moderate potential to occur at the GSEP site. There are no CNDDB records for this species for the entire state of California (CNDDB 2010). This species was not observed during spring 2009 field surveys, but one occurrence was detected north of the proposed substation (TTEC 2010o).

Table 3.18-2 lists all special-status species evaluated during the analysis that are not likely to occur or have a low to moderate potential for occurrence in the GSEP area. This table provides additional information on the species identified in Table 3.18-3 and the determination of their potential for occurrence in the GSEP area such as the presence or absence of suitable habitat, nearby occurrence records, and survey efforts that have taken place.

TABLE 3.18-3
SPECIAL-STATUS PLANT SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR AT THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
PLANTS		
Angel trumpets *Acleisanthes longiflora*	This species occurs in Sonoran desert scrub habitats on carbonate soils from approximately 200 to 300 feet above MSL. There are two records from the Consortium of California Herbaria from the Colorado Desert, Palo Verde area (CCH 2010).	This species has low potential to occur in the GSEP area due to the presence of suitable habitat although the site being located above the elevation range of this species. Surveys will be conducted for this species in 2010. This species is not expected to occur in the GSEP area because it is above the elevation range of this species.
Argus blazing star *Mentzelia puberula*	This plant species occurs in desert scrub and desert woodlands with limestone and granitic slopes above 2,000 feet in elevation. This is a species of hot, rugged, rocky areas and should be distinguishable from M. multiflora on habitat characteristics alone. Argus blazing star was a proposed addition and is now a recent addition to CNPS List 2, In California, this species has been observed in good numbers in the Whipple, Chemehuevi and Turtle mountains, in southeastern San Bernardino and eastern Riverside counties along the Colorado River (Silverman, Pers. Comm. March 2010). Based on 13 Consortium of California Herbaria database records for this species, this species has been collected from Riverside, San Bernardino, and Imperial counties from the Little and Big Maria Mountains in Riverside County.	This species has low potential to occur in the GSEP area; limestone and granitic slopes which are soil types preferred by this species are absent from the GSEP area. The GSEP site is located at approximately 360 to 450 feet above MSL which is well below the typical elevation where this species typically occurs. This will be a target species during 2010 focused botanical surveys.
Arizona spurge *Chamaesyce arizonica*	This species occupies sandy, Sonoran desert scrub habitat areas and has been reported from Imperial, Riverside, San Diego counties and portions of Arizona and Baja, California (CNPS 2009) from approximately 150 feet to 1,200 feet above MSL. There are 7 database records from the Consortium of California Herbaria primarily from San Diego County but also Riverside and Imperial counties often from sandy areas and transition areas between chaparral and desert habitats. The record from Riverside County is near Palm Springs from Andreas Canyon (CCH 2010).	This species has a low potential to occur within the GSEP area. Although suitable habitat is present and the GSEP site is within the appropriate elevation range, there are no CNDDB occurrences within 10 miles of the site and the species is not known to occur in the area.
Bitter hymenoxys *Hymenoxys odorata*	Bitter hymenoxys grows in riparian scrub and Sonoran desert scrub habitats from 150 feet to 500 feet above MSL. This plant species blooms from February through November (CNPS 2009). There are five CNDDB records for this species for the entire state of California, two of which occur in Riverside County.	This species has low potential to occur within the Sonoran creosote bush scrub habitats within the GSEP area. However, this species was not found during spring 2009 field surveys. There are no CNDDB occurrences within 10 miles of the site.
Bitter snakeweed *Condalia globosa* var. *pubescens*	Another common name for this species is spiny abrojo. Bitter snakeweed occurs in Sonoran desert scrub from approximately 400 feet to 3,000 feet above MSL. Bitter snakeweed blooms from March through May (CNPS 2009). Based on 35 records Consortium of California Herbaria database, all records are from Imperial County except one from Riverside County, a record from 1,900 feet elevation from a relatively flat alluvial fan from Chuckwalla Bench (CCH 2010). There are no CNDDB records for this species for the state of California (CNDDB 2010).	The higher elevation levels of the GSEP site are within the appropriate elevation range where this species typically occurs. However, this species was not observed during spring 2009 field surveys. There are no CNDDB occurrences within 10 miles of the site.

**TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH NO,
LOW OR MODERATE POTENTIAL TO OCCUR AT THE GSEP AREA**

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
PLANTS (cont.)		
California ayenia *Ayenia compacta*	This species occurs in Mojavean and Sonoran desert scrub habitats from approximately 500 to 3,300 feet above MSL. This species blooms from March through April. There are 29 records from the Consortium of California Herbaria database from the Anza Borrego area alone, one from Riverside County from a sandy wash in the Santa Rosa Mountains off Martinez Canyon (CCH 2010).	This species was not observed during spring 2009 field surveys. This species not expected to occur since the elevation range of the GSEP site is not appropriate for this species.
California satintail *Imperata brevifolia*	This species occurs in grassy areas found near chaparral, desert scrub, riparian scrubs, coastal scrub, wet springs, meadows, stream sides and floodplains from sea level to approximately 1,500 feet above MSL. There are 64 records from the Consortium of California Herbaria database from many northern and southern California counties. Records from Riverside County are from the Palm Springs and San Jacinto Mountains area along irrigation ditches or streams.	This species has low potential to occur within the GSEP area due to the presence of suitable habitat. However, this species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Chaparral sand verbena *Abronia villosa* var. *aurita*	This species occupies sandy soil areas of chaparral, coastal sage scrub, and sandy desert dune habitats (CNPS 2009) from approximately 240 feet to approximately 4,800 feet above MSL. There are 147 records in the Consortium of California Herbaria database many from Riverside County in the San Jacinto Mountains area.	This species has low potential to occur within the GSEP area due to the presence of suitable habitat. However, this species was not observed during spring 2009 field surveys. There are no CNDDB occurrences within 10 miles of the site.
Coachella Valley milk-vetch *Astragalus lentiginosus* var. *coachellae*	The Coachella Valley Multiple Species Habitat Conservation Plan states that this species occurs on “dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides and in areas formerly occupied by undisturbed sand dunes. Within the sand dunes and sand fields, this milk-vetch tends to occur in the coarser sands at the margins of dunes, not in the most active blows and areas. As this species is strongly affiliated with sandy substrates, it may occur in localized pockets where sand has been deposited by wind or by active washes. It may also occur in sandy substrates in creosote bush scrub, not directly associated with sand dune habitat (CVAG 2007). This plant species blooms from February to May, producing pink to deep magenta-colored flowers. This species occurs on aeolian deposits with fewer than 25 occurrences in the Coachella Valley. Coachella Valley milk-vetch depends on natural disturbances from fluvial and aeolian processes for seedling establishment (BLM CDD 2002).	This species was not observed during spring 2009 surveys and does not have a potential to occur in the GSEP area. The distribution of Coachella Valley milk-vetch is restricted to the Coachella Valley in Riverside County, between Cabazon and Indio. CVAG (2007) identifies six outlying occurrences within a 5-mile area along Rice Road in the Chuckwalla Valley north of Desert Center, California (CVAG 2007); however, USFWS staff has indicated that these occurrences are not of the listed taxon (Engelhard, personal communication).
Cove’s cassia *Senna covesii*	This species occurs on dry, sandy desert washes and slopes, roadsides, alkaline flats in the Mojave Desert and northern Sonoran Desert between 1,600 to 2,000 feet above MSL (CNPS 2009).	This species is not expected to occur within the GSEP area since the GSEP site is located below the typical elevation range where this species is known to occur. This species was not observed during spring 2009 field surveys.
Crucifixion thorn *Castela emoryi*	This species occurs in Sonoran Desert and Mojavean Desert in scrub habitats and playas with dry, gravelly washes, slopes, and plains from approximately 300 to 2,100 feet above MSL. There are 64 records in the Consortium of California Herbaria database from Riverside, San Bernardino and Imperial counties among others and often times prefers grassy or hayfield habitats. There is a record from a hayfield in Chuckwalla Valley.	This species has a low potential to occur within the GSEP area due to the presence of suitable habitat and appropriate elevation range of the GSEP site. However, this species was not observed during spring 2009 field surveys. The nearest CNDDB record for this species is approximately 5 miles north of the GSEP site in the Palen Mountains.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH NO,
LOW OR MODERATE POTENTIAL TO OCCUR AT THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
PLANTS (cont.)		
Desert portulaca *Portulaca hamiloides*	This species occurs in Joshua tree woodlands and has been reported from Riverside, San Bernardino, and portions of Arizona and Baja, California from 3,000 feet to 3,600 feet above MSL (CNPS 2009).	Given the lack of typical habitat associations and the GSEP site being located outside of the elevation range, this species has low potential to occur within the GSEP area. This species was not observed during spring 2009 field surveys, and will be a target species for the 2010 botanical surveys.
Desert sand parsley *Ammoselinum giganteum*	This species occupies Sonoran creosote bush scrub habitat and has been reported from Riverside County, California and portions of Arizona (CNPS 2009) at approximately 1,200 feet elevation. There are 2 records from the Consortium of California Herbaria database from Riverside County from the Chuckwalla Valley where this species was observed growing in dry basins at 500 feet above MSL (CCH 2010).	This species has a low potential to occur within the GSEP area due to presence of suitable habitat and reported occurrences from the Chuckwalla Valley. However, this species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Desert spike moss *Selaginella eremophila*	This is a dense, mat forming, non-flowering plant. This species occurs in Sonoran creosote bush scrub habitats in gravelly or rocky soils from approximately 600 to 2,700 feet above MSL. There are 56 records in the Consortium of California Herbaria database from Riverside and San Diego counties with several records from Anza Borrego State Park, Palm Springs, Palm Canyon, and San Jacinto Mountain Range. One collection from Riverside County is from the vicinity of the Chocolate-Chuckwalla Mountain region near the north side of the Orocopia Mountains from sloped rocky, shady surfaces in gravelly soils (CCH 2010).	This species has a low potential to occur within the GSEP area given the presence of suitable desert scrub habitat, although the GSEP site is located below the typical elevation range of this species. This species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Foxtail cactus *Coryphantha alversonii*	This species occurs on rocky, granitic soils in Sonoran and Mojavean desert scrub habitats from 200 feet to 4,600 feet above MSL. Prior to conducting spring 2009 field surveys, a reference population was observed on April 9, 2009 at a gravel pit northwest of Blythe along State Route 95 and several individuals were observed in relatively undisturbed Sonoran creosote bush scrub on granitic rock, a preferred habitat type of this species (CNPS 2009). There are 25 records of this species from the Consortium of California Herbaria database from Riverside, Imperial, and San Bernardino counties. There are records from the Chuckwalla Valley from rocky, granitic slopes (CCH 2010).	This species has a low potential to occur within the GSEP area due to the presence of suitable desert scrub habitat and appropriate elevation of the site. However, there are no rocky, granitic soils, which is required for this species. This species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Mesquite nest straw *Stylocline sonorensis*	This species occupies Sonoran desert scrub habitats around 1,300 feet elevation and has been reported from Riverside County and portions of Arizona and Sonora, Mexico (CNPS 2009). There are 2 records from the Consortium of California Herbaria database from Riverside County both from the Chuckwalla Mountains, Hayfields region from 1930 (CCH 2010).	There is low potential for this species to occur given the presence of suitable habitat although the GSEP occurs well below the typical elevation range of this species. This species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Orocopia sage *Salvia greatae*	This species occurs in the southeastern Sonoran Desert and is associated with the Orocopia and Chocolate Mountains on alluvial slopes between 100 and 800 feet above MSL. There are 49 records from the Consortium of California Herbaria database several from the Chocolate, Chuckwalla, and Orocopia mountain areas (CCH 2010).	This species has a low potential to occur within the GSEP area due to the presence of suitable habitat and appropriate elevation range of the site. This species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH NO,
LOW OR MODERATE POTENTIAL TO OCCUR AT THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
PLANTS (cont.)		
Pink fairyduster *Calliandra eriophylla*	This species occurs in the Sonoran Desert in sandy washes, slopes and mesas from 350 to 5,000 feet above MSL. There are 62 records from the Consortium of California Herbaria database several from the Chocolate-Chuckwalla Mountains area in Imperial and San Diego counties (CCH 2010).	This species has a low potential to occur within the GSEP area due to the presence of suitable habitat and appropriate elevation range of the site. However, this species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Pink velvet mallow *Horsfordia alata*	This species occurs in the Sonoran Desert in California, Arizona, and Mexico. It occurs in Sonoran desert scrub habitats from approximately 300 to 1,500 feet above MSL.	This species was not observed during spring 2009 field surveys. There are no CNDDB records for this species for the entire state of California; the most recent collections have been from the Chocolate, Chuckwalla, and Cargo Muchacho Mountains approximately 50 miles south of the GSEP area and are believed to be extant. Surveys will be conducted for this species in 2010.
Sand evening-primrose *Camissonia arenaria*	This species occupies sandy and gravelly areas of Sonoran desert scrub habitat and has been reported from Imperial and Riverside counties and areas of Arizona and Mexico from 200 feet to 2,700 feet above MSL (CNPS 2009). There are 13 records of this species in the Consortium of California Herbaria database several from the Chocolate-Chuckwalla Mountains, Palo Verde Valley, and Ogilby Pass area (CCH 2010).	This species has a low potential to occur within the GSEP area due to the presence of suitable habitat and appropriate elevation of the site. However, this species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Slender woolly-heads *Nemacaulis denudata* var. *gracilis*	This species occupies desert sand dunes, coastal dunes, and Sonoran desert scrub (CNPS 2009) from 150 to 1,200 feet above MSL. There are 45 records in the Consortium of California Herbaria database from the Palm Springs, Indian Wells area in Riverside County (CCH 2010).	This species has a low potential to occur within the GSEP area due to suitable habitat and appropriate elevation range of the site. However, this species was not observed during spring 2009 field surveys and there are no CNDDB occurrences within 10 miles of the site.
Small-flowered androstephium *Androstephium breviflorum*	This species occurs in desert dune and Mojavean desert scrub habitats from approximately 700 feet to 2,000 feet above MSL (CNPS 2009). This species blooms from March through April and often occurs on desert bajadas.	This species has a low potential to occur within the GSEP area given the presence of suitable desert scrub habitat, although the GSEP site is located below the typical elevation range of this species. The nearest CNDDB record for this species is from Cadiz Valley from Riverside and San Bernardino counties approximately one mile north of Highway 62 during 1995 from a sandy, Mojavean desert shrub-land bajada (CNDDB 2010). This species was not observed during 2009 field surveys and will be a target species to be surveyed for during 2010 botanical surveys.
Spearleaf *Matelea parvifolia*	This species occurs on rocky ledges and slopes in Mojavean and Sonoran desert scrub habitats from 1,000 feet to approximately 6,000 feet above MSL. This species blooms from March through May (CNPS 2009). The nearest CNDDB record for this species is from the Chuckwalla Bench area during 1986 from desert dry wash woodland and creosote bush scrub habitats (CNDDB 2010).	This species is not likely to occur within the GSEP site. The GSEP site is located below the typical elevation range of this species. This species was not observed during spring 2009 field surveys.

TABLE 3.18-3 (Continued)
SPECIAL-STATUS PLANT SPECIES WITH NO,
LOW OR MODERATE POTENTIAL TO OCCUR AT THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
PLANTS (cont.)		
White-margined penstemon *Penstemon albomarginatus*	White-margined penstemon is a perennial herb that is restricted to sandy substrates in desert dunes and Mojavean desert scrub habitats from approximately 2,000 feet elevation to 3,000 feet above mean sea level and appears to be restricted to the southeastern Mojave Desert ecoregion (BLM 2006, TNC 2007). In California, this plant often occurs in fine alluvial sand and in wide canyons within a creosote bush scrub community; sandy environments help establish and hold the deep taproot of this species. This species also occurs in deep, loose to stabilized sand, sometimes on sand dunes or in sandy to gravelly washes. White-margined penstemon typically blooms from March through May and flowering does not always appear to be dependent on the amount of rainfall (CNPS 2009, BLM 2006). It is believed that established plants may bloom even in very dry years by utilizing water and food resources that are stored in the large taproot (1 to 4 feet long); however rain probably affects germination rates of this species (BLM 2006, TNC 2007). White-margined penstemon occurs in southern Nevada, western Arizona, and in the western Mojave Desert in San Bernardino County (BLM 2006). There are 19 recent CNDDB records for the entire state of California all of which are from San Bernardino County near the vicinity of Highway 40 and Pisgah Crater (CNDDB 2010). There are 40 records of this species from the Consortium of California Herbaria database from the same general Ludlow and Lavic areas in San Bernardino County (CCH 2010).	The GSEP site occurs at elevations of approximately 400 feet above mean sea level which is a significantly lower elevation where this species has been reported; however given the location of the GSEP site in the distributional range of this species and presence of suitable habitats, this species has a potential to occur within the GSEP site. This species was not observed during spring 2009 or preliminary spring 2010 field surveys although white-margined penstemon was not specifically targeted during botanical field surveys.
Wiggins' cholla *Cylindropuntia wigginsii* (=*Opuntia wigginsii*)	Wiggins' cholla is not believed to be a valid taxon and is considered a hybrid of silver cholla (C. echinocarpa) and pencil cholla (C. ramosissima) (GSEP 2009f); however, this species is covered under the NECO Plan and was targeted during spring 2009 field surveys. CNPS describes the potential taxon as occurring in Sonoran creosote bush scrub in sandy areas between 100 feet and 2,600 feet elevation. There are two records of this species from the Consortium of California Herbarium from San Bernardino and Imperial counties (CCH 2010).	Since this is not a valid taxon recognized by local botanical experts; this species is not expected to occur in the GSEP site.

3.19 Visual Resources

This section introduces the GSEP study area in terms of its existing value as a visual resource, and describes the applicable regulatory framework that seeks to manage and preserve scenic landscapes. Following a brief description of the characteristics and extent of the study area, this section focuses on determining the extent and quality of visual resources in the study area by referencing existing inventory efforts that use the methodology outlined in BLM's Visual Resource Management (VRM) Program (see Appendix F).

3.19.1 Project Study Area

The GSEP site is located in the Mojave Desert geomorphic province of California, also referred to as the Sonoran Desert section of the Basin and Range physiographic region of the United States[1]. This region is characterized as a broad interior region of isolated mountain ranges separated by expanses of internally-drained desert plains. The plains are mantled by scattered patchworks of Sonoran creosote bush and dissected by dry desert washes which terminate at dry lakes. Figure 3.19-1 provides a panoramic view of the project area, as seen from an interchange along I-10. In the photo, the GSEP would be located beyond the sandy Ford Dry Lake, but ahead of the base of the Palen Mountains in the background. Figure 3.19-2 provides a number of context photographs illustrating characteristic landscape in the GSEP area.

The project study area is defined as all land areas from which any element of the GSEP would be visible, i.e., the project's viewshed. The project viewshed is shown in Figure 3.19-3, and was generated via computer-generated viewshed tools, based on several points that model the location and height of the proposed power block units, solar trough arrays, and transmission lines; and a ten-meter resolution (horizontal) United States Geological Survey digital elevation model. Bolder colors in Figure 3.19-3 represent areas where a greater portion of the GSEP site would be visible (as opposed to a fraction of the solar arrays, or a few transmission line poles). Distance zones in the figure provide a reference to approximate the prominence of the GSEP in views. The outer extent of the study area is a radius 15 miles away from the outer edges of the project footprint. Beyond 15 miles, it is not expected that the GSEP would be visible since it would likely disappear into the horizon line, or be hidden by atmospheric conditions (e.g. haze, or dust) and intervening topography.

Some of the more prominent visual features located within the project study area include:

1. Several prominent mountain ranges to the north, west, south and east of the Project site, including the McCoy, Palen, Chuckwalla, Little Chuckwalla, and Mule Mountains

2. Ford Dry Lake, immediately south of the site

3. Palen Dry Lake, immediately west of the site

[1] California's geomorphic provinces and the physiographic regions of the U.S. are naturally defined geologic regions that display a distinct landscape or landform. These divisions are based on unique, defining features such as geology, topographic relief, climate, and vegetation. The distinction between California's geomorphic provinces and the physiographic regions of the U.S. is in the scale at which they are defined.

4. Several inconspicuous existing and abandoned mining operations
5. Chuckwalla Valley State Prison and Ironwood State Prison, south of I-10 at the Wiley's Well Road Interchange, and approximately nine miles to the south of the Project

The GSEP would not be visible to residents in Lake Tamarisk, Desert Center, Nicholls Warm Springs, or the City of Blythe due to the distances involved. In addition, SR-117 and the Joshua Tree Wilderness are also beyond the background zone of the GSEP, making it unlikely the project would be visible to the public from those areas. The primary user groups that could have views of the GSEP would be motorists along I-10, including users of Wiley's Well Rest Area, located immediately adjacent to the south of the Project site. The Palen- McCoy Wilderness is immediately north of the GSEP, but the area with views of the project is rarely used for recreation and features neither trails nor trailheads (BLM Greg Hill, 2009). However, since the wilderness area is physically accessible, it may be visited on rare occasions by backcountry hikers.

Figure 3.19-2 provides a number of context photographs illustrating characteristic landscape in the GSEP area. The three top photos represent the landscape character for the Chuckwalla Valley relatively unencumbered by cultural modifications, whereas the two bottom photographs exemplify the landscape character in the immediate vicinity of I-10. Electric power infrastructures are well-established components of the landscape in the area. Blythe Energy, Western Area Power Administration (WAPA), and Southern California Edison (SCE) own and operate substations and transmission lines in the area. The Project would interconnect to existing transmission lines south of the Project site and south of I-10. These existing transmission lines are located mostly within BLM Utility Corridor K, which runs parallel to and approximately 1 to 2½ miles south of I-10. Interstate 10, the existing transmission lines, and the Chuckwalla Valley and Ironwood State Prisons are the primary cultural modifications within the project viewshed.

3.19.2 BLM Visual Resource Management (VRM) Policy

BLM's Visual Resource Management Policy is the agency's implementation of requirements from FLPMA and other sources for managing scenic resources. Pursuant to FLPMA, BLM has developed and applied a standard visual assessment methodology to inventory and manage scenic values on lands under its jurisdiction. BLM Manual M-8400-Visual Resource Management Handbook H-8410-Visual Resource Inventory, and Handbook H-8431-Visual Resource Contrast Rating set forth the policies and procedures for determining visual resource values, establishing management objectives, and evaluating proposed actions for conformance to the established objectives for BLM administered public lands. The following describes the three primary elements of the BLM's VRM Policy.

Determining Visual Resource Values

The primary way to establish visual resource values is to conduct a Visual Resource Inventory (VRI), as described in BLM handbook H-8410. There are four VRI Classes (I to IV). Visual Resource Inventory Class I has the highest value and VRI Class IV has the lowest. VRI Class I is reserved for special congressional designations or administrative decisions such as Wilderness

Areas, visually sensitive ACECs, or Wild and Scenic Rivers, etc. VRI Classes I through III are determined through a systematic process that documents the landscape's scenic quality, public sensitivity and visibility. Rating units for each of the three factors are mapped individually, evaluated, and then combined through an over-layering analysis. The three considerations are briefly described below.

> *Scenic Quality*: Scenic Quality Rating Units (SQRUs) are delineated based on common characteristics of the landscape. There are seven criteria used for inventorying the landscape's scenic quality within each SQRU: landform, vegetation, water, color, influence of adjacent scenery, scarcity, and degree of cultural modification. Each factor is scored for its respective contribution to the scenic quality, the scores are summed, and the unit is given a rating of A (highest), B, or C (lowest) based on the final score.

> *Sensitivity Level*: Sensitivity Level Rating Units (SLRU) are delineated and evaluated for public sensitivity to landscape change. Criteria used for determining level of sensitivity within each unit includes types of use, amount of use, public interest, adjacent land uses, special areas, and other factors. Each criterion is rank high, medium, or low and an overall sensitivity level rating then is assigned to the unit.

> *Distance Zones (visibility)*: The third factor is visibility of the landscape evaluated from where people commonly view the landscape. The distance zones are divided into foreground/middleground (three to five miles); background (five to 15 miles); and seldom seen (beyond 15 miles or topographically concealed areas within the closer range distance zones).

The relationships between the rated values of scenic quality, sensitivity level, and visibility are cross-referenced with the Visual Resource Inventory Matrix to determine the Visual Resource Inventory (VRI) Class, as shown in Table 3.19-1. Visual resource inventory classes are informational in nature and provide the basis for considering visual values in the land use planning process. They do not establish management direction and should not be used as a basis for constraining or encouraging surface disturbing activities. They are considered the baseline data for existing conditions.

Establishing Management Objectives

VRM Classes (defined in Table 3.19-2) are determined by considering both VRI Class designations (visual values) along with resource allocations or special management decisions made in the applicable resource management plan (RMP). Management objectives for each VRM Class set the level of visual change to the landscape that may be permitted for any surface-disturbing activity. The objective of VRM Class I is to preserve the character of the landscape, whereas VRM Class IV provides for activities that require major modification to the landscape. Thus, the allowable levels of visual change for VRM Classes I through IV are decreasingly restrictive.

VRI Classes are not intended to automatically become VRM class designations. Management classes are determined through careful analyses of other land uses and demands. The VRM classes are considered a land use plan decision that guides future land management actions

TABLE 3.19-1
DETERMINING VISUAL RESOURCE INVENTORY CLASSES

		Sensitivity Level								
		High			Medium			Low		
Special Areas		I	I	I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II	II	II
	B	II	III	III/IV[a]	III	IV	IV	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV	IV	IV
		Fg/mg	Bg	Ss	Fg/mg	Bg	Ss	Fg/mg	Bg	Ss
		Distance Zones								

[a] If adjacent area is Class III or lower assign Class III, if higher assign Class IV

Fg/mg=Foreground/Middleground
Bg=Background
Ss=Seldom seen

SOURCE: BLM Manual H-8410-1

TABLE 3.19-2
VISUAL RESOURCE MANAGEMENT CLASSES

VRM Class	Objective
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape
Class III	The objective of this class is to partially retain the existing character of the landscape. The level of change to characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape
Class IV	The objective of this class is to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

and subsequent site-specific implementation decisions. The VRM class designations are to be assigned to all BLM public land in the applicable RMP. The VRM class designations may be different than the VRI classes assigned in the inventory and should reflect a balance between protection of visual values while meeting energy and other land use, or commodity needs. For example, an area with a VRI Class II designation may be assigned a VRM Class IV designation, based on its overriding value for mineral resource extraction, or its designation as a utility corridor.

While the applicable RMP for the study area is the CDCA Plan, it does not contain a visual resource element, and has not established VRM Classes. When a project is proposed and there are no RMP-approved VRM objectives, Interim Visual Resource Management (IVRM) Classes must be established. These classes are developed using the process just described, but may be restricted in geographic scope to areas affected by the proposed action. If the area is also without a VRI, then one must be conducted in order to provide a baseline of data by which to analyze impacts and to inform appropriate designation of interim VRM Classes.

Evaluating Proposed Actions

Proposed plans of development are evaluated for conformance to the VRM Class objectives through the use of the Visual Resource Contrast Rating process set forth within BLM Handbook H-8431-1. Because this concerns the environmental consequences of the proposed action, this process is further described and applied in Section 4.18.

3.19.3 Visual Resource Inventory

The baseline mapping of landscape units in this assessment is derived from the visual resource inventory and subsequent Interim Visual Resource Management (IVRM) Classes developed in connection with the Devers-Palo Verde No. 2 Transmission Line EIR/EIS (DPV 2 EIR/EIS). In the baseline setting for that document, landscape units were delineated, assessed and rated following the BLM's Visual Resource Management (VRM) system. The applicable portions of that document, which include photographs and an evaluation of scenic quality factors is provided in Appendix F. Following the VRM methodology, the inventory mapping and evaluation reflects an assessment of the landscape's *scenic quality*, *viewer sensitivity*, and *distance zone* of observers, described briefly below.

Scenic Quality Rating

The entire GSEP is located in SQRU 12, which encompasses the central-eastern portion of Chuckwalla Valley. The landform of the Chuckwalla Valley SQRU is flat and non-descript with grass and low-growing shrubs of subdued color. Though distant mountain ranges (McCoy Mountains to the north and Chuckwalla Mountains to the south) provide limited backdrops of visual interest (not part of this unit), SQRU 12 is primarily influenced by the dominant presence of existing utility infrastructure and I-10.

This landscape unit is rated as C-Quality scenery, based on the combination of scores for landform, vegetation, water, color, adjacent scenery, scarcity and cultural modifications. The most influential factor in this unit's low rating for scenic quality was the abundance of cultural modification along I-10 (roads, transmission lines, 4-wheel drive tracks, etc.) and the flatness and lack of visual variety in landform (though a relatively high score was given for adjacent scenery).

Sensitivity-Level Rating

The CDCA was designated by Congress in large part for its visual values and uniqueness in terms of being a fairly undisturbed portion of the California Desert close to large population centers. In recognition of this, VRM inventories within the CDCA have historically regarded the entire CDCA as having a high viewer sensitivity level (BLM 1980)(CDCA Plan). This means that the public, in general, would take interest in the scenery of the project area and in changes to the characteristic landscape. Thus, the GSEP area is assigned a high visual sensitivity.

Distance Zone

The distance zone for all portions of the GSEP is assigned to foreground/middleground (under five miles) due to the distance of I-10 and other local roads to the project (see Figure 3.19-3).

3.19.4 Interim Visual Resource Management Classes

As discussed above, VRM classes are typically assigned by the BLM through its RMPs; but in the case of the GSEP, VRM classes were not established in the CDCA. Instead, BLM land managers must establish “Interim VRM Classes” for each project on a case-by-case basis. The DPV 2 EIR/EIS determined Interim VRM Classes, which were mapped by the consultants and approved by the BLM. Therefore, those Interim VRM Classes will apply and be used for the GSEP because they cover the same geographical area. Figure 3.19-4 shows the Interim VRM Classes from the DPV2 EIR/EIS. The entire site of the Project, including the solar troughs, power blocks, and transmission line corridor, is classified as Interim VRM Class III (as determined in Table 3.19-1).

The Interim VRM Class was determined by the Visual Resource Inventory, the land use plan decisions that guide resource use for the proposed project area, and concurrence of the authorized officer. Under the DPV2 EIR/EIS, the VRI (Class III) was considered along with the multiple use class for the project site, which is MUC M (Moderate Use). MUC M is based upon a controlled balance between higher intensity use and protection of public lands; while providing for a wide variety of present and future uses such as mining, livestock grazing, recreation, and energy or utility development. These factors, along with a high viewer sensitivity level, led to a determination of an Interim VRM Class III. The BLM has determined that the inventory and Interim VRM Class established for the DPV2 EIR/EIS will be carried over and used to analyze visual impacts and changes to the landscape for the GSEP. The permitting and LUP amendment decisions shall be managed in accordance with Interim VRM Class III objectives (see Table 3.19-2).

3.20 Water Resources

The GSEP site is located in the Mojave Desert Geomorphic Province. The Mojave Desert is a broad interior region of isolated mountain ranges separated by expanses of desert plains. It has an interior enclosed drainage and many playas. There are two important fault trends that control topography—a prominent NW-SE trend and a secondary east-west trend (apparent alignment with Transverse Ranges is significant). The Mojave province is wedged in a sharp angle between the Garlock Fault (southern boundary Sierra Nevada) and the San Andreas Fault, where it bends east from its northwest trend. The northern boundary of the Mojave is separated from the prominent Basin and Range by the eastern extension of the Garlock Fault.

The GSEP Site lies on a broad, relatively flat, southward sloping surface dominantly underlain by alluvial deposits derived from the Palen Mountains to the north and the McCoy Mountains to the east. The alluvial deposits have created two distinct landform types and several discernable landform ages. The deposits immediately adjacent to the mountains have formed alluvial fans from multiple identifiable sources, and multiple fan surfaces have coalesced into a single bajada surface that wraps around each of these mountain fronts. Between the bajada surfaces from each mountain chain is a broad valley-axial drainage that extends southward between the mountains and drains to the Ford Dry Lake playa, located about 1 mile south of the Site (WPAR 2009).

The elevation of Chuckwalla Valley ranges from under 400 feet at Ford Dry Lake to approximately 1,800 feet above mean sea level (amsl) west of Desert Center and along the upper portions of the alluvial fans that ring the valley flanks. The surrounding mountains rise to approximately 3,000 and 5,000 feet amsl.

The Site itself is relatively flat and generally slopes from north to south with elevations of approximately 400 to 370 feet amsl. It is occupied by a community of low creosote and bursage scrub vegetation.

3.20.1 Climate and Precipitation

The climate in the Chuckwalla Valley, which is classified as a “low desert,” is characterized by high aridity and low precipitation. The region experiences a wide variation in temperature, with very hot summer months with an average maximum temperature of 108 degrees Fahrenheit (ºF) in July and cold dry winters with an average maximum temperature of 66.7 ºF in December. The Blythe area receives an average of approximately 3.5 inches of rainfall per year. The majority of the rainfall occurs during the winter months, but rainfall during the late summer is not uncommon. The summer rainfall events tend to be a result of tropical storms that have a short duration and a higher intensity than the winter rains. Annual precipitation ranges from 0.02 to 0.47 inches per month (average monthly) for a total average annual precipitation of just under four inches per year. **Table 3.20-1** and **Table 3.20-2** display the average monthly and annual minimum and maximum temperatures and precipitation (rainfall) from 1913 to 2008 collected from the Blythe Airport, located approximately 35 miles southeast of the GSEP site.

TABLE 3.20-1
CLIMATE TEMPERATURE DATA FOR BLYTHE AIRPORT, CALIFORNIA

	Temperatures °F					Mean Number of Days			
	Monthly Averages			Record Extremes		Max. Temp.		Min. Temp.	
Month	Daily Max.	Daily Min.	Monthly	Record High	Record Low	90°F & Above	32°F & Below	32°F & Below	0°F & Below
Jan	66.7	41.5	54.1	89	20	0	0	2.7	0
Feb	72	45.4	58.7	93	22	0.2	0	0.8	0
Mar	78.4	50.2	64.3	100	30	3.1	0	0.1	0
Apr	86.4	56.5	71.5	107	38	11.6	0	0	0
May	95.2	64.4	79.8	114	43	23.8	0	0	0
Jun	104.5	72.7	88.6	123	46	29	0	0	0
Jul	108.4	81	94.7	123	62	30.9	0	0	0
Aug	106.6	80.2	93.4	120	62	30.6	0	0	0
Sep	101.3	73	87.2	121	51	28.4	0	0	0
Oct	89.8	60.9	75.3	111	27	17.6	0	0	0
Nov	75.8	48.6	62.2	95	27	0.8	0	0.1	0
Dec	66.7	41.2	53.9	87	24	0	0	1.8	0
Year	87.7	59.6	73.6	123	20	175.9	0	5.5	0

SOURCE: CEC, RSA (June 2010) Soil and Water Table 3.

TABLE 3.20-2
PRECIPITATION DATA FOR BLYTHE AIRPORT, CALIFORNIA

	Rainfall (inches) [1913-2008]			
Month	Mean	Highest Month	Lowest Month	Highest Daily
Jan	0.47	2.48	0	1.64
Feb	0.44	3.03	0	1.66
Mar	0.36	2.15	0	1.52
Apr	0.16	3	0	2.67
May	0.02	0.22	0	0.22
Jun	0.02	0.91	0	0.91
Jul	0.24	2.44	0	1.4
Aug	0.64	5.92	0	3
Sep	0.37	2.14	0	1.9
Oct	0.27	1.89	0	1.61
Nov	0.2	1.84	0	1.04
Dec	0.39	3.33	0	1.42
Year[a]	3.59	---	---	3

NOTES:

[a] Totals may not match the data in specific columns due to rounding errors.

SOURCE: CEC, RSA (June 2010) Soil and Water Table 4.

Monthly evapotranspiration rates average from 1.5 inches/month during the winter months to over 9 inches per month in the summer. Total yearly average evapotranspiration rates range from 60 to 70 inches/year. **Table 3.20-3** presents average monthly evapotranspiration rates for various stations located in the region.

TABLE 3.20-3
MONTHLY AVERAGE POTENTIAL EVAPOTRANSPIRATION (ET_O) RATES

Month	CIMIS Station #135 Station: Blythe NE	CIMIS Station #151 Station: Ripley	CIMIS Station #162 Station: Indio	CIMIS Station #175 Station: Palo Verde II	Regional
Jan (in/mo)	2.32	2.44	2.44	2.41	1.55
Feb (in/mo)	3.09	3.31	3.31	3.23	2.52
Mar (in/mo)	5.00	5.25	5.25	5.59	4.03
Apr (in/mo)	6.61	6.85	6.85	7.22	5.70
May (in/mo)	8.54	8.67	8.67	8.78	7.75
Jun (in/mo)	9.69	9.57	9.57	9.42	8.70
Jul (in/mo)	10.13	9.64	9.64	9.58	9.30
Aug (in/mo)	8.91	8.67	8.67	8.61	8.37
Sep (in/mo)	6.85	6.85	6.85	6.58	6.30
Oct (in/mo)	4.64	5.00	5.00	4.74	4.34
Nov (in/mo)	2.95	2.95	2.95	2.94	2.40
Dec (in/mo)	2.07	2.20	2.20	2.25	1.55
Year (in/yr)	70.8	71.4	71.4	71.35	62.50

NOTES: CIMIS monitoring station closest to GSEP site are listed.
Regional evapotranspiration values correspond to CIMS Reference ETo Zone 18, which includes Imperial Valley, Death Valley, and Palo Verde.

SOURCE: CEC, RSA (June 2010) Soil and Water Table 5.

3.20.2 Groundwater

Groundwater in the area of the GSEP is contained within Colorado River Hydrologic Region, which covers about 20,000 square miles of southeastern California (CRBRWQCB 2006). The Colorado River Hydrologic Basin Region is bound to the west by the San Bernardino, San Jacinto and Launa Mountain ranges; to the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman and Ord Mountain ranges and the State of Nevada; to the east by the Colorado River and the State of Arizona; and to the south by the border of the United States and Mexico. The Colorado River Hydrologic Basin Region includes the Salton Sea and the Coachella and Imperial Valleys. The Colorado River Hydrologic Region is subdivided into 28 groundwater basins, one of which is the Chuckwalla Valley Groundwater Basin (CVGB).

The GSEP site is located within the Chuckwalla Valley (CDWR Basin No. 7-5). It has a surface area of 940 mi^2 (2,435 km^2). The CVGB is not listed on the DWR list of adjudicated groundwater basins (DWR, 2009). Because water within the basin is tributary to the Colorado River System, it is subject to the U.S. Supreme Court's Consolidated Decree (regarding Arizona v. California).

Studies have estimated the flow to the Colorado River Basin as being between about 400 to 1,200 ac-ft/yr (see below for additional discussion). The USGS identifies the CCGB as part of the Colorado River Basin/System in USGS SIR 2008-5113. The basin is subject to the Colorado River Compact of 1922, and the Boulder Canyon Project act of 1928, and Consolidated Decree (547 U.S. 150 [2006])..

Groundwater contained in the CVGB discharges across the eastern basin boundary, located between the McCoy Mountains and the Mule/Palo Verde Mountains, about 8 miles southeast of the GSEP (see **Figure 3.20-2**), where it enters into the Palo Verde Mesa Groundwater Basin (PVMGB). Groundwater contained in the PVMGB is hydrologically contiguous with groundwater contained in the Palo Verde Valley Groundwater Basin (PVVGB), which flanks the Colorado River. Therefore, under current/natural conditions, groundwater underlying the GSEP site flows in a southeasterly direction, into the PVVGB, and eventually influences the hydrology of the Colorado River. Downstream water right holders include California, Arizona, and Mexico.

The CVGB is bounded by the consolidated rocks of the surrounding mountains. Three water-bearing Quaternary- and Tertiary-age sedimentary units overlay non-water bearing bedrock (CDWR 2004; CDWR 1963). DWR reports the maximum thickness of these deposits as about 1,200 feet in the CVGB (CDWR 1979); however, modeling of Bouger gravity data obtained from USGS suggest greater depths to bedrock exist in some parts of the basin (**Figure 3.20-1**).

The CVGB is bounded upgradient by two other groundwater basins that include the eastern part of the Orocopia Valley (CDWR Basin No. 7-31) and Pinto Valley (CDWR Basin No. 7-6) groundwater basins and downgradient by the Palo Verde Mesa (CDWR Basin No. 7-5) Groundwater basin.

Natural groundwater recharge to the CVGB includes precipitation and subsurface inflow from the Pinto Valley Groundwater Basin and the Orocopia Valley Groundwater Basin (CDWR 2004; Eagle Crest 2009). Underflow from the Cadiz Valley Groundwater Basin has also been hypothesized by DWR (2004); however, recent work has reportedly confirmed that the Cadiz Valley Groundwater Basin does not contribute inflow to the CVGB (BV and WCC 1998). CVGB also shares a boundary with the Ward Valley Groundwater Basin, but groundwater is not reported to flow across this boundary (Bedinger, et al., 1989). Other sources of recharge to the basin include agricultural return flow and return flow from treated wastewater disposal.

In this part of California, much of the moisture from rain is lost through evaporation, or evapotranspiration and runoff that occurs during intense thunderstorms (RWQCB 2006). Most recharge from precipitation occurs when runoff from the surrounding mountains exits bedrock canyons and flows across the coarse sediments deposited in the proximal portions of the alluvial fans that ring Chuckwalla Valley. To a lesser extent, recharge occurs from infrequent precipitation or runoff on the valley floor (CDWR, 2004). The Chuckwalla Valley watershed encompasses Chuckwalla Valley (601,543 acres) and the surrounding mountains (258,825 acres), for a total area of 860,368 acres. Available estimates of recharge in CVGB are variable and in some cases based on incomplete or incorrect data. DWR has not published an estimated recharge rate (CDWR 2004). In 1986, Woodward Clyde calculated recharge from precipitation occurring within the watershed to be 29,530 acre feet per year (ac-ft/yr) (Woodward Clyde 1986). This equates to an average recharge rate of approximately 0.036 feet per year (0.4 inches).

Woodward Clyde reported this number as approximately 12.8 percent of an average annual precipitation of 3.39 inches across the watershed. However, this was the average annual precipitation in Blythe at the time, and does not consider that the orographic effect of the surrounding mountains which results in precipitation rates of over 6 inches per year in the higher elevations of the watershed (Hely and Peck 1964).

In 1992, the average recharge to CVGB was estimated by BLM and the County of Riverside to be 5,540 to 5,600 ac-ft/yr based upon an assumed 10 percent infiltration of precipitation (Eagle Crest 2009). This number evidently considered only a portion of the watershed as it would equate to an average annual precipitation depth of only about 1 inch per year across the watershed. Recent studies have demonstrated recharge rates for nearby desert basins ranging from approximately 3 to 5 percent of the total precipitation on the basin catchment area (Whitt and Jonker, 1998). A review of recharge studies in the arid southwest performed by USGS (2007b) cited a wide range of recharge rates, but rates in similar basins ranged from about 3 to 7 percent. For rain falling specifically on bedrock mountains in other arid basins, studies published by the USGS report that approximately 7 to 8 percent of incident precipitation goes to mountain front recharge (USGS, 2007).

For this study, recharge from precipitation was estimated by overlaying isohyetal maps prepared by Hely and Peck on the Chuckwalla watershed boundaries and calculating the volume of average annual precipitation for each of four precipitation zones for the valley and bedrock portions of the watershed. Recharge was then estimated as 3, 5 and 7 percent of total incident precipitation and a reasonable lower bound recharge estimate was adopted. The calculated average annual precipitation volume for the CVGB watershed is 286,250 acre feet over an area of 822,259 acres. Recharge for the CVGB is estimated as a fraction of 3, 5 and 7 percent of total incident precipitation is therefore calculated to be 8,588, 14,313 and 20,038 ac-ft/yr, respectively.

An analysis of infiltration and runoff rates for the CVGB is provided in **Table 3.20-4**. Based on this analysis, approximately 36 percent of precipitation in the watershed falls on the bedrock areas that ring the watershed. This is significant because precipitation that falls on the valley floor is not expected to contribute consistently to recharge. This would amount to approximately 3 percent of the total precipitation that falls on the Chuckwalla Valley watershed. In the absence of more detailed study, 3 percent of total precipitation falling on the Chuckwalla Valley watershed (8,588 ac-ft/yr) is used as a reasonable lower bound estimate of recharge through precipitation to the CVGB.

Subsurface Inflow

Underflow from the Pinto Valley Groundwater Basin has been calculated to be 3,173 ac-ft/yr (GeoPentech 2003; Eagle Crest Energy Company 2009). Inflow from the Orocopia Valley Groundwater Basin has been estimated to be 1,700 ac-ft/yr (LCA 1981). CH2M Hill (1996) estimated the combined subsurface inflow from both basins to be 6,700 ac-ft/yr. However, recent

TABLE 3.20-4
ESTIMATED RUNOFF AND INFILTRATION IN CHUCKWALLA VALLEY GROUNDWATER BASIN

Layer[a]	Area (acres)	Mean Annual Precipitation (inches)[b]	Total Volume of Rainwater from Mean Annual Precipitation (AF)	Runoff Curve Classification (2)	Runoff Curve Number[b]	Runoff (%of Precipitation)	Total Annual Volume of Infiltration – Hely & Peck (AF)	Total Annual Volume of Infiltration (AF) based on 3% (3)	Total Annual Volume of Infiltration (AF) based on 5% (3)	Total Annual Volume of Infiltration (AF) based on 7% (3)
unit1-cw	30,303	5	12,626	Alluvium, Steep Slope	74	3.50%	442	379	631	884
	211,498	4	70,499	Alluvium, Flat Slope	69	2.00%	1,410	2,115	3,525	4,935
	41,073	3.5	11,980	Alluvium, Steep Slope	74	3.50%	419	359	599	839
	12,077	4	4,026	Alluvium, Steep Slope	74	3.50%	141	121	201	282
	910	4	303	Alluvium, Steep Slope	74	3.50%	11	9	15	21
	194	4	65	Alluvium, Steep Slope	74	3.50%	2	2	3	5
	81,233	5	33,847	Alluvium, Steep Slope	74	3.50%	1,185	1,015	1,692	2,369
bedrockchuckwalla	32,001	5	13,334	Mountains	93	29.10%	3,880	400	667	933
	21,456	5	8,940	Mountains	93	29.10%	2,602	268	447	626
	11,050	5	4,604	Mountains	93	29.10%	1,340	138	230	322
	109	5	46	Mountains	93	29.10%	13	1	2	3
	9,246	4	3,082	Mountains	93	29.10%	897	92	154	216
	10,042	4	3,347	Mountains	93	29.10%	974	100	167	234
	282	4	94	Mountains	93	29.10%	27	3	5	7
	3,480	4	1,160	Mountains	93	29.10%	338	35	58	81
	275	4	92	Mountains	93	29.10%	27	3	5	6
	90	4	30	Mountains	93	29.10%	9	1	2	2
	398	4	133	Mountains	93	29.10%	39	4	7	9
	316	4	105	Mountains	93	29.10%	31	3	5	7
	39,340	5	16,392	Mountains	93	29.10%	4,770	492	820	1,147
	194	5	81	Mountains	93	29.10%	24	2	4	6
unit3-cw	28,973	3	7,243	Alluvium, Flat Slope	69	2.00%	145	217	362	507
unit2-cw	198,558	3	49,640	Alluvium, Steep Slope	74	3.50%	1,737	1,489	2,482	3,475
bedrockchuckwalla	89,161	6	44,581	Mountains	93	29.10%	12,973	1,337	2,229	3,121
Totals	**822,259**	**---**	**286,250**		**---**	**---**	**33,436**	**8,588**	**14,313**	**20,038**

NOTES:

[a] See Figure DR-S&W-179-1 in Solar Millennium, 2010a.
[b] From Hely & Peck, 1964. Based on a percent of Total Volume of Rainwater from Mean Annual Precipitation (Column 4).

SOURCE: CEC, RSA (June 2010) Soil and Water Table 7.

studies by GeoPentech reportedly indicate that subsurface inflow from Orocopia Valley Groundwater Basin may be as low as several hundred ac-ft/yr. Therefore a combined subsurface inflow rate of 3,500 ac-ft/yr was assumed for both basins for water budget purposes.

Wastewater Return Flow

Chuckwalla State Prison was constructed approximately 7 miles southwest of the GSEP site in 1988, and Ironwood State Prison became operational in 1994. The prisons use an unlined pond to dispose of treated wastewater, and a large percentage of this discharge is reported to infiltrate into the subsurface and recharge the CVGB. For the years 1998 through 2001, the California Department of Water Resources-Department of Planning and Local Assistance (CDWR-DPLA) reported that deep percolation of applied urban water in the Chuckwalla Planning Area (assumed to be wastewater return flow) was 500 to 800 ac-ft/yr (CDWR-DPLA 2007).

Authorities at the State prison complex (Lanahan 2009) indicated that approximately 600 ac-ft/yr of treated effluent recharges the basin. A more recently published water budget for the Eagle Crest Pumped Storage Project (Eagle Crest 2009), indicates 795 ac-ft/yr of treated effluent is recharged by the prisons. An additional source of wastewater return flow in the basin is approximately 36 ac-ft/yr from the Lake Tamarisk development near Desert Center (Eagle Crest 2009).

Irrigation Return Flow

The amount of applied irrigation water that returns to recharge a groundwater basin depends on the soil, crop type, amount and method of irrigation, and climatic factors. Woodward Clyde (1986) reported an irrigation efficiency of 60 percent (return flow of 40 percent) for jojoba crops in Chuckwalla Valley.

DWR-DPLA reported an irrigation efficiency of 72 percent (return flow of 28 percent) for subtropical crops in the Palen Detailed Analysis Unit (DAU) of the Chuckwalla Planning Area (CDWR-DPLA 2007). In its water budget calculations for the Chuckwalla Planning Area in support of California Water Plan updates, DWR-DPLA calculated an irrigation return flow of approximately 9 to 11 percent for 1998, 2000 and 2001, respectively. A 10 percent return flow is a reasonable factor for deep percolation from irrigation in the basin, and was applied to the assumed agricultural and landscape water demand in the basin for the purposes of a water budget.

Current irrigation return flow is estimated to be approximately 7,700 ac-ft/yr in the CVGB; this includes 6,400 ac-ft/yr for agriculture, 215 ac-ft/yr for aquaculture pumping, and 1,090 ac-ft/yr for Tamarisk Lake (Worley-Parsons 2010). Return flows are calculated as being10 percent of this total, or approximately 800 ac-ft/yr as shown in Table 3.20-5.

Groundwater Demand/Outflow

Groundwater provides the only available water resource in Chuckwalla Valley. Designated and potential beneficial uses of groundwater in the basin include domestic, municipal, agricultural and industrial use (RWQCB 2006). As such, groundwater demand is a significant contributor to basin outflow. Other sources of basin outflow include subsurface discharge to the Palo Verde Mesa Groundwater Basin, and evapotranspiration at Palen Lake.

Groundwater Demand

Current and historical groundwater pumpage in CVGB includes agricultural uses, Chuckwalla and Ironwood State Prisons, the Tamarisk Lake development and golf course, domestic uses, and a minor amount for Southern California Gas Company. In addition, historical pumpage included water supply for the Kaiser Corporation Eagle Mountain Mine. With the exception of the Chuckwalla Valley and Ironwood State Prisons, most of the current pumping in the basin occurs in the western portion of the basin, near the town of Desert Center. Current pumpage is estimated to be approximately 7,756 ac-ft/yr in the western CVGB and 2,605 ac-ft/yr in the eastern basin (please refer to Table 3-4 of WPAR, 2010 for additional detail and discussion). Agricultural production is limited to the western portion of the basin (Eagle Crest 2009; DWR-DPLA 2007 and 2009), with the exception of a relatively limited amount of acreage that is associated with the state prisons.

Subsurface Outflow

Subsurface outflow to Palo Verde Mesa Groundwater Basin was estimated by Metzger (1973) to be 400 ac-ft/yr. This calculation was based on a cross sectional profile of the boundary between the two basins derived using geophysical methods and regional data regarding groundwater gradients and hydraulic conductivity. Woodward Clyde (1986) revised this estimate based on the results of pump testing at Chuckwalla State Prison and calculated the outflow to be 870 ac-ft/yr. Engineering Science (1990) updated this estimate to 1,162 ac-ft/yr, presumably as a result of return flow from prison wastewater disposal. However, the rationale for this adjustment was not provided. Using more recent gravity data, Wilson and Owens-Joyce (1994) found that the area through which discharge occurs is significantly more limited than previously thought due to the presence of a buried bedrock ridge. As a result, the most recent available water budget for the basin has adopted an outflow rate of 400 ac-ft/yr (Eagle Crest 2009).

Palen Lake Evapotranspiration

Regional groundwater flow and discharge mapping performed by USGS (Bedinger, et al., 1989) did not identify Palen Lake as an area where groundwater discharges at the ground surface. Nevertheless, groundwater elevation contour mapping suggests that groundwater may occur near the ground surface beneath approximately the northwestern 25 percent of Palen Lake. It is therefore possible that a portion of Palen Lake is operating as a wet playa. Depth to the water table beneath the southeastern portions of Palen Lake, and a small ancillary playa located approximately one mile southeast of Palen Lake, were reported by Steinemann (1979) as being 20 to 30 feet below ground level, suggesting that Palen Lake would be a dry playa at various times.

Review of aerial photography shows what appears to be a relatively small area of dissected salt pan near the northern and western sides of the playa. Because the salt pan is dissected, it is not clear whether salt deposition is actively occurring or whether this material is residual deposition from surface water evaporation. Immediately northwest of Palen Lake, between Palen Lake and Desert Center-Rice Road, Pleistocene lake bed deposits crop out at the ground surface in the form of dissected, mesa-like prominences that are 5 to 10 feet high (CDWR 1963). These deposits are capped with a layer of caliche and locally support scattered mesquite trees. There does not appear to be any other evidence of shallow groundwater or evapotranspiration visible in aerial photography.

Groundwater elevation contour mapping (Steinemann, 1989) suggests that groundwater may occur near the ground surface beneath approximately the northwestern 25 percent of Palen Lake. A well located approximately two miles north of Palen Lake is reported to be completed to a depth of 501 feet below the ground surface and has a ground surface elevation of 500 feet amsl (WPAR 2009a). A screened interval for the well is not reported. Depth to the water table in this well were reported to be approximately 20 to 25 feet below the ground surface (bgs) between 1932 and 1984. Given that the surface elevation at Palen Lake two miles to the south is approximately 460 feet amsl, or 40 feet lower, it appears possible that the water table is very close to the ground surface beneath the northern portion of the playa.

In addition, DWR (1963) identified the presence of mesquite trees on low mesa-like promontories of Pleistocene lacustrine sediments at the northwest margin of Palen Lake playa, also suggesting the possible presence of relatively shallow groundwater. These data suggest it is possible that an area in the northern portion of Palen Lake is discharging groundwater by evaporation as a wet playa. Water table levels beneath the southeastern portions of Palen Lake, and a small ancillary playa located approximately one mile southeast of Palen Lake, are 20 to 30 feet below ground level (Steinemann 1989), indicating these are dry playa areas.

Review of aerial photography indicates there is an approximately 700-acre area of dissected salt pan in the northwest portion of the playa (Worley-Parsons 2010). This feature is surrounded by an additional approximately 1,300 acres that show evidence of more limited surface salt accumulation. The extent of this area is visible in aerial imagery from November 2005, and was generally confirmed by a reconnaissance performed on December 10 and 30, 2009.

Review of the historical progression aerial imagery (Worley-Parsons 2010**)** indicates no or limited salt accumulation in this area from 1996 through 2002, light salt accumulation in March of 2005, and the currently observed salt pan area in November 2005. This suggests that salt pan accumulation in the playa is episodic; however, seasonal, intermittent accumulation cannot be ruled out.

Historical precipitation records indicate that 2005 rainfall in Blythe was approximately twice the long term annual average, with 5.10 inches occurring in January and February 2005 (WRCC 2009), just before the March 2005 aerial photograph was taken. These storm events would be expected to have resulted in the accumulation of runoff in Palen Lake, and consequently in dissolution and re-crystallization of salt deposits during evaporation of surface water, and by wetting and subsequent drying of salt containing playa sediments. As such, these rainfall events are likely responsible for at least a portion of the observed salt accumulation; however, groundwater discharge by evaporation at the ground surface could also be responsible.

During a December 10, 2009 site visit by Worley-Parsons (2010), conditions at the northwestern edge of the playa were investigated. Intermittent salt deposits were observed to be located both in low lying areas and on the tops of low, dissected, mesa-like promontories of Pleistocene lacustrine sediments approximately three feet high that extend into the playa. Deposition of salt by groundwater evaporation at the surface would be expected to occur on the sides as well as the top of these promontories. The occurrence of salt deposits on the top, but not on the sides, suggests that these deposits are the result of salt dissolution from layers with elevated salt content and reposition as soil moisture evaporates at the ground surface. The shallow soil beneath the salt deposits was observed to be wetted to a depth of approximately three inches from a recent rain event, but underlying soil to depths of approximately one foot were observed to be generally dry. As such, evidence of salt deposition by evapotranspiration at the playa surface was not observed in this area during Worley-Parsons' reconnaissance (Worley-Parsons 2010).

Mesquite trees were observed in the area north of the playa, but wetland species or other species indicative of or dependant on shallow groundwater were not observed. Mesquite trees are typically thought to be associated with "shallow" groundwater; however, the term shallow should be understood in a relative sense—the depth to groundwater utilized by mesquite trees may be several tens of feet below the ground surface. This would be too deep to support groundwater discharge at the ground surface. Thus, the presence of mesquite is not necessarily indicative of discharging playas.

In December 2009, Worley-Parsons advanced two hand auger borings to approximately 10 feet bgs beneath the salt pan area in the northwest portion of the playa. The moisture content of the soil was observed to increase with depth in both borings, and free groundwater was encountered at a depth of approximately 8 feet below the playa salt pan surface in one of the borings. Subsurface soil encountered consisted of alternating layers clay/silt mixtures and sandy sediments. A depth of 2 to 3 meters is generally the maximum depth of free water documented beneath discharging playas. This suggests that groundwater could be shallow enough to discharge at the surface by capillary rise and evaporation to occur at least some of the time (Worley-Parsons 2010).

Based on the above data, salt accumulation at Palen Lake is likely the result of dissolution and recrystallization of existing salt deposits during times of surface water inflow, as well as limited episodic and possibly seasonal or intermittent groundwater discharge. The rate of groundwater discharge in a wet playa is dependent on the depth to groundwater and magnitude of upward vertical gradients, the ability of subsurface materials to facilitate capillary rise, climatic conditions, and the presence and extent of free water, wetlands and salt pans on the playa surface (Tyler 2005; Allen and Sharike 2003). In general, groundwater discharge rates are highest when groundwater is shallow, temperatures are high, and when open water or wetlands are exposed at the playa surface.

Increased depth to groundwater, lower temperatures, the presence of coarse grained material that inhibits capillary rise, and the presence of salt pan (which increases albedo) tends to decrease groundwater discharge rates. Based on these factors, discharge of groundwater at Palen Lake appears to be limited based on the depth to groundwater (including absence of vegetation that indicates consistent shallow groundwater), the presence of coarse grained layers that limit capillary rise, and the apparent intermittent or episodic nature of discharge.

Groundwater discharge rates were estimated based on reported groundwater discharge rates at other playas, the area of identified salt accumulation, and the evident episodic or intermittent nature of salt accumulation. Measured evapotranspiration rates at Franklin Lake Playa were used to form a basis for this estimate (Czarnecki 1997). Franklin Lake Playa is a well developed and extensively characterized wet playa in the Death Valley area (USGS 2007b). Evapotranspiration rates at Franklin Lake Playa are calculated to be 38 to 41 cm/year (1.3 to 1.4 feet/year) based on the Energy-Balance Eddy-Correlation method, which is reported to be the most reliable method by the USGS. WorleyParsons (WPAR 2010a) suggested that these rates would be a conservative measure of evapotranspiration for active wet playa areas at Palen Lake for the following reasons:

1. Franklin Lake Playa is a terminal playa, which is the terminal discharge point of the local groundwater flow system; whereas, Palen Lake is a bypass playa, with most groundwater flowing laterally past the playa.

2. Franklin Lake Playa includes extensive groundwater discharge features (e.g., saltpan, puffy ground and halophyte wetlands) that are generally less developed or lacking at Palen Lake, indicating less groundwater discharge would be expected at Palen Lake.

3. Evapotranspiration rates at wet playas are temperature dependent, with maximum rates occurring during the summer months. Franklin Lake Playa occurs in Death Valley, where mean annual and summer high temperatures typically exceed those at Palen Lake.

4. The available data suggest that groundwater discharge, if it is occurring at Palen Lake, is episodic or intermittent; whereas groundwater discharge at Franklin Lake Playa occurs throughout the year.

The total area of potential groundwater discharge at Palen Lake is estimated to be approximately 2,000 acres, with salt pan occupying approximately 700 acres of this total. Based on a groundwater discharge rate that is approximately half that at Franklin Lake Playa, and is estimated to occur for three months every year, the total discharge rate would be approximately 0.175 feet of water per year. Over an area of 2,000 acres, this equates to approximately 350 ac-ft/yr (WorleyParsons, 2010a).

Groundwater Budget

Perennial yield is the maximum quantity of water that can be annually withdrawn from a groundwater basin over a long period of time, during which water supply conditions approximate average conditions, without developing an overdraft condition (CDWR 1998). The perennial yield of CVGB was estimated to be between 10,000 and 20,000 ac-ft/yr (Hanson 1992). A perennial yield of 12,200 ac-ft/yr was adopted in the EIS for the Eagle Crest Landfill project in 1992 (BLM and County of Riverside, 1992). However, the amount of recharge from precipitation used to derive this number appears to be based on recharge to only a portion of the basin, so the perennial yield may be underestimated.

A comprehensive water budget was compiled based on published literature, water budget information collected by the DWR for updates to the California Water Plan, information obtained from the California State Prison Authority, and the analysis of basin inflow and outflow discussed in the previous two sections. This information is summarized in **Table 3.20-5**.

TABLE 3.20-5
GROUNDWATER BUDGET (AC-FT/YR)

Budget Components	Totals
Inflow	
Recharge from Precipitation	8,588
Underflow from Pinto Valley and Orocopia Valley Groundwater Basins	3,500
Irrigation Return Flow	800
Wastewater Return Flow	831
Total Inflow	***13,719***
Outflow	
Groundwater Extraction	-10,361
Underflow to Palo Verde Mesa Groundwater Basin	-400
Evapotranspiration at Palen Dry lake	-350
Total Outflow	***-11,111***
Budget Balance (Net Inflow)	2,608

SOURCE: CEC, RSA (June 2010) Soil and Water Table 8.

Water Bearing Units

The following water-bearing formations have been identified in the CVGB. The extent and relationship of these formations is presented in hydrostratigraphic cross sections A-A' and B-B' included as **Figures 3.20-3** and **3.20-4**. The locations of the cross sections are shown in **Figure 3.20-5**.

The analysis suggests that the CVGB is in positive balance (inflow exceeds outflow) by approximately 2,600 ac-ft/yr under average conditions.

Quaternary Alluvium

Quaternary alluvial fill in the basin consists of Holocene to Pleistocene alluvial fan and fluvial (stream) deposits, as well as lacustrine (lake) and playa (ephemeral lake) deposits (CDWR 2004). These deposits consist of gravel, sand, silt and clay (CDWR 1963). In general, coarser alluvial fan deposits are expected near the valley edges and grade into finer distal fan deposits that interfinger with fine grained lacustrine and playa deposits near the center of the basin. These deposits are typically heterogeneous. Valley axial drainages tend to be more uniform and continuous, and contain a greater proportion of sand and fine gravel. Portions of the basin are also occupied by aeolian (wind blown) sand deposits, but the identified aeolian deposits occur at the ground surface and are of limited thickness. Therefore, they are not believed to be an important water bearing unit.

The majority of the GSEP site is underlain by a relatively thin veneer of active valley axial alluvial sediments that is in equilibrium (neither eroding or aggrading) and underlain at shallow depth by older alluvium with buried soil horizons (WorleyParsons 2009b). A seismic shear wave profile investigation indicates that shear wave velocities are highest in a layer that occurs at about 20 to 30 feet below ground surface (bgs), which is consistent with the presence of carbonate cementation (JRA 2009). Portions of the basin are also occupied by aeolian (wind blown) sand deposits, and these sediments increase in prevalence near Ford Dry Lake and the area southeast of the GSEP site (DWR 1963; WorleyParsons 2009b). The identified aeolian deposits occur at the ground surface and are of limited thickness. The Quaternary sediments include the Pleistocene-age Pinto Formation, which consists of coarse fanglomerate (cemented, consolidated or semi-consolidated alluvial fan gravels) containing boulders and lacustrine clay with some interbedded basalt (DWR, 2004).

Pliocene Bouse Formation

The Pliocene Bouse Formation underlies the Quaternary sediments. The Bouse Formation includes a marine to brackish-water estuarine sequence deposited in an arm of the proto-Gulf of California (Metzger 1968; Wilson and Owen-Joyce 1994). This formation has alternatively been interpreted as, or may include, lacustrine sediments deposited in a closed, brackish basin (Stone 2006). The Bouse Formation is widely reported in the Colorado River Valley and tributary basins in southeastern California and descriptions of this formation come from occurrences outside of Chuckwalla Valley. It is reported to be composed of a basal limestone (marl) overlain by interbedded clay, silt, sand, and tufa. The top of the Bouse Formation is relatively flat lying, with a reported dip of approximately 2 degrees at a location south of Cibola (Metzger and others, 1973). The Bouse Formation in the CVGB is estimated to extend to approximately 2,200 feet bgs (approximately -1,800 feet amsl) beneath the site based on geophysical modeling (see WPAR, 2010 Figure 5). These unconsolidated to semi-consolidated sediments are reported to yield several hundred gallons per minute (gpm) to wells perforated in coarse grained units (Wilson and Owen-Joyce, 1994).

Miocene Fanglomerate

The Bouse Formation is unconformably underlain by a fanglomerate composed chiefly of angular to subrounded and poorly sorted partially to fully cemented pebbles with a sandy matrix (Metzger and others, 1973). The fanglomerate is likely Miocene-age; however, it may in part be Pliocene-age (Metzger and others, 1973). The fanglomerate represents composite alluvial fans built from the mountains towards the valley, and the debris of the fanglomerate likely represents a stage in the wearing down of the mountains following the pronounced structural activity that produced the basin and range topography in the area (Metzger and others, 1973). Bedding surfaces generally dip from the mountains towards the basin. The fanglomerate reportedly dips between 2 and 17 degrees near the mountains due to structural warping (Metzger and others, 1973). The amount of tilting indicates a general decrease in structural movements since its deposition (Metzger and others, 1973). The fanglomerate is estimated to extend to approximately 3,000 feet bgs (-2,600 feet amsl) beneath the site, based on geophysical modeling by Worley-Parsons (WPAR, 2009).

Bedrock

Bedrock beneath the site consists of metamorphic and igneous intrusive rocks of pre-Tertiary age that form the basement complex (CDWR, 1963). In some areas of the basin, volcanic rocks of Tertiary age overlie the basement complex (CDWR, 1963). These rocks are considered nonwater bearing. The bedrock topography in the GSEP area as interpreted by modeling of Bouger gravity data obtained from USGS is illustrated in **Figure 3.20-1**. The methods used to model the bedrock topography are discussed in more detail in Genesis Solar Energy Project Application for Certification Appendix D (Worley-Parsons 2009).

Groundwater Occurrence and Movement

In general, groundwater flow in the basin is south-southeastward (**Figure 3.20-2**). Groundwater flow is directed southward from the basin's boundary with the Cadiz Valley Basin and east-southeastward from its boundary with the Pinto Valley Basin, toward the eastern basin boundary where it flows into the adjacent Palo Verde Mesa Basin (Steinemann 1989). From this point, groundwater continues to flow eastward and eventually discharges into the Colorado River. The groundwater gradient is the steepest in the western half of the Chuckwalla Valley Groundwater Basin and is nearly flat in the central portion of the basin (CDWR 1963). Near Ford Dry Lake and east of Ford Dry Lake, the gradient becomes steeper as groundwater approaches the narrows in the southeast portion of the basin (Steinemann 1989; DWR 1963).

Groundwater levels exceed 500 feet amsl in the western portions of the basin and fall to less than 275 feet amsl near the eastern end of the basin in the narrows between the Mule and McCoy Mountains (Steinemann 1989). Near Palen Lake, groundwater occurs near the ground surface, and may result in groundwater discharge by evapotranspiration at the land surface. Near Ford Dry Lake, groundwater is reported at depths of 50 feet below ground surface. Beneath the GSEP site, groundwater occurs at depths of approximately 70-90 feet bgs (approximately 400 feet amsl) based on site-specific investigation (WPAR 2009a). **Figures 3.20-6** and **3.20-7** present water table contours for 1963 and 1992, respectively.

The DWR reports that groundwater levels in the basin have been generally stable (CDWR 2004). **Figure 3.20-8** shows hydrographs for selected wells within the Chuckwalla Valley from 1950 to 2009. The wells selected to present the hydrograph data were chosen to present the most complete set of historic water level elevation data across the Chuckwalla Valley. The hydrographs show that the water level has been generally stable over the last 40 years in the eastern part of the basin. The hydrograph for well 7/20-18H1 in the eastern part of the basin shows a decrease in water level elevation starting between 1985 and 1990. This well is associated with the Chuckwalla and Ironwood Prisons, and the decline in water level is likely due to increased water use at the prisons. The hydrograph for State Well No. 7S/18E-14H1 shows a slight (approximately 20 foot) increase in the water level between 1983 and 1992. This well and the three other wells at this location are associated with agricultural activities, and the water level increase is likely due to fallowing of the land in this area.

Aquifer Characteristics

The basin fill sediments within the CVGB include three aquifers: the alluvium, the Bouse Formation, and the fanglomerate. Groundwater in the alluvium likely occurs under unconfined conditions but could locally be semi-confined. Groundwater in the Bouse Formation and the fanglomerate was reported to be under semi-confined to confined conditions based on stratigraphic data and storativity values derived from aquifer pumping tests at the GSEP (Worley-Parsons 2010). However, the continuity of confining layers across the basin has not been established and may not be present as one progresses toward the alluvial source areas away from the Ford Dry Lake area. **Table 3.20-6** summarizes the reported and estimated aquifer properties for these aquifers based on data from specific capacity tests and aquifer pumping tests performed on wells in the CVGB.

Groundwater Quality

Groundwater quality varies markedly in the basin. Groundwater in the western portion of the basin near Desert Center generally contains lower concentrations of total dissolved solids (TDS) than groundwater in the eastern, downgradient portion of the basin near Ford Dry Lake (Steinemann 1989). Groundwater to the south and west of Palen Lake is typically high in sodium chloride and sodium sulfate chloride (DWR 2004). The concentrations of TDS range from 274 milligrams per liter (mg/L) to 8,150 mg/L, with an average concentration of 2,100 mg/L (Steinemann 1989). In general, the groundwater in the basin has concentrations of sulfate, chloride, fluoride, and dissolved solids too high for domestic use and concentrations of sodium, boron, and dissolved solids too high for irrigation use (DWR 1975). Several of the wells sampled in the basin contain high levels of fluoride and boron.

Reported water quality of samples collected from wells at the Site is presented in **Table 3.20-7**. This table indicates that water quality varies laterally and vertically in the area. Generally, water quality improves vertically with depth and laterally to the south. Vertically, TDS concentrations are generally highest in the alluvium followed by the Bouse Formation, and lowest in the fanglomerate.

Calculated TDS concentrations from borehole geophysical logging indicate TDS concentrations as high as 30,500 mg/L within finer grained units (silt and clay) in the alluvium, decreasing to less than 5,000 mg/L TDS in more transmissive sediments in the Bouse Formation at depths of 800 to 900 feet bgs (see AFC [March, 2009] Appendix D). Laterally, TDS concentrations in groundwater decrease south and southeast of the Site within all three water bearing units in the basin, and are lowest in the area south of I-10, as referenced in **Figure 3.20-9**.

Groundwater Wells in Proximity to the Proposed GSEP

An inventory of groundwater wells in the area was compiled from published literature, review of data from the National Water Information System (NWIS), and by obtaining well completion records from the DWR for wells registered in the eastern CVGB. A total of 50 wells were identified, the majority of which were reported by Worley-Parsons (2010) as abandoned or

TABLE 3.20-6
AQUIFER CHARACTERISTICS

Geologic Unit	Well ID	Well Depth	Specific Capacity (gpm/ft)	Transmissivity (gpd/ft)	Hydraulic Conductivity (ft day)	Storativity	Basis
Alluvium (Western Basin)	OW-2	---		224,400	100	0.05	Aquifer test near Desert Center (Eagle Crest Energy Company, 2009)
	CW-1 TO CW-4			56,000	50	0.05	Aquifer test of Eagle Mountain Iron Mine wells (Eagle Crest Energy Company, 2009)
				1,100-16,000	19.6-42	10^2-10^4	Aquifer test conducted for the PSPP
	Average			**74,000**	**53**	**0.05**	---
Bouse Formation (Eastern Basin)	TW-1	50		21,542	3 to 16		Aquifer test and lab analysis conducted for the GSEP
	3	957	5	10,000	4		Specific Capacity Test
	26	1,000	1.5	3,000	1		Specific Capacity Test
	29	985	1.6	3,200	1		Specific Capacity Test
	43	830	35	70,000			Specific Capacity Test
	Average			21,500	12 to 14		---
Bouse Formation/ Fanglomerate (Eastern Basin)	33	1,200	14.8	29,600	8	---	Specific Capacity Test
	34	1,200	26.7	53,400	14	---	Specific Capacity Test
	35	1,200	51.6	103,200	28	---	Specific Capacity Test
	36	1,200	15.6	31,200	8	---	Specific Capacity Test
	37	1,050	12.9	25,806	11	0.0002	Aquifer test conducted at State prison
	39	1,139	11.1	22,222	13	---	Specific Capacity Test
	40	1,200	10.3	20,600	5	---	Specific Capacity Test
	42	1,100	19.7	39,444	15	---	Specific Capacity Test
	Average			40,684	13	0.0002	---
Fanglomerate	14	982	2.6	5,200	14		Specific Capacity Test

SOURCE: CEC, RSA (June 2010) Soil and Water Table 9.

TABLE 3.20-7
ANALYTICAL RESULTS FOR ON-SITE GROUNDWATER SAMPLES

Analyte	Well ID	TW-1	TW-1	TW-1	TW-1	OBS-2
	Sample Collection Date	6/5/2009	7/9/2009	7/13/2009	7/16/2009	6/17/2009
	Sample Depth (feet bgs)[a]	Whole Well	Whole Well	Whole Well	Whole Well	800
pH	pH units	7.9@23°C[b]	7.9@19°C	7.9@20°C	7.8@19°C	7.8@21°C
Total Hardness (calc as $CaCO_3$)	mg/L[c]	570	540	490	500	220
Specific Conductance (at 25°C)	μS/cm[d]	19,000	19,000	18,000	18,000	8,800
Total Dissolved Solids @ 180°C (TDS)	mg/L	9,500	10,000	9,500	8,900	5,000
Calcium	mg/L	160	-- [e]	--	--	66
Magnesium	mg/L	38	--	--	--	14
Sodium	mg/L	4,500	4,000	3,600	3,600	1,500
Potassium	mg/L	30	27	24	25	12
Bicarbonate Alkalinity (As $CaCO_3$)	mg/L	--	--	--	96	--
Carbonate Alkalinity (As $CaCO_3$)	mg/L	--	--	--	ND<10[f]	--
Hydroxide Alkalinity (As $CaCO_3$)	mg/L	--	--	--	ND<10	--
Total Alkalinity (As $CaCO_3$ at pH 4.5)	mg/L	97	83	81	96	150
Chloride	mg/L	5,600	5,300	6,400	4,700	2,300
Sulfate as SO_4	mg/L	1,500	1,400	1,800	1,200	810
Fluoride	mg/L	4.6	6.2	4.6	4.7	1.1
Silica	mg/L	--	--	--	22	19
Dissolved Silica	mg/L	--	--	--	20	15
Sulfide	mg/L			--	ND<0.10	--
Nitrate (NO_3) – N	mg/L	ND<0.25	--	--	ND<0.25	0.5
Nitrite (NO_2) – N	mg/L	ND<0.63	ND<0.25	0.28	ND<0.50	ND<0.25
Total Phosphorus	mg/L	--	--	--	ND<0.10	--
Total Cyanide	mg/L	--	--	--	ND<0.005	--
Antimony	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Arsenic	mg/L	0.024	0.023	0.027	--	0.0092
Barium	mg/L	0.03	0.028	0.027	0.028	0.033
Beryllium	mg/L	ND<0.004	ND<0.004	ND<0.004	ND<0.004	ND<0.004
Cadmium	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Chromium	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Cobalt	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Copper	mg/L	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010
Iron	mg/L	1.4	--	--	--	0.46
Lead	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Lithium	mg/L	--	--	--	1.4	--
Manganese	mg/L	0.065	--	--	--	0.029
Mercury	mg/L	ND<0.001	ND<0.001	ND<0.001	ND<0.001	ND<0.001
Molybdenum	mg/L	0.44	0.43	0.4	0.37	0.24
Nickel	mg/L	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010
Selenium	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Silver	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Thallium	mg/L	ND<0.002	ND<0.002	ND<0.002	ND<0.002	ND<0.002
Vanadium	mg/L	ND<0.005	ND<0.005	ND<0.005	ND<0.005	ND<0.005
Zinc	mg/L	ND<0.10	ND<0.10	ND<0.10	ND<0.10	ND<0.10

NOTES:
[a] bgs = below ground surface
[b] °C = Celsius
[c] mg/L = milligrams per liter
[d] μS/cm - microsiemens per centimeter
[e] -- = not analyzed
[f] ND<0.10 = not detected above the noted laboratory reporting limit.

SOURCE: CEC, RSA (June 2010) Soil and Water Table 10.

disused. Information regarding the completion depths, construction details, and status of these wells, to the extent available, is presented in **Table 3.20-8** and shown in **Figure 3.20-2**.

Surface Water Hydrology

The site is located within the Colorado River Basin, within the Chuckwalla Valley Drainage Basin. There are no perennial streams in Chuckwalla Valley. Chuckwalla Valley is an internally drained basin, and all surface water flows to Palen Dry Lake in the western portion of the valley and Ford Dry Lake in the eastern portion of the valley. As discussed earlier, Palen Dry Lake is a "wet playa" with apparently significant shallow groundwater discharge at the ground surface by evaporation; whereas, Ford Dry Lake is a "dry playa," with groundwater occurring well below the ground surface. Palen Dry Lake is located in the central portion of Chuckwalla Valley about 11 miles west of the proposed plant site.

The only perennial surface water resources in the eastern portion of Chuckwalla Valley are McCoy Spring, at the foot of the McCoy Mountains approximately 6.5 miles northeast of the site and 7.5 miles northeast of the proposed well field, and Chuckwalla Spring, approximately 15 miles south of the site at the foot of the Chuckwalla Mountains.

The Federal Emergency Management Agency (FEMA) is responsible for documenting flood potential across the United States. FEMA's Flood Insurance Rate Maps document the extent of flooding that is expected to have a 1% annual chance of occurrence (100 year flood zone). Neither the GSEP site nor its vicinity has been mapped by FEMA for flooding potential, and therefore the GSEP is not located within a delineated flood zone. Storm water flow across and adjacent to the GSEP occurs in a network of shallow and poorly expressed alluvial channels, and during larger events as widespread sheetflow. Although the GSEP is not located within a FEMA-delineated flood zone, flooding could occur on site. During a large storm event, off-site storm water flows from a large watershed area to the north of the site, which covers approximately 91,627 acres, would be expected to cause flooding at the GSEP site. The upstream extents of the contributing watersheds extend into the Palen Mountains. The extent of the watershed impacting the GSEP was delineated using existing USGS digital elevation model data and is shown in **Figure 3.20-10,** which was taken directly from the preliminary Drainage Erosion and Sediment Control Plan (DESCP) (GSEP 2009a).

To provide additional detail regarding flood potential, the applicant completed existing conditions FLO-2D modeling on the GSEP to provide information regarding the extents, depths, and velocities of surface flow across the GSEP during the 100-year event as well as for more frequent storm events. The results of the analysis confirm the presence of general widespread and shallow sheet flooding across the site and do not provide resolution on the distribution of flow in individual washes due to a lack of detailed topographic data and the fact that the washes are so poorly expressed. The overall offsite watershed impacting the GSEP has been divided into three distinct sub-basins in the DESCP for the purpose of designing and sizing engineered channels to collect flow and convey it around and through the GSEP site. However, the boundaries of the sub-basins are not well defined and are subject to change depending on the magnitude of the flow event and the propensity for the small drainages to migrate in response to erosion and sediment deposition.

TABLE 3.20-8
INVENTORY OF WELLS IN THE EASTERN CHUCKWALLA VALLEY GROUNDWATER BASIN

Well ID	State Well Number	Other Name	Owner	Installation Date	Use/Status	Well Casing Diameter (inches)	Approximate Ground Surface Elevation (feet msl)[a]	Well Depth (feet bgs)[b]	Screened Interval (feet bgs)	Geologic Unit
OBS-1	N/A[c]	Shallow Observation Well	Genesis Solar, LLC	5/9/2009	Monitoring Well	5	883	155	100 to 150	Alluvium
OBS-2-270[d]	N/A	Nested Observation Well	Genesis Solar, LLC	7/2/2009	Monitoring Well	N/A	883	270	265 to 275	Bouse Formation
OBS-2-315[d]	N/A	Nested Observation Well	Genesis Solar, LLC	7/2/2009	Monitoring Well	N/A	883	315	304 to 327	Bouse Formation
OBS-2-370[d]	N/A	Nested Observation Well	Genesis Solar, LLC	7/2/2009	Monitoring Well	N/A	883	370	359 to 374	Bouse Formation
OBS-2-400[d]	N/A	Nested Observation Well	Genesis Solar, LLC	7/2/2009	Monitoring Well	N/A	883	400	387 to 418	Bouse Formation
TW-1	N/A	Test Well	Genesis Solar, LLC	5/22/2009	Monitoring Well	5	883	555	340 to 564	Bouse Formation
1	5S/20E-16M1	McCoy Spring and DWR-17	N/A	N/A	Unused	N/A	889	N/A	N/A	N/A
2	6S/18E-36E1	N/A	CA Jojoba Research and Development	12/18/1981	Irrigation	10 to 6	424	940	250 to 290; 770 to 810	Alluvium/Bouse Formation
3	6S/18E-29	Siddall Well	Agra Energy Corp.	2/26/1982	Irrigation	20 to 8	498	957	560 to 940	Bouse Formation
4	6S/19E-19J1	N/A	N/A	N/A	Unused	12	354	N/A	N/A	N/A
5	6S/19E-25P1	N/A	N/A	N/A	Unused	10	360	85.7	N/A	Alluvium
6	6S/19E-25R1	N/A	N/A	N/A	Destroyed	10	360	61.9	N/A	Alluvium
7	6S/19E-25	NOS 1A, 1B, 1C	USGS[e]	N/A	Exploratory Borehole	N/A	358	N/A	N/A	N/A
8	6S/19E-26Z1	N/A	N/A	N/A	Destroyed	N/A	N/A	N/A	N/A	N/A
9	6S/19E-28R1	N/A	N/A	N/A	Unused	N/A	354	N/A	N/A	N/A
10	6S/19E-29E1	N/A	N/A	N/A	Destroyed/Collapsed	6	377	N/A/19.7[f]	N/A	N/A
11	6S/19E-30H1	N/A	N/A	N/A	Destroyed	6	370	28.7	N/A	Alluvium
12	6S/19E-31Z1	N/A	N/A	N/A	Destroyed	N/A	N/A	N/A	N/A	N/A
13	6S/19E-32	N/A	Jacado Agri Corp.	6/27/1982	Destroyed[g]	22 to 18 to 12	392	732	307 to 327; 365 to 732	Bouse Formation
14	6S/19E-32	N/A	Lorne Froats	5/1/1991	Domestic/ Irrigation/ Dust Control	12 to 10	392	982/450[f]	890 to 940	Fanglomerate
15	6S/19E-32K1	N/A		N/A	N/A	12.5	390.2	N/A/526[f]	N/A	Bouse Formation
16	6S/19E-32K2	N/A		N/A	N/A	10.5	390	--/297[f]	N/A	Bouse Formation
17	6S/19E-33A1	Hopkins Well and DWR-33X1	N/A	1911	Destroyed	12 to 8	361	1200/267[f]	1,175 to 1,200	Fanglomerate
18	6S/19E-34	N/A	So Cal Gas	4/29/1989	Anode	1	368	400	200 to 400	Alluvium/Bouse Formation

TABLE 3.20-8 (Continued)
INVENTORY OF WELLS IN THE EASTERN CHUCKWALLA VALLEY GROUNDWATER BASIN

Well ID										
19	6S/19E-34	N/A	So Cal Gas	7/15/1981	Other	N/A	369	274	0 to 274	Alluvium/Bouse Formation
20	6S/19E-36A1	N/A	N/A	N/A	Destroyed	10	365	64.8	N/A	Alluvium
21	6S/20E-30Z1	Ford Well	N/A	N/A	Stock; Destroyed	10	N/A	N/A	N/A	N/A
22	6S/20E-33L1	N/A	N/A	N/A	Destroyed[g]	N/A	387.60	1,197	N/A	Bouse Formation
23	6S/20E-33C1	N/A	N/A	N/A	Monitoring	10	392.10	400.00	N/A	Bouse Formation
24	6S/20E-33	N/A	Sol Cal Gas	4/29/1989	Andoe	1	397.00	435	235 to 435	Alluvium/Bouse Formation
25	6S/20E-33	N/A	Sol Cal Gas	7/20/1981	Other	N/A	397	278	0 to 278	Alluvium/Bouse Formation
26	7S/18E-14F1	N/A	U.S. AgriResearch and Development	12/26/1982	Irrigation	16 to 10	562.58	1,000/952[f]	410 to 630; 750 to 770; 810 to 870	Alluvium/Bouse Formation
27	7S/18E-11N1	N/A	N/A	N/A	Unused	16	555	486.4	N/A	Bouse Formation
28	7S/18E-11R1	N/A	N/A	N/A	Unused	16	520	779.4	N/A	Bouse Formation
29	7S/18E-14H1	N/A	U.S. AgriResearch and Development	1/16/1983	Irrigation	10	545.91	985/950[f]	420 to 460; 500 to 520; 540 to 580; 620-820; 840-990	Bouse Formation
30	7S/18E-14H1	N/A	N/A	N/A	Destroyed	6	546	123.9	N/A	Alluvium
31	7S/19E-4R1	Teaque Well	N/A	N/A	Unused	12	423.89	242.2	N/A	Alluvium
32	7S/20E-4R1	Vada McBride	N/A	N/A	Unused	16	418.00	315.7	N/A	Bouse Formation
33	7S/20E-16M1	N/A	CA Department of Corrections	N/A	N/A	30 to 16	456.02	1,200	690 to 1190	Bouse Formation/ Fanglomerate
34	7S/20E-17L1	WP-4	CA Department of Corrections	9/8/1992	Public Water Supply	24	458.30	1,200	690 to 1190	Bouse Formation/ Fanglomerate
35	7S/20E-17K1	N/A	CA Department of Corrections	12/20/1989	N/A	30 to 16	456.48	1,200	690 to 1190	Bouse Formation/ Fanglomerate
36	7S/20E-17G1	N/A	CA Department of Corrections	12/30/1987	Industrial	30 to 16 to 10	443.54	1,200	690 to 1190	Bouse Formation/ Fanglomerate
37	7S/20E-17C1	78	N/A	1981	Irrigation	14 to 10	433.09	1,050	750 to 1,050	Bouse Formation/ Fanglomerate
38	7/20E-17C2	observation well 1	CA Department of Corrections	6/20/1986	Monitoring	1 1/4	433	1,040	795 to 815 and 995 to 1,015	Bouse Formation/ Fanglomerate
39	7S/20E-18H1	59/observation well 2/Vada McBride	N/A	1959	Irrigation	15 to 12	442.94	1,139	853 to 1,083	Bouse Formation/ Fanglomerate

TABLE 3.20-8 (Continued)
INVENTORY OF WELLS IN THE EASTERN CHUCKWALLA VALLEY GROUNDWATER BASIN

Well ID	State Well Number	Other Name	Owner	Installation Date	Use/Status	Well Casing Diameter (inches)	Approximate Ground Surface Elevation (feet msl)[a]	Well Depth (feet bgs)[b]	Screened Interval (feet bgs)	Geologic Unit
40	7S/20E-18K1	WP-6	CA Department of Corrections	11/4/1992	Public Water Supply	15 to 10	449.40	1,200	690 to 1,200	Bouse Formation/ Fanglomerate
41	7S/20E-18R1	WP-5	CA Department of Corrections	10/24/1992	Public Water Supply	13.5 to 10	453.60	1,160	N/A	Fanglomerate
42	7S/20E-20B1	79/observation well 3	N/A	6/4/1905	Irrigation	16 to 12	470.00	1,100	738 to 1,100	Bouse Formation/ Fanglomerate
43	7S/20E-28C1	7S/20E-28F1/80	Jojoba Inc.	3/15/1982	Irrigation	10 to 8	505.60	830	510 to 600 and 680 to 780	Bouse Formation
44	7S/20E-28C2	N/A	Jojoba Southwest	11/30/1989	Irrigation	16 to 12	505.30	1,100	700 to 1,100	Bouse Formation/ Fanglomerate
45	7S/20E-28	N/A	Chuckawalla Jojoba inc Great American Securities	6/6/1989	Test Hole/Abandoned	N/A	505	825	N/A	N/A
46	7S/20E-27L1	N/A	N/A	N/A	Destroyed	8	517.00	53.6	N/A	Alluvium
47	8S/20E-10N2	60	N/A	1984	N/A	4	621	872	500 to 580; 620 to 640; 710 to 850	Bouse Formation
48	4S/16E-32M1	N/A	N/A	N/A	N/A	N/A	548	N/A	N/A	N/A
49	4/S17E-6C1	N/A	N/A	N/A	N/A	N/A	500	N/A	N/A	N/A
50	6S/17E-3M1	N/A	N/A	N/A	N/A	N/A	566	818	N/A	Bouse Formation
51	5S/17E19Q1	N/A	N/A	N/A	N/A	N/A	538	760	N/A	N/A
52	5S/16E-7M1	N/A	N/A	N/A	N/A	N/A	603.67	648	N/A	N/A
53	5S/16E-7P1	N/A	N/A	N/A	N/A	N/A	598	347	N/A	N/A
54	8S/20E-28N1	N/A	N/A	N/A	N/A	N/A	654.5	500	N/A	Bouse Formation

NOTES:

[a] msl = above mean sea level
[b] bgs = below ground surface
[c] N/A = information not available or unknown
[d] Nested pressure transducer buried in place.
[e] USGS-NWIS = United States Geological Survey - National Water Information System (USGS-NWIS) website at http://nwis.waterdata.usgs.gov/ca/nwis/gwlevels
[f] 1,000/952 = reported well depth/measured well depth. Well depth was measured by WorleyParsons or Azca Drilling.
[g] Well could not be located by WorleyParsons. Reported as destroyed.

SOURCE: CEC, RSA (June 2010) Soil and Water Table 11.

Peak discharges for each sub-basin were calculated using the Bently Pondpack software package and generally followed the guidelines presented in the *Riverside County Flood Control and Water Conservation District Hydrology Manual.* The results of the peak discharge analysis are summarized in **Table 3.20-9**.

TABLE 3.20-9
SUMMARY OF OFFSITE PEAK DISCHARGES

Sub-basin ID	Sub-basin Area (Sq. Mi.)	Q100 (cfs) (HEC-HMS)	Q100 (cfs) (Regression)*
1	27.9	4,070	11,476
2	17.2	2,203	8,140
3	98.1	10,022	28,022

SOURCE: CEC, RSA (June 2010) Soil and Water Table 12.
*The regional regression equation used in the analysis above was taken from the U.S. Geological Survey Open File Report 93-419 (1994), as provided in the Caltrans Highway Design Manual. The equation provided was Q_{100}=850AREA$_{0.69}$ for Region 10.

A comparison was made between the discharge data provided as part of the Conceptual Drainage Study and discharges obtained using the USGS Regional Regression Equation for the region. The purpose of the comparison was to provide some insight into the reasonableness of the calculated discharges when compared to some other regionally accepted methodology. The discharges presented in the Concept Drainage Study (GSEP 2009a) were significantly lower than those calculated using the regional regression equations. The subject area is likely significantly flatter with much more dispersed flow than the “average” watershed used in the derivation of the regional regression equation, which could account for lower discharges for the larger watersheds. Overall, the reported discharges appear to fulfill the purpose of design given the site specific watershed conditions.

Dry Washes

There are no perennial streams in Chuckwalla Valley and a vast majority of the time, the area is dry and devoid of any surface flow anywhere. Water runoff occurs only in response to infrequent intense rain storms. Much of the area is subject to inundation either by sheet flow or weakly-expressed braided ephemeral surface water flow. The Chuckwalla Valley watershed drains to Palen and Ford Dry Lakes, but runoff from most of the basin generally does not reach these dry lakes. During large rainfall events, Ford Dry Lake and Palen Dry Lake will retain water in shallow ponds for days or weeks. This occurs on average approximately once every 20 years (RCFCWCD 2009). There are no named ephemeral washes within the GSEP site; however, a few ephemeral washes are located upslope of the GSEP site or traverse the southeastern part of the proposed off-site linear alignment. The GSEP site itself is located in an area where washes disperse into a subdued bar and swale morphology, with widely dispersed swales that are small, only a few inches deep, and do not have defined banks (Worley Parsons, 2009b).

There are numerous small dry washes traversing the site which have no or poorly developed banks. These channels are typically very subtle, with a width of 2 to 8 feet and a depth of 3 to

9 inches. These features are poorly expressed and can be difficult to discern on aerial photography. Many of these channels do not reach the dry lake but fade out on the vegetated sand dune surface. The conveyance capacity of these washes is limited, and runoff during moderate to large events will break out of these features and be conveyed across the terrain as shallow sheet flow.

Springs, Seeps and Playa Lakes

A comprehensive review was conducted to identify potential springs, seeps and surface water discharges that may be present in the central and eastern portions of Chuckwalla Valley (the area that may be affected by drawdown from GSEP pumping). Sources reviewed included published reports and maps by the United States Geological Survey and California Department of Water Resources, maps published by the Bureau of Land Management, and contact with BLM personnel. The only springs, seeps or surface discharges identified are McCoy Spring (at the foot of the McCoy Mountains approximately 6.5 miles northeast of the GSEP site and 7.5 miles northeast of the proposed well field), and Chuckwalla Spring (approximately 15 miles south of the site, which is actually located outside the valley a short distance in the Chuckwalla Mountains) (BLM 2002 and 2009b; DWR 1963; RWQCB 2006; Stone and Pelka 1989; and USGS 1983a, 1983b). McCoy Spring and Chuckwalla Spring are perennial springs; however, there is no information available regarding the discharge quantity for these springs. Published water quality data for McCoy Spring is included in DWR, 1963.

McCoy Spring is located at an elevation of 889 feet amsl at the outlet of a bedrock canyon near the toe of the western slope of the McCoy Mountains, and includes a cistern and seeps. Based on the close proximity of bedrock outcrops to the spring and seeps, the spring likely represents baseflow discharge from the McCoy Mountains. Similarly, the Chuckwalla Spring likely represents baseflow discharge from the Chuckwalla Mountains. As such, neither spring would have a direct hydraulic connection to the aquifers in the CVGB, which occur in the basin fill materials to the west of McCoy Spring and to the north of Chuckwalla Spring.

Surface and Groundwater Beneficial Uses

The Basin Plan for the CRBRWQCB establishes water quality objectives, including narrative and numerical standards that protect the beneficial uses of surface and ground waters in the region. The Basin Plan describes actions and other control measures designed to ensure compliance with statewide plans and policies and provide comprehensive water quality planning.

Beneficial water uses are of two types: consumptive and non-consumptive. Consumptive uses are those normally associated with people’s activities, primarily municipal, industrial and irrigation uses that consume water and cause corresponding reduction and/or depletion of water supply. Non-consumptive uses include swimming, boating, waterskiing, fishing, and other uses that do not significantly deplete water supplies.

1. **Past or Historical Beneficial Uses**
   a. Historical beneficial uses of water within the Colorado River Basin Region have largely been associated with irrigated agriculture and mining. Industrial use of water has become increasingly important in the region, particularly in the agricultural areas.

2. **Present Beneficial Uses**
   a. Agricultural use is the predominant beneficial use of water in the Colorado River Basin Region, with the major irrigated acreage being located in the Coachella, Imperial and Palo Verde Valleys. The second in quantity of usage is the use of water for municipal and industrial purposes. The third major category of beneficial use, recreational use of surface waters, represents another important segment of the Region's economy.

3. **Sources of Drinking Water Policy**
   a. All surface and ground waters are considered to be suitable, or potentially suitable, for municipal or domestic water supply with the exception of:
      i. Surface and ground waters where: the TDS exceed 3,000 mg/L, and it is not reasonably expected by the Regional Board to supply a public water system, or
      ii. There is contamination, either by natural process or by human activity, that cannot be treated for domestic use using either Management Practices or best economically achievable treatment practices, or
      iii. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.

Existing springs in the Colorado River Basin with beneficial water uses include Box Spring, Crystal Spring, Old Woman Spring, Cove Spring, Mitchell Caverns Spring, Bonanza Spring, Agua Caliente Spring, Kleinfelter Spring, Von Trigger Spring, Malpais Spring, Sunflower Spring, Bousic Spring, Veale Spring, Nett Spring, Gordon Spring, and Arctic Canyon Spring. Based on a review of available information including the USGS NWIS database, USGS quadrangle maps and data provided by the BLM, none of these springs are within the area that would be influenced by the GSEP.

Water quality objectives are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area.

1. **General Surface Water Objectives** (CRBRWQCB)
   a. *Aesthetic Qualities* – All waters shall be free from substances attributable to wastewater of domestic or industrial origin or other discharges which adversely affect beneficial uses not limited to: setting to form objectionable deposits; floating as debris, scum, grease, oil, wax, or other matter that may cause nuisances; and producing objectionable color, odor, taste, or turbidity.

   b. *Tainting Substances* – Waters shall be free of unnatural materials which individually or in combination produce undesirable flavors in the edible portions of aquatic organisms.

c. *Toxicity* – All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in human, plant, animal, or indigenous aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, 96-hour bioassay or bioassays of appropriate duration or other appropriate methods as specified by the CRBRWQCB. Effluent limits based upon bioassays of effluent will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data to become available, and source control of toxic substances will be encouraged. The survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality factors, shall not be less than that for the same water body in areas unaffected by the waste discharge, or other control water which is consistent with the requirements for "experimental water" as described in Standards Methods for the Examination of Water and Wastewater.

d. *Temperature* – temperature shall not be altered.

e. *pH* – shall range from 6.0 to 9.0

f. *Dissolved Oxygen* – shall not be reduced below the following minimum levels at any time: warm – 5.0 mg/L, cold – 8.0 mg/L, and warm and cold – 8.0mg/L

g. *Total Dissolved Solids* – discharges of wastes or wastewater shall not increase the total dissolved solids content of receiving waters, unless it can be demonstrated to the satisfaction of the Regional Board that such an increase in total dissolved solids does not adversely affect beneficial uses.

h. *Bacteria* – The geometric mean of the indicated bacterial densities should not exceed one or the other of the following: E. coli – 630 colonies (col) per 100 ml and enterococci – 165 col per 100 ml. Nor shall any sample exceed one other following maximum allowable: E.coli 2000 col per 100 ml and enterococci 500 col per 100 ml.

Any discharge, except from agricultural, shall not cause concentration of total dissolved solids in surface waters to exceed the following limits:

TDS (mg/L)	Annual Average	Maximum
Coachella Valley Drains	2000	2500
Palo Verde Valley Drains	2000	2500

2. **General Groundwater Objectives:** Establishment of numerical objectives for groundwater involves complex considerations and it is acknowledged that the quality of groundwater varies significantly throughout the CVGB and varies with depth. It is the CRBRWQCB's goal to maintain the existing quality of non-degraded groundwater basins and to minimize the quantities of contaminants reaching any groundwater basin.

   a. Groundwater designated for domestic or municipal supply shall not contain taste or odor producing substances.

   b. Groundwater designated for domestic or municipal supply shall not contain coliform organisms in excess of limits specified in the regulations.

c. Groundwater designated for domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22 regulations.

d. Discharges of water softeners, regeneration brines, other mineralized wastes, and toxic wastes to disposal facilities which ultimately discharge in areas where such waste can percolate to ground waters useable for domestic and municipal purposes, are prohibited.

Wastewater reclamation and reuse is encouraged; however, such use must meet applicable water quality standards.

3.21 Wild Horse and Burros

As shown on Map 2-26 of the Approved Northern and Eastern Colorado Desert Coordinated Management Plan (BLM 2002), there are no Wild Horse and Burro Herd Areas (HAs) or Herd Management Areas (HMAs) within or adjacent to the proposed project area or right-of-way application area.

3.22 Wildland Fire Ecology

The GSEP area is located within the boundaries of BLM's NECO Plan. Compared to other parts of the state, there are relatively few fires in the NECO planning area and most are small. In the 15 years between 1980 and 1995, a handful of fires burned a total of about 6,000 acres, all outside the GSEP area. Of this amount, about 900 acres in the Chemehuevi Critical Habitat Unit and about 11 acres in the Chuckwalla Critical Habitat Unit burned. Most fires in the desert are caused by lightning or vehicles.

BLM and NPS have collaborated in the development of the Fire Management Activity Plan (FMAP) 1996 for the California Desert. The FMAP brings together fire management goals for biological resources, wilderness, and other sources and establishes fire management standards and prevention and protection programs. The FMAP includes limitations on fire suppression methods in critical habitat and other tortoise habitat; the limitations are designed to limit habitat disturbance while keeping fires small.

The vegetation-fuel types in the GSEP area, Sonoran creosote bush scrub, desert dry wash woodland, unvegetated ephemeral dry wash, desert sink scrub, and desert dunes, are not fire-adapted. Fire, particularly repeated wildfire is deleterious to these plant communities and tends to deplete the native woody shrubs that characterize and dominate these communities in favor of exotic weedy annuals.

Exotic and invasive weedy annual plants such as Mediterranean splitgrass and red brome form a complete ground cover in some places, where they have displaced native annual and perennial grasses and forbs. There are indications that the increase in exotic annual grasses might be enhanced by nitrogen deposition from air pollution originating outside of the planning area (e.g., Los Angeles Basin, Coachella Valley) (Brooks 1998). There is some evidence that disturbances such as livestock grazing, OHV use, and fire have contributed to the spread of exotic annuals (Brooks 1998).

Sonoran Desert Scrub is the dominant community type within the NECO Planning Area, covering 3.8 million acres, or 69 percent of the total area. The large majority of its distribution (86 percent) is on public lands. Major threats to this community type include fire, grazing, off-road vehicles, and invasions of alien species. Sonoran creosote bush scrub occupies approximately 64 percent of the GSEP area.

Wildfire suppression occurs with the minimum surface disturbance practical in all habitats. Wildfires are suppressed using a mix of only the following methods in order to minimize habitat disturbance:

a. aerial attack,

b. crews using hand tools to create fire breaks,

c. mobile attack engines limited to public roads, designated open routes, and routes authorized for limited-use,

d. use of foam and/or fire retardant, and

e. earth-moving equipment or tracked vehicles (such as bulldozers) in critical situations to protect life, property, or high-value resource.

f. Post fire-suppression mitigation includes rehabilitation of firebreaks and other ground disturbances and obliteration of vehicle tracts sufficient to discourage future casual use. Hand tools are used for rehabilitation activities whenever feasible.

Disturbed areas are more likely to support exotic annual weeds. The information developed for the GSEP reveals no developed, disturbed, or agricultural land, in the GSEP area (see Section 3.19, *Vegetation Resources*). These would be the areas most likely to support or carry wildfires in the GSEP area.

3.23 Wildlife Resources

3.23.1 Introduction

The GSEP area occurs at elevations ranging from approximately 350 to 450 feet above mean sea level, approximately 25 miles west of the community of Blythe and 27 miles east of Desert Center, California in eastern Riverside County. The proposed GSEP would be located within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) area. The GSEP would be located on the alluvial fan on the southern flank of the Palen Mountains in the Chuckwalla Valley.

Common wildlife in the GSEP area may include house finch (*Carpodacus mexicanus*), white-crowned sparrow (*Zonotrichia leucophrys*), northern flicker (*Colaptes auratus*), Say's phoebe (*Sayornis saya*), kangaroo rat (*Dipodomys* sp.), round-tailed ground squirrel and antelope ground squirrel (*Spermophilus tereticaudus*, *Ammospermophilus leucurus*), desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), desert kit fox (*Vulpes macrotis arsipus*), and coyote (*Canis latrans*) (Helix 2010 as cited in the CEC RSA June 2010). Information used to update this FEIS section is found in an updated Biological Resources Technical Report that includes findings from spring, 2010, surveys (TTEC 2010p). Additionally, golden eagle survey results from spring 2010 and a golden eagle risk assessment became available in time for preparation of this FEIS (TTEC 2010u; TTEC 2010v).

3.23.2 Special Status Wildlife

Special-status wildlife species are those species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and typically require unique habitat conditions. Special-status species are defined as meeting one or more of the following criteria:

1. Listed as threatened or endangered or candidates for future listing as threatened or endangered under CESA or FESA;
2. Protected under other regulations (e.g. Migratory Bird Treaty Act);
3. Listed as species of concern by CDFG;
4. A plant species considered by the CNPS to be "rare, threatened, or endangered in California" (CNPS List 1A, 1B, and 2) as well as CNPS List 3 and 4 plant species;
5. A plant listed as rare under the California Native Plant Protection Act;
6. Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances; or
7. Any other species receiving consideration during environmental review under CEQA.

The BLM designates sensitive species as those requiring special management considerations to promote their conservation and reduce the likelihood and need for future listing under FESA. BLM Sensitive Species include all Federal Candidate and Federally Delisted species which were so designated within the last 5 years, CNPS List 1B species that occur on BLM lands, and additional species for which BLM administered lands are vital to their conservation. For the purposes of this analysis, all BLM Sensitive Species are considered special-status species.

Table 3.23-1 lists all special-status species evaluated during the analysis that are known to occur or could potentially occur in the GSEP area and vicinity. Special-status species (or their sign) observed during the 2009 field surveys are indicated by **bold-face type**. Special-status species listed in Table 3 that were detected or considered likely to occur based on known occurrences in the vicinity and suitable habitat present within the GSEP area are discussed in more detail below. The rest of these species have no or low-to-moderate potential to occur in the GSEP area and are described in Table3.23-2.

Desert Tortoise

The desert tortoise was listed by the State of California as threatened on August 3, 1989. The Mojave population was federally listed as threatened on April 2 1990, and critical habitat was designated on February 8, 1994. The Mojave population of the desert tortoise includes those animals living north and west of the Colorado River in the Mojave Desert of California, Nevada, Arizona, and southwestern Utah, and in the Sonoran (Colorado) Desert in California (USFWS 1990; USFWS 1994). The desert tortoise's range, outside the listed Mojave population, extends into the Sonoran Desert, where tortoises occur in the lower Colorado River Valley, Arizona uplands, plains of Sonora, and the central Gulf Coast; the species has not been documented in northeastern Baja California (Germano et al. 1994).

Desert tortoises are well adapted to living in a highly variable and often harsh desert environment. They spend much of their lives in burrows, even during their seasons of activity, which generally coincides with the greatest annual forage availability. In late winter or early spring, they emerge from over-wintering burrows and typically remain active through fall. Activity does decrease in summer, but tortoises often emerge after summer rain storms to drink (Henen et al. 1998). During activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Berry 1974; Luckenbach 1982; Esque 1994). During periods of inactivity, they reduce their metabolism and water loss and consume very little food. Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind and can apparently tolerate large imbalances in their water and energy budgets (Nagy and Medica 1986; Peterson 1996a, b; Henen et al. 1998).

The size of desert tortoise home ranges varies with respect to location and year (Berry 1986a) and also serves as an indicator of resource availability and opportunity for reproduction and social interactions (O'Connor et al. 1994). Females have long-term home ranges that may be as little or less than half that of the average male, which can range to up to 200 acres (Burge 1977; Berry 1986a; Duda et al. 1999; Harless et al. 2009). Core areas used within tortoises' larger home ranges depend on the number of burrows used within those areas (Harless et al. 2009). Over its

TABLE 3.23-1
SPECIAL-STATUS WILDLIFE SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE GSEP AREA

Common Name	Scientific Name	Status State/Federal
WILDLIFE		
Reptiles/Amphibians		
Desert tortoise	***Gopherus agassizii***	**ST/FT**
Couch's spadefoot toad	*Scaphiopus couchii*	CSC/BLM Sensitive
Mojave fringe-toed lizard	***Uma scoparia***	**CSC/BLM Sensitive**
Desert rosy boa	*Charina (Lichanura) trivirgata*	G4/G5/BLM Sensitive
Chuckwalla	*Sauromalus obesus*	G5
Birds		
Western burrowing owl	***Athene cunicularia hypugaea***	**CSC/BCC/BLM Sensitive**
Golden eagle	*Aquila chrysaetos*	CFP/BGEPA/BLM Sensitive
Short-eared owl	***Asio flammeus***	**CSC**
Ferruginous hawk	***Buteo regalis***	**WL/BLM Sensitive**
Swainson's hawk	***Buteo swainsoni***	**ST**
Prairie falcon	***Falco mexicanus***	**WL**
American peregrine falcon	*Falco peregrinus anatum*	SFP
Vaux's swift	*Chaetura vauxi*	CSC
Mountain plover	*Charadrius montanus*	CSC/BLM Sensitive
Northern harrier	***Circus cyaneus***	**CSC**
Gilded flicker	*Colaptes chrysoides*	SE
Yellow warbler	*Dendroica petechia sonorana*	CSC
California horned lark	***Eremophila alpestris actia***	**WL**
Yellow-breasted chat	*Icteria virens*	CSC
Loggerhead shrike	***Lanius ludovicianus***	**CSC/BCC**
Gila woodpecker	*Melanerpes uropygialis*	SE
Purple martin	*Progne subis*	CSC
Vermilion flycatcher	*Pyrocephalus rubinus*	CSC
Brewer's sparrow	***Spizella breweri***	**BCC**
Bendire's thrasher	*Toxostoma bendirei*	CSC/BLM Sensitive
Crissal thrasher	*Toxostoma crissale*	CSC
Le Conte's thrasher	***Toxostoma lecontei***	**WL/BCC/Sensitive**
Mammals		
Pallid bat	*Antrozous pallidus*	CSC/BLM Sensitive
Townsend's big-eared bat	*Corynorhinus townsendii*	CSC/BLM Sensitive
Spotted bat	*Euderma maculatum*	CSC/ BLM Sensitive
Western mastiff bat	*Eumops perotis californicus*	CSC/ BLM Sensitive
California leaf-nosed bat	*Macrotus californicus*	CSC/ BLM Sensitive
Arizona myotis	*Myotis occultus*	CSC
Cave myotis	*Myotis velifer*	CSC/ BLM Sensitive
Yuma myotis	*Myotis yumanensis*	BLM Sensitive
Colorado Valley woodrat	*Neotoma albigula venusta*	NECO species
Pocket free-tailed bat	*Nyctinomops femorosaccus*	CSC

TABLE 3.23-1 (Continued)
SPECIAL-STATUS WILDLIFE SPECIES KNOWN OR POTENTIALLY OCCURRING IN THE GSEP GSEP AREA

Common Name	Scientific Name	Status State/Federal
Mammals (cont.)		
Big free-tailed bat	*Nyctinomops macrotis*	CSC
Burro deer	***Odocoileus hemionus eremicus***	**NECO species**
Nelson’s bighorn sheep	*Ovis canadensis nelson*	CFP/BLM Sensitive
Yuma mountain lion	*Puma concolor browni*	CSC
American badger	***Taxidea taxus***	**CSC**
Desert kit fox	***Vulpes macrotis arsipus***	**Furbearing mammal**

Status Codes:

Federal

FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future
BCC = Fish and Wildlife Service: Birds of Conservation Concern: Identifies migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent highest conservation priorities <www.fws.gov/migratorybirds/reports/BCC2002.pdf>
BGEPA = protected under the Bald and Golden Eagle Protection Act

State

CSC = California Species of Special Concern Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
SE = State listed as endangered
ST = State listed as threatened
CFP = California Fully Protected
WL = State watch list
SR = State-listed rare; Plant species listed as rare under the California Native Plant Protection Act (Fish and Game Code §1900 et seq.). A plant is rare when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens (Fish and Game Code §1901)
Furbearing Mammal = CDFG Code Section 4000 - 4012

California Native Plant Society

List 1B =Rare, threatened, or endangered in California and elsewhere
List 2 = Rare, threatened, or endangered in California but more common elsewhere
List 3 = Plants which need more information
List 4 = Limited distribution – a watch list
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Bureau of Land Management

BLM Sensitive = Species requiring special management consideration to promote their conservation and reduce the likelihood and need for future listing under the ESA. BLM Sensitive species also include all Federal Candidate species and Federal Delisted species which were so designated within the last 5 years and CNPS List 1B plant species that occur on BLM lands. http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/blm_manual.Par.43545.File.dat/6840.pdf.

NECO Species: animals specifically identified in the NECO plan and identified for special consideration

Global Rank/State Rank

Global rank (G-rank) and *State rank (S-rank)* is a reflection of the overall condition of an element throughout its global (or *State*) range. Subspecies are denoted by a T-Rank; multiple rankings indicate a range of values. *State rank (S-rank)* is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical

G1 or S1 = Critically imperiled; Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals
G2 or S2 = Imperiled; 6-20 EOs OR 1,000-3,000 individuals
G3 or S3 = Rare, uncommon or threatened, but not immediately imperiled; 21-100 EOs OR 3,000-10,000 individuals
G4 or S4 = Not rare and apparently secure, but with cause for long-term concern; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.
G5 or S5= Demonstrably widespread, abundant, and secure.

Threat Rank:

.1 = very threatened
.2 = threatened
.3 = no current threats known

SOURCES: CNDDB 2010

lifetime, each desert tortoise may use more than 1.5 square miles of habitat and may make periodic forays of more than 7 miles at a time (Berry 1986a).

Tortoises are long-lived and grow slowly, requiring 13 to 20 years to reach sexual maturity, and have low reproductive rates during a long period of reproductive potential (Turner et al. 1984b; Bury 1987; Germano 1994). Mating occurs both during spring and fall (Black 1976; Rostal et al. 1994), and the number of eggs as well as the number of clutches (set of eggs laid at a single time) that a female desert tortoise can produce in a season is dependent on a variety of factors including environment, habitat, availability of forage and drinking water, and physiological condition (Turner et al. 1986, 1987; Henen 1997; McLuckie and Fridell 2002). Egg-laying occurs primarily from April to July (Rostal et al. 1994; USFWS 1994); the female typically lays 2-14 eggs (average 5-6) eggs in an earthen chamber excavated near the mouth of a burrow or under a bush (Woodbury and Hardy 1948; USFWS 1994). The eggs typically hatch 90 to 120 days later, between August and October. The success rate of clutches has proven difficult to measure, but predation, while highly variable (Bjurlin and Bissonette 2004), appears to play an important role in clutch failure (Germano 1994).

The majority of threats to the desert tortoise and its habitat are associated with human land uses. Many of those identified in the 1994 Recovery Plan, and that formed the basis for listing the species as threatened, continue to affect the tortoise today (USFWS 2008a). Some of the threats identified at the time of listing include urbanization, upper respiratory tract disease and possibly other diseases, predation by common ravens and domestic and feral dogs, unauthorized off-road vehicle activity, authorized vehicular activity, illegal collecting, mortality on paved roads, vandalism, drought, livestock grazing, feral burros, non-native plants, changes to natural fire regimes, and environmental contaminants (USFWS 1994).

Even though a wide range of threats are known to affect desert tortoises and their habitat, very little is known about their demographic impacts on tortoise populations or the relative contributions each threat makes to tortoise mortality (Boarman 2002a). Extensive research shows that all of these threats can directly kill or indirectly affect tortoises; research has also clarified many mechanisms by which these threats act on individuals. While current research results can lead to predictions about how local tortoise abundance should be affected by the presence of threats, quantitative estimates of the magnitude of these threats, or of their relative importance, have not yet been developed. Thus, the revised recovery plan focuses on expanding the knowledge of individual threats and places emphasis on understanding their multiple and combined effects on tortoise populations (USFWS 2008a).

The original Desert Tortoise (Mojave Population) Recovery Plan identified 6 recovery units (Upper Virgin River, Northeastern Mojave, Eastern Mojave, Eastern Colorado, Northern Colorado, and Western Mojave) and recommended the establishment of 14 DWMAs throughout the recovery units (USFWS 1994). Since 1994, greater insight into patterns of both ecological and genetic variation within the Mojave desert tortoise population has been gained. While the revised recovery plan has not yet been finalized, based on this new information, the revision redefines the recovery units to balance both distinctiveness and variability within the population. Given the generally continuous variation in genetic structure and biomes across the Mojave desert tortoise's range, the approach in delineating revised recovery units stresses identification of geographic discontinuities or barriers that coincide with any observed variation among tortoise populations. Several potential barriers are evident from topographic maps, the U.S. Geological Survey habitat model (Nussear et al. 2009), and landscape genetic analyses (Hagerty 2008). Differences in genetic, ecological, and physiological characteristics to help highlight boundaries or other differences between units were used in the delineation. In doing this, the USFWS considered demographic, ecological, and behavioral considerations to be of greater importance than genetic issues alone, as have been suggested by researchers providing recommendations on the formulation of conservation plans for threatened or endangered species (Avise 2004; Mace and Purvis 2008). The draft revised recovery plan reduces the number of recovery units from six to five, which reflects the newly obtained information and ensures that local adaptations and critical genetic diversity are maintained (USFWS 2008a).

According to the 1994 Recovery Plan, the GSEP is located within Eastern Colorado Recovery Unit, which was merged with the Northern Colorado Recovery Unit in the draft revised recovery plan and referred to simply as the Colorado Desert Recovery Unit (USFWS 2008a). Within this recovery unit desert tortoise are found primarily in "well-developed washes, desert pavements, piedmonts, and rocky slopes characterized by relatively species-rich succulent scrub, creosote bush scrub, and blue palo verde-ironwood-smoke tree communities" (USFWS 1994). Habitat within this recovery unit has been described as being in excellent condition despite declines in tortoise densities over the past several decades; disturbance was estimated at less than 1.3 percent throughout (USFWS 2005). The highest desert tortoise densities within this recovery unit occur in Chemehuevi and Ward valleys, on the Chuckwalla Bench within the Chuckwalla Desert Wildlife Management Area (DWMA and associated Critical Habitat Unit) and in Joshua Tree National Park. Desert tortoise densities at the Chuckwalla Bench in 1992 were estimated between 22 and 49 adults per square kilometer (approximately 57–127 adults per square mile) but have shown declining trends (Berry 1997; Tracey et al. 2004).

According to the 1994 Recovery Plan, tortoise densities in the Eastern Colorado Recovery Unit were estimated between 5 and 175 adult tortoises per square mile and the area was given a threat level of 4 out of 5 (5 = extremely high) (USFWS 1994). Density estimates based on range-wide line distance sampling monitoring from 2001–2005 (USFWS 2006) are lower than estimates from earlier studies (Luckenbach 1982; Berry 1984), but these simple comparisons cannot be taken at face value when the historical monitoring efforts were conducted using different techniques at different scales and with different goals. Differences may reflect a difference in scale between methods, with relatively large historical tortoise densities estimated in small, local areas being smoothed over larger areas with range-wide sampling. However, low tortoise densities across recovery units from 2001-2005 may also represent continued decline of populations throughout the Mojave Desert since the species was listed (USFWS 2006).

Protocol-level surveys of most of the GSEP area were conducted between March 17 – 25 and April 6 – 13, 2009 (GSEP area except south of I-10) and October 30, 2009 (transmission line south of I-10). The transmission line route changed after spring surveys; the northern alignment was included in spring surveys, but not to the same level of intensity as the rest of the GSEP area, and further surveys are scheduled for Spring 2010 (TTEC 2010a). Survey results of the Project Disturbance Area include 19 mineralized and 9 non-mineralized carcass fragments. Preliminary spring 2010 surveys identified approximately 30 tortoise bone fragments (>> 4 years age) along the transmission line and buffer area (TTEC 2010m). No live tortoises were observed on site (TTEC 2010m).

The habitat within the Project Disturbance Area is of lower quality closer to the Ford playa and is higher quality toward the upper bajadas (Nussear et al. 2009), but the entire GSEP site contains suitable habitat for desert tortoise (e.g., Sonoran creosote bush scrub with friable soils for burrowing and appropriate forage plants) and could potentially be occupied by this species in the future.

Mojave Fringe-toed Lizard

The Mojave fringe-toed lizard is endemic to southern California and a small area of western Arizona, where it is restricted to aeolian (wind-blown) sand habitats in the deserts of Los Angeles, Riverside, and San Bernardino Counties in California and La Paz County in Arizona (Hollingsworth and Beaman 1999; Stebbins 1985). Nearly all records for this species are associated with present-day and historical drainages and associated sand dune complexes of the Mojave and Amargosa Rivers (Norris 1958).

The distribution of Mojave fringe-toed lizards is naturally fragmented because of its obligate habitat specificity to loose sand, a patchy habitat type (Murphy et al. 2007). Many local populations of this species are quite small, with small patches of sand supporting small populations of lizards. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation (Murphy et al. 2007). The loose wind-blown sand habitat, upon which the species is dependent, is a fragile ecosystem requiring the protection against both direct and indirect disturbances (Weaver 1981; Barrows 1996). Environmental changes that stabilize sand, affect sand sources, or block sand movement corridors will also affect this species (Turner et al. 1984; Jennings and Hayes 1994). Additional threats to this species include habitat loss or damage from urban development, off-highway vehicles (OHV), and agriculture. Aside from the direct loss of land, development can also increase predators, such as the common raven, to occupied habitat.

Murphy et al. (2006) identified two maternal lineages of this species; the northern lineage is associated with the Amargosa River drainage system, and the southern with the Mojave River drainage system, Bristol Trough, Clark’s Pass (including Palen Lake and Pinto Wash), and the Colorado River sand transport systems.

The Mojave fringe-toed lizard is found in arid, sandy, sparsely vegetated habitats and is associated with creosote bush scrub throughout much of its range (Norris 1958; Jennings and Hayes 1994). This species is totally restricted to habitats of fine, loose, aeolian sand, typically with sand grain size no coarser than 0.375 mm in diameter (Turner et al. 1984; Jennings and Hayes 1994; Stebbins 1944). It burrows in the sand for both cover from predators and protection from undesirable temperatures (Stebbins 1944), though it will also seek shelter in rodent burrows. They are primarily insectivorous, but also eat plant food including leaves, seeds, and buds (Stebbins 1944). Mojave fringe-toed lizards normally hibernate from November to February, emerging from hibernation sites from March to April. The breeding season is April to July, and adult Mojave fringe-toed lizards reach sexual maturity two summers after hatching. Females deposit 2-5 eggs in sandy hills or hummocks May through July (Mayhew 1964, Jennings and Hayes 1994). April to May, while temperatures are relatively cool, this species is active during mid-day; from May to September, they are active in mornings and late afternoon, but seek cover during the hottest parts of the day. Common predators of the Mojave fringe-toed lizard include burrowing owls, leopard lizards, badgers, loggerhead shrikes, roadrunners, various snakes, and coyotes (Jennings and Hayes 1994).

Thirty-nine Mojave fringe-toed lizards were observed during spring 2009 GSEP surveys. Approximately 60+ Mojave fringe-toed lizards including juvenile, subadult, and adults were found during spring 2010 field surveys within the transmission line and buffer area (TTEC 2010m). Several Mojave fringe-toed lizards were observed within the proposed six-pole extension area for the gen-tie transmission line at the SCE Colorado River Substation site. The Project Disturbance Area contains suitable Mojave fringe-toed lizard habitat wherever stabilized and partially stabilized sand dune habitat (1 acre) and playa/sand drift over playa habitat (37 acres) occur. Mojave fringe-toed lizard habitat preferences are more closely tied to the landform than to the vegetation community, and Sonoran creosote bush scrub habitat with an active sand layer can also support this species. This species was detected south of I-10 in Sonoran creosote bush scrub because this area supports a layer of wind-blown sand from the adjacent dunes.

Couch’s Spadefoot Toad

Couch’s spadefoot toad is found in southeastern California east through Arizona, New Mexico, Texas, and Oklahoma, south to San Luis Potosi, Nayarit, Mexico, at the southern tip of Baja California, Mexico, and an isolated population in Colorado. In California, it is found in the extreme southeast, including southeastern San Bernardino County and eastern Riverside and Imperial Counties (Jennings and Hayes 1994). The GSEP area is west of the range for this species as the range is described in the Northern & Eastern Colorado Desert Coordinated Management Plan (BLM CDD 2002) and Amphibian and Reptile Species of Special Concern in California (Jennings and Hayes 1994); however, Dimmitt (1977) identifies the Palen Dry Lake area as a place of interest for further surveys.

They are found in a variety of plant communities, including desert dry wash woodland, creosote bush scrub, and alkali sink scrub. They require habitat with substrate capable of sustaining temporary pools for breeding, and loose enough to permit burial in subterranean burrows (Jennings and Hayes 1994, BLM CDD 2002). Breeding habitat includes temporary impoundments at the base of dunes as well as road or railroad embankments, temporary pools in washes or channels, pools that form at the downstream end of culverts, and playas (Morey 2005; Morey, pers. comm.; Mayhew 1965). Natural scour sites in washes with breeding toads (included in Dimmitt 1977) had washed down to a hardpan, which enabled ponding (Dimmitt, pers.

comm.). The majority of known Couch's spadefoot toad breeding ponds are artificial, though this may be because of the difficulty of locating natural ponds within the limited amount of time ponds may retain water. Couch's spadefoot toads require a food source, primarily alate termites, but they also eat beetles, ants, grasshoppers, solpugids, scorpions, and centipedes.

This species is dormant from 8-10 months of the year, emerging from burrows at the onset of warm summer rains. Emergence appears to be triggered by the low frequency sound caused by falling rain, though it appears to be inhibited by low soil temperatures.

Threats to Couch's spadefoot include loss of habitat from urbanization and agriculture and impacts from off-highway vehicles, which can destroy potential pool habitat. There are also indications that the low-frequency sound created by off-highway vehicles may trigger emergence cues, and result in emergence in poor environmental conditions (Jennings and Hayes 1994). Emergence may also be triggered by construction vehicle noise (Dimmitt, pers. com.).

No Couch's spadefoot toads were observed during surveys; however, because of the short time this species is above ground, and because the surveys were not conducted during the proper season (i.e., after summer rains), the lack of observations does not suggest the species is absent from the GSEP site. During GSEP surveys, the Applicant searched for artificial or temporary water catchments that could serve as breeding pools (GSEP 2009a). None were identified within the GSEP area. The CEC reviewed GSEP site aerials, however, and has identified some areas that appear to sustain or that could potentially sustain surface water.

The closest known record for this species is from Dimmitt (1977) from a breeding pond near the intersection of I-10 and Wiley Well Road. While Dimmitt (1977) does not identify the exact location of this pond, a large ponded area (an old borrow pit) is visible in aerial photos in the same general area identified by Dimmit (1977). Aerial photos and a site visit by BLM indicate the borrow pit can sustain ponded water. This area is within the GSEP transmission line route.

Western Burrowing Owl

The western burrowing owl inhabits arid lands throughout much of the western United States and southern interior of western Canada (Haug et al. 1993) and is typically a year-round resident in much of California (Gervais et al. 2008).

Burrowing owls are unique among the North American owls in that they nest and roost in abandoned burrows, especially those created by California ground squirrels, kit fox, desert tortoise, and other wildlife. Burrowing owls have a strong affinity for previously occupied nesting and wintering habitats. They often return to burrows used in previous years, especially if they were successful at reproducing there in previous years (Gervais et al. 2008). The southern California breeding season (defined as from pair bonding to fledging) generally occurs from February to August with peak breeding activity from April through July (Haug et al. 1993).

In the Colorado Desert, western burrowing owls generally occur at low densities in scattered populations, but they can be found in much higher densities near agricultural lands where rodent and insect prey tend to be more abundant, including along the lower Colorado River (Gervais et al. 2008). Western burrowing owls tend to be opportunistic feeders. Large arthropods, mainly beetles and grasshoppers, comprise a large portion of their diet. Small mammals, especially mice and voles (*Microtus*, *Peromyscus*, and *Mus* spp.), are also important food items for this species. Other prey animals include reptiles and amphibians, young cottontail rabbits, bats, and birds such as sparrows and horned larks. Consumption of insects increases during the breeding season (Haug et al. 1993).

Threats to burrowing owls include habitat modification and destruction of ground squirrel burrows. Other threats include pesticide accumulation, burrow destruction from farming practices and canal and road maintenance, roadside shooting, and direct mortality from squirrel poisons (BLM CDD 2002; Gervais et al. 2008).

Protocol-level surveys of part of the Project Disturbance Area (except for part of the GSEP area associated with the newest transmission line route south of I-10) were conducted in winter of 2007 (Phase I) and spring of 2009 (GSEP 2009a). One burrowing owl was observed during 2007 surveys and two owls and burrowing owl sign (burrows, whitewash, feathers and pellets) were observed throughout the GSEP area during 2009 field surveys although outside of the Project Disturbance Area. One burrowing owl was observed during spring 2010 field surveys within the transmission line GSEP area (TTEC 2010m). The entire Project Disturbance Area (1,811acres) is considered burrowing owl habitat.

Golden Eagle

Golden eagles are typically year-round residents throughout most of their western United States range. They breed from late January through August with peak activity March through July (Kochert et al. 2002). Migratory patterns are usually fairly local in California where adults are relatively sedentary, but dispersing juveniles sometimes migrate south in the fall. This species is generally considered to be more common in southern California than in the northern part of the state (USFS 2008).

Habitats for this species typically include rolling foothills, mountain areas, and deserts. Golden eagles need open terrain for hunting and prefer grasslands, deserts, savanna, and early successional stages of forest and shrub habitats. Golden eagles primarily prey on lagomorphs and rodents but will also take other mammals, birds, reptiles, and some carrion (Kochert et al. 2002). This species prefers to nest in rugged, open habitats with canyons and escarpments, with overhanging ledges and cliffs and large trees used as cover.

The status of golden eagle populations in the United States is not well known, though there are indications populations may be in decline (USFWS 2009b, Kochert et al. 2002). Accidental death from collision with man-made structures, electrocution, gunshot, and poisoning are the leading causes of mortality for this species, and loss and degradation of habitat from agriculture, development, and wildfire continues to put pressure on golden eagle populations (Kochert et al. 2002; USFWS 2009b).

Absent interference from humans, golden eagle breeding density is determined by either prey density or nest site availability, depending upon which is more limiting (USFWS 2009b). A compilation in Kochert et al. (2002) of breeding season home ranges from several western United States studies showed an average home range of 20 to 33 square kilometers (7.7 to 12.7 square miles) that ranged from 1.9 to 83.3 square kilometers (0.7 to 32.2 square miles). In San Diego, a study of 27 nesting pairs found breeding ranges to be an average of 36 square miles with a range from 19 to 59 square miles (Dixon 1937). Other studies from within and outside the United States include ranges from 9 to 74.2 square miles (McGahan 1968; Watson et al. 1992 [range of 14.7 to 26.1 pairs per 1,000 square kilometers]). An Environmental Assessment (EA) and Implementation Guidance for take permits was issued under the Bald Eagle and Golden Eagle Protection Act (USFWS 2009b). The EA specifies that in implementing the resource recovery permit for take of inactive golden eagle nests (50 CFR 22.25), data within a 10-mile radius of the nest provides adequate information to evaluate potential effects. No golden eagles were observed during surveys in the GSEP area, including during avian point count surveys. The avian point count surveys were conducted in March and April, 2009 (GSEP 2009a). However, these surveys were conducted within the GSEP site only and therefore were not designed to survey potential golden eagle nesting habitat near the GSEP site, and did not assess the quality of foraging habitat or prey abundance for eagles.

Helicopter surveys for golden eagle nests were conducted by the Wildlife Research Institute following USFWS protocols (Pagel et al. 2010). The initial surveys were conducted on March 25-26 and April 2-3 2010 (TTEC 2010U). WRI found three golden eagle nests within the 10-mile buffer of the GSEP Area; one inactive nest in the McCoy Mountains (8.26 miles from the Plant Site) and two nests within the Palen Mountains (nests are co-located 9.8 miles from the Plant Site), one inactive and one with evidence that some new material may have been recently added to the nest though no eagles were observed using the nest. These nests likely represent two eagle territories, one in the McCoys and one in the Palen Mountains. The multiple nest sites in the Palen Mountains likely represent alternate nest sites for one pair due to the proximity of the nest locations (TTEC 2010U). No eagles were seen either associated with the nests or while flying in these two mountain ranges. As per protocol requirements, a second survey was conducted on May 14, 2010 by helicopter to revisit active or possible activity territories that were identified in the initial surveys. No new nesting activity was observed (TTEC 2010U).

Loggerhead Shrike

Loggerhead shrikes are uncommon residents throughout most of the southern portion of their range, including southern California. In southern California they are generally much more common in interior desert regions than along the coast (Humple 2008). Loggerhead shrikes initiate their breeding season in February and may continue with raising a second brood as late as July; they often re-nest if their first nest fails or to raise a second brood (Yosef 1996).

This species can be found within lowland, open habitat types, including creosote bush scrub and other desert habitats, sage scrub, non-native grasslands, chaparral, riparian, croplands, and areas characterized by open scattered trees and shrubs. Fences, posts, or other potential perches are typically present. In general, loggerhead shrikes prey upon large insects, small birds, amphibians, reptiles, and small rodents over open ground within areas of short vegetation, usually impaling prey on thorns, wire barbs, or sharp twigs to cache for later feeding (Yosef 1996). Loss of habitat to agriculture, development, and invasive species is a major threat; this species has shown a significant decline in the Sonoran Desert (Humple 2008).

Loggerhead shrikes were observed throughout the survey area during spring 2009 and preliminary spring 2010 field surveys (TTEC 2010m) as well as during avian point count surveys. The entire GSEP site is considered loggerhead shrike habitat (GSEP 2009a).

Le Conte's Thrasher

In California, Le Conte's thrasher is a resident in the San Joaquin Valley and the Mojave and Colorado deserts. It occurs in desert flats, washes and alluvial fans with sandy and/or alkaline soil and scattered shrubs. It rarely occurs in monotypic creosote bush scrub habitat, because creosote bush is unable to support a nest, or in massive Sonoran Desert woodlands (Prescott 2005). Preferred nest substrate includes thorny shrubs and small desert trees. Breeding activity occurs from January to early June, with a peak from mid-March to mid-April (BLM CDD 2002). Le Conte's thrashers forage for food by digging and probing in the soil. They eat arthropods, small lizards and snakes, and seeds and fruit; the bulk of their diet consists of beetles, caterpillars, scorpions, and spiders.

This species was observed during GSEP surveys. Although the entire GSEP area may provide suitable habitat for this species, the best habitat is likely the microphyll woodland associated with the linear facilities.

Crissal Thrasher

Crissal thrashers are non-migratory residents ranging from southern Nevada and southeastern California to western Texas and central Mexico. This species prefers habitats characterized by dense, low scrubby vegetation, which, at lower elevations, includes desert and foothill scrub and riparian brush. Nests of this species typically consist of an open cup of twigs, lined with finer vegetation, and are placed in the middle of a dense shrub (Shuford & Gardali 2008).

Based on a review of the vegetation community descriptions provided by the Applicant, the GSEP site contains little, if any, of the dense scrub habitat preferred by this species. They are known from the area, including from McCoy Spring, Palen Valley, and Chuckwalla Well (Shuford & Gardali 2008). The closet occurrence based on the CNDDB (2010) is south of the GSEP site within one mile of the transmission line interconnection location.

California Horned Lark

The California horned lark is found throughout California except the north coast, and is less common in mountainous areas. This species prefers open areas that are barren or with short vegetation including deserts, brushy flats, and agricultural areas. Eggs are laid March to early June, and this species frequently lays a second clutch.

The GSEP site contains suitable habitat for this species, especially in creosote bush scrub. This species was observed frequently in the Project Disturbance Area during surveys, and was the most numerous species observed during avian point count surveys (GSEP 2009a).

Brewer's Sparrow

In California, Brewer's sparrow is a common breeding bird east of the Cascade-Sierra Nevada crest, in the mountains and higher valleys of the Mojave Desert, and, uncommonly, at high elevations in San Bernardino, Ventura, Kern, and San Luis Obispo counties. This species winters in the southeastern part of the state in sagebrush shrublands and brushy desert habitat, including desert scrub dominated by various saltbush species and creosote (Zeiner et al. 1990, Rotenberry et al. 1999).

Declines in this species have been noted in the breeding range, and may be attributable to loss and fragmentation of breeding habitat. Impacts due to degradation of wintering habitat have not been reported for this species (Rotenberry et al. 1999).

Brewer's sparrows were observed during GSEP surveys, and would be expected in the GSEP area as a winter resident.

Prairie Falcon

The prairie falcon inhabits dry environments in the North American west from southern Canada to central Mexico. It is found in open habitat from annual grasslands to alpine meadows at all elevations up to 3,350 m, but is associated primarily with perennial grasslands, savannahs, rangeland, some agricultural fields, and desert scrub areas. They require cliffs or bluffs for nesting though will sometimes nest in trees, on power line structures, on buildings, or inside caves or stone quarries. Ground squirrels and horned larks are the primary food source, but prairie falcon will also prey on lizards, other small birds, and small rodents.

One prairie falcon was observed (flyover) within the transmission line buffer area during spring 2010 surveys (TTEC 2010m). The entire Project Disturbance Area (1,811 acres) is suitable foraging habitat for prairie falcon, and this species was observed on the GSEP site. The GSEP site does not contain suitable nesting habitat, although adjacent mountains may. There are numerous CNDDB (2010) records in the region for this species, including nest records from Little Maria Mountains to the northeast (1977) and the Chuckwalla Mountains to the southwest (1978).

Short-eared Owl

Short-eared owls breed through much of northern North America, and are year-round residents in some areas of California. Historically, this species bred throughout much of California, west of the southern deserts, in low numbers. Currently, small populations breed regularly in the Great Basin and in the Sacramento/San Joaquin River Delta area, but sporadically in other parts of its former range. Short-eared owls require open country that supports small mammal populations, and that also provides adequate vegetation to provide cover for nests. This includes salt- and freshwater marshes, irrigated alfalfa or grain fields, and ungrazed grasslands and old pastures (Shuford & Gardali 2008, Zeiner et al. 1990).

The GSEP area is not within the breeding range for short-eared owl as the range is described in CDFG publications (Zeiner et al. 1990, updated 2008; Shuford & Gardali 2008); in addition, the GSEP site does not provide suitable breeding habitat. The GSEP site does contain suitable wintering habitat for the short-eared owl, and this species was observed during GSEP surveys.

Swainson's Hawk

Swainson's hawks require large areas of open landscape for foraging, including grasslands and agricultural lands that provide low-growing vegetation for hunting and high rodent prey populations. Swainson's hawks typically nest in large native trees such as valley oak, cottonwood, walnut, and willow, and occasionally in nonnative trees, such as eucalyptus within riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands (CDFG 1993).

While there are historical breeding records of this species from the Colorado Desert (Woodbridge 1998), this species is now known from southern California only as a spring and fall migrant (CDFG 1993). This reduction in breeding range is believed to be from loss of nesting habitat (Zeiner et al. 1990, updated 2006).

The GSEP site may provide foraging habitat for migrating individuals, and this species was observed in the GSEP site during spring 2009 and preliminary 2010 field surveys. Three individual Swainson's hawks (flyovers) were found during 2010 field surveys along the transmission line and buffer area (TTEC 2010m).

Ferruginous Hawk

Ferruginous hawks do not breed in California, but are winter residents and in California are most common in grassland and agricultural areas in the southwest. Ferruginous hawks are found in open terrain from grasslands to deserts, and are usually associated with concentrations of small mammals. Threats to this species include loss of wintering habitat from urbanization and cultivation.

The GSEP site contains suitable wintering habitat for ferruginous hawks, and this species was observed during spring 2009 and preliminary 2010 field surveys. One individual ferruginous hawk (flyover) was observed along the transmission line following spring 2010 surveys (TTEC 2010m).

Northern Harrier

In western North America, the northern harrier breeds from northern Alaska south to Baja California, Mexico. This species does not commonly breed in desert regions of California, where suitable habitat is limited, but winters broadly throughout California in areas with suitable habitat. Northern harriers forage in open habitats including deserts, pasturelands, grasslands, and old fields.

The GSEP site contains suitable wintering habitat for the northern harrier, and this species was observed during spring 2009 and 2010 field surveys (GSEP 2009a). One individual harrier was observed during 2010 field surveys (TTEC 2010m). There are CNDDB (2010) nesting records for this species in eastern Riverside County

American Badger

American badgers were once fairly widespread throughout open grassland habitats of California. Badgers are an uncommon permanent resident with a wide distribution across California, except from the North Coast area. American badger is most abundant in the drier open stages of most shrub, forest, and herbaceous habitats with friable soils. Badgers are generally associated with treeless regions, prairies, parklands, and cold desert areas (Zeiner et al. 1990). Badgers inhabit burrows and often predate and forage on other small mammal burrows as evidenced by claw marks along the edges of existing burrows.

American badger sign was found during spring 2009 field surveys; burrow predation evidence by badgers was found in the buffer area west of the solar power plant Project Disturbance Area. Therefore, the entire GSEP area is considered suitable habitat for American badger.

Desert Kit Fox

Desert kit fox is an uncommon to rare permanent resident of arid regions of the southern portion of California. Kit fox occur in annual grasslands, or grassy open, arid stages of vegetation dominated by scattered herbaceous species. Kit fox occur in association with their prey base which is primarily cottontail rabbits, ground squirrels, kangaroo rats and various species of insects, lizards, or birds (Zeiner et al. 1990). California Code of Regulations 14 CCR § 460 stipulates that desert kit fox may not be taken at any time. Protection provided by kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species.

Desert kit fox burrows, complexes and scat were observed throughout the GSEP area within desert wash and upland scrub habitats during 2009 field surveys; desert kit fox complexes, kit fox scat and burrows were observed south of I-10 during spring 2010 field surveys (TTEC 2010m). Over 65 kit fox burrow complexes, both active burrows with fresh scat present and inactive burrow complexes were observed throughout the solar power plant Project Disturbance Area and linear Disturbance Area (GSEP 2009a). The entire GSEP area is suitable habitat for desert kit fox.

Nelson’s Bighorn Sheep

Nelson’s bighorn sheep includes bighorns from the Transverse Ranges through most of the desert mountain ranges of California, Nevada, and northern Arizona to Utah. Essential habitat for bighorn sheep includes steep, rocky slopes of desert mountains, termed “escape terrain.” Their agility on steep rocky terrain is an adaptation used to escape predators such as coyotes, eagles, and cougars (Wehausen 1992). Surface water is another element of desert bighorn habitat considered essential to population health. Male and female bighorn sheep inhabiting desert ecosystems can survive without consuming surface water (Krausman et al. 1985) and males appear to drink infrequently in many situations; however, there are no known large populations of bighorn sheep in the desert region that lack access to surface water. In the spring, when annual plants are available, bighorn tend to disperse downhill to bajadas and alluvial fans to forage. Desert bighorn have a long lambing season that can begin in December and end in June in the Mojave Desert, and a small percentage of births commonly occur in summer as well (Wehausen 1992).

Over the past 140 years, bighorn sheep have suffered considerable population declines throughout their range and metapopulations have been fragmented by roads and other barriers with a resulting decline in genetic diversity (Bleich et al. 1996, Epps et al. 2005). Disease, sometimes brought about by contacts with domestic sheep, drought and predation, interacting with other anthropogenic factors may also have contributed to declines in bighorn sheep populations (Wehausen 2005). Loss of surface water sources may also diminish the viability of existing populations (Wehausen 2005).

Two metapopulations of bighorn sheep occur within the NECO Planning Area, the Southern Mojave and Sonoran. Within these metapopulations, there are smaller, somewhat isolated subpopulations of bighorn sheep known as demes, with nine demes occurring in the Sonoran metapopulation (BLM CDD 2002). Bighorn sheep metapopulations have been fragmented by highways, roads, railroads, and aqueducts primarily by the construction of Interstate 10 and Interstate 40 which are major barriers to bighorn sheep movements. Transportation corridors of Highways 66, 62, 177, 95, and 78, the Atchison, Topeka &and Santa Fe Railroad (parallel to Old Highway 66) and the Eagle Mountain Railroad (scheduled for reactivation) inhibit bighorn sheep movements between demes. Nevertheless, bighorn sheep are known to cross these and other linear features such as transmission lines and fences.

The GSEP site is located southeast of an occupied bighorn Sheep WHMA in the Palen, Granite, and Coxcomb Mountains (BLM CDD 2002), and southwest of a currently unoccupied Bighorn Sheep WHMA in the McCoy Mountains. Recent surveys suggest bighorn sheep may occur in the Little Maria Mountains, farther northeast of the GSEP area, in an area designated by the NECO Plan as an unoccupied WHMA (Wehausen 2009). The CNDDB records for this species from the GSEP area indicate that bighorn sheep disperse through these mountain ranges typically whenever forage and water conditions permit.

No sign or evidence of Nelson’s bighorn sheep were found during field surveys and bighorn sheep are not expected to occur in the GSEP area. The GSEP Area is not within a known bighorn sheep corridor as identified in the NECO Plan.

Burro Deer

Burro deer is a subspecies of mule deer (*Odocoileus hemionus*) found in the Colorado Desert of southern California. This species is found in the Colorado region of the Sonoran Desert near the Colorado River and within desert dry wash woodland communities. Some burro deer are resident along the Colorado River, but a significant portion move into desert areas in response to water and forage. During the hot summers, water is critical, and burro deer concentrate along the

Colorado River or the Coachella Canal where water developments have been installed and where microphyll woodland is dense and provides good forage and cover. With late summer thundershowers and cooler temperatures, deer move away from the Colorado River and Coachella Canal and then up the larger washes into mountains or wash complexes in the foothills (BLM CDD 2002).

During spring 2009 field surveys, tracks of burro deer were found in one location south of I-10 along the southern transmission line route (GSEP 2009a, Appendix C). Burro deer sign (tracks) were found along the transmission line and buffer area during spring 2010 field surveys (TTEC 2010m). This species is expected to occur north of I-10 and within the GSEP area especially along desert washes and areas of dry desert wash woodland and other microphyllous riparian vegetated washes. Therefore, these habitat areas are considered suitable for burro deer within the GSEP area.

Other Special Status Wildlife

Table 3.23-2 lists all special-status species evaluated during the analysis that are not likely to occur or have a low to moderate potential for occurrence in the GSEP area. This table provides additional information on the species identified in Table 3.23-1 and the determination of their potential for occurrence in the GSEP area such as the presence or absence of suitable habitat, nearby occurrence records, and survey efforts that have taken place.

TABLE 3.23-2
SPECIAL-STATUS WILDLIFE SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR IN THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Birds		
Bendire's thrasher *Toxostoma bendirei*	Bendire's thrashers are known in California from scattered locations in Kern, Inyo, San Bernardino, and Riverside counties. This species is a summer resident in southeastern California, and arrives at breeding grounds from mid-March through May, and departs by late August. This species favors open grassland, shrubland, or woodland with scattered shrubs, primarily in areas that contain large cholla, Joshua tree, Spanish bayonet, Mojave yucca, palo verde, mesquite, catclaw, desert-thorn, or agave. The status of populations of this species is poorly understood, but threats are believed to be loss of habitat due to urbanization, harvesting of yucca and Joshua trees, overgrazing, and off-road vehicle activity. In parts of the range, grazing may increase habitat suitability by increasing the area with scattered junipers.	The desert dry wash vegetation community provides potential habitat for this species, although it was not observed during surveys. There are CNDDB (2010) records near Desert Center from 2004.
Black-tailed gnatcatcher *Polioptila melanura*	A year round resident in southwestern United States and central and northern Mexico, in California the black-tailed gnatcatcher is found in the southeast desert wash habitat from Palm Springs and Joshua Tree National Monument south, and along the Colorado River. It is now rare in eastern Mojave Desert north to the Amargosa River, Inyo Co. This species nests primarily in wooded desert wash habitat, but also occurs in creosote bush scrub habitat during the non-breeding season.	Based on a review of the vegetation community descriptions provided by the Applicant, the GSEP site contains little, if any, of the dense scrub habitat preferred by this species. They are known from the area, including from McCoy Spring, Palen Valley, and Chuckwalla Well (Fitton 2008).
Gila woodpecker *Melanerpes uropygialis*	The Gila woodpecker's range is limited to a small area of southwestern United States and northwestern Mexico. In California, this species is found only along the Colorado River and in small numbers in Imperial County. In southeastern California, Gila woodpeckers were formerly associated with desert washes extending up to one mile from the Colorado River. Currently, they are found only in riparian areas along the Colorado River.	In California, this species is currently known only from the Colorado River; therefore this species is not expected in the GSEP site. The GSEP site does not contain suitable nesting habitat for this species. The closest CNDDB (2010) record for this species is a 1986 record east of the GSEP site at the Colorado River.
Gilded flicker *Colaptes chrysoides*	In California, the gilded flicker is known from the southeast; habitat includes stands of giant cactus, Joshua tree, and riparian groves of cottonwoods and tree willows in warm desert lowlands and foothills. Until the mid-1990's, this species was considered a subspecies of northern flicker (*C. atratus*). This species nests primarily in cactus, but also will use cottonwoods and willows of riparian woodlands. This species may be nearly extinct in California.	This species is not expected to regularly use the GSEP site due to lack of suitable habitat. The closest CNDDB (2010) records for this species are along the Colorado River.
Mountain plover *Charadrius montanus*	Mountain plovers do not breed in California, but are winter visitors primarily from September to mid-March. In California they are found in the Central Valley, Antelope Valley, San Jacinto Valley, Imperial Valley, and Palo Verde Valley. Mountain plover habitat includes short-grass prairie or their equivalents, and in southern California deserts are associated primarily with agricultural areas, though use of these areas is suspected to be because of loss of native grassland and playa habitats.	This species may use the dry lakebed and nearby agricultural areas as winter habitat. The closest CNDDB (2010) record for this species is in Imperial County at the southern end of the Salton Sea.

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR IN THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Birds (cont.)		
Peregrine falcon *Falco peregrinus*	The Peregrine falcon's year-round range includes coastal and northwestern California and the Sierra Nevada and other California mountains. Additionally, this species winters inland throughout the Central Valley and in northeastern California. They are rare in the arid southeast, but they occur and are suspected to breed in the lower Colorado River Valley. Peregrine falcons require open habitat for foraging, and prefer breeding sites near water. Nesting habitat includes cliffs, steep banks, dunes, mounds, and some human-made structures.	This species may forage on the GSEP site and nest in nearby mountains, but was not observed in the GSEP site during GSEP surveys. There are no CNDDB (2010) records for Riverside County.
Purple martin *Progne subis*	The historical breeding range of the purple martin includes southern California, though populations have shrunk dramatically. Neither the historical or current breeding range, however, includes the Colorado Desert. Purple martins habitat requirements include adequate nest sites and availability of large aerial insects, and therefore are most abundant near wetlands and other water sources. Threats to this species include loss of large tree and snags and competition from European starlings.	This species not expected to occur at the GSEP site due to the lack of suitable foraging habitat. There are six CNDDB (2010) records for this species from western Riverside County, the most recent of which include nesting records from 1983 and 1993.
Vaux's swift *Chaetura vauxi*	This species is not known to breed in Riverside County or elsewhere in southern California. Very few nests have been found so their breeding range has been inferred from sightings of birds flying over potential nesting areas during their nesting season, in June and July. Vaux's swifts prefer to nest in the hollows formed naturally inside of large old conifer trees, especially snags, which are entirely lacking from the GSEP site.	This species was not observed during surveys and is not expected to occur due to a lack of nesting habitat on the GSEP site, any occurrences are expected to be of migrants only. There are no CNDDB occurrences within 10 miles of the site.
Vermilion flycatcher *Pyrocephalus rubinus*	Vermilion flycatchers are rare breeders or residents in localized areas of southern California, including along the Colorado River. They are usually found near water in arid scrub, farmlands, parks, golf courses, desert, savanna, cultivated lands, and riparian woodlands; nesting substrate includes cottonwood, willow, and mesquite.	Within the GSEP vicinity, occurrences of this species are limited to the Colorado River. This species is not expected in the GSEP site. The closest CNDDB (2010) records include a 1983 record from the Blythe golf course.
Yellow warbler *Dendroica petechia*	Yellow warblers historically bred throughout much of California except for high elevations, the Colorado Desert, and most of the Mojave Desert. Breeding abundance for this species has declined in much of California, as has the breeding range, especially in the Central Valley and parts of Owens Valley. In southeastern California, this species is known only from the lower Colorado River Valley from the middle of San Bernardino County through Riverside and Imperial Counties. Currently, this species no longer breeds in much of the Riverside County segment of the lower Colorado River Valley. This species commonly uses wet, deciduous thickets for breeding, and seeks a variety of wooded, scrubby habitats in winter.	This species was not observed during surveys, and is not expected to nest in the GSEP site due to lack of suitable habitat. The closest CNDDB (2010) records for this species are two 1986 records east of the GSEP site at the Colorado River.

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR IN THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
Birds (cont.)		
Yellow-breasted chat *Icteria virens*	The yellow-breasted chat occurs as a summer resident and migrant in California. In the southeastern California, the yellow-breasted chat breeds primarily in scattered locations in Owen's Valley and the Mojave, from the Salton Sea, and from the lower Colorado River Valley. This species occupies shrubby riparian habitat with an open canopy, and will nest in non-native species including tamarisk. Threats to this species include loss of riparian habitat, and, it is suspected, pressure from cowbird parasitism.	In this region, this species is associated with the Colorado River only. The GSEP site does not contain suitable habitat for this species. CNDDB (2010) records in the region are associated with the Salton Sea or the Colorado River. The closest CNDDB records for this species are two 1986 records east of the GSEP site at the Colorado River.
Mammals		
Arizona myotis *Myotis occultus*	This species has been found from southeastern California through Arizona, New Mexico, and south into Chihuahua, Mexico. Arizona myotis is most commonly known from conifer forests from 6,000 to 9,000 feet in elevation, although maternity roosts are known from much lower elevations including areas along the Colorado River in California.	This species is not expected to occur due to lack of coniferous forests and low elevation of the GSEP area. The closest CNDDB (2010) record is a historical occurrence from 1945 east of the GSEP site near the town of Ripley.
Big-free tailed bat *Nyctinomops macrotis*	This species ranges from most of South America northward to include Mexico, Arizona, New Mexico, southern and western Texas, southern California, southeastern Nevada, southern Utah, and north and western Colorado from generally sea level to 8,000 feet in elevation. This species occurs in desert shrub, woodlands, and coniferous forests. It roosts mostly in the crevices of rocks although big free-tailed bats may roosts in buildings, caves, and tree cavities	This species has the potential to forage within the GSEP area. The nearest occurrences for this species in Riverside County are from the vicinity of Palm Springs and Joshua Tree National Park (CNDDB 2010). There are no CNDDB occurrences within 10 miles of the site.
California leaf-nosed bat *Macrotus californicus*	California leaf-nosed bat is a species of concern and a BLM Sensitive species indicating it is covered under the NECO plan. California leaf-nosed bats occur in the deserts of California, southern Nevada, Arizona and south to northwestern Mexico. In California, they are now found primarily in the mountain ranges bordering the Colorado River Basin. In California, the two largest roosts (each sheltering 1,500 bats during winter months) are in mines in extreme southeastern California. This species depends on either caves or mines for roosting habitat. All major maternity, mating, and overwintering sites are in mines or caves (CDD 2002). Radio-telemetry studies of Macrotus in the California desert show that the California leaf-nosed bat forages almost exclusively among desert wash vegetation within 10 km of their roost (WBWG 2005-2009).	All habitats within the GSEP area are suitable for this species. There are several CNDDB records in the vicinity of the GSEP area. The nearest record is from 1993 near the McCoy Mountains in creosote bush scrub habitat where approximately 300 adults were observed roosting (CNDDB 2010).
Mammals (cont.)		
Cave myotis *Myotis velifer*	The cave myotis occurs from western Texas, to southern Nevada, southeastern California (only along the Colorado River), southward into Mexico, and is also widely distributed in Arizona. This species is found primarily at lower elevations (the Sonoran and Transition life zones) of the arid southwest in areas dominated by creosote bush, palo verde, and cactus. This species is a "cave dweller" and caves are the	This species has a potential to occur within the GSEP area, more likely as a foraging species than a roosting bat species. The nearest CNDDB record for this species is approximately 3 miles east of the GSEP site, near the McCoy Mountains.

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR IN THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
	main roosts although this species may also use mines, buildings, and bridges for roosts.	
Colorado Valley woodrat *Neotoma albigula venusta*	Occurs from southern Nevada, southeastern California, northeastern Baja California, to western Arizona. Colorado Valley woodrats are found in a variety of habitats including low desert, pinyon-juniper woodlands, and desert-transition chaparral. Suitable habitat elements for this species include washes where organic debris gathers, areas of prickly pear cactus and mesquite, rocky areas, and crevices in boulders which are used for cover and nest sites.	This species is not expected to occur on the GSEP site given the lack of suitable habitat. The nearest CNDDB record is from 1934 near Blythe (CNDDB 2010).
Hoary bat *Lasiurus cinereus*	Hoary bat is the most widespread of North American bats and are highly associated with forested habitats in the west. Hoary bats roost are usually located at the edge of a clearing although more unusual roosting sites have been reported in caves, beneath rock ledges, woodpecker holes, squirrel nests, and building sides.	This species may occur in the area as a forager and may roost within the GSEP area. The closest CNDDB (2010) record is a historical occurrence from the town of Neighbors during 1919.
Pallid bat *Antrozous pallidus*	The pallid bat is a California species of concern and a BLM Sensitive species indicating it is covered under the NECO plan. Pallid bats inhabit low elevation (less than 6,000 feet) rocky, arid deserts and canyonlands, shrub/steppe grasslands, but also occur in higher elevation coniferous forests, greater than 7,000 feet in elevation. This species is most abundant in xeric landscapes including the Great Basin, Sonoran, and Mojave deserts (WBWG 2005-2009). Pallid bats are known from Cuba, Mexico, and throughout the southwestern and western United States. Population trends are not well known, but there are indications of decline. Pallid bats roost alone, in small groups (2 to 20 bats), or gregariously (100s of individuals). Day and night roosts include crevices in rocky outcrops and cliffs, caves, mines, trees with exfoliating bark, and various human structures such as bridges, barns, porches, bat boxes, and human-occupied as well as vacant buildings (WBWG 2005-2009).	This species has a potential to roost and forage within the GSEP area. The nearest CNDDB (2010) record is approximately 8 miles north of the GSEP site near the McCoy Mountains.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	Pocketed free-tailed bat is a California species of concern. This species occurs in western North America, from southern California, central Arizona, southern New Mexico, western Texas, south into Mexico and Baja, California (WBWG 2005-2009). Despite only a limited number of records, pocketed free-tailed bats are known to occur in the desert from March through August, when they then migrate out of the area. In California, they are found primarily in creosote bush and chaparral habitats in proximity to granite boulders, cliffs, or rocky canyons.	This species has a potential to roost and forage within the GSEP site based on what is understood of its habitat requirements and roosting habits. The nearest CNDDB record for this species is from 2002 near the I-15 bridge over the Colorado River in Blythe.
Mammals (cont.)		
Spotted bat *Euderma maculatum*	This species is known from all the states west of and including Montana, Wyoming, Colorado, New Mexico and Texas. Although broadly distributed, this species is rarely common, but may occur locally from southern British Columbia, northern Arizona, Arizona/Utah border, and western Texas from below sea level to 8,100 feet above mean sea level. Spotted	This species has a potential to roost and forage within the GSEP site based on what is understood of its habitat requirements and roosting habits. The nearest CNDDB record is a historical occurrence from 1907 in the

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR IN THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
	bats occur in arid, low desert habitats to high elevation conifer forests and prominent rock features appear to be a necessary feature for roosting.	Colorado Desert near Mecca (CNDDB 2010).
Townsend's big-eared bat *Corynorhinus townsendii*	This species has been reported in a wide variety of habitat types ranging from sea level to approximately 9,000 feet above MSL. Habitat associations include coniferous forests, deserts, native prairies, riparian communities, active agricultural areas, and coastal habitat types. Foraging associations include edge habitats along streams, adjacent to and within a variety of wooded habitats.	This species has a potential to forage within the GSEP area although roosting is unlikely to occur since cave and abandoned buildings do not occur within the GSEP area. There are no CNDDB occurrences within 10 miles of the site.
Western mastiff bat *Eumops perotis*	The subspecies that occurs in North America*, E. p. californicus*, ranges from central Mexico across the southwestern United States including parts of California, southern Nevada, Arizona, southern New Mexico and western Texas. Recent surveys have extended the previously known range to the north in both Arizona with several localities near the Utah border and California. It is found in a variety of habitats, from desert scrub to chaparral to oak woodland and into the ponderosa pine belt and high elevation meadows of mixed conifer forests. Surveys in northern Arizona have documented roosts at approximately 3,600 feet elevation and foraging bat species at 7,500 feet above MSL (WBWG 2005-2009).	The GSEP site does not support suitable roosting habitat for western mastiff bat but this species may utilize the GSEP area for foraging. There are no CNDDB occurrences within 10 miles of the site
Yuma mountain lion *Puma concolor browni*	In the NECO planning area, mountain lions primarily inhabit the low mountains and extensive wash systems in and around Chuckwalla Bench, Chuckwalla Mountains, Chocolate Mountains, Picacho Mountains, Milpitas Wash, Vinagre Wash, and other washes in that area. Mountain lions typically occur in habitat areas with extensive, well-developed riparian or shrubby vegetation interspersed with irregular terrain, rocky outcrops, and community edges. Mountain lions are restricted to the southern Colorado Desert from Joshua Tree National Park south and east to the Colorado River. Burro deer, the primary prey item, are known to spend the hot summer and fall in riparian areas along the Colorado River and in dense microphyll woodlands near the Coachella Canal.	This species likely uses the GSEP site but no definitive sign for this species was observed during 2009 spring surveys.
Yuma myotis *Myotis yumanensis*	This species ranges across the western third of North America from British Columbia, Canada, to Baja California and southern Mexico. Yuma myotis is usually associated with permanent sources of water, typically rivers and streams, feeding primarily on aquatic emergent insects, but Yuma myotis also use tinajas in the arid west. It occurs in a variety of habitats including riparian, arid scrublands and deserts, and forests. The species roosts in bridges, buildings, cliff crevices, caves, mines, and trees.	This species has a potential to roost and forage within the GSEP site. The nearest CNDDB record is from 2002 near the Blythe bridge over the Colorado River where individual bats of this species were detected acoustically during April 2002 (CNDDB 2010).
Reptiles/Amphibians		
Desert rosy boa *Charina (Lichanura) trivirgata*	In California, desert rosy boas are found only in the southern part of the state south of Los Angeles, from the coast to the Mojave and Colorado deserts (Zeiner et al. 1990, updated 1997; BLM CDD 2002). It is uncommon throughout its range. Desert rosy boas are found in habitats with moderate to dense	There are 4 CNDDB records of this species from Riverside County, the majority of which are reported from western Riverside County near Cabazon, Lake Matthews, Lake Elsinore, and

TABLE 3.23-2 (Continued)
SPECIAL-STATUS WILDLIFE SPECIES WITH NO, LOW OR MODERATE POTENTIAL TO OCCUR IN THE GSEP AREA

Species	Habitat Requirements and Geographic Range	Potential to Occur or Presence On Site
	vegetation and rocky cover, such as desert canyons, washes, and mountains. They have been found under rocks, in boulder piles and along rock outcrops and vertical canyon walls. Their diet consists of small mammals and birds. Rosy boas are primarily nocturnal, but may be out in the evening or morning in the spring and may appear during the day. The greatest activity occurs in late spring to early or mid-summer. They hibernate in winter. Desert rosy boas are not listed, but are included in the NECO and the GSEP area is within the range of this species.	Hemet areas from disturbed sage scrub habitats with rocky soils and outcroppings. This species was not observed during spring 2009 field surveys; however temperatures may have been too low and therefore not during an optimal time to identify this species in the field. The GSEP site does not contain the preferred substrate, and therefore the site is not expected to provide important habitat for this species.
Western chuckwalla *Sauromalus obesus*	This species has no protective status or designation. Western chuckwalla occurs in southeastern California, southern Nevada, southeastern Utah, and western Arizona. Chuckwallas occur in virtually all undisturbed rocky hillsides and often escape into deep rock crevices to evade predators. These areas are typically vegetated by creosote bush and other such drought-tolerant scrub habitats.	This species was detected during spring 2009 field surveys (Solar Millennium 2009a, Volume II, Biological Technical Report). Suitable large, rock outcroppings do not occur within the GSEP site which is often preferred by this species.

CHAPTER 4
Environmental Consequences

4.1 Introduction

This chapter assesses environmental impacts that would occur due to the implementation of proposed action or the alternatives described in Chapter 2. The baseline affected environment, or existing condition, is described in Chapter 3.

4.1.1 Analytical Assumptions

The following impacts analysis was conducted with the following assumptions:

1. The laws, regulations, and policies applicable to BLM authorizing ROW grants for renewable energy development facilities would be applied consistently for all action alternatives.

2. The proposed facility would be constructed, operated, maintained and decommissioned as described in each action alternative.

3. Short-term impacts are those expected to occur during the construction phase and the first five years of the operation and maintenance phase. Long-term impacts are those that would occur after the first five years of operation.

4.1.2 Types of Effects

The potential impacts from those actions that would have direct, indirect, and cumulative effects were considered for each resource. Effects and impacts as used in this document are synonymous and could be beneficial or detrimental.

Direct effects are caused by the action and occur at the same time and place as the action; indirect effects are caused by the action and occur later in time or further in distance, but are still reasonably foreseeable. 40 CFR 1508.8. Cumulative impacts are those effects resulting from the incremental impacts of an action when combined with other past, present, and reasonably foreseeable future actions (regardless of which agency or person undertakes such actions). 40 CFR 1508.7. Cumulative impacts could result from individually insignificant but collectively significant actions taking place over a period of time.

Section 1502.16 of the CEQ regulations forms the scientific and analytic basis for the comparisons of alternatives as described under 40 CFR 1502.14, Alternatives including the Proposed Action. The environmental consequences chapter (FEIS Chapter 4) consolidates the discussions of those elements required by sections 102(2)(C)(i), (ii), (iv), and (v) of NEPA which are within the scope of this EIS and as much of Section 102(2)(C)(iii) as is necessary to support the comparisons. The discussion includes the environmental impacts of the alternatives, including any adverse environmental effects which cannot be avoided, the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible or irretrievable commitments of resources which would be involved in the proposal should it be implemented.

4.1.3 Resources and Resource Uses Not Affected or Present in the Action Area

Resources, BLM program areas or other aspects of the human environment that are not affected or present in the GSEP area include: environmental justice; wild and scenic rivers; national scenic or historic trails, monuments, recreation areas, or conservation areas; cooperative management and protection areas; outstanding natural areas; forest reserves; back country byways; wetlands; livestock grazing; and wild horse and burros.

4.1.4 Cumulative Scenario Approach

This PA/FEIS analyzes the cumulative impact of the construction, operation and maintenance, closure and decommissioning of the GSEP project ROW grant, taking into account the effects in common with other past, present, and reasonably foreseeable future actions. The cumulative effects analysis highlights past actions that are closely-related either in time or space (i.e., temporally or in geographic proximity) to the proposed action, present actions that are ongoing at the same time this EIS was being prepared; and reasonably foreseeable future actions, including those for which there are existing decisions, funding, formal proposals, or which are highly probable, based on known opportunities or trends.

The intensity, or severity, of cumulative impacts considers the magnitude, geographic extent, duration and frequency of the effects (CEQ, 1997). The magnitude of the effect reflects the relative size or amount of the effect; the geographic extent considers how widespread the effect may be; and the duration and frequency refer to whether the effect is a one-time event, intermittent, or chronic (CEQ, 1997). If the proposed action and alternatives would have no direct or indirect effects on a resource, the PA/FEIS does not analyze potential cumulative effects on that resource. See, for example, Section 4.1.3, Resources and Resource Uses Not Affected or Present in the Action Area.

For the proposed action, the cumulative scenario includes projects identified in Table 4.1-1 (Cumulative Scenario). Table 4.1-1 identifies each resource or BLM program, the cumulative analysis impact area (which is the geographic scope for each cumulative effects issue), elements to consider, BLM renewable projects, other BLM authorized actions and other known actions or activities that are located or would occur within the cumulative analysis impacts area. Most of the projects listed below have been, are being, or would be required to undergo their own independent environmental review under NEPA or CEQA or both, as applicable. Figure 2-5 identifies existing and reasonably foreseeable future projects along the I-10 Corridor. Table 4.1-2 identifies projects in the immediate vicinity of the I-10 corridor.

**TABLE 4.1-1
CUMULATIVE SCENARIO**

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Air Resources	Mojave Desert Air Basin	PM2.5, PM10, ozone	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines,	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs,	I-10, Blythe Airport Solar 1, Chuckwalla Valley Raceway,
Global Climate Change	International, national and regional	CO2e	All		
Cultural Resources	Cultural sites, traditional use areas, and cultural landscapes on the plant site, along the linear facilities corridor and in the general vicinity of the site, including along the I 10 corridor	Ground-disturbing activities and the cultural character of the site and its vicinity. Cultural resources, including archaeological (prehistoric and historic), and ethnographic resources.	See Figure 2-5, which includes: Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Mule Mountain Solar, Associated Gen-tie Trans Lines, etc.	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs. Etc.	Blythe Airport Solar 1, Chuckwalla Valley Raceway, various commercial and residential projects, etc.
Lands and Realty	Eastern Riverside County	Designated utility corridors (e.g., transmission lines, cellular telephone towers, poles), existing ROWs, I-10	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines,	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs,	Blythe Airport Solar 1, Chuckwalla Valley Raceway,
Multiple Use Classes	CDCA Plan areas bearing the multiple use class designation "Limited"	Restriction or preclusion of otherwise allowable use opportunities	McCoy Soleil, Mule Mountain Solar, maybe also Red Bluff Substation	None	Blythe Airport Solar 1, First Solar's Blythe
Noise	Five mile radius around GSEP site	Equipment, motor vehicles, high pressure steam blow	None	None	None
Paleontological Resources	Eastern Riverside County	Ground-disturbing activities; rock units with potential high sensitivity or known paleontological resources	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines,	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs,	Blythe Airport Solar 1, Chuckwalla Valley Raceway,

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Public Health and Safety					
Hazardous materials/ hazardous waste	Mojave Desert Air Basin, watershed, groundwater basin, with focus on and in the vicinity of the site	Releases, spills, emissions, bacteria; ground disturbance that exposes existing subsurface conditions; engineering and administrative controls; health risks	See Air Resources, above; see also, Water Resources, below, in this Table 4.1-1.		
Waste management	California Desert, with emphasis on Riverside County	Solid and liquid wastes	Blythe, Genesis, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Transmission line safety and nuisance	Immediate vicinity of the proposed line	Interference with radio-frequency communication; noise; fire hazards; hazardous shocks; nuisance shocks; and electric and magnetic field (EMF) exposure	Big Maria Solar, Blythe Energy Project Transmission Line, Colorado River Substation and Expansion, Desert Quartzite, Palen, Chuckwalla Solar I	West-wide Section 368 Energy Corridors, Devers-Palo Verde Transmission Line, Blythe Energy Project	Interstate 10
Aviation safety	Air space governed by the Blythe Airport Land Use Compatibility Plan	Navigable airspace; reflectivity and temporary flash occurrences; radio frequency emissions and potential interference; thermal plumes; height and location of structures; clear space within Compatibility Zone D; bird strike and avian-aviation incompatibilities	All		
Traffic and transportation safety	I-10 corridor	Equipment that exceeds roadway load or size limits; hazardous materials transport	Same as Cultural Resources, above.		
Worker safety and fire protection	GSEP site and linear facilities corridor; jurisdictional boundary of the Riverside County Fire Department (RCFD) plus mutual aid agencies	Site access; fire response; hazardous materials response; advanced life support/paramedic services; disaster preparedness	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Public Health and Safety (cont.)					
Geologic hazards	GSEP site and linear facilities corridor	Accelerated and/or environmentally harmful soil erosion; corrosive soils; earthquake fault ruptures; earthquake induced ground deformations (e.g. lateral spreading, subsidence, liquefaction, or collapse), or otherwise unstable soils; landslides.	Big Maria Vista Solar, Blythe Energy Project Transmission Line, Colorado River Substation and Expansion, Desert Quartzite, Palen, Chuckwalla Solar I	West-wide Section 368 Energy Corridors, Devers-Palo Verde Transmission Line, Blythe Energy Project	Interstate 10
Recreation	California Desert, with emphasis on eastern Riverside County	Dispersed recreational opportunities and experiences, ACECs, LTVAs	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs,	Blythe Airport Solar 1, Chuckwalla Valley Raceway,
Social Economics	Social: Eastern Riverside County Economic: Riverside County	Flow of goods and services; impacts to local infrastructure and services; ability to meet housing demand; employment/labor demand; possible positive impacts to regional economic sectors and/or adverse community impacts; severance or other tax benefits; ability of communities to absorb impacts.	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines,	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs,	Blythe Airport Solar 1, Chuckwalla Valley Raceway,
Soil Resources	Mojave Desert Air Basin and watershed	Erosion	See Air Resources, above; see also, Water Resources, below, in this Table 4.1-1.		
Special Designations	Wilderness Areas within sight or hearing distance of the site (i.e., Palen/McCoy, Big Maria Mountains and Little Chuckwalla Mountains Wilderness Areas); more generally, the I-10 corridor	Views, glint, glare, noise, recreation	See related resource sections in this Table 4.1-1.		
Transportation and Public Access	Transportation: Eastern Riverside County, focusing on the I-10 corridor Public Access: NECO Plan area	Construction traffic – materials and workers OHV recreation opportunities, changes in viewscape, unauthorized routes;	I-10 Corridor: Same as Cultural Resources, above. NECO Plan Area: See Figure 3.13-1, including GSEP, Genesis, Palen, Chuckwalla, First Solar/Desert Sunlight, etc.; see also cumulative projects identified for Vegetation Resources, below.		

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Public Health and Safety (cont.)					
Vegetation Resources	NECO Plan area	Ephemeral drainages and natural communities; special status plants; stabilized and partially stabilized dunes and sand transport corridors; invasive plants	See generally, Figure 3.13-1.		
			Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines,	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs,	Blythe Airport Solar 1, Chuckwalla Valley Raceway,
Visual Resources	I-10 corridor; Figure 3.19-3	Project appearance; construction-related dust, light, glint and glare; views from key observation points	See Figure 2-5 and Figure 3.19-3, which include, for example:		
			Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway
Water Resources					
Surface water	Chuckwalla Valley Watershed, Colorado River System	Hydrology and quality	Blythe, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, Mule Mountain Solar, Associated Gen-tie Trans Lines,	D-PV2, Colorado River Substation, DSW Trans Line, OHV, LTVAs	First Solar Blythe, Blythe Airport Solar 1
Groundwater	Chuckwalla Valley Basin, Colorado River Basin	Basin balance, levels and quality	Blythe, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, Mule Mountain Solar	Colorado River Substation, DSW Trans Line, OHV, LTVAs	First Solar Blythe, Blythe Airport Solar 1
Wildland and Fire Ecology	Eastern Riverside County	Mortality of plants and wildlife, loss of forage and cover; changes to the vegetation communities; spread of invasive plants; consequences of subsequent extreme weather events; air quality			

TABLE 4.1-1 (Continued)
CUMULATIVE SCENARIO

Resource or BLM Program	Cumulative Analysis Impact Area	Elements to Consider	BLM Renewable Energy Projects	Other BLM Authorized Actions	Other Known Actions/Activities
Water Resources (cont.)					
Wildlife Resources	Recovery Plan Area defined by NECO; Critical Habitat Unit defined by USFWS/CDFG; existing range or eastern Riverside County	Desert Tortoise, Mojave fringe-toed lizard, Couch's spadefoot toad, migratory birds, golden eagle, western burrowing owl, American badger, kit fox, Nelson's big horn sheep. Also, mortality and injury; special status wildlife; wildlife movement and connectivity; indirect impacts, including from lighting, collisions and climate change.	Blythe, Genesis, Rice, Palen, Desert Sunlight, Chuckwalla, Eagle Crest Pump Storage, Nextera McCoy, Bullfrog Big Maria Vista, Desert Quartzite, EnXco, Eagle Mountain Soleil, Mule Mountain Solar, Associated Gen-tie Trans Lines	Eagle Mtn Landfill, D-PV2, Colorado River Substation, Red Bluff Substation, DSW Trans Line, OHV, LTVAs	Blythe Airport Solar 1, Chuckwalla Valley Raceway

**TABLE 4.1-2
RENEWABLE ENERGY PROJECTS IN THE CALIFORNIA DESERT DISTRICT**

BLM Field Office	Number of Projects & Acres	Total MW
Solar Energy		
Barstow Field Office	18 projects 132,560 acres	12,875 MW
El Centro Field Office	7 projects 50,707 acres	3,950 MW
Needles Field Office	17 projects 230,480 acres	15,700 MW
Palm Springs Field Office	17 projects 123,592 acres	11,873 MW
Ridgecrest Field Office	4 projects 30,543 acres	2,835 MW
TOTAL – CA Desert District	***63 projects 567,882 acres***	***47,233 MW***
Wind Energy		
Barstow Field Office	25 projects 171,560 acres	n/a
El Centro Field Office	9 projects (acreage not given for 3 of the projects) 48,001 acres	n/a
Needles Field Office	8 projects 115,233 acres	n/a
Palm Springs Field Office	4 projects 5,851 acres	n/a
Ridgecrest Field Office	16 projects 123,379 acres	n/a
TOTAL – CA Desert District	***62 projects 433,721 acres***	n/a

SOURCE: CEC, RSA (June 2010) Section B.3.4, Table 1A.

With the exception of climate change, which is a global issue, the BLM has identified the California desert as the largest area within which cumulative effects should be assessed for all disciplines. However, within the desert region, the specific area of cumulative effect varies by resource. For each resource, the geographic scope of analysis is based on the topography surrounding the GSEP and the natural boundaries of the resource affected, rather than jurisdictional boundaries. The geographic scope of cumulative effects often extends beyond the scope of the direct effects, but not beyond the scope of the direct and indirect effects of the proposed action and alternatives. Table 4.1-1 identifies the relevant geographic scope for each discipline's analysis of cumulative impacts.

In addition, each project in a region would have its own implementation schedule, which may or may not coincide or overlap with the proposed action's schedule. This is a consideration for short-term impacts from the GSEP. However, to be conservative, the cumulative analysis assumes that all projects in the cumulative scenario are built and operating during the operating lifetime of the proposed GSEP.

Renewable Energy Projects Included in the Cumulative Scenario

A large number of renewable projects have been proposed on BLM managed land, State land, and private land in California. As of January 2010, there were 244 renewable projects proposed in California in various stages of the environmental review process or under construction. As of December 2009, 49 of these projects, representing approximately 10,500 MW, were planning on requesting American Recovery and Reinvestment Act funds from the Federal government. Solar, wind, and geothermal development applications have requested use of BLM land, including approximately one million acres of the California desert. State and private lands have also been targeted for renewable solar and wind projects. In addition, nearly 80 applications for solar and wind projects are being considered on BLM land in Nevada and Arizona. (CEC RSA June 2010) Renewable energy projects in BLM's California Desert District are identified in Table 4.1-2.

Large renewable projects now described in applications to the BLM and on private land are competing for utility Power Purchase Agreements, which will allow utilities to meet state-required Renewable Portfolio Standards. Not all of the projects listed will complete the environmental review process, and not all projects will be funded and constructed. It is unlikely that all of these projects will be constructed for the following reasons:

1. Not all developers will develop the detailed information necessary to meet BLM and Energy Commission standards. Most of the solar projects with pending applications are proposing generation technologies that have not been implemented at large scales. As a result, preparing complete and detailed plans of development (PODs) is difficult, and completing the required NEPA and CEQA documents is especially time-consuming and costly.

2. As part of approval by the appropriate Lead Agency under NEPA and/or CEQA (generally the BLM and/or Energy Commission), all regulatory permits must be obtained by the applicant or the prescriptions required by the regulatory authorities incorporated into the Lead Agency's license, permit or ROW grant. The large size of these projects may result in permitting challenges related to endangered species, mitigation measures or requirements, and other issues.

3. Also after project approval, construction financing must be obtained (if it has not been obtained earlier in the process). The availability of financing will be dependent on the status of competing projects, the laws and regulations related to renewable project investment, and the time required for obtaining permits.

The BLM reviewed the list of renewable energy projects on State and private lands that the Energy Commission evaluated (RSA Table 1B) and determined that several among them do not meet the standard for consideration within the NEPA Cumulative Analysis. Reasons include: (i) BLM's NEPA Handbook H-1790-1 states, "Analyzing future actions, such as speculative developments, is not required;"(ii) Where information about the status of a potential upcoming project is not available, it is impossible to determine what impacts would result from its construction, operation, maintenance or ultimate decommissioning and, without this data, there can be no reasoned analysis of additive, countervailing or synergistic effects; and (iii) a cumulative impact analysis appropriately is concerned with actions that are reasonably foreseeable and not about possible projects that can be conceived of or imagined. Accordingly, the following renewable energy (wind and solar) projects that were considered by the Energy Commission are not considered by the BLM:

1. In Humboldt County: Bear River Ridge (70 MW);
2. In Shasta County: Padoma Wind Energy (175 MW);
3. In Montezuma Hills, Solano County: Shiloh III (200 MW); Montezuma Wind II (52-60); and Montezuma Hills Wind Project (34-37 MW);
4. In Sacramento County: Rancho Seco Solar Thermal (15-17 MW solar trough);
5. In Contra Costa County: Tres Vaqueros (42 MW wind repower);
6. In Stanislaus County: Stanislaus Solar Project I (20 MW solar PV) and Stanislaus Solar Project II (20 MW solar PV);
7. In Kings County: Sun City Project Phase 1 (20 MW solar PV) and Synapse Solar 2 (20 MW solar PV/solar thermal);
8. In Kern County: Maricopa Sun Solar Complex (350 MW Solar PV); Panoche Ranch Solar Farm (250 MW Solar PV); Monte Vista (126 MW Solar PV); Lost Hills (32.5 solar PV); Tehachapi Photovoltaic Project (20 MW solar PV); T, squared, Inc. (19 MW solar PV); Global Real Estate Investment Partners, LLC (solar PV); Recurrent Energy (solar PV); Man-Wei Solar (solar PV); Regenesis Power for Kern County Airports Dept.; Manzana Wind Project (246 MW); Pine Canyon (150 MW); and Aero Tehachapi (65 MW).
9. In San Bernardino County: Boulevard Associates (20 MW solar PV);
10. In Los Angeles County: Gray Butte Solar PV (150 MW Solar PV) and NRG Alpine Suntower (40 MW solar PV and 46 MW solar thermal);
11. In Brawley / Imperial County: Orni 18, LLC Geothermal Power Plant (49.9 MW) and Black Rock Geothermal 1,2,and 3; and
12. In the City of Vernon: North Sky River Energy Project (300 MW).

Solar, wind and geothermal energy projects identified and analyzed by the Energy Commission as being on State and private lands that also are considered by the BLM are identified in Table 4.1-3. Proposed solar energy projects within BLM's cumulative scenario also are shown on Figure 2-5.

Other BLM-Authorized Actions and Known Actions/Activities in the Cumulative Scenario

Other existing BLM authorized actions and other known actions/activities along the I-10 corridor in Eastern Riverside County are identified in Table 4.1-4.

TABLE 4.1-3
RENEWABLE ENERGY PROJECTS ON STATE AND PRIVATE LANDS

Project Name	Location	Status
Solar Projects		
Solargen Panoche Valley Solar Farm (400 MW Solar PV)	San Benito County	EIR in progress
San Joaquin Solar 1 and 2 (107 MW Solar hybrid)	Fresno	Under environmental review
Palmdale Hybrid Power Project Unit 1 (50 MW solar thermal, part of a hybrid project)	City of Palmdale	Under environmental review
Lucerne Valley Solar (50 MW solar PV)	San Bernardino	Under environmental review
Abengoa Mojave Solar Project (250 MW solar thermal)	San Bernardino County, Harper Lake	Under environmental review
Rice Solar Energy Project (150 MW solar thermal)	Riverside County, north of Blythe	Under environmental review
3 MW solar PV energy generating facility	San Bernardino County, Newberry Springs	MND published for public review
Blythe Airport Solar 1 Project (100 MW solar PV)	Blythe, California	MND published for public review
First Solar's Blythe (21 MW solar PV)	Blythe, California	Under construction
California Valley Solar Ranch (SunPower) (250 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
LADWP and OptiSolar Power Plant (68 MW solar PV)	Imperial County, SR 111	Under environmental review
Topaz Solar Farm (First Solar) (550 MW solar PV)	Carrizo Valley, San Luis Obispo County	Under environmental review
AV Solar Ranch One (230 MW solar PV)	Antelope Valley, Los Angeles County	Under environmental review
Bethel Solar Hybrid Power Plant (49.4 MW hybrid solar thermal and biomass)	Seeley, Imperial County	Under environmental review
Mt. Signal Solar Power Station (49.4 MW hybrid solar thermal and biomass)	8 miles southwest of El Centro, Imperial County	Under environmental review
Wind Projects		
Alta-Oak Creek Mojave Project (up to 800 MW)	Kern County, west of Mojave	Under environmental review
PdV Wind Energy Project (up to 300 MW)	Kern County, Tehachapi Mountains	Approved
Iberdrola Tule Wind (200 MW)	San Diego County, McCain Valley	EIR/EIS in progress
AES Daggett Ridge (84 MW)	San Bernardino	EIS in progress
Granite Wind, LLC (81 MW)	San Bernardino	EIR/EIS in progress
Solano Wind Project Phase 3 (up to 128 MW)	Montezuma Hills, Solano County	Under environmental review
Hatchet Ridge Wind Project	Shasta County, Burney	Under construction
Lompoc Wind Energy Project	Lompoc, Santa Barbara County	Approved
Pacific Wind (Iberdrola)	McCain Valley, San Diego County	Under environmental review
TelStar Energies, LLC (300 MW)	Ocotillo Wells, Imperial County	Under environmental review
Geothermal Projects		
Buckeye Development Project	Geyserville, Sonoma	Under environmental review

SOURCE: CEC RSA June 2010 Section B.3.4, Table 1B. The CEC compiled this list from the projects on CEQAnet as of November 2009 and the projects located on private or State lands that are listed on the Energy Commission Renewable Action Team website as requesting ARRA funding. Additional renewable projects proposed on private and State lands but not requesting ARRA funds are listed on the website.

TABLE 4.1-4
EXISTING PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
1	Interstate 10	Linear project running from Santa Monica to Blythe (in California)	Caltrans	Existing	N/A	Interstate 10 (I-10) is a major east-west route for trucks delivering goods to and from California. It is a four lane divided highway in the Blythe region.
2	Chuckwalla Valley State Prison	19025 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	1,080	State prison providing long-term housing and services for male felons classified as medium and low-medium custody inmates jointly located on 1,720 acres of State-owned property. APN 879040006,008, 012, 027, 028, 029, 030,
3	Ironwood State Prison	19005 Wiley's Well Rd. Blythe, CA	CA Dept. of Corrections & Rehabilitation	Existing	640	ISP jointly occupies with Chuckwalla Valley State Prison 1,720 acres of State-owned property, of which ISP encompasses 640 acres. The prison complex occupies approximately 350 acres with the remaining acreage used for erosion control, drainage ditches, and catch basins. 879040001, 004, 009, 010, 011, 015, 016, 017, 018, 019, 020
4	Devers-Palo Verde Transmission Line	From the Midpoint Substation to Devers Substation	SCE	Existing	N/A	Existing 500 kV transmission line parallel to I-10 from Midpoint Substation, approximately 10 miles southwest of Blythe, to the SCE Devers Substation, near Palm Springs.
5	Blythe Energy Project	City of Blythe, north of I-10, 7 miles west of the CA/AZ border	Blythe Energy, LLC	Existing	76	520 MW combined-cycle natural gas-fired electric-generating facility. Project is connected to the Buck Substation owned by WAPA.
6	West-wide Section 368 Energy Corridors	Riverside County, parallel to DPV corridor	BLM, DOE, U.S. Forest Service	Approved by BLM and U.S. Forest Service	N/A	Designation of corridors on federal land in the 11 western states, including California, for oil, gas, and hydrogen pipelines and electricity transmission and distribution facilities (energy corridors). One of the corridors runs along the southern portion of Riverside County.
7	Eagle Mountain Pumping Plant	Eagle Mountain Road, west of Desert Center	Metropolitan Water District of Southern California	Existing		144 ft. pumping plant that is part of the Metropolitan Water District of Southern California's facilities. APNs 807150007, 807150009, 807150010

TABLE 4.1-4 (Continued)
EXISTING PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
8	Recreational Opportunities	Eastern Riverside County	BLM	Existing	N/A	BLM has numerous recreational opportunities on lands in eastern Riverside County along the I-10 corridor including the Wiley's Well Campground, Coon Hollow Campground, and multiple Long-Term Visitor Areas. See FEIS Chapter 3.13.
9	Kaiser Mine	Eagle Mountain, north of Desert Center	Kaiser Ventures, Inc.	Mining activities stopped in 1983.		Kaiser Steel mined iron ore at Kaiser Mine in Eagle Mountain and provided much of the Pacific Coast steel in the 1950s. Mining project also included the Eagle Mountain Railroad, 51 miles long. Imported steel captured market share in the 1960s and 1970s and primary steelmaking closed in the 1980s. 701380031

* ID # correlates with location on Figure 2-5.
SOURCE: CEC RSA June 2010 Section B.3.4, Table 2.

Other future foreseeable projects along the I-10 corridor in Eastern Riverside County are identified in Table 4.1-5.

4.1.5 Mitigation Measures Included in the Analysis

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

1. Measures that have been proposed by the applicant;
2. Conditions of Certification (COCs) proposed by the California Energy Commission;
3. Regulatory requirements of other federal, state, and local agencies;
4. USFWS terms and conditions identified in the Biological Opinion; and
5. Additional BLM-proposed mitigation measures, standard right-of-way (ROW) grant terms and conditions, and best management practices.

TABLE 4.1-5
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
A	Four Commercial Projects	Blythe, CA	Various	Approved	N/A	Four commercial projects have been approved by the Blythe Planning Department including the Agate Road Boat & RV Storage, Riverway Ranch Specific Plan, Subway Restaurant and Motel, and Agate Senior Housing Development.
B	Intake Shell	Blythe, CA		Under Construction	N/A	Reconstruction of a Shell facility located at Intake & Hobsonway. Demolition occurred in 2008, reconstruction planned for 2009-2010.
C	Fifteen Residential Developments	Blythe, CA	Various	Approved/ Under Construction	N/A	Twelve residential development projects have been approved by the Blythe Planning Department including: Vista Palo Verde (83 Single Family Residential [SFR]), Van Weelden (184 SFR), Sonora South (43 SFR), Ranchette Estates (20 SFR), Irvine Assets (107 SFR), Chanslor Village (79 SFR), St. Joseph's Investments (69 SFR), Edgewater Lane (SFR), The Chanslor Place Phase IV (57 SFR), Cottonwood Meadows (103 Attached SFR), Palo Verde Oasis Phase IV (29 SFR). Three residential development projects have been approved and are under construction including: The Chanslor Phase II & III (78 SFR), River Estate at Hidden Beaches, Mesa Bluffs Villas (26 Attached SFR).
D	Devers-Palo Verde 2 Transmission Line Project	From the Midpoint Substation to Devers Substation	SCE	Project was approved by CPUC 11/2009.	N/A	New 500 kV transmission line parallel to the existing Devers-Palo Verde Transmission Line from Midpoint Substation, approximately 10 miles southwest of Blythe, to the SCE Devers Substation, near Palm Springs. The ROW for the 500 kV transmission line would be adjacent to the existing DPV ROW and would require an additional 130 feet of ROW on federal and State land and at least 130 feet of ROW on private land and Indian Reservation land.
E	Colorado Substation	10 miles southwest of Blythe	SCE	Project was approved by CPUC 11/2009.	44	The new 500/230 kV substation would be constructed within a rectangular area approximately 1,000 feet by 1,900 feet, resulting in approximately 44 acres permanently disturbed. The 500 kV switching station would include buses, circuit breakers, and disconnect switches. The switchyard would be equipped with 108-foot-high dead-end structures. Outdoor night lighting would be designed to illuminate the switchrack when manually switched on.
F	Blythe Energy Project Transmission Line	From the Blythe Energy Project (Blythe, CA) to Devers Substation	Blythe Energy, LLC	Under construction	N/A	Transmission Line Modifications including upgrades to Buck Substation, approximately 67.4 miles of new 230 kV transmission line between Buck Substation and Julian Hinds Substation, upgrades to the Julian Hinds Substation, installation of 6.7 miles of new 230 kV transmission line between Buck Substation and SCE's DPV 500 kV transmission line.
G	Desert Southwest Transmission Line	118 miles primarily parallel to DPV	Imperial Irrigation District	Final EIR prepared 2005. Approved by the BLM in 2006.	N/A	New, approximately 118-mile 500 kV transmission line from a new substation/switching station near the Blythe Energy Project to the existing Devers Substation located approximately 10 miles north of Palm Springs, California.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
H	Green Energy Express Transmission Line Project	70-mile transmission line from the Eagle Mountain Substation to southern California	Green Energy Express LLC	September 9, 2009, Green Energy Express LLC filed a Petition for Declaratory Order requesting that FERC approve certain rate incentives for the project	N/A	70-mile double-circuit 500 kV transmission line and new 500/230 kV substation from near the Eagle Mountain Substation (eastern Riverside County) to Southern California
I	Blythe Energy Project II	Blythe, CA. Near the Blythe Airport and I-10	Blythe Energy, LLC	Approved December 2005	30 acres (located on Blythe Energy Project land)	520 MW combined-cycle power plant located entirely within the Blythe Energy Project site boundary. Blythe Energy Project II will interconnect with the Buck Substation constructed by WAPA as part of the Blythe Energy Project. Project is designed on 30 acres of a 76-acre site.
J	Eagle Mountain Pumped Storage Project	Eagle Mountain iron ore mine, north of Desert Center	Eagle Crest Energy Company	License application filed with FERC in June 2009	1,524	1,300 MW pumped storage project designed to store off-peak energy to utilize during on-peak hours. The captured off-peak energy will be used to pump water to an upper reservoir where the energy will be stored. The water will then be released to a lower reservoir through an underground electrical generating facility where the stored energy will be released back into the Southwestern grid during “high demand peak” times, primarily weekdays. Estimated water use is 8,100 AFY for the first four-year start-up period and replacement water is 1,763 AFY thereafter. 1
K	Palen Solar Power Project	North of I-10, 10 miles east of Desert Center	Solar Millennium LLC/Chevron Energy	Undergoing environmental review, construction to begin end of 2010 with one unit online in 2012 and one unit online in 2013.	5,200	500 MW solar trough project on 5,200 acres. Facility would consist of two 250 MW plants. Approximately 3,870 acres would be disturbed. Project would include interconnection to the SCE Red Bluff Substation. Project would use 300 AFY.
L	Blythe Solar Power Project	North of I-10, 8 miles west of Blythe	Palo Verde Solar I, LLC	Undergoing environmental review; construction to begin end of 2010.	7,025	A concentrated solar thermal electric generating facility with four adjacent, identical units of 250 megawatt (MW) nominal capacity each for a total nominal capacity of 1,000 MW.
M	NextEra (FPL) McCoy	Northwest of Blythe, CA, immediately north of Blythe Solar Power Project	NextEra (FPL)	Plan of Development in to Palm Springs BLM	7,771	250 MW solar trough project. ROW in process for monitoring water well drilling.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
N	McCoy Soleil Project	10 miles northwest of Blythe	enXco	Application withdrawn	1,959	300 MW solar power tower project located on 1,959 acres. Project would require a 14 mile transmission line to proposed SCE Colorado Substation south of I-10. Would use 575-600 AFY.
P	Big Maria Vista Solar Project	North of I-10, approximately 12 miles northwest of Blythe	Bullfrog Green Energy	Plan of Development submitted to BLM	22,717	500 MW solar photovoltaic project on 22,717 acres of land. Project would be built in three phases and would require 6,000 gallons of water monthly.
Q	Chuckwalla Solar I	1 mile north of Desert Center	Chuckwalla Solar I, LLC	Plan of Development submitted to BLM	4,083	200 MW solar photovoltaic project on 4,083 acres of land. Project would be developed in several phases and would tap into an existing SCE 161-kV transmission line crossing the site.
R	Rice Solar Energy Project	Rice Valley, Eastern Riverside County	Rice Solar Energy, LLC (SolarReserve, LLC)	Undergoing environmental review. Construction to begin in 2011	1,410	150 MW solar power tower project with liquid salt storage. Project is located on approximately 1,410 acres and includes a power tower approximately 650 feet tall and a 10-mile long interconnection with the WAPA Parker-Blythe transmission line.
S	Blythe Airport Solar I Project	Blythe Airport	U.S. Solar	Application has been submitted to City of Blythe, City of Blythe approved the project in November, 2009	640	100 MW solar photovoltaic project located on 640 acres of Blythe airport land.
T	Blythe PV Project	Blythe	First Solar	CPUC approved project terms of a 20 year power purchase agreement for sale of 7.5 MW, Under construction in fourth quarter, 2009	200	7.5 MW solar photovoltaic project located on 200 acres. Project was constructed by First Solar and sold to NRG Energy.
U	Desert Quartzite	South of I-10, 8 miles southwest of Blythe	First Solar (previously OptiSolar)	POD in to BLM	7,724	600 MW solar photovoltaic project located on 7,724 acres. Adjacent to DPV transmission line and SCE Colorado Substation. Approximately 27 AF would be used during construction and 3.8 AFY during operation.
V	Desert Sunlight	North of Desert Center	First Solar (previously OptiSolar)	POD in to BLM	5,000-6,000	250 MW solar photovoltaic project located on 5,000-6,000 acres. Project would tie into the SCE Red Bluff Substation. Approximately 27 AF would be used during construction and 3.8 AFY during operation.
W	Mule Mountain Soleil Project	North of Wileys Well Road, east of Genesis Solar Energy Project	enXco	POD in to BLM	2,058	200 MW solar photovoltaic project location on 2,058 acres.
X	Eagle Mountain Soleil Project	6 miles north of Desert Center	enXco		1,057	100 MW photovoltaic plant on 1,057 acres of BLM land. Would require a 5-8 mile transmission line to planned SCE Red Bluff Substation.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
Y	Red Bluff Substation	Unknown at this time – near Desert Center	SCE		N/A	Proposed 230/500 kV Substation near Desert Center. Planned to interconnect renewable projects near Desert Center with the DPV transmission line.
Z	Chuckwalla Valley Raceway	Desert Center Airport (no longer a functioning airport)	Developer Matt Johnson	Under construction, track expected to be open in mid 2010	400	Proposed 500-mile race track located on 400 acres of land that used to belong to Riverside County and was used as the Desert Center airport. APN 811142016, 811142006
AA	Eagle Mountain Landfill Project	Eagle Mountain, North of Desert Center	Mine Reclamation Corporation and Kaiser Eagle Mountain, Inc.	U.S. Court of Appeals for the Ninth Circuit issued its regarding the EIS for the project in 11/09 and ruled that the land exchange for the project was not properly approved by the administrative agency. Kaiser's Mine and Reclamation is considering all available options.	~ 3,500	The project proposed to develop the project on a portion of the Kaiser Eagle Mountain Mine in Riverside County, California. The proposed project comprises a Class III nonhazardous municipal solid waste landfill and the renovation and repopulation of Eagle Mountain Townsite. The proposal by the proponent includes a land exchange and application for rights-of-way with the Bureau of Land Management and a Specific Plan, General Plan Amendment, Change of Zone, Development Agreement, Revised Permit to Reclamation Plan, and Tentative Tract Map with the County. The Eagle Mountain landfill project is proposed to accept up to 20,000 tons of non-hazardous solid waste per day for 50 years.
AB	Wileys Well Communication Tower (part of the Public Safety Enterprise Communication System)	East of Wileys Well Road, just south of I-10	Riverside County	Final EIR for the Public Safety Enterprise Communication System published in August 2008.	N/A	The Public Safety Enterprise Communication project is the expansion of the County of Riverside's fire and law enforcement agencies approximately 20 communication sites to provide voice and data transmission capabilities to assigned personnel in the field.
AC	Mule Mountain Solar Project	South of I-10, approximately 4 miles west of Blythe	Bullfrog Green Energy	Plan of Development in to Palm Springs BLM	6,634	500 MW solar concentrating photovoltaic project located on 6,634 acres. Considering interconnection with proposed SCE Colorado Substation. Approximately 6,000 gallons of water would be required monthly.
See "E"	Colorado River Substation Expansion Project	Riverside County, near Blythe	Southern California Edison		45	Expand existing 500 kV switchyard, previously approved as part of the DPV2 CPCN on approximately 45 acres of land, into a full 500/220 kV substation on approximately 90 acres of land.

TABLE 4.1-5 (Continued)
FUTURE FORESEEABLE PROJECTS ALONG THE I-10 CORRIDOR (Eastern Riverside County)

ID #*	Project Name; Agency ID	Location	Ownership	Status	Acres	Project Description
Additional Projects Outside Cumulative Figure Boundaries						
	Paradise Valley "New Town" Development	Approximately 30 miles west of Desert Center (7 miles east of the city of Coachella)	Glorious Land Company	Notice of Preparation of an EIR published in December of 2005. Still under environmental review.	6,397	Company proposed to develop a planned community as an international resort destination with residential, recreational, commercial, and institutional uses and facilities. The project is planned as a self-contained community with all public and quasi-public services provided. The project is located outside the Coachella Valley Water District (CVWD) boundaries and the applicant has entered into an agreement with the CVWD to manage artificial recharge of the Shaver's Valley groundwater. The proponent has purchased a firm water supply from Rosedale-Rio Bravo Water District in Kern County. In-kind water will be transferred to the MWD which will release water from the Colorado River Aqueduct to a 38 acre percolation pond on the project site. The MWD will deliver approximately 10,000 AFY to the percolation pond and over the long term, no net loss of groundwater in storage is anticipated.
	Proposed National Monument (former Catellus Lands)	Between Joshua Tree National Park and Mojave National Preserve		In December 2009, Senator Feinstein introduced bill S.2921 that would designate two new national monuments including the Mojave Trails National Monument.	941,000 acres	The proposed Mojave Trails National Monument would protect approximately 941,000 acres of federal land, including approximately 266,000 acres of the former railroad lands along historic Route 66. The BLM would be given the authority to conserve the monument lands and also to maintain existing recreational uses, including hunting, vehicular travel on open roads and trails, camping, horseback riding and rockhounding.
	BLM Renewable Energy Study Areas	Along the I-10 corridor between Desert Center and Blythe	BLM	Proposed		The DOE and BLM identified 24 tracts of land as Solar Energy Study Areas in the BLM and DOE Solar PEIS. These areas have been identified for in-depth study of solar development and may be found appropriate for designation as solar energy zones in the future.
	Solar Energy projects along Arizona Border	Approximately 15 miles east of the CA/ AZ border along I-10 corridor	Various	Applications filed in to Arizona BLM field offices, application status listed as pending.		Five solar trough and solar power tower projects have been proposed along the I-10 corridor approximately 15 miles east of the CA/AZ border. The projects have been proposed on BLM administered-land in the Yuma and Kingman Field Offices and have requested use of approximately 75,000 acres.

* ID # correlates with location on Figure 2-5.

1 Water usage for the Eagle Mountain Pumped Storage Project was based on the information provided to FERC by the Eagle Crest Energy Company in the Responses to Deficiency of License Application and Additional Information Request dated October 26, 2009.

SOURCE: CEC, RSA (June 2010) Section B.3.4, Table 3.

These requirements are generically referred to as "Mitigation Measures" throughout this FEIS. Because these Mitigation Measures are derived from a variety of sources, they also are required, and their implementation regulated, by the various agencies.

Many of the other mitigation measures are required by agencies other than the BLM and their implementation will be enforced by those other agencies against the Applicant. The Applicant will be required by the Record of Decision (ROD) and the ROW grant to comply with the requirements of those other agencies (see, e.g., 43 CFR 2805.12(a) (Federal and state laws and regulations). In addition, the Applicant will be required by 43 CFR 2805.12(i)(6) to comply with project-specific terms calling for compliance with state standards (when they are more stringent than Federal) for public health and safety, environmental protection and siting, constructing, operating, and maintaining any facilities and improvements on the ROW).

As noted above, the BLM recognizes that the Energy Commission COCs are not generally within the enforcement authority of the BLM since the CEC COCs are requirements originating in State law and regulation. While the Applicant must comply with these measures, they are not directly enforceable by the BLM. For those COCs that are also within the enforcement authority of the BLM because of overlapping authorities, the BLM incorporates those COCs into its ROW grant as its own terms and conditions subject to its enforcement authority. Appendix G contains a list of COCs and denotes those measures that will be monitored and managed by the CEC, and those that will be subject to joint administration between the BLM and CEC.

In some instances, the BLM identified potential impacts to public land resources that would not be and have not been addressed by mitigation measures required by these other agencies. In these instances, individual mitigation measures have been developed by the BLM for incorporation into any ROW grant that may issue, and will be monitored and managed solely by the BLM. In addition, standard terms and conditions for approval of the use of public land will be set forth in any ROD and incorporated into any ROW grant and therefore will be enforced by the BLM as part of any ROW grant approved for the project.

4.1.6 Terms and Conditions found in FLPMA and BLM ROW Regulations

Title V of the Federal Land Policy and Management Act of 1976 addresses the issuance of ROW authorizations on public land. The BLM has identified all the lands that will be occupied by facilities associated with the GSEP that are needed for its construction, operation, and maintenance. The general terms and conditions for all public land rights of way are described in FLPMA section 505, and include measures to minimize damage to scenic and esthetic values and fish and wildlife habitat and otherwise protect the environment, require compliance with air and water quality standards pursuant to Federal or State law; and require compliance with any state standards (where more stringent than the Federal) for public health and safety, environmental protection, siting, construction, operation, and maintenance of ROWs. The Secretary may prescribe additional terms and conditions as s/he deems necessary to protect Federal property, provide for efficient management, and among other things, generally protect the public interest in the public lands subject to the right-of-way or lands adjacent thereto. For this project, terms and conditions have been developed for incorporation into any ROW that may issue that are necessary to protect public safety, including security fencing and on-site personnel. The environmental consequences analysis in this FEIS identifies impacts and mitigation measures to reduce/eliminate impacts. The mitigation measures identified by the BLM and incorporated as a term and condition of the ROW grant provide those actions necessary to prevent unnecessary or undue degradation of the public lands as required by FLPMA section 302. The additional mitigation measures that are identified and described in this FEIS and that will be enforced by the other agencies, as noted above, provide additional protection to public land resources.

Specifically, this PA/FEIS identifies recommended mitigation measures that would:

1. Require compliance with Mojave Desert Air Quality Management District State regulations, reduce carbon emissions, and minimize dust;

2. Require planning and compliance with Federal, State and local agency requirements for Drainage, Erosion and Sediment Control, wastewater management, groundwater use and monitoring, and stormwater control and monitoring;

3. Require measures to protect public health and safety including traffic control, transmission line standards, and worker safety plans; and

4. Require biological resource mitigation and cultural resources mitigation to protect sensitive environmental resources and cause the least damage to the environment and protect the public interest, while allowing the project to be constructed.

Finally, all BLM ROW grants are approved subject to regulations contained at 43 CFR 2800. Those regulations specify that the BLM may, at any time, change the terms and conditions of a ROW grant “as a result of changes in legislation, regulations, or as otherwise necessary to protect public health or safety or the environment.” 43 CFR 2805.15(e).

The BLM will monitor conditions and review any ROW grant issued for the GSEP to evaluate if future changes to the grant terms and conditions are necessary or justified under this provision of the regulations to further minimize or reduce impacts resulting from the project.

If approved, the solar energy ROW authorization will include diligent development terms and conditions, consistent with the requirements of 43 CFR 2805.12(i)(5). Failure of the holder to comply with the diligent development terms and conditions provides the BLM authorized officer the authority to suspend or terminate the authorization (43 CFR 2807.17).

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

4.2 Impacts on Air Resources

4.2.1 Impact Assessment Methodology

Dispersion Modeling Assessment

The Applicant used the U.S. Environmental Protection Agency guideline American Meteorological Society/EPA Regulatory Model (AERMOD) to estimate ambient impacts from GSEP construction and operation. The construction emission sources for the site were grouped into two categories: equipment (off-road equipment); and vehicles (on-road equipment), where the exhaust and fugitive dust emissions for each type were calculated for particulate matter modeling. Emissions from onsite equipment engines and fugitive dust emission sources were modeled as area sources. Similar modeling procedures were used by the applicant to determine impacts from the operating maintenance vehicle exhaust and fugitive dust emissions, while the stationary sources (boilers, engines, cooling towers) were modeled as point sources.

This air dispersion model provides a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of several complex series of mathematical equations, which are repeatedly calculated by a computer for many ambient conditions to provide theoretical maximum offsite pollutant concentrations for short-term (one-hour, three-hour, eight-hour, and 24-hour) and annual periods. The model results are generally described as maximum concentrations, often described as a unit of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

The inputs for the air dispersion models include two power blocks with stack information (exhaust flow rate, temperature, and stack dimensions); specific engine and vehicle emission data; and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For the proposed GSEP, the meteorological data used as inputs to the model included hourly wind speeds and directions measured at the Blythe Airport meteorological station during 2002 through 2004.

For the determination of one-hour average and annual average construction NOx concentrations the Ozone Limiting Method (OLM) was used to determine worst-case near field NO_2 impacts. The NOx emissions from internal combustion sources, such as diesel engines, are primarily in the form of nitric oxide (NO) rather than NO_2. The NO converts into NO_2 in the atmosphere, primarily through the reaction with ambient ozone, and NOx OLM assumes full conversion of stack NO emission with the available ambient ozone. The NOx OLM method was used assuming an initial NO_2/NOx ratio of 0.1 for all NOx emission sources. Actual monitored hourly background ozone concentration data from Niland, California were used for all of 2002 and January through April of 2003, and Blythe monitoring data were used from May 2003 through 2004, based on data availability, to provide ozone data that corresponds with the years of meteorological data that were used to calculate maximum potential NO to NO_2 conversion to determine the maximum hourly NO_2 impacts.

Background concentrations provided by the Applicant were replaced where appropriate[1] with the available highest ambient background concentrations from the last three years at the most representative monitoring stations as shown in Table 4.2-1. The information presented in Table 4.2-1 has been updated since the publication of the DEIS to use peak values from 2007 to 2009 background data for gaseous pollutants (2009 data was not yet available); the updated information shows an improvement in worst-case background concentrations for many of the criteria pollutants included in the air dispersion modeling analysis. Modeled impacts to these background concentrations were added, and then compared with the ambient air quality standards for each respective air contaminant to determine whether the proposed GSEP's emission impacts would cause a new exceedance of an ambient air quality standard or would contribute to an existing exceedance.

TABLE 4.2-1
BACKGROUND CONCENTRATIONS (µG/M^3)

Pollutant	Averaging Time	Recommended Background	Limiting AAQS[b]	Percent of Standard
NO_2	1 hour	119	339	35%
	Annual	19	57	33%
CO	1 hour	2,645	23,000	12%
	8 hour	878	10,000	9%
PM10	24 hour	83	50	166%
	Annual	30.5	20	153%
PM2.5	24 hour[a]	20.5	35	59%
	Annual	8.7	12	73%
SO_2	1 hour	23.6	195	12%
	3 hour	15.6	1,300	1%
	24 hour	13.1	105	12%

NOTE:
[a] PM2.5 24-hour data shown are 98th percentile values which is the basis of the ambient air quality standard and the basis for determination of the recommended background concentration.
[b] The limiting AAQS is the most stringent of the CAAQS or NAAQS for that pollutant and averaging period.

SOURCE: CEC, RSA (June 2010) Air Quality Table 5.

Construction Modeling Analysis

The total duration of the construction phase for Genesis Solar Electric Power (GSEP) is estimated to be approximately 37 months. Different areas within the GSEP site and the construction laydown areas would be disturbed at different times over the construction period. The total construction disturbance area would be approximately 1,800 acres, and the permanent disturbance area of the GSEP operations would be approximately 1,360 acres. The maximum acreage disturbed on any one day during construction is estimated by the applicant to be 160 acres.

[1] This does not include the background for the federal one-hour NO_2 standard since the Applicant's modeling analysis uses actual monitored NO_2 concentrations to determine the combined GSEP plus background average 98th percentile 1-hour NO_2 impacts.

Combustion emissions would result from the off-road construction equipment, including diesel construction equipment used for site grading, excavation, and construction of onsite structures, and water and soil binder spray trucks used to control construction dust emissions. Fuel combustion emissions also would result from exhaust from on-road construction vehicles, including heavy duty diesel trucks used to deliver materials, other diesel trucks used during construction, and worker personal vehicles and pickup trucks used to transport workers to and from and around the construction site. Fugitive dust emissions would result from site grading/excavation activities; installation of new transmission lines, water and gas pipelines; construction of power plant facilities, roads, and substations; and vehicle travel on paved/unpaved roads.

The annual emissions for the shorter duration offsite construction activities are based on the following construction durations:

1. Access Road Construction – 3 months (Months 1-3)
2. Gas Pipeline Construction – 5 months (Months 15-19)
3. Transmission Line Construction – 6 months (Months 4-9)

Using estimated peak hourly, daily and annual construction equipment exhaust emissions, the applicant modeled the proposed GSEP's air quality impacts (TTEC 2010h). To determine the construction impacts on ambient standards (i.e., 1-hour through annual), it was assumed that the emissions would occur during a daily construction schedule of 10-hour days from March through September (7am to 5pm) and 8-hour days from October through February (8am to 4pm).

The predicted proposed GSEP pollutant concentration levels were added to a conservatively estimated background of existing emission concentration levels (Table 4.2-1) to determine the cumulative effect. Table 4.2-2 presents the results of the Applicant's modeling analysis. The construction-related maximum daily emissions modeling analysis for the GSEP, including both the onsite fugitive dust and vehicle tailpipe emission sources, is summarized in Table 4.2-3, and maximum annual emissions are summarized in Table 4.2-4.

Operation Modeling Analysis

Using estimated peak hourly, daily and annual operating emissions, the applicant modeled the proposed GSEP's operation emissions to determine impacts (TTEC 2010h). The predicted proposed GSEP pollutant concentration levels were added to conservatively estimated worst-case maximum background concentration levels (Table 4.2-1) to determine the cumulative effect. Table 4.2-5 presents the results of the Applicant's modeling analysis of operations-phase emissions. This analysis includes emissions from the stationary sources for all four power blocks and the onsite fugitive dust and vehicle tailpipe emission sources estimated by the Applicant. Table 4.2-6 presents operation-related maximum daily emissions modeling analysis for the GSEP. Table 4.2-7 presents operation-related maximum annual emissions modeling analysis for the GSEP. The following are the stationary and mobile emission source operating assumptions that were used to develop the operation emissions estimates for the GSEP:

TABLE 4.2-2
MAXIMUM GSEP CONSTRUCTION IMPACTS

Pollutants	Avg. Period	Project Impact[a] (μg/m^3)	Background (μg/m^3)	Total Impact (μg/m^3)	Standard (μg/m^3)	Percent of Standard
NO_2	1-hr.	84.1	119	203.1	339	60%
	Annual	0.34	19.0	19.3	57	34%
CO	1-hr	41.6	2,645	2,687	23,000	12%
	8-hr	10.8	878	889	10,000	9%
PM10	24-hr	45.0	83	128	50	256%
	Annual	0.47	30.5	31.0	20	155%
PM2.5	24-hr	9.5	20.5	30.0	35	86%
	Annual	0.11	8.7	8.8	12	73%
SO_2	1-hr	0.09	23.6	23.7	195	12.2%
	3-hr	0.06	15.6	15.7	1,300	1%
	24-hr	0.02	13.1	13.1	105	12%

NOTE: Modeled 1-hour NO_2 concentrations were determined using the OLM method with time-matched ambient NO_2background.

[a] These results do not include the fugitive dust emission revision performed by the applicant in the revised data responses.

SOURCE: CEC, RSA (June 2010) Air Quality Table 10

TABLE 4.2-3
GSEP CONSTRUCTION – MAXIMUM DAILY EMISSIONS (lbs/day)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Construction Emissions						
Onsite Combustion Emissions	445.8	0.5	220.3	71.2	25.4	25.1
Onsite Fugitive Dust Emissions	--	--	--	--	48.5	10.2
Subtotal of Onsite Emissions	***445.8***	***0.5***	***220.3***	***71.2***	***73.9***	***35.3***
Offsite Emissions						
Access Road Equipment Exhaust	97.3	0.1	48.5	14.4	6.5	6.5
Gas Line Equipment Exhaust	110.9	0.1	63.9	18.8	6.8	6.7
Transmission Line Equipment Exhaust	73.7	0.1	38.6	11.7	4.3	4.3
Delivery Hauling Exhaust	74.97	0.094	26.4	5.72	3.41	3.42
Worker Travel Exhaust	71.8	0.65	716.5	59.5	5.82	5.81
Access Road Fugitive Dust	--	--	--	--	0.9	0.2
Gas Line Fugitive Dust	--	--	--	--	1.2	0.2
Transmission Line Fugitive Dust	--	--	--	--	1.2	0.2
Paved Road Fugitive Dust	--	--	--	--	10.2	1.7
Unpaved Road Fugitive Dust	--	--	--	--	197.1	19.6
Track Out Fugitive Dust	--	--	--	--	4.2	0.7

NOTE: Emissions that were not added may not be additive due to occurring at different times during the construction schedule.

SOURCE: CEC, RSA (June 2010) Air Quality Table 6.

TABLE 4.2-4
GSEP CONSTRUCTION – TOTAL CONSTRUCTION PERIOD EMISSIONS (tons)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Construction Emissions						
Onsite Combustion Emissions	109.7	0.12	54.2	17.5	6.24	6.19
Onsite Fugitive Dust Emissions	--	--	--	--	18.6	3.9
Subtotal of Onsite Emissions	***109.7***	***0.12***	***54.2***	***17.5***	***24.84***	***10.09***
Offsite Emissions						
Access Road Equipment Exhaust	2.5	0.003	1.3	0.4	0.17	0.17
Gas Line Equipment Exhaust	5.8	0.007	3.3	1.0	0.36	0.35
Transmission Line Equipment Exhaust	4.5	0.005	2.4	0.7	0.27	0.27
Delivery Hauling Exhaust	30.5	0.037	10.74	2.33	1.39	1.39
Worker Travel Exhaust	29.2	0.3	291.6	24.2	2.4	2.4
Access Road Fugitive Dust	--	--	--	--	0.031	0.01
Gas Line Fugitive Dust	--	--	--	--	0.06	0.01
Transmission Line Fugitive Dust	--	--	--	--	0.07	0.02
Paved Road Fugitive Dust	--	--	--	--	3.82	0.65
Unpaved Road Fugitive Dust	--	--	--	--	6.5	0.65
Track Out Fugitive Dust	--	--	--	--	1.58	0.27
Subtotal of Offsite Emissions	***72.5***	***0.352***	***309.34***	***28.63***	***16.65***	***6.19***
Total Emissions	**182.2**	**0.472**	**363.54**	**46.13**	**41.49**	**16.28**

SOURCE: CEC, RSA (June 2010) Air Quality Table 7.

TABLE 4.2-5
GSEP OPERATION EMISSION IMPACTS

Pollutants	Avg. Period	Project Impact[a] (μg/m^3)	Background (μg/m^3)	Total Impact (μg/m^3)	Standard (μg/m^3)	Percent of Standard
NO2	1-hr.	189.9	119	308.9	339	91%
	Annual	0.06	19.0	19.1	57	33%
CO	1-hr	12.3	2,645	2,657	23,000	12%
	8-hr	2.5	878	881	10,000	9%
PM10	24	15.9	83	98.8	50	198%
	Annual	4.3	30.5	34.8	20	174%
PM2.5	24	3.4	20.5	23.9	35	68%
	Annual	0.9	8.7	9.6	12	80%
SO2	1-hr	0.184	23.6	23.8	195	12.2%
	3-hr	0.102	15.6	15.7	1,300	1%
	24-hr	0.008	13.1	13.1	105	12%

[a] These results do not include the fugitive dust emission revision performed by the applicant after the data

SOURCE: CEC, RSA (June 2010) Air Quality Table 11.

TABLE 4.2-6
GSEP OPERATIONS – MAXIMUM DAILY EMISSIONS (lbs/day)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
HTF Auxiliary Heaters	9.25	0.224	15.8	2.46	4.19	4.19
Cooling Towers	--	--	--	--	35.47	35.47
HTF Venting/Control System	--	--	--	2.95	--	--
HTF Components Fugitive	--	--	--	82.25	--	--
Emergency Fire Pump Systems	3.73	0.01	0.62	0.08	0.08	0.08
Emergency Electrical Generators	29.12	0.03	0.77	0.59	0.11	0.11
Gasoline Storage Tank	--	--	--	0.38	--	--
Onsite Operations Vehicle	0.08	0.00	0.05	0.01	0.01	0.01
Operations Fugitive Dust	--	--	--	--	85.4	18.1
Subtotal of Onsite Emissions	***42.18***	***0.26***	***17.24***	***88.72***	***125.26***	***57.96***
Offsite Emissions						
Delivery Vehicles	21.94	0.03	7.45	1.81	1.07	0.92
Employee Vehicles	3.52	0.05	35.11	3.69	0.45	0.29
Offsite Vehicle Fugitive Dust	--	--	--	--	8.20	0
Subtotal of Offsite Emissions	***25.46***	***0.08***	***42.56***	***5.50***	***9.72***	***1.21***
Total Maximum Daily Emissions	**67.64**	**0.34**	**59.8**	**94.22**	**134.98**	**59.17**

SOURCE: CEC, RSA (June 2010) Air Quality Table 8.

TABLE 4.2-7
GSEP OPERATIONS – MAXIMUM ANNUAL EMISSIONS (tons/yr)

	NOx	SOx	CO	VOC	PM10	PM2.5
Onsite Operation Emissions						
HTF Auxiliary Heaters	0.17	0.00	0.28	0.04	0.08	0.08
Cooling Towers	--	--	--	--	3.78	3.78
HTF Venting/Control System	--	--	--	0.54	--	--
HTF Components Fugitive	--	--	--	15.01	--	--
Emergency Fire Pump Systems	0.10	0.00	0.02	0.00	0.00	0.00
Emergency Electrical Generators	0.76	0.00	0.02	0.02	0.00	0.00
Gasoline Storage Tank	--	--	--	0.07	--	--
Onsite Operations Vehicle	0.35	0.00	0.24	0.05	0.03	0.03
Operations Fugitive Dust	--	--	--	--	15.60	3.30
Subtotal of Onsite Emissions	***1.38***	***0.01***	***0.56***	***15.73***	***19.49***	***7.19***
Offsite Emissions						
Delivery Vehicles	1.21	0.00	0.41	0.10	0.06	0.05
Employee Vehicles	0.64	0.01	6.41	0.67	0.08	0.05
Offsite Vehicle Fugitive Dust	--	--	--	--	1.31	0.00
Subtotal of Offsite Emissions	***1.85***	***0.01***	***6.82***	***0.77***	***1.45***	***0.10***
Total Maximum Daily Emissions	**3.23**	**0.02**	**7.38**	**16.5**	**20.94**	**7.29**

SOURCE: CEC, RSA (June 2010) Air Quality Table 9.

Stationary Emission Sources

GSEP would consist of two 125 MW power plant units at the facility, each of which consists of the following equipment and emission estimate bases:

a. Auxiliary boiler: 30.0 MMbtu/hr, fired on natural gas. Emissions estimate is based on 14 hr/day, and 1,000 hr/year of full load operation each.

b. Cooling tower: seven cell wet cooling tower unit that provides steam cycle and auxiliary plant cooling. Water recirculation rate of 94,623 gallons/minute, maximum recirculating water total dissolved solids content of 5,000 ppm, and mist eliminator efficiency of 0.0005 percent. Emissions are based on 15 hr/day and 3,200 hr/year of operation each.

c. HTF vent control system: Venting emission rate based on project specific HTF decomposition rate and decomposition product assumptions. A venting carbon adsorption control system would reduce emissions by 99 percent.

d. HTF piping system: 2,500 valves in service 16 hr/day, 10 pump seals in service 16 hr/day, 3,000 connectors in service 16 hr/day and 10 pressure relief valves in service 8 hr/day. SOCMI light liquid and gas (PRVs) emission factors are used[2].

e. Fire pump engine: 315 horsepower (hp) diesel-fired engine. One hour per day and 52 hours per year maximum operation.

f. Emergency generator engine: 1341 hp (1000 kW) diesel-fired engine. One hour per day and 52 hours per year maximum operation.

g. Gasoline tank: 2,000 gallon tank: Phase 1 vapor recovery, no Phase 2 vapor recovery. Tank annual 10,768 gallons. Daily emissions based on annual emissions divided by 365 days/ year.

These emission factors may not assume appropriate control efficiencies for the inspection and maintenance program required by MDAQMD. This emission estimate will be revised as determined necessary and appropriate pursuant to adaptive management principles, after further consideration of the effectiveness of the inspection and maintenance program.

Mobile emissions sources

Mobile emissions sources required for operation and maintenance and employee trips are estimated based on vehicle miles traveled (VMT) and operating hours. Each mobile source has different basis for emissions estimates as provided in the applicant's revised emission estimate spreadsheets (TTEC 2010h). The GSEP onsite stationary and onsite and offsite mobile source emissions, totaled for both power units, are estimated and summarized in Air Quality Tables 4.2-5 and 4.2-6.

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[2] The process of determining a consistent approach for HTF piping component emission factors with other local agencies that are currently permitting thermal solar facilities, where light liquid Synthetic Organic Chemical Manufacturing Industry (SOCMI) factors are being used to estimate VOC emissions for other projects that also use Therminol® VP-1 HTF. A revised emission estimate for this and other emission consistency issues related to the FDOC in the Air Quality Staff Assessment Addendum will be provided, if necessary.

Construction and Operation Overlapping

Units #1 and #2 would be developed in phases with construction for Unit #2 scheduled to begin twelve months after construction of Unit #1. Each unit would take approximately twenty five months to construct before beginning commercial operation. Unit #1 would be expected to begin commercial operation in the 25th month of construction and Unit #2 would be expected to begin commercial operation after the 37th month. Construction emissions are considerably higher than operating emissions and the maximum construction emissions occur early in the overall construction process (months 2 through 13), so any overlap after the maximum construction period is assumed not to create a new maximum emissions scenario.

Closure and Decommissioning

The anticipated lifespan of the GSEP is estimated to be 30-40 years. Closure and decommissioning-related impacts would occur from the onsite and offsite emissions that would result when the facility is dismantled and the site is restored. Such impacts would be a one-time, limited-duration event. Given expected advances in fuel efficiency and other air quality control-related advancements, it would be speculative to project the types and volumes of air emissions that would be associated with the construction and other equipment that would be necessary to decommission the GSEPP. Nonetheless, as a conservative worst-case scenario, air quality impacts associated with the ultimate decommissioning of the GSEP are evaluated using the same methods as initial construction emissions, as discussed above, and are anticipated to be comparable in type and magnitude, but likely to be lower than, construction-related emissions.

4.2.2 Discussion of Direct and Indirect Impacts

Proposed Action

The modeling analysis for both the construction and operation phases indicates that, with the exception of 24-hour and annual PM10 impacts, the proposed GSEP would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The conditions that would create worst-case project modeled impacts (low wind speeds) are not the same conditions when worst-case background is expected for PM10/PM2.5. Additionally, the worst-case PM2.5 and PM10 impacts occur at the fence line and drop off quickly with distance. Therefore, the impacts, when including mitigation measures, would not contribute substantially to exceedances of the PM10 CAAQS in the Chuckwalla Valley.

Ozone

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, it can be said that the emissions of NOx and VOC from the GSEP do have the potential (if left unmitigated) to contribute to higher ozone levels in the region.

PM2.5 Impacts

Secondary particulate formation, which is assumed to be 100 percent PM2.5, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid and converts completely and irreversibly to particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase would tend to fall out; however, the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air.

The emissions of NOx and SOx from GSEP do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region; however, the region is in attainment with PM2.5 standards and the low level of NOx and SOx emissions from the proposed GSEP would not significantly impact that status.

Regional Air Quality Improvement

The proposed GSEP would have indirect emission reductions from fossil-fuel fired power plant electrical generation. This would be due to the proposed GSEP displacing the need for their operation, since solar renewable energy facilities would operate on a must-take basis.[3] However, the exact nature and location of such reductions is not known.

Alternatives

Reduced Acreage Alternative

The short-term construction emissions and ground level pollutant concentration impacts would be similar to the proposed GSEP and would require the same level of mitigation. The total construction period and total construction emissions would be reduced from those required to construct the proposed GSEP.

The operation emissions and ground level pollutant concentration impacts would be somewhat lower than the proposed GSEP, but the same level of mitigation would be required.

The benefits of the proposed GSEP in displacing fossil fuel fired generation and reducing associated criteria pollutant emissions would be reduced.

3 This refers to the fact that the contract between the owner of this solar power facility and the utility will require that the utility take all generation from this facility with little or no provisions for the utility to not accept generation from the facility.

Dry Cooling Alternative

The magnitude of emissions from the construction of the air-cooled condenser (ACC) would be different than those from the construction of the proposed wet-cooled system. Approximately 40% more land would be disturbed for the ACCs as compared with the wet-cooling towers, and the laydown area(s) may have to be increased to store and/or prepare the air-cooled radiator components prior to installation. Grading and construction equipment would be required to prepare the site and install the ACC system. The additional soil disturbance and equipment activity would result in increased fugitive dust and vehicle exhaust emissions (as compared to the emissions shown in Tables 4.2-2 and 4.2-3). This additional construction in the context of the total construction requirements for the GSEP are relatively minor.

There would be a minor reduction in particulate (PM10 and PM2.5) emissions from the removal of the two cooling towers, as shown in Table 4.2-5. The reduction is estimated to be approximately 3.8 tons per year. The use of the ACCs would be expected to increase the auxiliary boilers' startup requirements and increase the criteria pollutant emissions from the auxiliary boilers as shown in Tables 4.2-5 and 4.2-6. The ACCs would reduce the steam power cycle's efficiency, which would reduce the total amount of facility emissions generation. The result would be a reduction in the displacement of fossil fuel fired power plant emissions from the GSEP.

The maximum short-term and maximum annual construction pollutant concentration impacts for the Dry Cooling Alternative would be slightly higher than that estimated for the proposed GSEP, assuming that the increased ACC construction requirements occur during the maximum daily and annual construction periods. Therefore, the short-term and annual construction pollutant concentration impacts for this alternative would likely be slightly higher than those shown for the proposed GSEP in Table 4.2-4.

The maximum short-term and annual operation pollutant concentration impacts for the Alternative would reduce particulate (PM10/PM2.5) emissions. There would be a slight increase for the other criteria pollutants from those for the proposed GSEP as shown in Tables 4.2-4 and 4.2-7.

No Action Alternative A

Under this alternative, the proposed GSEP would not be approved by BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designations in the CDCA Land Use Plan of 1980, as amended.

The results of the No Project / No Action Alternative would be the following:

> The impacts of the proposed GSEP would not occur. However, the land on which the GSEP is proposed would remain available to other uses that are consistent with BLM's land use plan, including another potential renewable energy project.
>
> The benefits of the proposed GSEP in reducing fossil fuel use and greenhouse gas emissions from gas-fired generation would not occur.

> Renewable energy projects would likely be developed on other sites in Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and State/Federal mandates.

No Project Alternative B

Under this alternative, the proposed GSEP would not be approved by BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. Because the CDCA Plan would be amended, it is possible that the site could be developed with the same or a different solar technology. Air pollutant emissions and impacts would result from the construction and operation of like solar technology and would likely be similar to the air quality impacts from the proposed GSEP.

Different solar technologies require different amounts of construction and operations maintenance; however, the benefits of the proposed GSEP in displacing fossil fuel fired generation and reducing associated pollutant emissions could occur with a different solar technology at this site. As such, this No Project Alternative could result in air quality impacts and benefits similar to the impacts under the proposed GSEP.

No Project Alternative C

Under this alternative, the proposed GSEP would not be approved by BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the air quality of the site is not expected to change noticeably from existing conditions and, as such, this No Project Alternative would not result in air quality impacts under the proposed GSEP nor would it result in the air quality benefits from the proposed GSEP. However, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.2.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the GSEP and its alternatives could result in a cumulative effect on air quality with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for air quality consists of the Mojave Desert Air Basin, which is comprised of four air districts: the Kern County APCD (governing the eastern portion of Kern County), the Antelope Valley AQMD (governing the northeastern portion of Los Angeles County), the Mojave Desert AQMD (San Bernardino County and eastern-most Riverside County), and the eastern portion of the South Coast AQMD (eastern Riverside County). This geographic scope of cumulative impacts analysis was established based on the natural boundaries of the affected resource, and not on jurisdictional boundaries. Potential cumulative effects on air quality could be short-term (i.e., limited to the GSEP's proposed 39-month construction period) or long-term (i.e., occur during the projected 30-40 year lifespan of the proposed action).

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions, are described above, and are summarized in Table 4.2-1. Direct and indirect effects of the construction and operation of the GSEP are analyzed above; results of the GSEP-specific construction modeling analysis, including onsite fugitive dust and vehicle tailpipe emission sources, are provided in Table 4.2-2. See also Tables 4.2-3 and 4.2.4. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, projects that would be developed in eastern Kern County, northeastern Los Angeles County, San Bernardino County and eastern Riverside County could contribute to short-term or long-term pollutant concentration levels. Other utility-scale solar energy projects, such as the Blythe, Rice, Palen and Desert Sunlight solar power projects, are expected to contribute air pollutants in comparable amounts as the GSEP. Other, non-renewable energy projects are expected to contribute construction-related air pollutants, including fugitive dust and tailpipe emissions, in amounts consistent with the intensity and duration of each project's construction period, although operations-related air emissions would differ. Cumulative impacts would vary by alternative to the GSEP only to the degree to which direct and indirect impacts would vary by alternative.

4.2.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G The following mitigation measures would avoid or minimize impacts on air resources:

AQ-SC1, AQ-SC2, AQ-SC3, AQ-SC4, AQ-SC5, AQ-SC6, AQ-SC8

AQ-1, AQ-2, AQ-3, AQ-4, AQ-5, AQ-6, AQ-7, AQ-9, AQ-10, AQ-11, AQ-12, AQ-13, AQ-14, AQ-15. AQ-16, AQ-17, AQ-18, AQ-19, AQ-20, AQ-21, AQ-22, AQ-23, AQ-24, AQ-25, AQ-26, AQ-27, AQ-28, AQ-29, AQ-30, AQ-31, AQ-32, AQ-33, AQ-34, AQ-35, AQ-36, AQ-37, AQ-38, AQ-39, AQ-40

4.2.5 Residual Impacts after Mitigation Measures were Implemented

Residual Air Quality impacts are the emissions associated with construction and operation as outlined in Tables 4.2-4 and 4.2-5.

4.2.6 Unavoidable Adverse Impacts

The residual impacts described above would be unavoidable consequences of development.

4.3 Impacts on Global Climate Change

4.3.1 Impact Assessment Methodology

The methodology to assess impacts to climate change under NEPA is continuing to evolve as consensus forms as to how best to evaluate such effects on proposed action-specific and cumulative levels. The CEQ published draft guidance on February 18, 2010 for Federal agencies to improve their consideration of the effects of greenhouse gas (GHG) emissions and climate change in their evaluation of proposals for Federal actions under NEPA. For example, the CEQ proposes that agencies should consider the direct and indirect GHG emissions from the action and to quantify and disclose those emissions in the environmental document (40 CFR 1508.25). The CEQ further proposes that agencies should consider mitigation measures to reduce proposed action-related GHG emissions from all phases and elements of the proposed action and alternatives over its/their expected life, subject to reasonable limits based on feasibility and practicality.

For the GSEP and alternatives, this Section 4.3 carefully considers detailed information about the potential for construction-, operation-, maintenance- and decommissioning-related activities to emit GHGs and, thereby, contribute meaningfully to global warming in light of the combined emissions of other broad-scale causes of climate change. GHG emissions are quantified and set forth in Tables 4.3-1 and 4.3-2. Although it is doubtful that this individual project, standing alone, could result in significant climate change effects, the PA/FEIS considers the "incremental impact" of GSEP emissions as a possible contributor, together with the incremental impacts of other past, present, and reasonably foreseeable actions, to cause global climate change, which intrinsically is a cumulative issue. Mitigation measures are considered. Additionally, as discussed in Section 3.3, Global Climate Change, agencies under the U.S. Department of the Interior are required to consider potential impact areas associated with climate change, including potential changes in flood risk, water supply, sea level rise, wildlife habitat and migratory patterns, invasion of exotic species, and potential increases in wildfires.

Analysis of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the GSEP and its alternatives would result in the emission of GHGs that, together with past, present, and reasonably foreseeable future actions, could contribute to climate change. GSEP-specific GHG emissions are considered in the context of this cumulative impacts analysis. Although the cumulative scenario described in Section 4.1 generally includes activities in the California desert and highlights projects along the I-10 corridor, the geographic scope of the cumulative effects analysis for climate change is much broader: it is both regional and global. Potential cumulative effects, whether adverse or beneficial, on climate change could be short-term (i.e., limited to the GSEP's proposed 39-month construction period) or long-term (i.e., occur during the projected 30-40 year lifespan of the proposed action).

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions. Recent years have seen record-high average global surface temperatures; in fact, the past 20 years include the 18 warmest years on record since 1850. (Pew, 2008). This warming trend could result from several factors that influence the earth's climate, including natural factors, such as changes in solar radiation and volcanic activity, and anthropogenic (or human-caused) factors, such as the release of GHGs to the atmosphere and land-cover changes. (Pew, 2008). Although climate science is complex and uncertainties remain, the evidence is compelling: human activities associated with fossil fuel burning and land use are primarily responsible for the changing (warming) global climate.

In response, the EPA issued a final rule on May 13, 2010 to apply Prevention of Significant Deterioration (PSD) requirements to new facilities whose carbon dioxide-equivalent emissions exceed 100,000 tons per year (EPA, 2010). Additionally, several states have enacted legislation establishing reduction targets for GHG emissions. For example, the California legislature adopted Assembly Bill 32, the Global Warming Solutions Act of 2006 (AB 32), which requires the California Air Resources Board to develop regulations that will reduce greenhouse gas emissions to 1990 levels by 2020 (Health and Safety Code Section 38500 et seq., 17 CCR 95100 et seq.). Moreover, State regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 MTCO2/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO2/MWh) (20 CCR 2900 et seq.). California's state-specific policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some existing plants are likely to require substantial capital investments in order to continue operating in light of these policies and may instead be retired or be replaced. For additional discussion of relevant federal level regulations and requirements for assessing the potential impacts of climate change, please refer to Section 3.3. The GSEP could provide 250 MW of renewable energy generation capacity to partially offset the resulting loss in supply.

4.3.2 Discussion of Direct and Indirect Impacts of the Proposed Action on Climate Change

Although the system to deliver adequate and reliable electricity supply is complex and variable, it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. The GSEP would provide a new, utility-scale source of solar energy to complement existing and proposed sources of renewable energy. When the sun shines and electricity is generated by the GSEP, the real-time output required from fossil fuel plants would be reduced by the amount of renewable generation going into the electrical grid to maintain the balance between the supply and demand for electricity, thereby causing a measurable decrease in GHG emissions from fossil fuel plants. As analyzed below, construction of the GSEP would involve the use of construction equipment and operation of motor vehicles and operation of the GSEP would involve the generation of electricity using fossil fuels, at least to the extent required to operate any back-up generators at the thermal solar plant. Thus, construction and operation of the GSEP would produce GHGs.

Construction of the GSEP

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The estimated 39-month construction period for the GSEP would require on-site construction activities that would result in short-term, unavoidable increases in vehicle and equipment emissions, including GHGs. The GHG emissions estimate, for the entire construction period, is provided in Table 4.3-1.

TABLE 4.3-1
GSEP CONSTRUCTION-RELATED GREENHOUSE GAS EMISSIONS

Construction Element	CO_2-Equivalent (MT CO_2E)[a,b,c]
On-Site Construction Equipment	24,094
Gas Pipeline Construction Equipment	1,544
Access Road Construction Equipment	564
Transmission Line Construction Equipment	1,185
Delivery Vehicles (Construction Period)	3,520
Construction Worker Vehicles	22,067
Construction Total	***52,974***

NOTES:
[a] One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms
[b] The vast majority of the CO2E emissions, over 99 percent, is CO_2 from these combustion sources.
[c] This does not include the revised construction description that now includes an onsite concrete batch plant and on-site fuel depot. On balance staff believes that these changes will not significantly impact the totals, which might be estimated to be higher or lower depending the balance of how concrete and fuel deliveries would have been handled versus the deliveries of the materials to make concrete (sand, aggregate, cement, water) and daily fueling of equipment by fuel/lube truck(s).

SOURCE: CEC, RSA (June 2010), Appendix AIR-1, Greenhouse Gas Table 2.

In addition to direct emission of GHGs, construction of this 1,746-acre proposed action also would cause the clearing of land and complete removal of vegetation over most of the project site. This would reduce the ongoing natural carbon uptake by vegetation. A study of the Mojave Desert indicated that the desert may uptake carbon in amounts as high as 100 grams per square meter per year (Wohlfahrt et. al. 2008). This would equate to a maximum reduction in carbon uptake, calculated as CO_2, of 1.48 MT of CO_2 per acre per year for areas with complete vegetation removal. The maximum equivalent loss in carbon uptake for the GSEP would be about 2,584 MT of CO_2 per year, which would correspond to 0.007 MT of CO_2 per MWh generated. Compared to the CO_2 emissions that would be associated with the generation of fossil fuel in amounts comparable to energy to be supplied by the proposed action (fossil fuel energy generation-related GHG emissions can range from 0.35 to 1.0 MT of CO_2 per MWh depending on the fuel and technology), the natural carbon uptake loss caused by construction of the GSEP would be negligible.

Operation and Maintenance of the GSEP

Electricity generation GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and also are more likely to be easily controlled or reused/recycled. For this solar project, the primary fuel (solar energy) is GHG-free; however, natural gas would be used in the two auxiliary boilers used for HTF freeze protection, and gasoline and diesel fuel would be used in the maintenance vehicles, offsite delivery vehicles, staff and employee vehicles, the four emergency fire water pump engines, and four emergency generator engines. Sulfur hexafluoride emissions also could result from electrical equipment leakage. Anticipated annual operations-related GHG emissions of the GSEP are shown in Table 4.3-2. All emissions are converted to CO_2-equivalent and totaled.

TABLE 4.3-2
GSEP OPERATING GREENHOUSE GAS EMISSIONS

	Annual CO2-Equivalent (MTCO2E)[a]
Auxiliary Boilers[b]	3,520
Emergency Generators[b]	83.9
Fire Pumps[b]	17.5
Maintenance Vehicles[b]	194.1
Delivery Vehicles[b]	42
Employee Vehicles[b]	272.3
Equipment Leakage (SF6)	3.4
Total Project GHG Emissions – MTCO$_2$E[b]	**4,133**
Facility MWh per year	600,000
Facility GHG Emission Rate (MTCO2E/MWh)	0.0070

NOTES:
a One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b The vast majority of the CO2E emissions, over 99 percent, is CO2 from these emission sources.

SOURCE: CEC, RSA (June 2010), Appendix AIR-1, Greenhouse Gas Table 3.

The proposed action is estimated to emit, directly from primary and secondary emission sources approximately 4,100 metric tons of CO_2-equivalent GHG emissions per year. GSEP, as a renewable energy generation facility, is determined by rule to comply with the Greenhouse Gas Emission Performance Standard requirements of SB 1368 (Chapter 11, Greenhouse Gases Emission Performance Standard, Article 1, Section 2903 [b][1]). Regardless, GSEP has an estimated GHG emission rate of 0.007 MTCO2E/MWh, which is well-below the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh.

The beneficial energy and GHG impacts of the GSEP also could be measured in terms of the time required to produce an amount of energy as great as what was consumed during production, which, in the context of a solar power plant, includes all of the energy required during construction and operation. Within the realm of life cycle analysis, this amount of time is called the “energy payback time.” Tables 4.3-1 and 4.3-2 provide an estimate of the onsite construction and operation emissions, employee transportation emissions, and the final segment of offsite materials and consumables transportation. However, there are additional direct transportation and indirect manufacturing GHG emissions associated with the construction and operation of the proposed action, all of which are considered in the determination of the energy payback time. A document sponsored by Greenpeace estimates that the energy payback time for concentrating solar power plants, such as GSEP, to be on the order of five months (Greenpeace 2005, Page 9); the project life for GSEP is on the order of 30 years. Therefore, the proposed action's GHG emissions reduction potential from energy displacement would be substantial. The GHG displacement for the GSEP would be similar to, but not exactly the same as, the amount of energy produced after energy payback is achieved multiplied by the average GHG emissions per unit of energy displaced.[1]

Closure and Decommissioning of the GSEP

Closure and decommissioning-related activities would emit GHGs when the facility is dismantled and the site is restored. It is anticipated that such emissions would be caused by the operation of construction equipment and motor vehicles; related impacts would be a one-time, limited-duration event. GSEP-specific contributions to global climate change during the closure and decommissioning phase are evaluated using the same methods as initial construction emissions, and are anticipated to be comparable in type and magnitude, but likely to be lower than, the construction emissions as discussed above.

Mitigation Potential of the GSEP on Climate Change

As discussed previously, the GSEP would generate approximately 600,000 MWh of power per year, with a GHG emission rate of less than 0.01 MT of CO_2 per MWh. The power produced by the GSEP would offset power production by fossil-based power plants, which can range from 0.35 to 1.0 MT CO_2 per MWh. The electric power produced from the GSEP would be imported onto California's power grid, and would be used preferentially to conventional fossil fuel based power generation, including natural gas combined cycle plants, natural gas single cycle peaking plants, and power imported from other states, which may include power from coal-fired plants. Therefore, the Project would provide a direct benefit to climate change – namely the offset of up to approximately 600,000 MWh/yr of carbon dioxide-emitting power derived from existing/conventional fossil fuel power plants. Additionally, assuming that reductions in demand for existing fossil power would reduce demands for the natural gas and coal feedstocks used for those power plants, some degree of offset of upstream carbon dioxide, methane, nitrous oxide, and other GHG emissions associated with natural gas and coal extraction and transport, will also be realized. Therefore, implementation of the Project will provide direct and indirect benefits that counter the potential effects of climate change. The Project supports and is part of a transition towards increased in-state, national, and global renewable power production, which is a key component towards the mitigation of climate change.

[1] The average GHG emissions for the displaced energy over the project life is not known, but currently fossil fuel fired power plants have GHG emissions that range from 0.35 MT/MWh CO2E for the most efficient combined cycle gas turbine power plants to over 1.0 MT/MWh for coal fired power plants.

4.3.3 Direct and Indirect Impacts of the Proposed Action on Climate Change

In addition to simple warming, climate change also is expected to result in a suite of additional potential changes that could affect the natural environment, in a manner that is relevant to the GSEP. The potential for climate change effects on the proposed action is discussed below.

Hydrologic Resource

In California and much of the U.S. West, climate change is expected to result in several potential effects related to water resources. These include potential sea level rise, potential changes in the frequency of flooding and droughts, and potential reductions in surface water supply.

Sea Level Rise

Sea level rise is expected to occur as a result of increased global temperatures. Increased global temperatures include increases in ocean temperature, as well as air temperature. As water temperature increases, the water contained in the world's oceans would undergo thermal expansion. Increased temperatures could also result in a net melting/reduction in the extent of polar ice sheets. These effects could result in an increase in the level of the world's oceans, and some degree of sea level increase has already been established over the last century. However, these potential effects are not expected to affect the GSEP, which would be located approximately 150 miles from the ocean, and at an elevation of at least 370 feet mean sea level (msl). The proposed action would not be affected by sea level rise.

Snowpack and Snowmelt Period

Changes in snowpack and snowmelt period are anticipated in California, as a result of climate change. Similar effects are anticipated in the Colorado River system, which includes the Chuckwalla Valley Basin and the action area (see Sections 3.20 and 4.19 for additional discussion). Specifically, climate change is expected to result in generally warmer temperatures, which, in turn, would result in a greater proportion of total annual precipitation falling as rain. Snowpack in California and the Colorado River watershed serves as a temporary means of water storage, wherein water is released slowly and into the early summer during snowmelt. If a greater proportion of precipitation falls as rain, the snowpack would be lessened, and the potential for water storage within the snowpack also would be lessened. Also, warmer temperatures would cause earlier snowmelt events, potentially reducing the ability of water managers to capture snow melt in reservoirs. However, there is no snowpack in the vicinity of the proposed action, and the GSEP is not dependent on snowmelt water for water supply. Therefore, the GSEP would not affect snowpack, and would not be deleteriously affected by potential changes in snowpack characteristics.

Dilution

Dilution refers to the amount of water that is available in a receiving water body into which wastewater is discharged. Under some circumstances, climate change could result in a change in the volume or timing of water flows that are available in stream for dilution of wastewater. However, the GSEP would not discharge wastewater to surface waters (a septic system is included for on-site wastewater, and process water is controlled on site via an evaporation pond system). Therefore, potential climate-related changes in dilution capacity would not affect the proposed action.

Water Temperature

Water temperature can be critical to fisheries resources in parts of California, in particular, along those waterways that support cold water fisheries. However, the site and its vicinity do not contain any perennial surface waterways that could support fisheries. During rain events, surface water from the site drains into Ford Dry Lake, which is considered a dry playa, and does not support any fisheries resources. The GSEP would rely on groundwater for a water supply, and the temperature of the groundwater would not be critical to GSEP operation. Furthermore, the GSEP would not result in any water discharge or other activity that would affect water temperature along the Colorado River or other rivers or waterways that support fisheries. No component of the GSEP would alter reservoir flows or otherwise change water management operations, such that water temperature would be altered. Therefore, potential changes in water temperature would not affect the GSEP, and no further discussion is warranted.

Flooding, Drainage, and Erosion

Climate change is anticipated to affect the frequency and intensity of extreme weather events, including large storm events and droughts, in western watersheds including the Colorado River basin. Although the degree of change is a subject of substantial debate, most investigations concur that the Colorado River watershed, including the GSEP area, would experience an increase in the frequency and intensity of high rainfall/flood events. This could result in an increase in potential stormwater runoff and flooding, and an increase in erosion and sedimentation on site and downstream from the site. Increases in the intensity or frequency of droughts are discussed in terms of water resources availability, below.

As discussed in Section 4.19, Water Resources, the GSEP would include a series of engineered facilities, including rerouted drainage/flood channels, berms, and on-site drainage facilities that would channel, retain, and otherwise manage stormwater and flood flows on site and in the areas immediately surrounding the site. Also discussed in Section 4.19, the GSEP would be designed to account for stormwater drainage and flood flows, and CEC Conditions of Certification (Appendix G) SOIL&WATER-8 through SOIL&WATER-11would require revisions to the GSEP's drainage report and plans, completion of a detailed FLO-2D analysis, and implementation of drainage channel design and channel erosion protection measures. Additionally, these Conditions of Certification have been updated and incorporated into the FEIS as mitigation measures WATER-10, WATER-11, and WATER-13 to include assessment of potential climate change effects on water resources, and incorporation of GSEP design feature recommendations that would serve to offset potential drainage and flooding effects associated with climate change.

Water Resources Availability

As discussed in Section 3.20 and Section 4.19, the site is located within the Chuckwalla-Ford Dry Lake watershed, a watershed that contains only ephemeral drainages and washes. Surface waters in the GSEP area and its immediate vicinity occur only during substantial precipitation events, where surface runoff occurs. There are no perennial streams or other perennial waterways located on site or hydrologically connected to the GSEP via surface waters. The GSEP would not rely on surface water for water supply during construction or operation. Instead, the GSEP would rely on groundwater for water supply during both construction and operation.

Estimates of the potential effects of climate change on the frequency and amount of rainfall in the west vary, however, most studies concur that in the desert southwest, some degree of reduction of precipitation would occur. Seager et al (2007) and Christensen et al (2004) completed extensive reviews and modeling of potential climate change effects on the Colorado River watershed and other southwestern watersheds, including several climate change scenarios. The authors conclude that precipitation and runoff within the watershed could generally decrease, while periods of drought could increase, resulting in an overall reduction in the availability of water along the Colorado River. These scenarios could result in moderate to substantial effects on water supply availability, and could affect the ability of water rights holders along the Colorado River to divert their full entitlements.

In the event that climate change results in reduced precipitation within the GSEP area and its vicinity, some degree of associated reduction in groundwater recharge from rainfall could occur. This situation would not result in increased water requirements by the proposed action, and would not result in additional groundwater pumping during project construction or operations. Therefore, even with potential reductions in total precipitation volume associated with future climate change, no increase in pumping would be required as a result of the effects of climate change.

If climate change does result in reduced recharge to the underlying groundwater basin, the potential cumulative effects on groundwater levels identified in Section 4.19 could be exacerbated. Mitigation measures WATER-1 through WATER-5 and WATER-15 would offset these effects in part. However, as discussed in the cumulative effects analysis discussion of Section 4.19, the combined operation of all of the foreseeable projects will have an impact on groundwater levels, and this effect could be exacerbated by anticipated reductions in groundwater recharge due to climate change.

Biological Resources

Biological resources could be affected as a result of climate change in California. Distribution patterns of species are generally expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species also could be altered.

Fisheries

The GSEP does not contain any perennial or other surface waters that contain fisheries resources, and would not affect or be affected by changes in fisheries characteristics. Therefore, no further discussion is warranted.

Habitat Values of Mitigation Lands

As discussed in Section 4.17, Impacts to Vegetation Resources, and Section 4.21, Impacts to Wildlife Resources, implementation of the GSEP would require mitigation for biological resources values that would be lost as a result of implementation of the GSEP. As discussed in these sections, the proposed mitigation lands would be required to be equivalent in terms of habitat value, and at a replacement ratio of at least 1:1 (typically greater than 1:1, as specified in Sections 4.17 and 4.21) for direct impacts. Unfortunately, climate change could result in adverse effects on biological resources located on these mitigation lands. However, given that mitigation lands must be similar in biological resources value as compared to lost resources on site, it is anticipated that climate-related effects for the mitigation lands would be similar to those located at the GSEP site, if the GSEP were never built. Therefore, potential reductions in the biological resources values of mitigation land values resulting from climate change are expected to be similar to on-site conditions in the absence of the GSEP, and no further discussion is warranted.

Hazards

Heat related hazards, including potential increases in wildfire and heat waves, could be exacerbated by climate change.

Wildfire Risks

Potential risks associated with fire are discussed in Section 3.12, Public Health and Safety. Section 4.11, Impacts to Public Health and Safety, provides a discussion of potential fire-related risks, and also ensures that adequate fire control personnel, infrastructure, and associated planning would be completed and/or available to the GSEP, to ensure compliance with federal, state, and local regulations, and to ensure worker safety.

Climate change would result in a small but general increase in temperature, and could also result in an increase in the frequency of extreme weather events that could generate wildfires, such as increased frequency of drought and heat waves, during operation of the GSEP. In compliance with applicable regulations and mitigation proposed in Section 4.11, the Applicant would be required install a fire protection/control system on site in including a fire water supply system and associated infrastructure, and to comply with state and federal regulations regarding worker safety and training. Additionally, under CEC Condition of Certification WORKER SAFETY-7 (see Appendix G), the Applicant would be required to provide funding to the Riverside County Fire Department (RCFD) to ensure available resources to fight potential fires on site, while Condition of Certification WORKER SAFETY-9 would provide for joint training exercises with the RCFD. Although the risk of wildfire that could affect the site could increase as a result of climate change, these potential increases in risk are expected to be offset by ongoing compliance with the worker safety and fire protection regulations and mitigation measures specified in Section 4.11. Therefore, no additional mitigation is warranted.

Heat Waves

The frequency of occurrence and the severity of heat waves could increase as a result of climate change. Heat waves could result in increased potential risk to GSEP employees. However, Mitigation Measure WORKER SAFETY-2 (see Appendix G) would require implementation of an operation period heat stress protection plan that is based on and expands on Cal OSHA requirements. This plan would provide measures to protect workers against the effect of heat-related hazards, whether or not those hazards are caused by climate change. Although the frequency and/or intensity of heat wave events could increase as a result of future climate change, the heat stress protection plan would meet state requirements for worker safety. Therefore, no further discussion or mitigation is warranted.

Other Issues

In addition to the issues discussed above, potential climate change related impacts associated with soil moisture and fugitive dust concentrations also warrant discussion.

Soil Moisture

As discussed in Section 3.15, Soils Resources, and 4.14, Impacts on Soil Resources, almost all rainfall that occurs in this region of California is lost through evaporation and evapotranspiration, and soil moisture in the GSEP area and its vicinity is characteristically low. As discussed previously, although precise changes are impossible to predict, climate change could result in increases in extreme weather events, including droughts and heat waves, and an overall reduction in precipitation. These conditions could result in a concurrent reduction in soil moisture content at the site and regionally. However, reductions in soil moisture content would not affect GSEP-related operations, and would not require any change in water resources usage. Additionally, the proposed facilities would in no way support additional drying of soils on site, or otherwise exacerbate potential changes in soil moisture associated with climate change. Therefore, no additional change would occur, and no further discussion is warranted.

Fugitive Dust

As discussed in Section 3.02, Air Resources, and Section 4.02, Impacts on Air Resources, fugitive dust emissions would require mitigation during operation of the GSEP. CEC Condition of Certification AQ-SC7 (see Appendix G) would mitigate operation period fugitive dust emissions to ensure compliance with state and local regulations and requirements. Although climate change could result in some degree of reduction of soil moisture, as discussed above, soil moisture is already very low under current conditions. Any further reductions in soil moisture would be minimal in terms of the absolute amount of water contained in on-site soils. Therefore, any potential further reductions in soil moisture associated with climate change are not anticipated result in a substantial increase in fugitive dust emissions, and the proposed Mitigation Measure would be sufficient to meet federal, state, and local requirements regarding fugitive dust.

Direct and Indirect Impacts of GSEP Alternatives

Reduced Acreage Alternative

The Reduced Acreage Alternative essentially would reduce the total construction-, operation- and decommissioning-related GHG emissions of the proposed action by approximately half, due to elimination of one of the two power blocks. Therefore, the total GHG emissions could be determined by multiplying the proposed action's GHG emissions provided in Tables 4.3-1 and 4.3-2 by 0.5. The benefits of the proposed action in displacing fossil fuel fired generation and reducing associated GHG emissions from gas-fired generation would be reduced by a factor of approximately 2. The extent of effects to biological resources and hydrologic resources would also be reduced, due to the reduced intensity of construction activities and reduced water requirements. However, the Reduced Acreage Alternative would not alter the potential effects of climate change on mitigation lands, drainage and flooding, or water resources availability. All other potential climate change related impacts would be the same as for the proposed action.

If the Reduced Acreage Alternative were selected, other renewable projects could be developed that would compensate for the loss of generation compared to the proposed action on other sites in the Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and Federal and state mandates.

Dry Cooling Alternative

The Dry Cooling Alternative would be the same as the proposed action, except that dry cooling would be implemented instead of wet cooling. Dry cooling minimizes water use at the facility, but has the trade-off of reduced efficiency. The Dry Cooling Alternative would utilize dry cooling technologies for the steam cycle heat rejection system, but would rely on a closed cooling water system for ancillary equipment cooling. Implementation of the Dry Cooling Alternative would result in substantially reduced water consumption by the power plant: 202 acre-feet per year (AF/y), as compared to 1600 AF/y for the proposed action.

Because the Dry Cooling Alternative would reduce the operational water requirements of the power plant, the Dry Cooling Alternative would also result in reduced potential for groundwater level reduction, as compared to the proposed action (for additional discussion, refer to Section 4.19, Impacts On Water Resources). However, implementation of the Dry Cooling Alternative would not alter the extent to which climate change would affect water supplies, flooding, drainage, or other climate related issues on site. Other potential impacts of climate change on the proposed action would be similar to those described for the proposed action.

In terms of GHG emissions, dry cooling is less efficient than wet cooling, and therefore the Dry Cooling Alternative would result in reduced power generation, as compared to the proposed action. Specifically, increased on-site demand for electricity, as compared to the proposed action, would require approximately 12% of the energy produced by the GSEP to be used on site to support dry cooling. This is equivalent to a 12% (72,000 MWh/yr) reduction in power output per year, that could otherwise be used to offset fossil power generation. Therefore, implementation of the Dry Cooling Alternative would result in slightly reduced GHG offsets produced by the GSEP.

No Action Alternative A

None of the anticipated impacts, beneficial or adverse, of the proposed action would occur. Instead, the land on which the GSEP is proposed would become available to other uses consistent with BLM's land use plan, potentially including another renewable energy project.

If the proposed action is not approved, renewable projects would likely be developed on other sites in Riverside County, the Colorado Desert, or in adjacent states as developers strive to provide renewable power that complies with utility requirements and Federal and state mandates. In terms of potential impacts due to climate change, under No Action Alternative A, the proposed action would not be implemented, and, therefore, would not be affected by climate change. However, renewable projects developed on other sites in Riverside County, the Colorado Desert, or in adjacent sites would likely be subject to similar climate change effects as compared to the proposed action.

No Project Alternative B

Because the CDCA Plan would be amended under this alternative to make the site unavailable for future solar development, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, GHG emissions associated with the development of renewable energy projects would occur elsewhere and the carbon uptake potential of the site would not be expected to change noticeably from existing conditions. Consequently, this No Project Alternative would not result in GHG benefits on this site, but could occur in connection with other renewable energy projects developed elsewhere to meet State and Federal mandates. Such projects would likely have similar impacts on climate change as the proposed action, and climate change related impacts would likely affect such projects similarly to the proposed action, although in other locations.

No Project Alternative C

Because the CDCA would be amended under this alternative, it is possible that the site would be developed with the same or a different solar technology. As a result, GHG emissions and carbon sequestration potential similar to that of the proposed action could result. Different solar technologies require different amounts of construction and operations maintenance, and different volumes of water during operations; however, it is expected that all the technologies would provide the more significant benefit, like the proposed action, of displacing fossil fuel fired generation and reducing associated GHG emissions. As such, No Project Alternative C could result in GHG benefits similar to those of the proposed action. In terms of potential climate change impacts on No Project Alternative C, these impacts would likely be similar to the proposed action, although metrics related to project size and water use could vary somewhat based on the selected power generation technology.

Summary of GSEP-Specific Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These Conditions of Certification are set forth in Appendix G. The following mitigation measures would avoid or minimize impacts on global climate change:

AQ-SC2, AQ-SC5, AQ-SC6

AQ-1, AQ-2, AQ-3, AQ-4, AQ-5, AQ-6, AQ-7, AQ-9, AQ-10, AQ-11, AQ-12, AQ-13, AQ-14, AQ-15. AQ-16, AQ-17, AQ-19, AQ-20, AQ-21, AQ-22, AQ-23, AQ-24, AQ-25, AQ-26, AQ-27, AQ-33, AQ-34, AQ-39, AQ-40

4.3.4 Residual Incremental, GSEP-specific Impacts after Mitigation Measures Were Implemented

The residual GHGs emitted from construction were estimated to be 52,974 metric tons of C CO_2 equivalent for construction and 4,133 metric tons/year CO_2 equivalent for a total of 176,964 tons CO_2 equivalent over the life of the GSEP.

4.3.5 GHG Emissions Associated with Past, Present and Reasonably Foreseeable Future Actions

GHG Emissions from Past, Present and Reasonably Foreseeable Actions

As stated above, human activities are widely-recognized as being primarily responsible for the changing (warming) global climate. Such activities result in emissions of carbon dioxide and other GHGs from industrial processes, fossil fuel combustion, and changes in land use, such as deforestation. For example, in 1990, industrial processes and electric power generation caused the majority of human-generated global GHG emissions, contributing 32 percent and 20 percent, respectively (Pew, 2010a). Within the United States, which emitted over seven billion metric tons of CO_2E in 2004; in that year, industry emitted 30 percent of the total, transportation emitted 28 percent, the commercial sector emitted 17 percent, the residential sector emitted 17 percent, and agriculture emitted 8 percent (Pew, 2010b). Industrial processes, power generation, land use changes and other actions contributing to climate change are expected to continue in the foreseeable future, subject to increasingly stringent requirements.

The proposed GSEP and other present and reasonably foreseeable future actions, including those identified in Section 4.1, would contribute construction-, operation and maintenance-, and closure and decommissioning-related GHG emissions impacts and benefits in the existing international, national, State-wide and regional context. Internationally, this context includes, among many other efforts, the Bali Roadmap, which was adopted in 2007 to launch negotiations toward a new global climate agreement; and the Copenhagen Accord, which was reached at the 2009 U.N. Climate Change Conference and provides for explicit national GHG emissions reduction pledges. The international context also includes urbanization by developing countries, deforestation and development-related conversion of agricultural lands.

The national context includes GHG-related activity by all branches of government, including the GHG Emissions Reduction Target for Federal Operations set by President Obama in January

2010; proposed legislation including the American Clean Energy and Security Act of 2009 (H.R.2454), the Clean Energy Jobs and American Power Act of 2009 (S.1733), and the American Clean Energy Leadership Act of 2009 (S.1462); and attention to climate change issues by the nation's highest court. *Massachusetts et al. v. Environmental Protection Agency,* 549 U.S. 497 (2007).

Recent State-level GHG-related actions include the California Air Resources Board's February 25, 2010, adoption of a regulation to limit and monitor sulfur hexafluoride (SF6) emissions from electric power sector equipment; the California Building Standards Commission's January 14, 2010, approval of the most environmentally stringent building code in the United States, which will go into effect in January 2011 and which the California Air Resources Board (CARB) anticipates will reduce GHG emissions by 3 million metric tons in 2020; and CARB's September 24, 2009, adoption of a revised Forest Project Protocol that allows private landowners, public lands, and out-of-state projects to participate in the State's voluntary forestry offsets market – it is the first state-approved carbon accounting standard that is applicable to projects nationwide. Additionally, the adoption of Senate Bill 375 (SB 375) in 2008 enhances California's ability to reach its AB 32 goals by providing regional planning-related GHG emissions-reduction goals.

Regionally, based on SB 375, the Southern California Association of Governments' six-county area (including Riverside, San Bernardino, Orange, Los Angeles, Imperial and Ventura counties) must reduce its annual GHG emissions by 2.5 million metric tons by 2020. Local governments are considering GHG and related emissions reductions in their planning efforts. For example, the Riverside County Transportation Demand Management Program (Riverside County Code Ch. 10.36) is intended in part to reduce motor vehicle emissions, which include GHGs. In turn, San Bernardino County, which has been a focal point in conflicts over local climate regulation, has updated its General Plan and otherwise incorporates GHG emissions reduction considerations into its local planning decision-making process (OPR, 2010).

Overall, it is expected that the GSEP would enhance the attainment of international, national, Statewide and regional GHG reduction efforts.

Environmental Consequences of Climate Change

Beneficial and adverse impacts of GHG emissions caused by the proposed action, together with GHG emissions-related impacts of past, present and reasonably foreseeable future actions, would contribute to cumulative global climate change impacts on the various elements of human society and the environment that are sensitive to climate variability. For example, human health, agriculture, natural ecosystems, coastal areas, and heating and cooling requirements are examples of climate-sensitive systems. Globally, rising average temperatures are believed to have caused glaciers to shrink, permafrost to thaw, ice on rivers and lakes to freeze later and break up earlier, growing seasons to lengthen, and animal and wildlife ranges to shift. In North America, warming in western mountains is expected to cause decreased snowpack, more winter flooding, and reduced summer flows, thereby exacerbating competition for over-allocated water resources. Extended periods of high fire risk and large increases in areas burned – each a risk of global warming – would increase impacts on forests from pests, diseases and wildfire. Areas that currently experience periods of extreme heat are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts particularly for elderly populations. (IPCC, 2007). For a review of how climate change could affect the proposed action and alternatives, please see the previous subsection, “Direct and Indirect Impacts of Climate Change on the Proposed Action.”

Mitigation Measures to Reduce Impacts on Global Climate Change

As stated above, implementation of mitigation measures imposed by the BLM in a right-of-way and the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce incremental, GSEP-specific impacts on the quality of the human environment. These mitigation measures are set forth in the FEIS, Appendix G, and are summarized above. Additionally, it is expected that each of the projects that comprise the cumulative scenario, other federal projects, and other projects within the State of California would likely be subject to similar types of mitigation measures to address contributions to climate change impacts. Additional voluntary and obligatory measures could apply to projects at the local or international level.

4.4 Impacts on Cultural Resources

4.4.1 Impact Assessment Methodology

The basic regulatory process for assessing impacts on cultural resources consists of the following five steps:

1. Determining the appropriate geographic extent of the analysis for the proposed action and for each alternative action under consideration;

2. Producing a cultural resources inventory for each such geographic area;

3. Determining the historical significance of the cultural resources in the inventory for each geographic area, unless the construction, operation and maintenance, and decommissioning and closure of the proposed or alternative actions will avoid particular resources;

4. Assessing the character and the severity of the effects of the proposed and alternative actions on the historically significant cultural resources in each respective inventory that cannot be avoided; and

5. Developing measures that would resolve those effects that are found to be significant.

Further details of each of these phases follow below and help provide the parameters of the present analysis.

The Area of Potential Effects

The regulations for implementing Section 106 of the NHPA define the Area of Potential Effects (APE) as the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The area of potential effects is influenced by the scale and nature of the undertaking and may be different for different kinds of effects caused by the undertaking (36 CFR 800.16(d)). For purposes of complying with Section 106, the APE for the GSEP consists of the following:

1. For archaeological resources, the APE is defined as the GSEP disturbance area plus a buffer of 200 feet around this area, and the GSEP linear facilities routes, plus a buffer of 50 feet to either side of the rights-of way for these routes, and the maximum depth that would be reached by all foundation excavations and by all pipeline installation trenches.

2. For ethnographic resources, the APE is expanded to take into account historic properties to which Indian Tribes may attach religious or cultural significance which may be further afield than the GSEP site footprint or right-of-way, including the visual setting that may contribute to the historical integrity of the resources. Ethnographic resources are often identified in consultation with Native Americans and other ethnic groups, and issues that are raised by these communities may define the APE. For the GSEP the ethnographic APE is the geographic area around and including the proposed GSEP where the project has the potential to directly or indirectly alter the character or use of ethnographic resources that are historic properties.

3. For built-environment resources in the rural context of the GSEP, the APE is defined as the GSEP site and any above-ground linear facilities, plus a half-mile buffer. As the GSEP is located in an undeveloped area, the APE was reduced to include only the above-ground linear facilities and a half-mile buffer.

Assessing Effects

The core of a cultural resources analysis under NEPA and Section 106 is the assessment of the character of the effects that a proposed or alternative action may have on historically significant cultural resources. The analysis takes into account direct, indirect, and cumulative effects.

In accordance with 36 CFR § 800.5 of the ACHP's implementing regulations, which describes criteria for adverse effects, impacts on cultural resources are considered significant if one or more of the following conditions would result from implementation of the proposed action:

1. An undertaking has an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. For the purpose of determining the type of effect, alteration to features of a property's location, setting, or use may be relevant, depending on the property's significant characteristics, and should be considered.

2. An undertaking is considered to have an adverse effect when the effect on a historic property may diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties include, but are not limited to:

   a. Physical destruction, damage, or alteration of all or part of the property

   b. Isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the NRHP

   c. Introduction of visual, audible, or atmospheric elements that are out of character with the property or that alter its setting

   d. Neglect of the property, resulting in its deterioration or destruction

   e. Transfer, lease, or sale of the property

Consideration is given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. A formal effect finding under Section 106 relates to the proposed or alternative action as a whole rather than relating to individual resources.

4.4.2 Direct and Indirect Effects

Proposed Action

Direct and indirect effects are those that are more clearly and immediately attributable to the implementation of proposed or alternative actions. Direct and indirect effects are those "which are caused by the [proposed or alternative] action and [which] occur at the same time and place"

(40 CFR § 1508.8(a)). Indirect effects are those “which are caused by the [proposed or alternative] action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR § 1508.8(b)).

The Section 106 regulations narrow the range of direct effects and broaden the range of indirect effects relative to the definitions of the same terms under NEPA. The regulatory definition of “effect,” pursuant to 36 CFR Section 800.16(i), is that the term “means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register.” In practice, a “direct effect” under Section 106 is limited to the direct physical disturbance of a historic property. Effects that are immediate but not physical in character, such as visual intrusion, and reasonably foreseeable effects that may occur at some point subsequent to the implementation of the proposed undertaking are referred to in the Section 106 process as “indirect effects.”

Ground-disturbing construction activities associated with the GSEP can directly impact cultural resources by damaging and displacing artifacts, diminishing site integrity and altering the characteristics that make the resources significant. In addition, in the case of historic architectural resources and places of traditional cultural importance, impacts can occur to the setting of a resource even if the resource is not physically damaged.

Based on graphical representations showing the anticipated disturbance below ground and the anticipated above-ground intrusion into the flat landscape, impacts associated with the GSEP potentially affecting cultural resources, which include:

1. General cutting and filling would disturb the overall GSEP plant site to a maximum depth of 2 feet.

2. In the solar array fields, GSEP collector foundation excavations would cause ground disturbance down to an unspecified depth, and the collectors would intrude into the flat landscape to a maximum height of 25 feet.

3. In the power blocks, GSEP equipment foundation excavations would cause ground disturbance down to a maximum depth of 25 feet, and the equipment would intrude into the flat landscape to a maximum height of 75 feet.

4. Along the linear facilities corridor, GSEP natural gas pipeline trench excavations would cause ground disturbance down to a maximum depth of 10 feet. The transmission line supports would cause ground disturbance down to a depth of 15 feet and create an intrusion into the flat landscape to a maximum height of 75 feet.

Based on this information all archaeological resources, and possibly additional resources yet to be discovered during construction, located within the full extent of the GSEP’s surface and below-grade impacts (inclusive of foundations and trenches) would be adversely affected by the GSEP.

Based on preliminary evaluations of NRHP eligibility, the proposed GSEP would directly impact 27 significant archaeological resources (see Table D-9). These include:

1. 12 prehistoric-to-historic period Native American archaeological sites, 6 of which are potential contributing elements to a potential Prehistoric Trails Network Archaeological Landscape (PTNAL); and

2. 15 historic-period archaeological sites that are potential contributing elements to a World War II Desert Training Center California-Arizona Maneuver Area Historic Archaeological Landscape (DTCHAL).

In addition, the proposed GSEP would indirectly impact 248 sites that are contributors to the potential Prehistoric Trails Network Archaeological Landscape (PTNAL) (see 3.4-16 and 3.4-39 through 3.4-41).

The two built-environment resources identified within the GSEP area would not be directly impacted by the GSEP, nor would the integrity of their settings be adversely affected by the GSEP.

With respect to direct impacts, if, during operation of the GSEP, the applicant should plan any changes or additions entailing significant amounts of ground disturbance, the applicant would have to obtain authorization from the BLM. The BLM would determine if previously undisturbed sediments would be affected by the planned activities and, if so, require the implementation of existing identification, evaluation and treatment measures or devise new ones to mitigate any impacts to significant known or newly identified cultural resources in accordance with the Programmatic Agreement being developed for the GSEP.

With respect to indirect impacts during operation of the GSEP, cultural resources on and in the immediate vicinity of the GSEP site may experience increased vandalism, illegal collection of artifacts, and/or destruction of resources by vehicles traveling on the site, as a result of improved access due to the GSEP's construction. Construction and operation of the GSEP would also introduce visual elements that are out of character with the potential PTNAL and DTCHAL historic landscapes, thereby affecting the integrity of their setting, feeling and association[1]. The Programmatic Agreement (PA) will include provisions to address these possible indirect effects.

McCoy Springs National Register District, one of the 248 sites identified as contributing to the potential PTNAL, is the largest concentration of petroglyphs in the region and may be indirectly affected by the proposed GSEP. The site is listed on the National Register of Historic Places and is located on the west side of the McCoy Mountains approximately 5 miles from the Wiley's Well Rest Area. Persons needing access to the GSEP site footprint and linear facilities corridor for construction workers and permanent staff will share the rest area as an access point. The proposed GSEP will involve an average of 650 employees for 37 months (GSEP 2009a, p. 3-26). Traffic and off-road exploration of the areas surrounding the GSEP site will undoubtedly increase.

[1] *Setting* is the physical environment of a historic property. It refers to the character of a place in which the property played its historical role. *Feeling* is the property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character. *Association* is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer. Like feeling, association requires the presence of physical features that convey a property's historic character (NPS 1990).

Possible effects to the McCoy Springs site include vandalism as the result of increased visitation in addition to changes in the integrity of setting, feeling, and association. Evaluations and consultations carried out pursuant to the Programmatic Agreement being developed for the GSEP will determine whether Native American traditional values are ascribed to the McCoy Springs site that may be affected by the GSEP.

Closure and Decommissioning

Cultural resources within the proposed GSEP site footprint and linear facilities corridor are most likely present within the first 2 feet below the current ground surface. The construction of GSEP is expected to destroy all known and unknown cultural resources within the site footprint and most of the linear facilities corridor. Therefore the closure and decommissioning of the proposed GSEP is unlikely to cause additional impacts to known or previously unknown cultural resources. However, sites within the linear facilities corridor and near the boundary of the proposed GSEP footprint may still exist after GSEP construction and associated archaeological data recovery. These sites may be impacted by activities associated with GSEP closure and decommissioning.

Differences Among Alternatives

Reduced Acreage Alternative

The Reduced Acreage Alternative would essentially be Unit 1 of the proposed GSEP, including a 125-MW solar facility located within the boundaries of the proposed GSEP as defined by the applicant. This alternative eliminates about 50 percent of the proposed site footprint so impacts are reduced.

This alternative is located entirely within the boundaries of the proposed GSEP, so all of the aspects of the setting and existing conditions for the GSEP are also pertinent to this alternative except the project description. The project description for this alternative eliminates the eastern solar field and relocates the gas yard approximately 1.75 miles northwest of its present location. As a result, the environmental setting consists of the western portion of the proposed GSEP, as well as the area affected by the linear GSEP components.

Cultural resource surveys completed by the applicant identified 20 cultural resources within the Reduced Acreage Alternative site footprint. These cultural resources include 14 prehistoric Native American sites, 3 historic artifact scatters, 2 built environment resources, and 1 possible ethnographic resource. The significance (NRHP eligibility) of these resources has not yet been determined. The two built-environment resources identified within the project area would not be directly impacted by the GSEP, nor would the integrity of their settings be adversely affected by the GSEP.

Indirect impacts to the integrity of setting, feeling and association of the potential PTNAL and DTCHAL, including possible indirect impacts to McCoy Springs National Register District, would be the same under this alternative as under the proposed action.

Dry Cooling Alternative

This alternative is located entirely within the boundaries of the proposed GSEP. It eliminates the use of wet-cooling towers and incorporates the use of air-cooled condensers (ACC) in the same location. As a result, the APEs would be the same as for the proposed GSEP.

In the Dry-Cooling Alternative, the ACC units would be located in the same place as the proposed cooling towers in an area that would be graded for construction parking and construction trailers. No additional ground disturbance would be necessary for the use of the ACC units. Therefore, no additional impacts to known and unknown cultural resources would be expected beyond the impacts identified for the proposed GSEP.

However, the ACC units would be approximately 98-120 feet tall. This would be more than twice as tall as any other GSEP structure (GSEP 2009a) and would be taller than the wet cooling towers. The ACC units would be slightly more visible than any other GSEP structure, depending on the viewing distance, which could increase visual impacts on the potential PTNAL and DTCHAL, including McCoy Spring National Register District. Therefore, indirect impacts to the potential PTNAL and DTCHAL, including McCoy Spring National Register District, would be greater when compared to the proposed GSEP.

No Action Alternative A

Under this alternative, the proposed GSEP would not be approved by the BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would not be amended and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, no loss or degradations to cultural resources from construction or operation of the proposed GSEP would occur. However, the land on which the GSEP is proposed would become available to other uses that are consistent with BLM’s land use plan, including another solar project requiring a land-use plan amendment. In addition, in the absence of the GSEP, other renewable energy projects may be constructed elsewhere to meet state and federal mandates, and those projects would have similar impacts in other locations.

No Project Alternative B

Under this alternative, the proposed GSEP would not be approved by the BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the GSEP site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with a different solar technology. As a result, ground disturbance would result from the construction and operation of the solar technology and would likely result in a loss or degradation to cultural resources. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all solar technologies require some grading and ground disturbance. As such, No Project Alternative B could result in impacts to cultural resources similar to the impacts of the proposed GSEP.

No Project Alternative C

Under this alternative, the proposed GSEP would not be approved by the BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no corresponding land disturbance. As a result, the cultural resources of the site would not be expected to change noticeably from existing conditions. Therefore, No Project Alternative C would not result in impacts to cultural resources. However, in the absence of the GSEP, other renewable energy projects may be constructed elsewhere to meet state and federal mandates, and those projects would have similar impacts in other locations.

4.4.3 Discussion of Cumulative Impacts

The regulations implementing Section 106 of the NHPA contemplate close coordination between the NEPA and NHPA processes (36 CFR 800.8), and expressly integrate consideration of cumulative concerns within the analysis of a proposed action’s potential direct and indirect effects by defining “adverse effect” to include “reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative” (36 CFR 800.5(a)(1)).

For the cultural resources cumulative analysis, the regional scope was defined at two levels: local and regional. At the local level, the geographic area considered for cumulative impacts on cultural resources is an area on either side of I-10 referred to here as the I-10 Corridor. The area is broadly equivalent to a 4-mile-wide strip (2 miles to either side of I-10) 48 miles long, between Blythe and Desert Center, with an area of 192 square miles (122,440 acres). Although the total number of cultural resources present in this area is unknown, an estimate can be derived based on recent surveys related to three proposed solar power projects (Genesis Solar Energy Project, Palen Solar Power Project and Blythe Solar Power Project) which surveyed a total of 19,184 acres. These projects recorded 329 sites, indicating that the Corridor has an average site density of 0.017 cultural resources per acre. This figure suggests that the Corridor originally contained approximately 2,081 cultural resources.

At the regional level, the geographic area considered for cumulative impacts on cultural resources is the desert areas of southeastern California, southern Nevada, and western Arizona. In broad terms, the area covered in this analysis includes the 25-million-acre California Desert Conservation Area. Approximately 20 percent of Riverside and San Bernardino counties have been surveyed for cultural resources. These surveys have identified and documented more than 20,000 cultural resources. These results suggest that there is a high potential to discover previously unknown resources within the cumulative study region.

Impacts of Existing Projects

I-10 Corridor

At the regional level, the construction of Chuckwalla Valley and Ironwood State Prisons have disturbed approximately 1,720 acres, suggesting that 29 sites were destroyed during this project.

The construction of I-10, a four-lane divided highway, with associated bridges, off-ramps, and berm system, also resulted in significant ground disturbance in the Corridor. Assuming a width of a minimum of 200 feet and a length of 48 miles, this project disturbed approximately 2,328 acres within the I-10 Corridor, suggesting that 40 sites were destroyed during this construction.

Another linear project within the Corridor was the Devers-Palo Verde Transmission Line, a 500-kV transmission line paralleling I-10. Based on the construction of the access road and excluding the transmission tower pads, a width of 20 feet and a length of 48 miles was assumed for this analysis. A similar calculation was made for the Blythe-Eagle Mountain Transmission Line and a natural gas line, both of which were constructed parallel to I-10. This analysis estimates that during the construction of these three linear projects, approximately 350 acres were disturbed, and 6 cultural resources were destroyed.

Finally, the mining activities at the Kaiser Eagle Mountain Mine may have disturbed more than 3,500 acres, destroying 59 cultural resources.

In total, together, the larger of the ground-disturbing projects within the I-10 Corridor disturbed at least 7,898 acres, or 6.4 percent of the Corridor. One hundred and thirty-three of the estimated 2,081 cultural resources were likely destroyed by these projects.

Southern California Desert Region

Within the larger Southern California Desert Region, the most intensive use of the desert and concomitant disturbance of cultural resources has been on designated military installations (e.g., Edwards Air Force Base, Fort Irwin, Twentynine Palms Marine Corps Base, Chocolate Mountain Naval Aerial Gunnery Range) during Gen. Patton’s military training from 1942 to 1944, and during later training maneuvers in May 1964, throughout the I-10 Corridor.

Cultural resources in the Southern California Desert Region have been primarily impacted by past and currently approved projects through the ground disturbance that is required for construction of buildings, facilities, roads, and other infrastructure. Military training operations have been the most destructive, particularly at bombing ranges.

In the case of military installations and maneuvers, however, avoidance of substantial adverse changes to NRHP-eligible cultural resources has been accomplished through deliberate project planning. Likewise, the severity of impacts to previously unknown cultural resources have been reduced by implementing mitigation measures requiring construction monitoring, evaluation of resources discovered during monitoring, and avoidance or data recovery for significant resources.

Impacts of Reasonably Foreseeable Future Projects

Cultural resources are expected to be affected by reasonably foreseeable future projects. Some of these projects may not be built but this analysis estimates the maximum number of cultural resources that may be destroyed.

I-10 Corridor

Numerous projects are proposed and under consideration along the I-10 Corridor. For the purposes of this analysis, it is assumed that the 13 proposed solar projects and Chuckwalla Raceway project would destroy all of the cultural resources within the proposed project limits. Together these reasonably foreseeable future projects would disturb 48,056 acres, or 39 percent of the total I-10 Corridor. This cumulative analysis suggests that these projects would destroy 816 cultural resources.

Southern California Desert Region

The projects proposed for construction within the BLM California Desert District make a reasonable proxy for patterns across the larger area. Solar projects occupying 567,882 acres and wind projects occupying 433,721 acres have been proposed for this region, consisting of nearly 4 percent of the CDCA.

Although the cultural resources density per acre is unknown for this entire region, the density proposed for the I-10 Corridor serves as a reasonable minimum. The disturbance of 1 million acres would likely result in the destruction of at least 17,000 cultural resources.

Construction of the solar and wind projects proposed throughout this region would result in substantial changes in the setting, feeling, and association of the areas in which they are constructed. These kinds of impacts may be especially severe for traditional use areas and traditional cultural properties. Potential impacts would include direct impacts in the form of physical disturbance or alteration as a result of construction activity or indirect impacts in the form of diminished visual character of traditional use areas due to the presence of industrial structures.

Contribution of the GSEP to Cumulative Impacts

The GSEP would directly impact 27 significant archaeological resources and indirectly impact two potential historic landscapes identified as present in the GSEP region. However, these impacts would be expected to contribute only a small amount to the possible permanent cumulative impacts related to cultural resources.

Almost all of the projects along the I-10 Corridor for which right-of-way applications have been submitted are on BLM or other federal land and, for this reason, are or would be subject to NEPA and the NHPA, which contain cultural resource-protective requirements related to investigations, impact assessment, avoidance and mitigation. It is anticipated that projects in the general vicinity of the site that are not on Federal land would be subject to CEQA; therefore, any related impacts on cultural resources would be subject to cultural-resource-protective requirements based on State law to avoid or minimize such impacts. Nonetheless, even with project-specific impacts on cultural resources avoided or minimized, historic properties on a substantial amount of land still would be affected. Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

4.4.4 Summary of Mitigation Measures

Adverse effects that the proposed or alternative actions may have on cultural resources will be resolved through compliance with the terms of the BLM's PA under Section 106. Analysis of impacts in this document and implementation of the terms of the PA will evidence BLM's compliance with Section 106 and NEPA.

In accordance with 36 CFR § 800.14(b), PAs are used for the resolution of adverse effects for complex project situations and when effects on historic properties, resources eligible for or listed in the National Register of Historic Places (NRHP), cannot be fully determined prior to approval of an undertaking. The BLM will prepare a PA in consultation with the Advisory Council on Historic Preservation, the State Historic Preservation Officer, Indian tribes, and other interested parties. The PA will govern the conclusion of the identification and evaluation of historic properties (eligible for the NRHP), as well as the resolution of any adverse effects that may result from the proposed or alternative actions.

Treatment plans regarding historic properties that cannot be avoided by project construction will be developed in consultation with stakeholders as stipulated in the PA. When the PA is executed and fully implemented, the GSEP will have fulfilled the requirements of NEPA and Section 106 of the NHPA. The PA will be executed prior to BLM's approval of the Record of Decision for the Right-of-Way grant for the action.

To mitigate impacts to significant cultural resources, the mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. To the extent that the following mitigation measures are consistent with the PA developed by the BLM to comply with Section 106 of the NHPA, they also would be implemented to avoid or minimize impacts pursuant to NEPA:

To mitigate impacts to significant cultural resources, per CUL-19 from the Energy Commission's Conditions of Certification, to the extent the following mitigation measures imposed by the CEC for the GSEP are consistent with BLM's Programmatic Agreement developed to comply with Section 106 of the NHPA, they would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G as follows:

CUL-1, CUL-2, CUL-3, CUL-4, CUL-5, CUL-6, CUL-7, CUL-8, CUL-9, CUL-10, CUL-11, CUL-12, CUL-13, CUL-14, CUL-15, CUL-16, CUL-17

The BLM would also require the following mitigation measures be implemented to the extent they are consistent with BLM's PA:

BLM-CUL-1: The Applicant shall contribute to a program to document three cultural landscapes described in Chapter 3.4 that will, in part, be impacted by the GSEP. These are: (1) a Prehistoric Trails Network Archaeological Landscape (PTNAL), (2) a Desert Training Center California-Arizona Maneuver Area Historic Archaeological Landscape (DTCHALL), and (3) a Prehistoric Quarries Archaeological District (PQAD). The Applicant will follow the documentation program by contributing to the preparation of National Register of Historic Places (NRHP) nominations for the PTNAL, DTCHAL and PQAD if the BLM determines, after reviewing the documentation, that they are eligible for the NRHP.

BLM-CUL-2: If significant or potentially significant cultural resources cannot be avoided, the Applicant will retain a qualified Cultural Resources Specialist to prepare and implement a Historic Property Treatment Plan (HPTP) for the affected resources. The HPTP may include protocols for affected resources including data recovery, research design, and treatment measures. The Principal Investigator for the HPTP program will meet the minimum Principal Investigator qualifications under the Secretary of the Interior's Standards for Archaeology.

BLM-CUL-3: A designated Cultural Resources Specialist will provide input to construction and operation training programs for employees to enhance awareness regarding the protection of cultural resources. The designated specialist or a qualified cultural resources monitor will be available during construction to inspect and evaluate any finds of potentially significant buried cultural material. The Cultural Resources Specialist will coordinate with the Applicant's construction manager and environmental compliance manager to stop all work in the vicinity of the find until it can be assessed. The Cultural Resources Specialist will also contact the BLM. If the discovery is determined to be not significant through consultation with the BLM, work will be allowed to continue.

BLM-CUL-4: All discoveries will be documented on Department of Parks and Recreation forms (Form DPR 523) and filed with the California Historical Resources Information System (CHRIS) Eastern Information Center housed at the University of California, Riverside.

BLM-CUL-5: If, in consultation with the BLM, a discovery is determined to be significant, a mitigation plan will be prepared and carried out in accordance with Federal guidelines. If the resources cannot be avoided, a data recovery plan will be developed to ensure collection of sufficient information to address archaeological or historical research questions.

BLM-CUL-6: A professional technical report will be prepared documenting assessment and data recovery investigations. The report will describe the methods and materials collected and will provide conclusions regarding the results of the investigations. The report will be submitted to the curatorial facility housing the collected archaeological materials, as well as the appropriate California Historical Resources Information System center.

BLM-CUL-7: Cultural material collected as part of an assessment or data recovery mitigation will be curated at a qualified curation facility at the applicant's expense. Field notes and other pertinent materials will be curated along with the archaeological collection.

BLM-CUL-8: If human remains are encountered during construction, potentially destructive activities in the vicinity of the find will be stopped. The Cultural Resources Specialist will immediately notify the Principal Investigator, who will contact the BLM. The Applicant will ensure that any such remains are treated in a respectful manner and that applicable state and federal laws are followed. If human remains of Native American origin, associated funerary objects, sacred objects or objects of cultural patrimony are discovered on federal land, the provisions of the Native American Graves Protection and Repatriation Act will be followed as per the NAGPRA plan in Appendix K of the BLM's PA, if such a plan is required.

BLM-CUL-9: The Applicant will provide worker environmental awareness program (WEAP) training during construction to assist in worker compliance with cultural resource protection procedures. The training will include photographs of a variety of historic and prehistoric artifacts and will include a description of the specific steps to be taken in the event of an unanticipated discovery of cultural material, including human remains.

4.4.5 Residual Impacts after Mitigation Measures were Implemented

Residual impacts on cultural resources would exist after mitigation measures were implemented. Cultural resources damaged or destroyed by construction of the proposed action, even if subjected to mitigation, would be permanently lost from the archaeological record. This would make the cultural resources unavailable for future study to address future research needs when more advanced investigative techniques and methods of analysis might be available.

4.4.6 Unavoidable Adverse Impacts

The ground disturbance that would occur from the BSPP would result in unavoidable adverse impacts on cultural resources through damage and displacement of artifacts, loss of integrity of cultural resources, and changes in the settings of cultural resources inconsistent with their historic or traditional cultural values.

4.5 Impacts on Environmental Justice

4.5.1 Impact Assessment Methodology

In considering environmental justice in energy siting cases, this PA/FEIS uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area. The potentially affected area consists of a six-mile radius beyond the site boundary and is consistent with air quality modeling of the range of a proposed action's air quality impacts.

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," directs Federal agencies to assess whether their actions have disproportionately high and adverse human health or environmental effects on minority and low-income populations. The Presidential memorandum accompanying the executive order states that "each Federal agency shall analyze the environmental effects, including human health, economic and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by NEPA." The demographic screening to determine the presence of minority and low income populations is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, December, 1997) and *Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses* (U.S. Environmental Protection Agency, April, 1998). The screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty-level populations.

In addition to the demographic screening analysis, this EIS follows the steps recommended by the U.S. EPA's guidance documents, which recommend outreach and involvement, and, if warranted, a detailed examination of the distribution of impacts on segments of the population.

The environmental justice analysis has reviewed the finding and analysis for the following 11 sections in the PA/FEIS: Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Social and Economics, Soils and Water, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management. In its review of each PA/FEIS section, the environmental justice analysis considered potential impacts and mitigation measures, significance, and whether there would result in a disproportionately high and adverse impact on an environmental justice population.

4.5.2 Discussion of Direct and Indirect Impacts

Proposed Action

The minority population within both Census Block 458.00.6 and the City of Blythe as the whole are more than 50 percent and therefore both represent a community of concern for the purpose of environmental justice analysis. Census Block 458.00.6 also has a proportion of low-income residents living below the poverty level (28.3 percent), which is nearly twice that for Riverside

County as a whole. Consequently, it is conservatively judged that the Census Block Group 458.00.6 is also identified as a low income population that represents a community of concern for the environmental justice analysis. In addition, even though the residential population consists solely of the inmates at Chuckwalla and Iron Wood State Prisons, Census Block Group 458.00.3 is also recognized as a minority community of concern for the environmental justice analysis.

In the context of the siting of a fossil-fired power plant, the primary environmental justice issues typically would be potential air or water issues that could adversely affect the health of nearby populations. Other issues could be any potential residential or business displacements, and noise impacts on populations near the power plant or ancillary facilities.

The GSEP would not result in significant air quality impacts or impacts to surrounding communities from emissions of toxic air contaminants. The proposed action would not involve wastewater discharges that could affect drinking water supplies or other water bodies. As a result of the proposed design, mitigation measures, and the absence of sensitive receptors nearby, there would be no significant noise impacts. The proposed action would not displace any homes or businesses. For these reasons, the rural and remote character of the area, and the low population concentration near the site, the GSEP would not result in disproportionate adverse impacts on low-income and minority populations. Therefore, no environmental justice impacts would be associated with the proposed action.

Alternatives

Under both action alternatives (Proposed Action and Reduced Acreage Alternative), the only difference with regard to direct and indirect impacts would be directly related to the total acreage of land disturbed within the site under each action alternative. Generally, resource impacts relating to any potential environmental justice impacts would be decreases based on the reduced acreage of the parcels for the reduced acreage alternatives. Therefore, no environmental justice impacts would be associated with the reduced acreage alternatives.

Generally, for the three No Action/No Project Alternatives, there would be no direct or indirect resource impacts relating to potential environmental justice impacts. Therefore, no environmental justice impacts would be associated with the three No Action/No Project Alternatives.

4.5.3 Discussion of Cumulative Impacts

No direct or indirect environmental justice impacts are expected to be associated with the proposed action and alternatives. Therefore, since there would be no direct or indirect environmental justice impacts, no cumulative environmental justice impacts would result.

4.5.4 Summary of Mitigation Measures

Given the absence of environmental justice impacts, no environmental justice mitigation measures are proposed.

4.5.5 Residual Impacts after Mitigation Measures were Implemented

No residual environmental justice impacts would occur.

4.5.6 Unavoidable Adverse Impacts

No unavoidable adverse environmental justice impacts would occur.

4.6 Impacts on Lands and Realty

4.6.1 Impact Assessment Methodology

The BLM Master Title Plats (MTPs) and Land & Mineral Legacy Rehost 2000 System (LR2000), which is an automated record system, were reviewed to obtain information related to pending and authorized uses on the lands potentially affected by the GSEP and its ancillary facilities. The BLM Washington Office and California State Office web sites provided additional information relating to corridor designations and solar study areas potentially affected by the proposed GSEP.

Impact assessment is based on known impacts relative to construction, operation, maintenance and decommissioning of rights-of-way and land use permits of all types on BLM-administered land.

4.6.2 Discussion of Direct and Indirect Impacts

Proposed Action

There would be no impacts to existing authorized users as a result of the solar generating facility because the site would be on vacant desert land. Although there are numerous existing rights-of-way (ROWs) of record within and adjacent to the designated corridors, only a few would be affected by the GSEP. Any new authorization(s) would be issued “subject to” the rights of the existing ROW holders. Therefore, the Applicant would be required to mitigate any potential impact to the existing users at Applicant’s expense. This would mean bearing all costs for relocating or modifying any facilities, such as power poles or conductors that might be necessary to accommodate the new use and by boring beneath any existing buried facilities to avoid impacts. This priority right attaches when a ROW is granted; subsequent grants of ROW would be issued subject to the rights of prior grants. Here, if and after the proposed ROW is granted for the GSEP, subsequent applicants would have to mitigate any impact of their proposals to the GSEP.

The proposed installation of a fiber optic cable would be attached to the gen-tie line and a required redundant fiber optic cable would be buried in a shallow trench along the same alignment as the road and gen-tie and gas lines, which would either cross over or bore under any existing authorized use.

Impacts to Designated Corridors

Potential impacts to the designated corridors could occur as a result of the overhead gen-tie power line and underground gas pipeline crossing the corridors on a nearly perpendicular alignment rather than following along the corridor path. Impacts to the corridors from the fiber optic line would be the same as either the power line or gas pipeline, depending on whether the cable is strung on the gen-tie line or buried in a shallow ditch. However, with today’s technology, the impacts would be expected to be minimal, easily mitigated and would not preclude continued and future use of either designated corridor. Future use would be slightly constrained by placement of additional facilities within the corridors.

Impacts from the access road exiting Wiley's Well Road and heading west to the GSEP would be minimal because future transmission lines, both gas and electric, could easily bore under or span across the road, respectively. Future use would be slightly constrained by placement of additional facilities within the corridors.

Impacts to Interstate 10

Potential impacts to Interstate 10 from the overhead gen-tie line (and fiber optic cable if strung on the gen-tie line) would be mitigated by following the requirements of the California Department of Transportation (CalTrans) and industry standards (SOPs) and best management practices (BMPs) for crossing highways. Potential impacts to I-10 from the underground pipeline (and fiber optic cable, if buried) would also be mitigated by implementing the requirements of the Federal Highway Administration (FHA), CalTrans and SOPs and BMPs for crossing under highways.

Impacts to Other Authorized Uses

There would be no impacts to existing uses from the proposed solar generating facility.

As proposed, the gen-tie line would cross multiple existing uses both north and south of I-10. Once across the highway, the line would connect to the Blythe Transmission line which would eventually interconnect with the planned Colorado River substation.

The gas pipeline, as proposed, would connect directly into an existing east-west running Southern California Gas (SCG) gas pipeline causing a direct impact. The pipeline could indirectly impact other buried utilities that the pipeline would cross north and south of I-10. However, the pipeline would follow SOPs and BMPs for connection of one gas line to another and would be buried at a depth that would avoid all existing buried gas lines, therefore mitigating potential negative impacts to existing authorized users.

Potential impacts from the fiber optic cable would be the same as either the overhead power line or buried gas line, depending on whether the cable is strung on the gen-tie line or buried in a shallow trench beside the access road.

Potential impacts from the new access road that would exit Wiley's Well Road and head west to the GSEP boundary would be mitigated by following requirements of the FHA, CalTrans and SOPs/BMPs for encroachment of state highways.

Alternatives

Reduced Acreage Alternative

The Reduced Acreage Alternative would have a net generating capacity of approximately 125 MW and would occupy approximately 900 acres of land. This alternative would retain

50 percent of the proposed GSEP's generating capacity, and would affect 50 percent of the land affected by the proposed GSEP. The alternative would retain the Unit 1 solar field, including the construction parking, construction trailers, and temporary construction laydown area; the administration building and warehouse; the solar collector assembly area; the western evaporation pond area (approximately 24 acres); and the land farm area (approximately 10 acres). The alternative would require relocating the switchyard, from the Unit 2 power block to the Unit 1 power block. Similar to the proposed GSEP, the Reduced Acreage Alternative would transmit power to the grid through the Colorado River Substation. It would require infrastructure including groundwater wells, a transmission line, road access, an administration building, and evaporation ponds. The required infrastructure and transmission line for the Reduced Acreage Alternative would follow the routes defined for the proposed GSEP, even though Unit 2 would not be constructed. The linear facilities would require approximately 90 acres.

Overall impacts would be largely the same. The length of the transmission line for collecting and carrying power to the on-site substation would be slightly reduced. The off-site transmission line, fiber optic cable, gas pipeline, and road access would be extended approximately 1 mile in length to the site, although they would cross into and over the corridors and connect into the existing gas and power lines in the same location as the proposed GSEP.

Dry Cooling Alternative

Dry cooling is being evaluated as an alternative to wet cooling for the proposed GSEP. The dry cooling alternative would use the same footprint as the proposed GSEP alternative.

Overall impacts to existing uses would be largely the same as with the proposed GSEP. There are no existing uses authorized within the footprint of the solar facility. The length of transmission lines for collecting and carrying power to the on-site substation would be the same. The off-site transmission line, gas pipeline and access road to the site would also be the same as with the proposed GSEP.

No Action Alternative A

Under this No action alternative, the ROW application would be denied, and the ROW grant would not be authorized. The CDCA (1980, as Amended) would not be amended.

Impacts associated with the GSEP would likely only be delayed by selecting No Action Alternative A since this region of the United States has extremely positive characteristics for solar power generation. If this GSEP were not approved, another application for a different solar generating facility, or a different type of solar generating facility, would likely be filed at some time in the near future. The various solar energy technologies require the use of different amounts of land. Depending on the type of facility, the amount of acreage needed could be less, approximately the same, or larger than the proposed GSEP. Additionally, an application could also be filed for a wind energy facility or any other kind of use, and impacts would result based on the size and specific use requested.

No Project Alternative B

Under this No Project alternative, the ROW application would be denied, and the ROW grant would not be authorized. The BLM would amend the CDCA Plan to make the proposed site unavailable for future solar energy development. As a result, no solar energy project would be constructed on the GSEP site.

Impacts resulting from the proposed GSEP would not occur under No Project Alternative B. However, the land would remain open to other types of rights-of-way and/or land use authorizations, resulting in impacts specific to a future use other than solar energy generation.

No Project Alternative C

Under this No Project alternative, the ROW application would be denied and the ROW grant would not be authorized. The CDCA (1980, as Amended) would be amended to identify the GSEP application area as suitable for any type of solar energy development.

Impacts associated with the proposed GSEP would likely only be delayed by selecting No Project Alternative C since this region of the United States has extremely positive characteristics for solar power generation. If this GSEP were not approved, another application for a different solar generating facility or a different type of facility would likely be filed at some time in the near future. The various solar energy technologies require the use of different amounts of land. Depending on the type of facility, the amount of acreage needed could be less, approximately the same or larger than the proposed GSEP. This No Project Alternative potentially could result in the conversion of acreage upwards to the amount of the proposed GSEP or possibly even a larger amount of land.

4.6.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the GSEP could result in a cumulative effect on lands and reality with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for lands and realty consists of eastern Riverside County, based on the jurisdictional boundaries within which the impacts of land use decisions of the proposed action and other projects could be additive, countervailing or synergistic. Potential cumulative effects on lands and realty could occur during the GSEP’s proposed 39-month construction period if, for example, it would be necessary to relocate or modify existing facilities within a ROW. Potential cumulative effects on lands and realty could also occur during the projected 30 year lifespan of the proposed action if, for example, future projects were constrained by the placement of GSEP-related facilities or are located within designated corridors. Potential cumulative effects on lands and realty could also occur during closure and decommissioning activities.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in PA/FEIS Chapter 3. Direct and indirect effects of the construction, operation and maintenance, and closure and decommissioning of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, other ROW applications for linear and non-linear projects could be developed in eastern Riverside County include other utility-scale solar projects and the proposed Eagle Crest Pump Storage project, and Associated Gen-tie Trans Lines. Additional actions that could have cumulative impacts include, among others, substation projects, Eagle Mountain Landfill, and activities in OHV areas and LTVAs. ROW grants and other land use decisions associated with these actions and projects would affect the nature, type, and intensity of uses authorized on the lands potentially affected by the GSEP and its ancillary facilities. They also would affect the amount of land within the cumulative impacts area that would be available for other uses.

Multiple ROW applications are pending in the vicinity of the GSEP. Based on the interconnection applications for the transition cluster participants, the Applicant would build a double-circuit 230 kV line to carry the GSEP site's 250 MW project on one circuit and Solar Reserve's 150 MW on the second circuit; the Solar Millennium, LLC and Chevron Energy Solutions would build a double-circuit 230 kV line carrying 1,000 MW from the Blythe Solar Power Project site; and enXco would build a double-circuit 230 kV transmission path through the GSEP site to support its McCoy development efforts north of the Genesis-McCoy site.

BLM's general policy is to review ROWs in the order in which they are received. However, each of the pending applications would be for a project on BLM land and it is in BLM's interest to have utilities on its property co-located in common utility corridors.

Two sets of policies bear on this issue (RSA 2010). First, it is the policy of the Western Electricity Coordinating Council (WECC) to separate adjacent transmission lines with a distance that is equal to or greater than the longest span length of the transmission lines in question, which in this case is approximately 900 feet. WECC is a regional entity responsible for promoting and coordinating bulk electric system reliability in the western United States (WECC 2010). Second, California Independent System Operator (CAISO) policies specify the maximum amount of power that can be interrupted (to avoid exceeding the single largest risk to the ISO controlled system) as follows:

1. 1,150 MW of capacity can be interrupted under a single contingency (i.e. one transmission line or circuit, one transformer bank, etc.)

2. 1,400 MW of capacity can be interrupted under a double contingency (i.e. two transmission lines or circuits (including two circuits on a single tower), two transformer banks, etc.)

The CAISO operates the energy grid, provides fair and open transmission access, and promotes environmental stewardship and infrastructure development (CAISO 2010). Of these two sets of policies, the WECC transmission line separation criterion appears most likely to constrain efforts to accommodate connectivity of the other proposed actions.

The connectivity of future applicants also could be accommodated consistent with BLM interests by using an existing two-mile wide utility corridor (designed in the CDCA Plan as "Planned Utility Corridor J") that is located east of the GSEP site and along California's eastern border, from the Arizona-California-Mexico border to its end, just west of Parker, Nevada. There remains sufficient capacity within Corridor J to accommodate up to 50 new transmission or gas lines and/or expansion of existing uses.

Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts vary by alternative.

4.6.4 Summary of Mitigation Measures

Compliance with industry SOPs and BMPs would avoid or mitigate potential safety and land use inconsistency issues related to the type of facilities proposed. SOPs and BMPs designed and adopted by the power industry would be followed to reduce or eliminate potential problems that might result from the gen-tie line crossing I-10 and existing power lines north and south of the highway. Additionally, SOPs and BMPs developed and adopted by the gas industry would be followed to ensure the public safety and continued safe operations of any underground power or gas lines the four inch gas line would cross. The SOPs and BMPs designed and adopted by the FHA and Caltrans provide for utilities to cross highways safely to protect the traveling public. Likewise, the SOPs and BMPs that would be tied to an encroachment permit from Caltrans for access from Black Rock Road to the site would ensure that the public safety would be protected during and after construction.

4.6.5 Residual Impacts after Mitigation Measures were Implemented

There would be no known residual impacts to existing authorized uses.

4.6.6 Unavoidable Adverse Impacts

Approval of a solar energy generation project would result in the land not being available for other uses during the life of the GSEP. However, once the GSEP is no longer viable and is decommissioned, the land would be available for other uses in the future, depending on the condition of the land and the use proposed.

4.7 Impacts on Mineral Resources

4.7.1 Impact Assessment Methodology

Applicable geologic maps and reports for this area (CDC 2000; CDC 2001; CDMG 1967; CDMG 1968; CDMG 1990; CDMG 1994a; CDMG 1998; CDMG 1999; McCleod, 2009; Kleinfelder 2009; USGS 2006; and USGS 2009b) were reviewed. The proposed GSPP is currently not used for mineral production, nor is it under claim, lease, or permit for the production of locatable, leasable, or salable minerals/mineral materials. The GSPP should not have a significant impact on the availability of such resources.

The proposed GSEP site is mapped as Mineral Resource Zone (MRZ)-4 (CDMG 1994a). The designation MRZ-4 refers to, “areas of no known mineral occurrences where geologic information does not rule out either the presence or absence of industrial mineral resources.” No economically viable mineral deposits are known to be present at the site (CDMG 1994a; Kohler 2006). Many inactive mines and mineral prospects are hosted by in metamorphic and intrusive basement rocks within 10 miles of the proposed GSEP boundaries and GSEP linears. These have produced a number of precious and base metals, including iron (magnetite) from the Iron King, Iron Queen and Iron Cap mines in the Palen Mountains1½ to the north (CDMG 1994a). Minor gold, silver, copper and uranium prospects are located in the Palen Mountains 2½ miles to the north, and in the McCoy Mountains 4½ miles to the east. The Roosevelt and Hodge Mining Districts produced gold and silver from quartz veins and shear zones in the Mule Mountains approximately 6 to 9 miles southeast of the proposed GSEP linears. Pyrophyllite, an industrial mineral used in the manufacturing of dry lubricants, paper, rubber, fabric and soap, has been mined from the Palen Mountains 3½ miles north of the site. Several borrow pits are present along Interstate 10. No mines are known to have existed within the proposed GSEP boundaries (USGS 2008b).

4.7.2 Direct and Indirect Impacts

There are no active mining claims, mineral leases or mineral materials disposal permits within the GSEP area. There would be no direct or indirect impacts to locatable or leasable minerals. Mineral materials are present at the site. However there are suitable materials throughout the area. Therefore, there would be no direct impacts to the availability and development of mineral materials resources within or near the GSEP area.

The southern part of the GSEP area and surrounding area are prospectively valuable for geothermal resources, and sodium and potassium. The GSEP would limit the development of geothermal resources, and sodium and potassium within the GSEP area.

Alternatives

There would be no difference in the direct or indirect impacts of the proposed action, or any of the proposed alternatives.

4.7.3 Cumulative Impacts

Because the proposed action and alternatives would have no direct or indirect effects on mineral resources, no cumulative effects analysis is required or provided for this resource.

4.8 Impacts on Multiple Use Classes

4.8.1 Impact Assessment Methodology

The Multiple Use Class (MUC) Guidelines in Table 1 of the CDCA (BLM 1980, as amended) provide that solar electrical generation facilities may be allowed in MUC Limited (L), Moderate (M), and Intensive (I) areas after NEPA requirements are met.

4.8.2 Discussion of Direct and Indirect Impacts

The proposed action would be developed entirely within MUC-M. The total acreage of the Moderate MUC that would be affected by construction of the solar facility under the proposed action would be roughly 1,800 acres. No changes in the MUC classification would be required prior to approving the ROW grant. Nonetheless, approval of the ROW grant would restrict multiple use opportunities on the GSEP site to a single dominate use for the anticipated 30-40 year lifespan of the proposed action. This restriction would be lifted upon closure and decommissioning of the proposed action; thereafter, use opportunities on the site would return to the pre-GSEP conditions discussed in FEIS Chapter 3.

Alternatives

Reduced Acreage Alternative

Like the Proposed Action, the Reduced Acreage Alternative would be developed entirely within MUC-M lands. Potential direct and indirect impacts on lands designated MUC-M would be the same as for the proposed action. The total acreage of the MUC-M lands that would be affected by construction of the Reduced Acreage Alternative would be 900 acres.

Dry Cooling Alternative

Like the Proposed Action, the Dry Cooling Alternative would be developed entirely within MUC-M lands. Potential direct and indirect impacts on lands designated MUC-M would be the same as for the proposed action. The total acreage of the MUC-M lands that would be affected by construction of the Dry Cooling Alternative would be roughly 1,700 acres.

No Action Alternative A

If the No Action Alternative A were selected, impacts associated with the proposed action would not occur because no use opportunities would be foreclosed. However, other utility-scale solar power facilities could be built, which would result in the same impact on MUC-M by this alternative that the proposed action would cause.

No Project Alternative B

If the No Project Alternative B were selected, the proposed GSEP would not be approved by the BLM, and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Plan. No use opportunities otherwise allowable on MUC-M designated land would be foreclosed.

No Project Alternative C

If the No Project Alternative C were selected, the proposed GSEP would not be approved by the BLM, and BLM would amend the CDCA Plan to allow for other solar projects on the site. The development of another solar energy project on the site would result in the same foreclosure of use opportunities that would result from the proposed action.

Land Use Plan Amendment Analysis

The proposed land use plan amendment to be made by the BLM is a Site Location Identification decision only. The proposed solar project and all of its alternatives are located within Multiple Use Class M lands. The classification designations govern the type and degree of land-use action allowed within the classification area. All land use actions and resource-management activities on BLM-administered lands within a multiple-use class delineation must meet the guidelines for that class. These guidelines are listed on Table 1, Multiple Use Class Guidelines, to the CDCA Plan of 1980 (at page 15). Multiple use class M allows electric generation plants for solar facilities after NEPA requirements are met. The specific application of the multiple use class designations and resource management guidelines for a specific resource or activity are further discussed in the plan elements section of the CDCA Plan. In Class M designations, the authorized officer is directed to use judgment in allowing for consumptive uses by taking into consideration the sensitive natural and cultural values that might be degraded.

The proposed Site Location (Site) for the proposed project, the Reduced Acreage Alternative, the Dry Cooling Alternative, the No Action Alternative A, and the No Project Alternatives B and C, meets the Multiple Use Class Guidelines as noted in the CDCA Plan for the resources listed below.

For purposes of this discussion, No Action Alternative A, as well as No Project Alternatives B and C, are considered herein as being one and the same and are therefore referred to as “No Action Alternatives” since none precludes development of any kind on the Site (although No Action Alternative B would make the land unavailable for a solar development facility, it would not preclude other types of development). Additionally, the terminology “proposed project and alternatives” is used herein since the Site is the same for the proposed project, the Reduced Acreage Alternative, the Dry Cooling Alternative and the No Action Alternatives.

1. *Agriculture:* Agricultural uses of Class M lands are not allowed, with the exception of livestock grazing. The site is not currently used for agriculture, and the proposed project and alternatives would not involve use of the site for agriculture.

2. *Air Quality:* Class M lands are to be managed to protect air quality and visibility in accordance with Class II objectives of Part C of the Clean Air Act as amended. The

anticipated maximum emissions that would be associated with the proposed project are provided in Table 4.02-6 for construction and Table 4.02-7 for operations. The analysis indicates, with the exception of PM10 impacts, that the proposed GSEP would not create new exceedances or contribute to existing exceedances for any of the modeled air pollutants. The emissions associated with the Reduced Acreage would be lower than those of the proposed project. For the Dry Cooling Alternative, there would be a slight increase for the other criteria pollutants from those for the proposed GSEP as shown in Table 4.02-7. There would be no emissions associated with the No Action Alternatives. Therefore, all of the alternatives would conform to the Class II objectives referenced in the CDCA Plan guidelines.

3. *Water Quality:* Class M lands are to be managed to provide for the protection and enhancement of surface and groundwater resources, and BMPs are to be used to avoid degradation and to comply with Executive Order 12088. Section 4.19 of this EIS evaluated the proposed project and alternatives, for groundwater use conflicts, the potential to impact groundwater quality, and the potential to impact surface water resources. Although BLM has not established BMPs for solar projects, the agency has reviewed, and agrees with the implementation of the BMPs that would be associated with the proposed project and its alternatives. These BMPs have been derived from a variety of sources, including those proposed by the applicant, those required by the Energy Commission through its Conditions of Certification, and those required for compliance with other state and Federal laws designed to protect water resources. Implementation of these BMPs, and BLM's standard term and condition requiring compliance with other Federal, state, and local regulations, would constitute compliance with Executive Order 12088. The measures would be applicable to all project alternatives, and would therefore conform to the guidelines in Table 1 of the CDCA Plan.

4. *Cultural and Paleontological Resources:* Cultural and paleontological resources will be preserved and protected. Procedures described in 36 CFR 800 will be observed where applicable. As described in detail in Sections 4.3 and 4.10, impacts on cultural and paleontological resources resulting from the development and operation of the proposed project, Reduced Acreage Alternative, and Dry Cooling Alternative would be mitigated, and therefore all three alternatives would conform to the MUC Guidelines. Adverse effects on cultural resources listed on or determined eligible for the National Register of Historic Places will be resolved in accordance with a Programmatic Agreement being prepared for the project in consultation with the California State Historic Preservation Officer, Indian tribes and other interested parties in accordance with Section 106 of the National Historic Preservation Act. Identification of the site location for the proposed action or any of the alternatives is subject to the MUC Guidelines for cultural and paleontological resource protection as is evidenced by the applicability of the guidelines to the specific facility proposal. As such, all of the site locations and the site location alternatives are within the MUC Guidelines for cultural and paleontological resource protection established by the CDCA Plan.

5. *Native American Values:* Native American cultural and religious values will be protected and preserved with appropriate Native American groups consulted. Consultation with Indian tribes was initiated at the earliest stages of project planning and will continue during the NEPA compliance process. Opportunities have been provided to allow Indian tribes to identify places and resources of importance to them and to express concerns regarding cultural and religious values that could be impacted by the proposed action and alternatives.

Adverse effects on any places of traditional cultural or religious importance that are identified by tribes will be resolved in accordance with the Programmatic Agreement being developed for the project with tribal participation. Therefore, cultural guidelines with respect to requirements for consultation have been met. In addition, the protection of cultural resources as discussed in Section 4.3 ensures that preservation and protection of Native American cultural and religious values associated with cultural resources is accomplished in accordance with the CDCA Plan MUC Guidelines.

6. *Electrical Generation Facilities:* Solar generation may be allowed on Class M lands after NEPA requirements are met. The analysis contained in the EIS, which addresses the proposed action and its alternatives, comprise the NEPA compliance required for this MUC guideline.

7. *Transmission Facilities:* New gas, electric and water transmission facilities and cable for interstate communication may be allowed only within designated corridors. NEPA requirements will be met. The proposed action and alternatives described for the GSEP meets this guideline by locating the gen-tie connection to the interstate transmission system within an existing designated ROW corridor.

8. *Communication Sites:* Communication sites may be allowed on Class M lands after NEPA requirements are met. The proposed project and alternatives, would not involve installation of communications sites.

9. *Fire Management:* Fire suppression measures in Class M areas will be taken in accordance with specific fire management plans, subject to such conditions as the authorized officer deems necessary. The project area is within the area covered by the Fire Management Activity Plan (FMAP) 1996 for the California Desert developed by the National Park Service and BLM. The FMAP brings together fire management goals for biological resources, wilderness, and other sources and establishes fire management standards and prevention and protection programs. The FMAP includes limitations on fire suppression methods in critical habitat and other tortoise habitat; the limitations are designed to limit habitat disturbance while keeping fires small. While the FMAP addresses management and suppression of wildfires, it does not address incidents on specific facilities such as power plants. The applicant has developed fire suppression measures that would be used for the proposed project and alternatives, and these measures are discussed in Section 4-23. The Project applicant would be required to install a fire protection/control system on site including a fire water supply system and associated infrastructure, and to comply with state and federal regulations regarding worker safety and training. Additionally, the applicant would be required to provide funding to the Riverside County Fire Department to ensure available resources to fight potential fires on site. However, the specific fire management plan is not relevant to the types of fires that would be addressed by the applicant. Should a fire occur in the area that is not specific to the facility, it would be addressed by BLM, not by the applicant, and it would be addressed in conformance with the Fire Management Plan, and therefore, would conform to the guideline for Fire Management for this multiple use class.

10. *Vegetation:* Table 1 of the CDCA Plan includes a variety of guidelines associated with vegetation as follows:

Native Plants – Commercial or non-commercial removal of native plants in Class M areas may be allowed only by permit after NEPA requirements are met, and after development of necessary stipulation. Approval of a ROW grant for the propose project and alternatives would constitute the permit for such removal. The BMPs in the FEIS and conditions of approval that would be required in a Record of Decision would constitute the stipulations to avoid or minimize impacts from removal of native plants.

Harvesting of plants by mechanical means – Harvesting by mechanical means is also allowed by permit only. Although the proposed project and its alternatives would include the collection of succulents and seeds to assist with reclamation, the removal of these items would not be done for distribution to the public. Also, the guidelines for vegetation harvesting include encouragement of such harvesting in areas where the vegetation would be destroyed by other actions, which would be the case with the proposed project and alternatives. Therefore, the proposed project and alternatives would be in conformance with this MUC guideline.

Rare, Threatened, and Endangered Species, State and Federal – In all MUC areas, all state and federally listed species will be fully protected. In addition, actions which may jeopardize the continued existence of federally listed species will require consultation with the U.S. Fish and Wildlife Service. As evaluated in Section 4.17, no federally or state listed plants would be impacted by the proposed project and alternatives.

Sensitive Plant Species – Identified sensitive plant species would be given protection in management decisions consistent with BLM's policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recover listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. One BLM sensitive plant, Harwood's eriastrum (= Harwood's woollystar), was identified in the GSEP area, and impacts and mitigation associated with this species were discussed in Section 4-17. In an effort to protect this species, BLM worked with the applicant and the Energy Commission to develop mitigation to reduce the number of individuals of the species that would be affected. Because these measures are intended to reduce threats to this species to minimize the likelihood of listing, these measures are in conformance with the MUC guidance in the CDCA Plan.

Unusual Plant Assemblages (UPAs) – No UPAs have been identified on the site of the proposed project and alternatives.

Vegetation Manipulation – Mechanical control may be allowed after consideration of possible impacts. Vegetation manipulation is defined in the CDCA Plan as removing noxious or poisonous plants from rangelands; increasing forage production; creating open areas within dense brush communities to favor certain wildlife species; or eliminating introduced plant species. Applicant would finalize the draft site-specific weed management plan prior to a ROW grant being issued. Such actions would be conducted as part of the proposed project and alternatives. Weed management under the weed management plan would conform to Federal, State, and local regulations, so would be allowed. Therefore, each alternative would conform to the guidelines.

11. *Land Tenure Adjustment:* Class M land may be sold in accordance with FLPMA and other applicable Federal laws and regulations. The proposed project and alternatives would not involve sale of any BLM-administered lands.

12. *Livestock Grazing:* Livestock grazing is allowed subject to the protection of sensitive resources. The proposed project and alternatives would not involve the livestock grazing on Class M lands.

13. *Minerals:* The proposed project and alternatives would not involve the development of minerals on Class M lands.

14. *Motorized Vehicle Access/Transportation:* Pursuant to the CDCA LUP guidelines for Class M areas, motorized-vehicle use is allowed on “existing” routes of travel unless closed or limited by the authorized officer, and new routes may be allowed upon approval of the authorized officer. Issuance of a ROW grant would constitute approval of the authorized officer. In areas designated as limited use area for OHV use, changes to the transportation network (new routes, re-routes, or closures) in “limited” areas may be made through activity-level planning or with site-specific NEPA analysis (IM 2008-014). Modifications to area OHV designations (open, closed, or limited) require amendment to the RMP. There are no area OHV designations that are being made or modified through the proposed action or any of the alternatives. This activity falls within the CDCA LUP guideline noted above.

15. *Recreation:* The proposed project and alternatives would not involve use of the proposed project or alternative sites for recreational uses.

16. *Waste Disposal:* The proposed project and alternatives would not involve the development of waste disposal sites on the proposed project or alternative sites.

17. *Wildlife Species and Habitat:* Table 1 of the CDCA Plan includes a variety of guidelines associated with wildlife as follows:

    Rare, Threatened, and Endangered Species, State and Federal – In all MUC areas, all state and federally listed species and their critical habitat will be fully protected. In addition, actions which may jeopardize the continued existence of federally listed species will require consultation with the U.S. Fish and Wildlife Service. As discussed in Section 4-21, Wildlife Resources, the desert tortoise, which is listed as federally and state threatened, would be affected by the proposed project and alternatives. All of the action alternatives would affect a small portion of critical habitat. As specified in the guideline, BLM has initiated formal consultation with the U.S. Fish and Wildlife Service in accordance with Section 7 of the Endangered Species Act. BLM has worked with the Energy Commission, USFWS, CDFG, and applicant to develop protection and compensation measures for the desert tortoise, which include stringent avoidance measures, the full level of compensation required by USFWS for this category of tortoise habitat, and enhancement and protection measures in other areas. Therefore, the proposed project and its alternatives would comply with the guideline to provide full protection to the species.

    Sensitive Species – Identified species would be given protection in management decisions consistent with BLM’s policy for sensitive species management, BLM Manual 6840. The objective of this policy is to conserve and/or recover listed species, and to initiate conservation measures to reduce or eliminate threats to BLM sensitive species to minimize the likelihood of and need for listing. Several BLM sensitive wildlife species (other than the desert tortoise, identified and discussed in the previous paragraph) present or likely to occur on habitat associated with the proposed project and alternatives include, but are not limited to, Couch's spadefoot toad, Mojave fringe-toed lizard, western burrowing owl, golden eagle, LeConte's thrasher, several species of bats, Nelson's bighorn sheep, desert kit fox and American badger. Those species that are likely to occur on the proposed project and alternatives would be protected under a number of mitigating measures meant to avoid, minimize, or compensate for impacts from the project as discussed in detail in Appendix G of this FEIS.

The proposed project and alternatives, including the mitigation measures associated with these actions, would involve habitat manipulation to improve habitat (such as tortoise fencing along roads and project) and introduction of native species (through the translocation of tortoises). Introduction of native species is permitted in Class M areas, and habitat manipulation is allowed subject to environmental assessment, as is done within this EIS. Therefore, the proposed project and its alternatives would be in conformance with these guidelines.

The proposed project and alternatives, including the translocation associated with these actions, may involve the control of depredation of ravens. Therefore, this guideline is applicable to these actions but is allowed subject to conformance with state and federal laws in MUC M.

18. *Wetland/Riparian Areas:* No wetlands or riparian areas are present on the site of the proposed project and alternatives.

19. *Wild Horses and Burros:* No wild and free-roaming horses or burros are present on the site of the proposed project and alternatives.

4.8.3 Discussion of Cumulative Impacts

The geographic scope of the cumulative effects analysis for multiple use classes would include CDCA Plan area lands designated MUC-M. This geographic scope was established based on the boundaries of the affected resource. Potential cumulative impacts could result from construction of the proposed action and, to the extent they exist, would continue until closure and decommissioning is complete, because this is the period of time during which the existence of the proposed action would preclude the development of other uses on the site and, thereby, affect the type of use opportunities on MUC-M lands throughout the CDCA Plan area.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition; MUC-M use opportunities presently being exercised; and, where such opportunities are not currently are being exercised, the flexibility to elect to pursue one or more among them at some point in the future. The effects of past actions are reflected in the discussion in FEIS Chapter 3. Effects of the GSEP on MUCs, as analyzed above, essentially relate to opportunity cost: if the GSEP or an alternative is developed on the site, the site cannot be used for use opportunities that otherwise would be available on the site. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, any projects that also would be developed on lands designated for MUC-M uses would similarly restrict available use opportunities within that classification for the duration of those projects. Any cumulative impact on multiple uses classes that could be caused by any of the action alternatives, No Action Alternative A or No Project Alternative C would be the same as for the proposed action. By contrast, because No Project Alternative B would not limit the multiple use opportunities that presently area available on the site, No Project Alternative B would not contribute to any cumulative impact on multiple use classes.

4.8.4 Summary of Mitigation Measures

No mitigation measures are required.

4.8.5 Residual Impacts after Mitigation Measures were Implemented

There would be no known residual impacts to existing authorized uses.

4.8.6 Unavoidable Adverse Impacts

Approval of the ROW grant would have the effect of limiting current multiple use opportunities of the facility footprint area to a single dominate use for the life of the project.

4.9 Impacts on Noise

4.9.1 Impact Assessment Methodology

Noise impacts associated with the project can be created by short-term construction activities and by normal long-term operation of the power plant. The Applicant provided noise level estimates that serve as the basis of this analysis. However, the Applicant did not perform full noise modeling for construction and operation of the proposed action because there are no noise sensitive receptors within 9 miles of the GSEP site (GSEP 2009a; RSA 2010).

4.9.2 Discussion of Direct and Indirect Impacts

Construction

Construction of the GESP is expected to occur over a period of 37 months (GSEP 2009a). Each unit of the GSEP is expected to require approximately 25 months to be constructed, with the construction of each unit overlapping by 12 months.

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The Applicant has predicted that there will be no noise impacts due to GSEP construction on the nearest sensitive receptors (GSEP 2009a). Assuming an average construction noise of 93 dBA L_{eq} at 50 feet from the noise center (the upper range of noise levels for construction equipment), GSEP construction noise would attenuate to 39 dBA at a distance of five miles from the acoustic center. GSEP construction noise would further attenuate to 34 dBA at the state prison, 9 miles away.

There are no LORS that limit construction noise levels for the GSEP. The Riverside County Code prohibits noisy construction work to daytime hours when a project is within one-quarter mile of a noise sensitive receptor. Given the distance between the proposed GSEP site and the nearest noise sensitive receptor, this limitation does not apply. No limit on construction hours needs to be enforced for the GSEP.

Construction activities would result in a temporary, although relatively long-term (37 months) increase in the ambient noise level. Animals rely on hearing to avoid predators, obtain food, and communicate. Excessive construction noise could interfere with normal communication, potentially interfering with maintenance of contact between mated birds, obscuring warning and distress calls that signify predators and other threats, and affecting feeding behavior and protection of the young. High noise levels may also render an otherwise suitable nesting area unsuitable. Behavioral and physiological responses to noise and vibration have the potential to cause injury, energy loss (from movement away from noise source), a decrease in food intake, habitat avoidance and abandonment, and reproductive losses (Hunsaker 2001; National Park Service 1994).

Studies have shown that noise levels over 60 A-weighted decibels (dBA) can result in nest abandonment by birds and intense, long-lasting noise can mask bird calls, which can reduce reproductive success (Dooling and Popper 2007; Hunsaker 2001). Noise impact studies on bighorn sheep have not identified numerical noise impact thresholds. Weisenberger (1996) found that bighorn sheep responded to aircraft over-flights (92-112 dBA) with increased heart rates and altered behavior; however, animal response decreased with increased exposure.

Assuming an average construction noise of 93 dBA at 50 feet from the noise center (the upper range of noise levels for construction equipment), project construction noise would attenuate to 39 dBA at a distance of five miles from the noise center (GSEP 2009a). Using sound extrapolation, project construction noise should attenuate to 60 dBA at approximately 2,300 feet (0.43 mile) from the noise center of construction activities (Bright pers. comm.).

The majority of the construction activities would occur within the powerblocks located approximately 3,200 feet (0.6 mile) from the GSEP boundary. Therefore, it is anticipated that construction noise levels would typically be less than 60 dBA in the Palen/McCoy Wilderness Area and surrounding the GSEP site. The infrequent occasions when construction activities would occur near the GSEP boundary and resultant noise levels would be temporarily elevated beyond 60 dBA surrounding the GSEP would not significantly impact sensitive wildlife.

Vibration

The only construction activity likely to produce vibration that could be perceived off site would be pile driving, should it be employed. Vibration attenuates rapidly; it is likely that no vibration would be perceptible at any appreciable distance from the GSEP site.

Operation and Maintenance

The majority of operational noise would originate from the power blocks, which would be roughly centered at each site and surrounded by solar fields; this creates a buffer for noise to attenuate before reaching the GSEP property boundary and the Palen/McCoy Wilderness Area. Other minor operational noise sources include mirror rotation and maintenance activities (e.g., mirror washing). Excessive noise could disrupt the nesting, roosting, or foraging activities of sensitive wildlife. The Palen/McCoy Wilderness Area, immediately north of the proposed GSEP, is an especially noise-sensitive biological receptor.

Because the proposed GSEP is located more than nine miles from a human noise-sensitive receptor, the applicant determined that a full acoustic modeling analysis of GSEP operations was not warranted (GSEP 2009a). However, data provided for nearby proposed solar projects of similar size and technology (i.e., Palen and Blythe Solar Power Projects) serve as a proxy for anticipated operational noise levels of the GSEP. As such, operational noise is expected to typically range from 90dBA and for certain equipment to approximately 50 to 60 dBA at greater linear distances from the power generation equipment (GSEP 2009a).

One possible source of disturbance would be strong tonal noises. Tonal noises are individual sounds (such as pure tones) that, while not louder than permissible levels, stand out in sound quality. The applicant plans to avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design. Given the lack of noise sensitive receptors within the vicinity of the GSEP, tonal noises would not be expected to cause annoyance.

Vibration

Vibration from an operating power plant could be transmitted by two chief means; through the ground (groundborne vibration) and through the air (airborne vibration).

The operating components of the GSEP consist of a high-speed steam turbine generator and various pumps and fans. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Ground borne vibration from GSEP would be undetectable at distances greater than a few hundred feet from the power block (RSA 2010). Given that there are no receptors within nine miles of the project, vibration would not have an impact on any receptors.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. None of the project equipment is likely to produce low frequency noise; this makes it highly unlikely that GSEP would cause perceptible airborne vibration effects.

Linear Facilities

Linear facilities include a new six-mile natural gas pipeline connecting to an existing Southern California Edison pipeline located north of highway I-10, as well as new electrical transmission lines interconnecting to the transmission system to the southeast of the GSEP site. Both the natural gas pipeline and the transmission lines would extend past the GSEP site boundaries; neither would pass close to noise sensitive receptors (GSEP 2009a, AFC Figure 5.12-1).

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feedwater and steam systems, the piping and tubing that comprises the steam path has accumulated dirt, rust, scale and construction debris such as weld spatter, dropped welding rods and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. High pressure steam is then raised in a heat recovery steam generator (HRSG) or a boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a steam blow, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, is performed several times daily over a period of two or three weeks. At the end of this procedure, the steam line is connected to the steam turbine, which is then ready for operation.

These steam blows can produce noise as loud as 130 dBA at a distance of 100 feet. This would attenuate to about 82 dBA at a distance of five miles from the GSEP site, and 77 dBA at the prisons nine miles from the GSEP site. While this is an annoying noise level, even at these great distances from the GSEP site, there are no noise sensitive receptors within these distances and the noise would attenuate further with greater distances.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized those applicable LORS that would protect construction workers (GSEP 2009a).

The applicant did not perform full noise modeling for GSEP operation because there were no noise sensitive receptors in the vicinity of the GSEP that would be impacted by operating noise (GSEP 2009a).

The applicant estimates that GSEP operational noise levels would be less than 30 dBA at a distance of five miles. GSEP operating noise would thus comply with the standard set by the Riverside County General Plan (60 dBA CNEL at the nearest receptor).

Closure and Decommissioning Impacts

In the future, upon closure of GSEP, all operational noise from the project would cease, and no further adverse noise impacts from operation of GSEP would be possible. The remaining potential temporary noise source is the dismantling of the structures and equipment and any site restoration work that may be performed. Since the noise would be similar to that caused by the original construction, it would likely cause no noise impacts given the remote location of the project. Any noise LORS that are in existence at that time would apply.

Alternatives

Reduced Acreage Alternative

The Reduced Acreage alternative would most likely correspond to lower operational noise, given that only half of the noise generating equipment (steam turbine generator, wet cooling tower, etc) would be included in the GSEP. Because there are no noise sensitive receptors within the vicinity of the GSEP, noise impacts for the Reduced Acreage alternative would most likely be the same, as for the proposed GSEP.

Because this alternative would result in fewer construction activities conducted at greater distances from sensitive receptors than the proposed GSEP, the analysis for the proposed GSEP demonstrates that the Reduced Acreage alternative can be built and operated in compliance with all applicable noise and vibration laws, ordinances, regulations, and standards. Also, if built in accordance with the conditions of certification proposed for the proposed GSEP, it would produce no significant adverse noise impacts on people within the affected area.

Dry Cooling Alternative

For the Dry Cooling Alternative, it is assumed that the ACC systems would be located where the cooling towers are currently proposed for each of the two 125 MW power block. Approximately 18 ACC fans would be required for each of the two solar fields. The 18 fans, or ACCs, would operate when the ambient temperature is above 50 degrees Fahrenheit. When the temperature is below 50 degrees Fahrenheit, only 10 of the fans would be used (GSEP 2009f). The 18 ACC fans described in the GSEP cooling study would have a length of approximately 279 feet, a width of approximately 127 feet, and a height of 98 feet (GSEP 2009f). However, based on the ACC preliminary designs for nearby solar thermal projects in similar ambient temperatures, an additional 11,690 square feet could be required. In addition to the ACC fans, NextEra would use a small Wet Surface Air Cooler when needed to provide auxiliary cooling during extremely hot days (GSEP 2009f). This alternative is analyzed because it would reduce the amount of water required for steam turbine cooling from 822 acre-feet per year (AFY) to 202 AFY. This reduction in water use would reduce impacts to water and biological resources.

The use of a Dry Cooling Alternative would introduce additional noise sources to the overall plant design, consisting of fans, motors, and gearboxes, but would eliminate cooling tower noise (a noise source that significantly contributes to GSEP noise levels). The overall difference in GSEP noise level between dry cooling and wet cooling would be small.

The far field noise level for the Dry Cooling Alternative is expected to be approximately 60 dBA at 400 feet (GSEP 2009f). This level would attenuate to approximately 47 dBA at the facility fenceline (approximately 1,800 feet from the proposed position of the ACC) and approximately 25 dBA at a distance of five miles from the GSEP site, compared to less than 30 dBA at five miles for the proposed GSEP. As with the proposed cooling system, no change in ambient noise levels at any noise sensitive receptor would result from the GSEP because there are no such receptors within the vicinity of the GSEP.

No Action Alternative A

Under this alternative, the proposed GSEP would not be approved by BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the construction and operation noise-related impacts of the GSEP would not occur at the proposed site.

However, the land on which the GSEP is proposed would remain available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

No Project Alternative B

Under this alternative, the proposed GSEP would not be approved by BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the GSEP site. As a result, it is possible that another solar energy project could be constructed on the GSEP site.

Different solar technologies use different machinery during construction and would create different ambient noise levels during operation; however, it is expected all technologies would require the use of large construction vehicles that would create unwanted noise and some intermittent noise during operations. However, as with the proposed GSEP, it is expected that solar technologies create minor increases in ambient noise during operation. As such, this No Project Alternative could result in an impact from increased ambient noise during construction and operation similar to under the proposed GSEP.

No Project Alternative C

Under this alternative, the proposed GSEP would not be approved by BLM and the BLM would amend the CDCA Plan to make the proposed GSEP site unavailable for future solar development. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain with the existing ambient noise from its existing condition. Ambient noise of the site is not expected to change noticeably from existing conditions and, as such, this Alternative would not result in impacts from any increase in noise at the GSEP site. However, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.9.3 Discussion of Cumulative Impacts

The geographic scope for considering cumulative noise impacts on sensitive receptors for this GSEP consists of the region immediately surrounding any identified receptors. There are no noise-sensitive receptors within nine miles of the GSEP site, the fact of which inherently precludes the possibility for cumulative noise impacts from the GSEP.

4.9.4 Summary of Mitigation Measures

The mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following mitigation measures would avoid or minimize impacts on noise resources:

NOISE-1, NOISE-2, NOISE-3, NOISE-4

4.9.5 Residual Impacts after Mitigation Measures were Implemented

None.

4.9.6 Unavoidable Adverse Impacts

None.

4.10 Impacts on Paleontological Resources

4.10.1 Impact Assessment Methodology

Information from the Natural History Museum of Los Angeles County (NHMLA) (McLeod, 2009), the University of California Museum of Paleontology at Berkeley (UCMP 2009), and the Riverside County Land Information System (RCLIS 2009) was reviewed for information regarding known fossil localities and stratigraphic unit sensitivity within the proposed GSEP area. Site-specific information generated by the applicant for the proposed GSEP was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP 1995) to determine whether any known paleontological resources exist in the general area and how they might be impacted by the proposed action and alternatives.

4.10.2 Discussion of Direct and Indirect Impacts

Proposed Action

Construction of the proposed GSEP will include grading, foundation excavation, and utility trenching. These activities could damage or destroy paleontological resources. Based on the soils profile, SVP assessment criteria, and recorded fossil localities within 25 miles of the proposed site, the probability of encountering paleontological resources is considered to be negligible in the upper 1.5 feet of most of the GSEP site. Sediments at the surface along the northern and southern borders of the site, as well as all sediments below 1.5 feet of the remainder of the site, should initially be treated as highly sensitive (PYFC Condition 2, Class 4a, 4b). After monitoring of grading and trenching activities during proposed construction of the site, a qualified professional paleontologist may determine the appropriate depth above which the coarse grained soils are Holocene in age, have a low sensitivity, and low potential for adverse impacts on paleontological resources.

As the value of paleontological resources is predicated on their discovery within a specific geological host unit, construction of the GSEP could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved.

Operation of the GSEP would not present additional risk to paleontological resources. Once ground disturbing activity is complete, plant operation has no real potential to further affect paleontological resources.

Decommissioning of the GSEP is expected to result in no adverse impacts related to paleontology. Any potential impact to paleontological resources would have occurred and been completed during the ground disturbing phase of project construction.

Alternatives

Reduced Acreage Alternative

The Reduced Acreage Alternative would essentially be Unit 1 of the proposed GSEP, including a 125-MW solar facility located within the boundaries of the proposed GSEP as defined by the applicant. This alternative eliminates about 50 percent of the proposed site footprint so impacts are reduced.

This alternative is located entirely within the boundaries of the proposed GSEP, so all of the aspects of the setting and existing conditions for the GSEP are also pertinent to this alternative except the project description. The project description for this alternative eliminates the eastern solar field and relocates the gas yard approximately 1.75 miles northwest of its present location. As a result, the environmental setting consists of the western portion of the proposed GSEP, as well as the area affected by the linear GSEP components.

This Alternative would create no additional impacts and would lower the potential to encounter fossils by virtue of a reduced construction footprint.

Dry Cooling Alternative

This alternative is located entirely within the boundaries of the proposed GSEP. It eliminates the use of wet-cooling towers and incorporates the use of air-cooled condensers (ACC) in the same location. As a result, the environmental setting would be the same as for the proposed GSEP.

Because the ACC system would be located at the same location as the proposed cooling towers within the proposed GSEP site and would not require any additional grading, impacts to paleontological resources from use of the ACC system are expected to be the same as with the proposed wet-cooling system. No additional ground disturbance would be required. Therefore, no additional disturbance to paleontological resources would be expected.

No Action Alternative A

Under this alternative, the proposed GSEP would not be approved by the BLM, and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would not be amended and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no new ground disturbance. As a result, no loss or degradations to paleontological resources from construction or operation of the proposed GSEP would occur. However, the land on which the GSEP is proposed would become available to other uses that are consistent with BLM’s land use plan, including another solar project requiring a land-use plan amendment. In addition, in the absence of the GSEP, other renewable energy projects may be constructed elsewhere to meet state and federal mandates, and those projects would have similar impacts in other locations.

As the value of paleontological resources is predicated on their discovery within a specific geological host unit, construction of the GSEP could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. No Action Alternative A would preclude this potential net gain.

No Project Alternative B

Under this alternative, the proposed GSEP would not be approved by the BLM, and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the GSEP site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with a different solar technology. As a result, ground disturbance would result from the construction and operation of the solar technology and would likely result in a loss or degradation to paleontological resources. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all solar technologies require some grading and ground disturbance. As such, No Project Alternative B could result in impacts to paleontological resources similar to the impacts of the proposed GSEP.

No Project Alternative C

Under this alternative, the proposed GSEP would not be approved by the BLM, and BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no corresponding land disturbance. As a result, paleontological resources on the site would not be expected to change noticeably from existing conditions. Therefore, this No Project Alternative would not result in impacts to paleontological resources. However, in the absence of the GSEP, other renewable energy projects may be constructed elsewhere to meet state and federal mandates, and those projects would have similar impacts in other locations.

As the value of paleontological resources is predicated on their discovery within a specific geological host unit, construction of the GSEP could result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. No Project Alternative C would preclude this potential net gain.

4.10.3 Discussion of Cumulative Impacts

Renewable energy projects on BLM and non-BLM administered lands, as shown in Table 4.1-1. Although not all of those projects are expected to complete the environmental review processes, or be funded and constructed, the list is indicative of the large number of renewable projects currently proposed in California.

These projects are defined within a geographic area that has been identified by the BLM as covering an area large enough to provide a reasonable basis for evaluating cumulative impacts for all resource elements or environmental parameters. Most of these projects have, are, or will be required to undergo their own independent environmental review under CEQA and/or NEPA. The geographic area considered for cumulative impacts on paleontology is the Chuckwalla Valley in the southeastern area of the Mojave Desert geomorphic province.

Reasonably foreseeable future projects in the immediate GSEP area, are shown in Table 4.1-1. These projects would be subject to CEQA and/or NEPA environmental review which would include requirements for construction monitoring and mitigation of potential paleontological resources. When properly implemented and enforced, these safeguards should reduce potential impacts and provide adequate protection for paleontological resources.

Construction of the GSEP would require localized excavation over a very large area. Because the project area lies within geological units with moderate to high paleontological sensitivity, the required excavation could, potentially, damage paleontological resources. Any damage could be cumulative to damage from other projects within the same geological formations. Implementation and enforcement of a properly designed Paleontological Resource Monitoring and Mitigation Plan (PRMMP) at this GSEP site should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved. Cumulative impacts from GSEP, in consideration with other nearby similar projects, should therefore be either neutral (no fossils encountered) or positive (fossils encountered, preserved, and identified).

Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

4.10.4 Summary of Mitigation Measures

The mitigation measures imposed by the Energy Commission as Conditions of certification for the GSEP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in **Appendix G**. To mitigate impacts to paleontological resources, the following measures will be implemented:

PAL-1, PAL-2, PAL-3, PAL-4, PAL-5, PAL-6, PAL-7

4.10.5 Residual Impacts after Mitigation Measures were Implemented

No residual impacts on paleontological resources would exist after mitigation measures were implemented. Implementation of mitigation should result in a net gain to the science of paleontology by allowing fossils that would not otherwise have been found to be recovered, identified, studied, and preserved.

4.10.6 Unavoidable Adverse Impacts

If mitigation is implemented, no unavoidable adverse impacts would be expected to occur. Construction associated with the GSEP could add to fossil discoveries which would enhance understanding of the prehistoric climate, geology, and geographic setting of the region for the benefit of current and future generations.

4.11 Impacts on Public Health and Safety

4.11.1 Impact Assessment Methodology

To complete this analysis of environmental consequences associated with impacts on public health and safety, the BLM considered potential impacts on the following issue areas: hazardous materials/hazardous waste, waste management, unexploded ordnance (UXO), abandoned mined lands (AML), undocumented immigrants (UDI), transmission line safety and nuisance, traffic and transportation safety, worker safety and fire protection, public and private air strips/airfields, and geologic hazards. The approach for each of these issues is described below.

4.11.2 Hazardous Materials

4.11.2.1 Impact Assessment Methodology

Risk of Accidents and Spills

This analysis includes a review and assessment of the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals were evaluated. This analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, this analysis includes several aspects of the proposed use of these materials at the facility. It is recognized that some hazardous materials must be used at power plants. Therefore, this analysis was conducted by examining the choice and amount of chemicals to be used, the manner in which the Applicant would use the chemicals, the manner by which they would be transported to the facility and transferred to facility storage tanks, and the way in which the Applicant plans to store the materials on site.

Engineering and administrative controls concerning hazardous materials use are included as part of the Proposed Action. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or that can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that would help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

This analysis includes a review and evaluation of the Applicant's proposed use of hazardous materials as described by the Applicant (GSEP 2009a, Section 5.12). To conduct this analysis, the BLM followed these five steps:

Step 1: Review of the chemicals and the amounts proposed for on-site use as listed in Table 5.12-1 of the AFC (GSEP 2009a) and determined the need and appropriateness for their use.

Step 2: Removed from further assessment those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public.

Step 3: Review and evaluate measures proposed by the Applicant to prevent spills, including engineering controls, such as automatic shut-off valves and different-sized transfer-hose couplings, and administrative controls such as worker training and safety management programs.

Step 4: Review and evaluate measures proposed by the Applicant to respond to accidents. These measures also included engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.

Step 5: Analyze the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the Applicant. When mitigation methods proposed by the Applicant would be sufficient, no further mitigation is recommended. If additional mitigation measures would improve the Proposed Action, additional prevention and response controls are proposed.

Health Risk Assessment

A screening level risk assessment has been performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis was designed that overestimated public health impacts from exposure to the emissions of the Proposed Action. In reality, it is likely that the actual risks from the Proposed Action would be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

1. using the highest levels of pollutants that could be emitted from the plant;
2. assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
3. using the type of air quality computer model that predicts the greatest plausible impacts;
4. calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
5. assuming that an individual’s exposure to cancer-causing agents occurs continuously for 70 years; and
6. using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment, at a minimum, would include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from non-inhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process for the proposed GSEP addresses two categories of health impacts: chronic (long-term) non-cancer effects, and cancer risk (also long-term). Since the only toxic air contaminant (TAC) emitted from this Proposed Action would be diesel particulate from diesel-fueled, emergency engines, and since only long-term health effects have been established for diesel particulate, no acute (short-term) health effects are calculated for this Proposed Action.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12 percent to 100 percent of a lifetime, or from eight to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for non-cancer health effects compares the maximum GSEP contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant REL. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to emissions from the Proposed Action are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the Proposed Action. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

Chronic Non-cancer Health Effects

The assessment of non-cancer health effects is calculated using a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the RELs. Under these conditions, health protection from the Proposed Action is likely to be achieved, even for sensitive members of the population. In such a case, it is presumed that there would be no significant non-cancer project-related public health impacts.

Cancer Risk

Regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code Section 25249.5 et seq.) were used for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations Section 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of 10 in one million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas this analysis bases significance on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied in this analysis is more conservative (health-protective) than that applied by Proposition 65.

As noted earlier, the initial risk analysis for a Proposed Action is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. The analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, this analysis uses the most current acceptable public health exposure levels set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in one million, appropriate measures would be required to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in one million, the risk would be deemed to be significant.

4.11.2.2 Discussion of Direct and Indirect Impacts

Accidents and Spills

The types of hazardous materials that would be used during construction and operation of GSEP are identified in Table 4.11-1, including the material name, Chemical Abstracts Service (CAS) Number, the application/use of the chemical, the hazard characteristics, the maximum quantity proposed for use on site, and the CERCLA/SARA reportable quantity (RQ). The purpose of this hazardous materials management analysis is to identify the hazardous materials that would be used at the GSEP site and to determine the affects of their transportation to the site, the use, handling, storage, and disposal on the environment.

The affects are determined by the following:

1. identifying the types and amounts of hazardous substances that GSEP could emit to the environment;

2. estimating amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and

3. characterizing potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Small Quantity Hazardous Materials

During the construction phase of the Proposed Action, hazardous materials proposed for use include paint, solvents, gasoline, diesel fuel, motor oil, lubricants, and welding gases (GSEP 2009a, Section 5.12.2.2). No acutely toxic hazardous materials would be used on site during construction, and none of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Any impact of spills or other releases of these materials would be limited to the site because of the small quantities involved, their infrequent use (and therefore reduced chances of release), and/or the temporary containment berms used by contractors. Petroleum hydrocarbon-based motor fuels, mineral oil, lube oil, and diesel fuel are all very low volatility and represent limited off-site hazards even in larger quantities.

TABLE 4.11-1
HAZARDOUS MATERIALS PROPOSED FOR USE AT THE GSEP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Acetylene	74-86-2	Welding gas	Health: moderate toxicity Physical: toxic	600 cubic feet	
Argon	7440-37-1	Welding gas	Health: low toxicity Physical: non-flammable gas	600 cubic feet	
Carbon Dioxide			Health: low toxicity Physical: non-flammable gas	15 tons	
Diesel Fuel		Equipment refueling and emergency diesel fire pump	Health: low toxicity Physical: combustible liquid	3,600 gallons	
Fertilizer Monopotassium Phosphate		Treatment of HTF contaminated soil	Health: low toxicity Physical: irritant	250 pounds	
Fertilizer Urea		Treatment of HTF contaminated soil	Health: low toxicity Physical: N/A	250 pounds	
Hydraulic Fluid		High-pressure combustion turbine starting system, turbine control valve actuators	Health: low to moderate toxicity Physical: Class IIIB combustible liquid	500 gallons in equipment, maintenance inventory of 110 gallons in 55-gallon steel drums	
Hydrogen		Steam turbine generator cooling	Health: low toxicity Physical: flammable gas	20,000 SCF	
Lube Oil		Lubricate rotating equipment (e.g., gas turbine and steam-turbine bearings)	Health: low toxicity Physical: N/A	10,000 gallons in equipment and piping, additional maintenance inventory of up to 550 gallons in 55-gallon steel drums	
Mineral Insulating Oil		Transformers/switchyard	Health: low toxicity Physical: N/A	32,000	
Natural Gas (Methane)	74-82-8	Auxiliary boiler operation	Health: low toxicity Physical: flammable gas	No on-site storage, up to 140 pounds of natural gas in equipment and piping	
Nitrogen	7727-37-9		Health: low toxicity Physical: flammable gas	7,500 pounds	
Oxygen	7782-44-7	Welding gas	Health: low toxicity Physical: oxidizer	600 cubic feet	
Sodium Hypochlorite (12.5%)		Cooling tower biological control	Health: high toxicity Physical: Poison-B, corrosive	8,500 gallons	100 pounds
Sulfur Hexaflouride		230-kV breaker insulating medium	Health: none Physical: none		
Sulfuric Acid (29.5%) solution			Health: high toxicity Physical: corrosive and water reactive	2,000 gallons	1,000 pounds

TABLE 4.11-1 (Continued)
HAZARDOUS MATERIALS PROPOSED FOR USE AT THE GSEP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Sulfuric Acid (93%) solution			Health: high toxicity Physical: corrosive and water reactive	8,500 gallons	1,000 pounds
Therminol VP-1 Diphenyl Ether (73.5%) Biphenyl (26.5%)		Heat transfer fluid in the solar array	Health: moderate toxicity Physical: irritant; combustible liquid (Class III-B)	2.0 MM gallons	100 pounds
Water Treatment Chemical NALCO Tri-Act 1800 Cyclohexlyamine (5 – 10%) Monoehtanolamine (10 – 30%) Methoxyproplyamine (10 – 30%)			Health: high toxicity Physical: corrosive, class II combustible liquid	800 gallons	
Water Treatment Chemical NALCO Elimin-Ox Carbohydazide (5 – 10%)			Health: moderate toxicity Physical: corrosive	800 gallons	
Water Treatment Chemical NALCO 3D Trasar 3DT185 Phosphoric Acid (60 – 100%)			Health: high toxicity Physical: corrosive	800 gallons	
Water Treatment Chemical NALCO 3D Trasar 3DT177 Phosphoric Acid S30%)			Health: moderate toxicity Physical: irritant	800 gallons	
Water Treatment Chemical NALCO 3D Trasar 3DT190			Health: low toxicity Physical: irritant	800 gallons	
Water Treatment Chemical NALCO Acti-Brom ® 7342 Sodium Bromide			Health: low toxicity Physical: irritant	800 gallons	
Water Treatment Chemical NALCO pHreedom ® 5200M Sodium salt of phosphonomethylated diamine			Health: low to moderate toxicity Physical: irritant	800 gallons	
Water Treatment Chemical NALCO PCL-1346			Health: low toxicity Physical: irritant	800 gallons	
Water Treatment Chemical NALCO Permacare ® PC-7408 Sodium Bisulfite			Health: low toxicity Physical: irritant	800 gallons	

TABLE 4.11-1 (Continued)
HAZARDOUS MATERIALS PROPOSED FOR USE AT THE GSEP

Material	CAS No.	Application	Hazardous Characteristics	Maximum Quantity On Site	CERCLA SARA RQ[a]
Water Treatment Chemical NALCO BT-3000 Sodium Hydroxide Sodium Tripolyphosphate			Health: high toxicity Physical: corrosive	800 gallons	
Water Treatment Chemical NALCO 8338 Sodium Nitrate Sodium Tolytriazole Sodium Hydroxide			Health: moderate toxicity Physical: toxic	800 gallons	

[a] Reportable quantities for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act.

SOURCE: CEC Genesis RSA, June 2010, Appendix A.

During operations, hazardous chemicals such as cleaning agents, water treatment chemicals, welding gasses, oils, activated carbon, and other various chemicals (see Table 4.11-1 for a list of chemicals proposed to be used and stored at GSEP during operations) would be used and stored in relatively small amounts and represent limited off-site hazards because of their small quantities, low volatility, and/or low toxicity. The Proposed Action would be limited to using, storing, and transporting only those hazardous materials listed in Table 4.11-1.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed of mostly methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless and lighter than air. Natural gas can cause asphyxiation when methane is 90% in concentration. Methane is flammable when mixed in air at concentrations of 5-14%, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (CEC, 2010), natural gas is less likely to cause explosions than many other fuel gases such as propane or liquefied petroleum gas, but can explode under certain confined conditions.

Natural gas at the GSEP site would be used to fuel the auxiliary boilers. It would not be stored on-site but delivered by Southern California Edison via a new 6-mile pipeline that would connect to an existing main north of I-10 (GSEP 2009a, Section 3.4.6). The risk of a fire and/or explosion on site can be reduced to acceptable levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85A requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures would significantly reduce the likelihood of an explosion in gas-fired equipment. The safety management plan proposed by the Applicant would address the handling and use of natural gas, and would significantly reduce the potential for equipment failure because of either improper maintenance or human error.

The natural gas pipeline must be designed to meet the appropriate level of California Public Utilities Commission (CPUC) General Order 112 standards and 49 CFR 192 standards. CPUC General Order 112-E, Section 125.1 requires that at least 30 days prior to the construction of a new pipeline, the owner must file a report with the commission that would include a route map for the pipeline. The natural gas pipeline must be constructed and operated in accordance with the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192 (see Table 1-1 LORS). Compliance with existing LORS would be sufficient to ensure minimal risks of pipeline failure.

Therminol VP-1

Therminol VP-1 is the heat transfer fluid (HTF) that would be used in the solar panels to collect solar heat and transfer it in order to generate steam to run the steam turbines. Therminol is a mixture of 73.5% diphenyl ether and 26.5% biphenyl, and is a solid at temperatures below

~54 °F. Therminol can therefore be expected to remain liquid if a spill occurs. While the risk of off-site migration is minimal, Therminol is highly flammable and fires have occurred at other solar generating stations that use it. Approximately 2,000,000 gallons of HTF would be stored at the GSEP contained in the pipes and heat exchanger. Isolation valves would be placed throughout the HTF piping system designed to automatically block off sections of the piping in which a loss of pressure is detected (GSEP 2009a, Section 5.12.2.3).

Construction-related Risks to Public Health

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in Chapter 3.2 and 4.2.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased cough, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel (SRP)[1] on Toxic Air Contaminants recommended a chronic REL for diesel exhaust particulate matter of 5 $\mu g/m^3$ and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). [The SRP, established pursuant to California Health and Safety Code section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.] The SRP did not recommend a value for an acute REL, since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved SRP's recommendations regarding health effect levels.

1 The SRP, established pursuant to California Health and Safety Code Section 39670, evaluates the risk assessments of substances proposed for identification as Toxic Air Contaminants by ARB and the Department of Pesticide Regulation (DPR). The SRP reviews the exposure and health assessment reports and the underlying scientific data upon which the reports are based.

Construction of the GSEP, including site preparation, is anticipated to take place over a period of 37 months (GSEP 2009a, Section 3.7.1). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to seventy years.

In order to model the cancer risk from construction emissions the Applicant conducted a health risk assessment for diesel particulate matter (DPM) from construction equipment emissions in accordance with methods provided by the South Coast AQMD in their guidance documents on modeling cancer risk from mobile sources. The Applicant's modeling of worst-case construction emissions adjusted to a 37-month period (lifetime exposure adjustment factor of 0.0126) found that the cancer risk was estimates to be 0.1 in one million at the maximum impact receptor (MIR), below the level of significance (10 in one million). The chronic hazard index was found to be 0.005 at the MIR, below the level of significance of 1.0 (GSEP 2009f, CEC Data Response Item 137).

Emissions Sources

The emissions sources at the proposed GSEP site include two natural gas-fired auxiliary boilers, two cooling tower, two diesel-fueled emergency generators, two diesel-fueled emergency fire pumps, DPM from maintenance vehicles, and VOCs from HTF fugitive emissions.

As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility. Table 5.15-3 of the AFC lists toxic air contaminants that may be emitted by the project. Each TAC has a toxicity value published in the OEHHA Guidelines that includes the REL used to calculate short-term and long-term noncancer health effects, and the cancer unit risks used to calculate the lifetime risk of developing cancer (OEHHA 2003).

Table 4.11-2 lists toxic emissions potentially emitted from the GSEP and shows how each contributes to the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde is not of concern, but if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

Appendix B.1 of the AFC (GSEP 2009a) and Data Responses Set 1A Appendix K (GSEP 2009f) list non-criteria pollutants and their emission factors that may be emitted from the sources listed above. Emission factors were obtained from the U.S. EPA emission factors database (AP-42), the California Air Toxics Emission Factors (CATEF II) database, and the vendors for particular equipment. Table B.1-7 of the AFC (GSEP 2009a) and its updated version Table K.1-7 (GSEP 2009f) list emissions from maintenance vehicles including DPM.

In response to CEC Data Requests 141 and 142, the Applicant stated that emissions of HTF toxic thermal degradation products be determined and considered in a HRA. According to the Applicant's response, HTF may decompose into the following gases in the ullage system (GSEP 2009f, CEC Data Response Item 141):

- 89.9 percent by weight Benzene
- 9.8 percent by weight Phenol
- 0.3 percent by weight Other VOCs

TABLE 4.11-2
TYPES OF HEALTH IMPACTS AND EXPOSURE ROUTES ATTRIBUTED TO TOXIC EMISSIONS

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			X	X	
Acrolein				X	X
Arsenic	X	X	X	X	X
Benzene			X	X	X
Biphenyl					
1-3 Butadiene			X	X	
Cadmium		X	X	X	
Copper				X	X
Diesel Exhaust			X	X	
Ethylbenzene				X	
Formaldehyde			X	X	X
Hexane				X	
Naphthalene		X	X	X	
Polycyclic Aromatic Hydrocarbons (PAHs)	X	X	X	X	
Propylene				X	
Propylene oxide			X	X	X
Selinium				X	X
Toluene				X	X
Xylene				X	X

*SOURCE: CEC Genesis RSA, June 2010, Public Health Table 2.

The Applicant noted that the MSDS sheet for the HTF states that decomposition products of HTF (benzene and phenol) occur in trace amounts. In addition, the Applicant proposes to use carbon adsorption technology for the HTF ullage system which is assumed to result in 99% control of VOCs. Therefore, 5 percent by weight of total VOCs were used to represent the upper limit for trace amounts of benzene and phenol. Table 3 of CEC Data Response 141 provides the estimated emissions of benzene and phenol from HTF system components (GSEP 2009f).

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a "worst case" analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances that may result from the project. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant's screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP) modeling program. Finally, ambient concentrations were used in conjunction with RELs and cancer unit risk factors to estimate health effects which might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA 2003) referred to earlier, and results in the following health risk estimates.

Proposed Action

The Applicant's revised screening health risk assessment, including all sources as presented in CEC Data Response 139 resulted in a maximum acute hazard index of 0.00668 and a maximum chronic hazard index of 0.00119 at the Maximum Impact Receptor (MIR). The MIR represents the residential receptor where the highest concentrations of project-related pollutants would exist. The cancer risk was calculated to be 3.27 in 1,000,000 at the MIR.

Table 4.11-3 shows, both acute and chronic hazard indices are under the significance level of 1.0 and cancer risk is under the significant level of 10 in 1,000,000, indicating that no cancer or short- or long-term adverse health effects are expected.

TABLE 4.11-3
OPERATION HAZARD/RISK AT THE MAXIMUM IMPACT RECEPTOR

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.007	1.0	No
Chronic Noncancer	0.001	1.0	No
Individual Cancer	3.3 in one million	10 in one million	No

SOURCE: CEC Genesis RSA, June 2010, Public Health Table 3.

Construction Phase Analysis

For the construction phase analysis, atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from construction equipment and vehicles was conducted by the applicant using AERMOD. The maximum predicted offsite concentration of diesel particulate matter was reported by the applicant to be 0.02562 ug/m^3. Cancer risk due to diesel exhaust emissions was determined by multiplying the DPM concentration by the diesel cancer inhalation unit risk of 0.0003 (ug/m^3)$^{-1}$ and an adjustment factor of 0.0126 to account for the 37 month construction period. Cancer risk at the location of the maximum offsite concentration was determined to be 0.1 in a million and chronic HI to be 0.005 (noncancer chronic REL is 5 ug/m^3).

Operations Phase Analysis

For the operations phase analysis, atmospheric dispersion modeling of facility emissions was conducted by the applicant using AERMOD. Local meteorological data were used, on-site buildings were included for building downwash effects, and 6814 grid receptors were modeled.

A total of 23 emitting units were modeled by the applicant for facility operations including:

a. 2 auxiliary boilers

b. 2 diesel emergency generators

c. 2 diesel firewater pumps

d. 2 HTF (heat transfer fluid) vents

e. 14 wet cooling tower cells (2 cooling towers, each with 7 cells)

f. Fugitive emissions of toxic thermal degradation products of HTF and fugitive emissions of mobile sources involved in routine operations. These emissions were modeled as being emitted from a single area source located between the two solar fields.

g. Total of 23 emitting sources evaluated at the proposed facility.

The HTF (heat transfer fluid) is circulated through the solar field where it is heated by sunlight concentrated on the receiver tube elements of the solar collectors. HTF is comprised biphenyl/diphenyl oxide. Thermal decomposition of HTF results in decomposition products that can include benzene, phenol and toluene. In modeling HTF fugitive loss emissions, the Applicant assumed that 89.9 percent of the emissions would be comprised of benzene and 9.8 percent of phenol.

The HARP On-Ramp program to load the Applicant's AERMOD results into the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a for the risk analysis. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. Emission factors obtained from the Applicant's modeling files and used in this analysis are listed in Table 4.11-4. For risk calculations using the HARP model, the "Derived (Adjusted) Method" was used for cancer risk and the "Derived (OEHHA) Method" was used for chronic noncancer hazard.

Cancer risk and chronic and acute hazard index values are compared to results reported by the Applicant in the December 2009 response to CEC Data Requests in Table 4.11-5. Risk and hazard were determined at the point of maximum impact, PMI, under the 70 year residential scenario, located between the two solar fields. The nearest residential receptor is located 15 miles from the site and there are no sensitive receptors within six miles of the project site.

Table 4.11-6 presents substance- and source-specific cancer risks at the PMI. Analysis of this table indicates that 100% of the cancer risk at the PMI is attributed to emissions from two sources: 12% due to emissions from the HTF vents and 88% due to fugitive emissions. Additional analysis indicates that 100% of cancer risk at the PMI is attributed to emissions of two substances: 47% due to benzene emissions (from the auxiliary boiler, the HTF vents and fugitive emissions) and 52% due to diesel particulate matter emissions (from onsite mobile sources as well as the two diesel engines).

TABLE 4.11-4
OPERATION PHASE EMISSION RATES

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
Emission Rates from Each of 2 Auxiliary Boilers		
Acetaldehyde	1.99E-03	1.36E-04
Acrolein	1.95E-03	1.33E-04
Benzene	1.05E-03	7.15E-05
Ethylbenzene	9.73E-04	6.62E-05
Formaldehyde	2.05E-03	1.40E-04
Hexane	2.72E-03	1.85E-04
Naphthalene	1.03E-04	6.97E-06
PAHs (4)	3.50E-05	2.38E-06
Propylene	2.00E-01	1.36E-02
Toluene	1.40E-02	9.50E-04
Xylene	8.09E-03	5.50E-04
Emission Rates from Each of 14 Cooling Tower Cells		
Arsenic	2.98E-03	9.32E-07
Barium	1.07E-02	3.34E-06
Manganese	9.40E-03	2.94E-06
Emission Rates from Operation of Each of 2 Emergency Generators		
Diesel PM	2.76E+00	5.00E-02
Emission Rates from Operation of Each of 2 Emergency Fire Pumps		
Diesel PM	1.98E+00	4.00E-02
Emission Rates from Each of 2 HTF Vents		
Benzene	4.85E+02	1.53E-01
Phenol	5.30E+01	1.65E-02
Emission Rates from Fugitive Emissions		
Benzene	6.90E+02	1.67E-01
Phenol	6.90E+02	1.67E-01
Diesel PM	4.60E+01	5.25E-03

SOURCE: CEC Genesis RSA (July 2010) Public Health Table 5.

TABLE 4.11-5
CANCER RISK AND HAZARD DUE TO OPERATION PHASE EMISSIONS

	Staff's Analysis			Applicant's Analysis		
	Cancer Risk (per million)	Acute HI	Chronic HI	Cancer Risk (per million)	Acute HI	Chronic HI
PMI (Rec. #1)	3.27	0.0085[a]	0.0013	3.27	0.0067	0.0012

PMI (point of maximum impact) is located between the two solar fields.
[a] At Rec. #266

SOURCE: CEC Genesis RSA (July 2010) Public Health Table 6

TABLE 4.11-6
CONTRIBUTION TO TOTAL CANCER RISK BY INDIVIDUAL SUBSTANCES FROM ALL SOURCES AT THE POINT OF MAXIMUM IMPACT (PMI)

Substance	Auxiliary Boilers (2 units)	Cooling Towers (14 cells)	Diesel Generators (2 units)	Diesel Firewater Pumps (2 units)
Acetaldehyde	1.48E-14			
Arsenic		1.21E-09		
Benzene	7.80E-14			
DieselExhPM*			1.99E-09	6.56E-09
DieselExhPM*			1.99E-09	6.56E-09
Ethyl Benzene	6.29E-15			
Formaldehyde	3.19E-14			
Naphthalene	9.18E-15			
PAHs-w/o	1.46E-11			
TOTAL	1.48E-11	1.21E-09	3.97E-09	1.31E-08

Substance	HTF Vents (2 units)	Fugitive Emissions (1 area source)	Total Cancer Risk
Acetaldehyde			1.48E-14
Arsenic			1.21E-09
Benzene	3.88E-07	1.16E-06	1.55E-06
DieselExhPM		8.52E-07	8.60E-07
Ethyl Benzene			6.29E-15
Formaldehyde			3.20E-14
Naphthalene			9.18E-15
PAHs-w/o			1.46E-11
TOTAL	3.88E-07	2.87E-06	3.27E-06

SOURCE: CEC Genesis RSA (July 2010) Public Health Table 7.

Cooling Towers

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the two wet cooling towers, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not apply to the GSEP project since it intends to use groundwater supplied from on-site wells; however, the potential remains for Legionella growth in cooling water at the GSEP due to nutrients found in groundwater.

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60 percent of industrial cooling towers tested was found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to six percent. The cooling towers all had implemented aggressive water treatment and biocide application programs.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

Alternatives

Reduced Acreage Alternative

If the Reduced Acreage Alternative were selected, a utility-scale solar energy generating facility would be developed on the site that would have approximately 50 percent less generating capacity as the Proposed Action. Types of hazardous materials would be substantially similar to the Proposed Action, although the amounts required would be less, commensurate with the reduction by one Unit. As a result, attendant public health and safety risks would be slightly reduced.

Dry Cooling Alternative

The majority of the toxic emissions from the Dry Cooling Alternative would not change compared with the Proposed Action and would not cause additional impacts. Dry cooling would eliminate the risk of contracting legionellosis by inhaling aerosolized Legionella-contaminated water from wet cooling towers.

As noted in the Section 4.2, the additional construction activities from erecting a dry cooling structure would increase the dust-related PM10 emissions. PM10 impacts are of concern in this public health analysis because health effects can result from the interaction of the toxic pollutants that might be adsorbed to the PM10. Such adsorption would be associated with specific soil contamination that would be remediated before beginning construction. The toxic health risks from diesel equipment emissions would be minimized through implementation of the mitigation measures described in Section 4.2.4, which would also apply to construction of any cooling structures that might be used for the project.

No Action Alternative A

If No Action Alternative A were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, no ROW grant authorized, and no amendment of the CDCA Plan would be approved to associate the site with solar energy development at this time. In this case, no cumulative impacts presently would be caused or contributed to under this alternative.

However, No Action Alternative A leaves open the possibility that a subsequent renewable energy facility application could be submitted that would be similar to, greater or less than, the Proposed Action. Depending on the technology proposed, different hazardous materials impacts could result. For example, if “power tower” or PV were proposed for a solar project instead of solar trough technology, no impacts relating the proposed HTF would result because no HTF would be required. Risks and hazards relating to accidents and spills, human health, small quantity hazardous materials, natural gas, construction risks and emissions could be similar to the Proposed Action.

No Project Alternative B

If No Project Alternative B were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, no ROW grant authorized, and the CDCA Plan would be amended to identify the site as unsuitable for any type of solar energy development. No cumulative impacts would be caused or contributed to under this alternative.

No Project Alternative C

If No Project Alternative C were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, no ROW grant authorized. In this case, no cumulative impacts presently would be caused or contributed to under this alternative.

However, under No Project Alternative C, the CDCA Plan would be amended to identify the site as suitable for any type of solar energy development. Accordingly, hazardous materials impacts associated with No Project Alternative C would depend on the solar technology proposed, size of the project and other variables. Impacts similar in nature to those of the Proposed Action could be expected to result from risks and hazards relating to accidents and spills, human health, small quantity hazardous materials, large quantity hazardous materials, construction and emissions. Such impacts could be similar to, greater or less than those of the Proposed Action.

4.11.2.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the GSEP could result in a cumulative impact relating to hazardous materials, including the use, storage, and transport of hazardous materials, with other past, present, or reasonably foreseeable future actions. For example, cumulative impacts would exist or could result from the interaction of one or more controlled or uncontrolled release of hazardous materials, e.g., airborne or subsurface plumes, within the same geographic area, and during the same timeframe. The geographic area of the cumulative impacts analysis area for hazardous materials management is the general project area, including the sites and the vicinity of the sites. BLM has identified this geographic area as large enough to provide a reasonable basis for evaluating cumulative hazardous materials-related impacts. The relevant timeframe within which incremental impacts could be additive, synergistic or otherwise combine includes the construction period for the Proposed Action, its anticipated 30-40 year lifespan and the period of time required for closure and decommissioning of the GSEP and alternatives.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3. Direct and indirect effects of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.

Relevant past actions include one existing combined-cycle natural gas power plant (i.e., the Blythe Energy Project), two prisons, and other facilities that would continue to manage hazardous materials in the cumulative impacts area during the relevant timeframe. It is expected that these facilities use, store, and/or transport hazardous materials, including aqueous ammonia to control the emissions of NOx in the case of the Blythe Energy Project. However, these facilities are not expected to contribute incremental hazardous materials management-related impacts that could overlap with those of the Proposed Action within the cumulative impacts area during the relevant timeframe, thereby causing or contributing to a cumulative effect, because they are subject to myriad safeguards, including the laws, ordinances, regulations, and standards (LORS) summarized in Table 1-1, which are intended to prevent uncontrolled releases and to control such releases in the event they occur.

In addition to the Proposed Action, other future foreseeable actions include 12 solar power plants planned along I-10, a combined-cycle natural gas power plant (i.e., Blythe Energy Project II), a communication tower, Eagle Mountain Pumped Storage Project, Eagle Mountain Landfill, a raceway, and several electric transmission infrastructure projects. Five of the 12 solar plants would be thermal and seven would be photovoltaic. Construction of the proposed thermal power plants would cause increases similar to the Proposed Action in the volume of heat transfer fluid and other hazardous materials required for the operation of such plants within the cumulative impacts area. These facilities would require the use, storage, and transport of various types of hazardous materials. Additional hazardous materials management is expected to occur at these facilities; however, these facilities are not expected to contribute incremental hazardous materials management-related impacts that could overlap with those of the Proposed Action within the cumulative impacts area during the relevant timeframe, thereby causing or contributing to a cumulative effect, because each such facility would be subject to the LORS and other safeguards that would prevent uncontrolled releases and to control such releases in the event they occur.

Collectively, the impacts associated with the construction, operation and maintenance, and closure and decommissioning of the GSEP and alternatives is not expected to cause or contribute to cumulative effects relating to hazardous materials management because of the nature of the materials used, compliance with applicable LORS and the engineering and administrative controls that would be implemented to prevent and control accidental releases of hazardous materials. Accordingly, it is unlikely that that a vapor or groundwater plume would mingle (combine) to produce an airborne or waterborne risk to the human environment should an accidental release occur.

4.11.2.4 Summary of Mitigation Measures

The implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following address impacts on public health and safety:

HAZ-1, HAZ-2, HAZ-3, HAZ-4, HAZ-5, HAZ-6

Public Health-1

SOIL&WATER-18

4.11.2.5 Residual Impacts after Mitigation Measures were Implemented

Although unlikely, it is possible that even after the implementation of the Mitigation Measures identified above, an accidental release could occur and could cause an airborne or waterborne risk to the human environment.

4.11.2.6 Unavoidable Adverse Impacts

Unavoidable adverse impacts would be the same as the residual impacts described above.

4.11.3 Non-hazardous Waste Management

This section presents an analysis of issues associated with wastes generated from the proposed construction and operation of the GSEP. The technical scope of this analysis encompasses solid and liquid wastes existing on site and those to be generated during facility construction, operation, and closure/decommissiong. Management and discharge of wastewater is addressed in Section 4.19. Additional information related to waste management may also be discussed in Section 4.11.2 and 4.11.9.

4.11.3.1 Impact Assessment Methodology

Projected wastes were evaluated in terms of landfill capacity and LORS compliance. The federal, state, and local environmental LORS listed in Table 1-1 have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment.

4.11.3.2 Discussion of Direct and Indirect Impacts

Proposed Action

Construction activities would generate an estimated 40 cubic yards per week of non-hazardous solid wastes, consisting of scrap wood, steel, glass, plastic, and paper, and another 1 cubic yard per week of office-related waste. Of these items, recyclable materials would be separated and removed as needed to recycling facilities. Non-recyclable materials (insulation, other plastics, food waste, roofing materials, vinyl flooring and base, carpeting, paint containers, packing materials, etc.) would be disposed at a Class III landfill.

Non-hazardous liquid wastes would be generated during construction, and would include 200 gallons of sanitary waste per day. Sanitary wastes would be pumped to tanker trucks by licensed contractors for transport to a sanitary water treatment plant. Please see the Section 4.14 and 4.19 for more information on the management of project wastewater.

Anticipated universal waste generated during construction includes: spent batteries (e.g. alkaline dry cell, nickel-cadmium, and lithium ion) and empty or nonempty aerosol cans (per year). Spent batteries and aerosol cans would be recycled by licensed universal waste handlers. Universal waste would be accumulated for less than one year and recycled off-site.

Alternatives

Reduced Acreage Alternative

If the Reduced Acreage Alternative were selected, a utility-scale solar energy generating facility would be developed on the site that would have approximately 50 percent less generating capacity as the Proposed Action. Types and amounts of non-hazardous solid and liquid wastes would be substantially similar to the Proposed Action, although the amounts required would be less, commensurate with the reduction by one Unit. As a result, attendant public health and safety risks would be comparable to the Proposed Action.

Dry Cooling Alternative

The Dry Cooling Alternative would significantly reduce the volume of non-hazardous evaporation pond residue estimated to be 50,000 tons every seven years requiring disposal using the wet cooling option. By comparison, with dry cooling, non-hazardous waste is reduced to 8,000 tons removed every twenty years. In addition, the non-hazardous solid waste generated during periodic maintenance of the water treatment filters (spent media of sand, gravel, garnet, anthracite, about 2,100 cubic feet every 5 years) and disposal or recycling of the reverse osmosis filters (approximately 440 cartridges every few months and about 160 RO membrane elements every 3 to 5 years) would be significantly reduced. Consequently, the overall impacts of the Dry Cooling Alternative related to waste management (waste generation and disposal) would be reduced compared to the Proposed Action.

No Action Alternative A

If No Action Alternative A were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, no ROW grant authorized, and no amendment of the CDCA Plan would be approved to associate the site with solar energy development at this time. In this case, no cumulative impacts presently would be caused or contributed to under this alternative.

However, No Action Alternative A leaves open the possibility that a subsequent renewable energy facility application could be submitted that would be similar to, greater or less than, the Proposed Action. Depending on the technology proposed, different hazardous materials impacts could result. For example, if “power tower” or PV were proposed for a solar project instead of solar trough technology, no impacts relating the proposed HTF would result because no HTF would be required. Risks and hazards relating to accidents and spills, human health, small quantity hazardous materials, natural gas, construction risks and emissions could be similar to the Proposed Action.

No Project Alternative B

If No Project Alternative B were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, no ROW grant authorized, and the CDCA Plan would be amended to identify the site as unsuitable for any type of solar energy development. No cumulative impacts would be caused or contributed to under this alternative.

No Project Alternative C

If No Project Alternative C were selected, there would be no direct or indirect impacts on public health and safety relating to hazardous materials, because the requested ROW application would be denied, no ROW grant authorized. In this case, no cumulative impacts presently would be caused or contributed to under this alternative.

However, under No Project Alternative C, the CDCA Plan would be amended to identify the site as suitable for any type of solar energy development. Accordingly, hazardous materials impacts associated with No Project Alternative C would depend on the solar technology proposed, size of the project and other variables. Impacts similar in nature to those of the Proposed Action could be expected to result from risks and hazards relating to accidents and spills, human health, small quantity hazardous materials, large quantity hazardous materials, construction and emissions. Such impacts could be similar to, greater or less than those of the Proposed Action.

4.11.3.3 Cumulative Impacts

Cumulative impacts can occur within 1-10/Eastern Riverside County area if implementation of the GSEP could combine with those of other local or regional projects. Cumulative impacts could also occur as a result of development of some of the many proposed solar and wind development projects and other non-energy projects that have been or are expected to be under consideration by the BLM, the Energy Commission and Riverside County during the life of the Proposed Action, from construction to decommissioning. Many of these projects are located within the California Desert Conservation Area, as well as on BLM land.

The geographic extent for the analysis of the cumulative impacts associated with the GSEP project is Riverside County, the location of the closest large Class III landfills. This geographic scope is appropriate because waste disposal facilities in Riverside County are the ones most likely to be used for disposal of waste generated by the GSEP considering regulatory acceptability and transport costs.

Existing waste management-related conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in PA/FEIS Chapter 3. Direct and indirect effects of the GSEP, including those associated with the generation of non-hazardous solid waste that would add to the total waste generated in Riverside County, are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Non-hazardous solid waste generated by past, present, and reasonably foreseeable projects in the cumulative impacts area during the relevant timeframe is summarized in Table 4.11-7, below, and Table 4.1-4, Existing Projects Along the I-10 Corridor (Eastern Riverside County) and also would be disposed of within Riverside County. Most of the reasonably foreseeable projects identified Table 4.1-4 would generate smaller volumes of non-hazardous waste than the GSEP.

TABLE 4.11-7
SUMMARY OF OPERATION WASTE STREAMS AND MANAGEMENT METHODS

Waste Stream and Classification[a]	Origin and Composition	Estimated Amount	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Used hydraulic fluid, oils and grease – Non-RCRA hazardous	HTF system, turbine, and other hydraulic equipment	200,000 gallons per year	Intermittent	Accumulated for < 90 days	Recycle
Effluent from oily water separation system – Non-RCRA hazardous	Plant wash down area/oily water separation system	12,000 gallons per year	Intermittent	None	Recycle
Oil absorbent, and oil filters – Non-RCRA hazardous	Various	20 55-gallon drums per month	Intermittent	Accumulated for < 90 days	Sent offsite for recovery or disposal at Class I landfill
Dirty shop rags – Recyclable material	Maintenance cleaning operations	200 pounds per month	Routine	None	Send to commercial laundry for cleaning and recycling
Spent carbon – RCRA hazardous	Spent activated carbon from air pollution control of HTF vent	182,000 pounds per year	Intermittent	Contained in engineered process vessel, no accumulation outside of process	Sent off site for regeneration at a permitted management facility
Soil contaminated with HTF (< 10,000 mg/kg) – Non-hazardous	Solar array	3,000 cy/year	Intermittent	Bioremediation or land farming at LTU	Disposal at permitted waste management facility
Spent batteries – Universal waste	Batteries containing heavy metals such as alkaline dry cell, nickel-cadmium, or lithium ion.	<40/month	Continuous	Accumulate for <one year	Recycle
Spent batteries – Hazardous (exempt if managed as prescribed by Title 22 CCR Chapter 16).	Lead acid	80 every two years	Intermittent	Accumulated for <180 days	Recycle
Spent fluorescent bulbs or high-intensity discharge lamps – Universal waste	Facility lighting	< 200 per year	Intermittent	Accumulate for <one year	Recycle
Spent demineralizer resin – Non-hazardous	Demineralizer	1,000 cubic feet (ft^3)	Once every three years	None	Recycle
Reverse Osmosis (RO) Membrane Cleaning Waste – Non-hazardous	Acidic and/or caustic chemicals	12,000 to 24,000 gallons per cleaning	Up to four times per year	Evaporation ponds	Evaporation Pond solids disposal at permitted waste management facility
RO system concentrate – Inert or liquid designated waste – Non-hazardous	Auxiliary cooling tower and boiler blowdown	TBD	Routine	Evaporation ponds	Evaporation Pond solids disposal at permitted waste management facility
Auxiliary cooling tower basin sludge – Non-hazardous	Auxiliary cooling tower	4,000 pounds/ year	Annually	Evaporation ponds	Evaporation Pond solids disposal at permitted waste management facility
Spent softener resin – Non hazardous	Softener	2,000 ft^3	Once every 3 years	None	Recycle
Damaged parabolic mirrors – Non-hazardous	Metals and other materials	TBD	Variable	None	Recycle for metal content and/or other materials or send for landfill disposal
Sanitary wastewater – Non-hazardous	Toilets, washrooms	11,000 gallons/ day	Continuous	Septic leach field	None

[a] Classification under Title 22 CCR Division 4.5, Chapters 11, 12, and 23.

4.11.3.4 Cumulative Impacts in the Project Area

A value of 100 cubic yards/MW was used as a rough guide for determining total volume of non-hazardous solid wastes that could result from implementation of all the projects listed in the two tables based on volumes of non-hazardous waste generated by similar facilities. Similar to the proposed projects, these quantities do not include closure or decommissioning wastes; disposal at landfills with adequate capacity would be a condition in facility closure plans. The approximately 450,000 cubic yards generated from projects in the cumulative scenario within the cumulative impacts area compares to the 150,000,000 cubic yards of Riverside County Class III landfill capacity available to these generators (RSA, 2010). The GSEP project wastes would be generated in modest quantities (10 cubic yards or 1 to 2 tons per week), waste recycling would be employed wherever practical, and sufficient capacity is available at several disposal facilities to handle the volumes of wastes that would be generated by the project. The Proposed Action's incremental effective of solid waste disposal is not cumulatively considerable and would have no cumulative impact on existing projects.

4.11.3.5 Cumulative Impacts in the California Desert

Implementation of the multiple solar and wind projects proposed to be developed in the California Desert, and other planned non-energy projects, would result in an increase in generation of hazardous and non-hazardous solid and liquid waste and would add to the total quantity of waste generated in throughout the desert. However, GSEP-specific wastes would be recycled wherever practical and sufficient capacity is available throughout the area, especially with the addition of the Mesquite Regional Landfill with a capacity of 600 million tons and scheduled to be fully operational in 2011/2012 (Mesquite Regional Landfill 2010). Therefore, impacts of the GSEP, when combined with impacts of the future solar and wind, and other development projects currently proposed within the California desert would not result in significant adverse and unavoidable cumulative impacts with regard to waste management.

In sum, incremental impacts of the GSEP could combine with impacts of past, present, and reasonably foreseeable projects to result in a contribution to local and regional cumulative impacts related to waste management. The amount of non-hazardous and hazardous wastes generated during construction, operation and closure/decommissioning of the GSEP project would add to the total quantity of hazardous and non-hazardous waste generated in Riverside County. However, sufficient capacity is available at treatment and disposal facilities to handle the volumes of wastes that would be generated by the combined projects. The impacts for the alternatives would vary, and be proportional to the size of the project.

4.11.3.6 Summary of Mitigation Measures

Implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following address impacts on non-hazardous waste:

WASTE-1, WASTE-2, WASTE-3, WASTE-4, WASTE-5, WASTE-6, WASTE-7, WASTE-8, WASTE-9, WASTE-10, WASTE-11

4.11.3.7 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.3.8 Unavoidable Adverse Impacts

None are expected.

4.11.4 Unexploded Ordnance (UXO)

UXO presents an immediate risk of acute physical injury from fire or explosion resulting from accidental or unintentional detonation. As discussed in Section 3.12, one 50-caliber cartridge was identified during the biological and cultural resources surveys across the GSEP site.

4.11.4.1 Impact Assessment Methodology

Review of historical uses of the site, generally-accepted risk information that is widely-available from a multitude of internet sources, and analysis included in the CEC's Revised Staff Assessment all contributed to the analysis of potential UXO-related impacts associated with development of the Proposed Action.

4.11.4.2 Discussion of Direct and Indirect Impacts

Proposed Action

During construction, maintenance, and closure and decommissioning activities associated with the Proposed Action, land disturbance activities could unearth unexploded World War II-era and more recent vintage munitions, including conventional and unconventional land mines, personnel mines, and bullets, the detonation of which would pose a safety risk to the construction workers. For example, surface and shallow sub-surface UXO could be disturbed by vehicles, walkers and excavation using shovels or similar hand tools, and deeper sub-surface UXO could be disturbed by the earth movement and excavation processes that would be required for development of the Proposed Action.

Alternatives

Action Alternatives, No Action Alternative A, and No Project Alternative C

Risks associated with accidental or unintentional detonation of UXO would be equally applicable for all of the alternatives pursuant to which ground disturbance could occur consistent with the CDCA Plan, including No Action Alternative A and No Project Alternative C, regardless of whether such disturbance related to the development of a renewable energy project.

No Project Alternative B

Because the selection of Alternative B would not be expected to result in ground disturbance, no UXO-related risks are anticipated to be associated with this alternative.

4.11.4.3 Discussion of Cumulative Impacts

Although accidental or unintentional detonation of UXO in the vicinity of the Proposed Action constitutes a continuing risk of immediate, acute physical injury from fire or explosion, the incremental UXO-related risks of projects in the cumulative scenario could not combine in a way that would be additive, countervailing or synergistic. Consequently, there would be no significant UXO-related cumulative impacts associated with the Proposed Action.

4.11.4.4 Summary of Mitigation Measures

A program for identifying UXO would be implemented during construction which would be sufficient to ensure proper handling of UXO in the unlikely event of encountering any (GSEP 2009f, Data Response Items 226 and 227).

4.11.4.5 Residual Impacts after Mitigation Measures were Implemented

Even with the implementation of the Mitigation Measure identified above, a risk of accidental or unintentional detonation of UXO would remain, resulting in a continuing risk of immediate, acute physical injury from fire or explosion.

4.11.4.6 Unavoidable Adverse Impacts

Unavoidable adverse impacts would be the same as the residual impacts discussed above.

4.11.5 Abandoned Mined Land (AML)

As stated in Section 3.12.5, there are no abandoned mine openings near or within the GSEP area. Thus, no AML-related direct or indirect impacts would result from the GSEP or alternatives, no mitigation measures would reduce impacts, and no cumulative impacts, residual impacts, or unavoidable adverse impacts on AML would result.

4.11.6 Undocumented Immigrants (UDI)

As stated in Section 3.12.6, there are no known incidents with UDI at or near the project area. Thus, no UDI-related direct or indirect impacts would result from the GSEP or alternatives, no mitigation measures would reduce impacts, and no cumulative impacts, residual impacts, or unavoidable adverse impacts on AML would result.

4.11.7 Transmission Line Safety and Nuisance

4.11.7.1 Impact Assessment Methodology

The potential magnitude of the line impacts of concern depends on compliance with the listed design-related LORS and industry practices (**Table 1-1**). These LORS and practices have been established to maintain impacts below hazard thresholds. Thus, if the Proposed Action would comply with applicable LORS, then it would remain below such thresholds.

4.11.7.2 Direct and Indirect Impacts

Proposed Action

This analysis assesses whether the GSEP's transmission line would constitute a public health and safety hazard in the areas around the proposed route as it runs between the site and the Southern California Edison's (SCE's) planned Colorado River Substation 6.5 miles to the east. The power generated by GSEP would be transmitted using an overhead single-circuit 230-kilovolt (kV) line. The SCE substation would be built by SCE under the jurisdiction of the California Public utilities Commission (PUC) and the BLM. Therefore, this analysis focuses on the proposed GSEP tie-in line and the related on-site 230-kV switchyard and not the proposed Colorado River Substation. Since the proposed line would be built and operated within the SCE service area, it would be designed, built, and operated according to SCE's guidelines. The potential impacts of concern in this analysis are those to be encountered along the proposed route and focuses on the following issues taking into account both the physical presence of the line and the physical interactions of its electric and magnetic fields:

1. aviation safety;
2. interference with radio-frequency communication;
3. audible noise;
4. fire hazards;
5. hazardous shocks;
6. nuisance shocks; and
7. electric and magnetic field (EMF) exposure.

Aviation Safety

The nearest airport to the project and related line is the Blythe Airport approximately 15 miles east of the project and 10 miles east of the proposed tie-in line meaning that the airport would be too far away for the project to pose a collision hazard to area aviation according to FAA criteria. Furthermore, the line support structures would, at less than 145 feet would be significantly less than the 200 feet in height that triggers the FAA concern over collision hazards. Therefore, no mitigation is necessary.

Interference with Radio-Frequency Communication

The Proposed Action transmission line would be built and maintained in keeping with standard SCE practices that minimize surface irregularities and discontinuities and related corona noise. Such corona effects would further be minimized by the specific low-corona designs proposed by the Applicant. Since the line would traverse an uninhabited open space, corona-related radio-frequency interference or related complaints is not anticipated to occur and no mitigation is necessary.

Audible Noise

Since the noise level depends on the strength of the line electric field, the potential for perception could be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, mainly from overhead lines of 345 kV or higher such as the proposed line. Research by the Electric Power Research Institute (EPRI 1982) has validated the efficacy of available mitigation measures by showing that the fair-weather audible noise from all modern transmission lines even of more than 345 kV would be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the proposed low-corona design is also aimed against surface electric fields, staff does not expect the proposed line operation to add significantly to current background noise levels in the project area. For an assessment of the noise from the proposed line and related facilities, please refer to staff’s analysis in Section 4.9.

Fire Hazards

Potential fire hazards would be addressed through the related LORS in Table 1-1. Such hazards would be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Hazardous and Nuisance Shocks

Operation of the proposed transmission line could result in hazardous and/or nuisance shocks. For the proposed line, the Applicant would be responsible in all cases for ensuring compliance with these grounding-related practices within the ROW.

Electric and Magnetic Field Exposure

While EMF hazards have not been established from the available evidence, the absence of such evidence does not serve as proof of a definite lack of a hazard. Therefore, it is appropriate, in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability of the proposed line.

Alternatives

Action Alternatives

Construction and operation of the Reduced Acreage Alternative and Dry Cooling Alternative would have the same transmission line safety and nuisance impacts to those analyzed for the Proposed Action because the transmission line under these alternatives would follow the same route.

No Action Alternative A and No Project Alternative C

Under No Action Alternative A, the Proposed Action would not be implemented, but the land on which the GSEP is proposed would become available to other uses that are consistent with BLM's land use plan, potentially including other renewable energy projects. Under No Project Alternative C, the Proposed Action would not be implemented, but BLM would allow for other solar projects on the site. Under these No Action/No Project scenarios, other renewable energy projects may be constructed to meet state and federal mandates, and those projects would likely require transmission lines that would have similar transmission line safety and nuisance impacts to the Proposed Action.

No Project Alternative B

Under No Project Alternative B, the Proposed Action would not be implemented and BLM would make the area unavailable for future solar development. Under this No Project scenario, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site. However, it is possible that other uses consistent with the site's CDCA Plan classification could require transmission lines that would have similar transmission line safety and nuisance impacts to the Proposed Action.

4.11.7.3 Cumulative Impacts

Incremental impacts of construction, operation, maintenance and decommissioning of the GSEP could contribute to a cumulative effect on transmission line safety and nuisance when considered in combination with additional transmission lines that would be associated with the cumulative projects (see Section 4.1). The cumulative impacts area for potential cumulative transmission line safety and nuisance impacts would be limited to the immediate vicinity of the proposed line. The relevant timeframe within which incremental impacts could interact to cause or contribute to cumulative impacts would begin when the proposed line is erected and would last for as long as the line remains in place. This time period very likely could extend past the point of site closure and decommissioning of the GSEP.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3. Direct and indirect effects of the GSEP and alternatives are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. It is unlikely that transmission lines associated with the cumulative projects would be sited in the immediate vicinity of the transmission line of the Proposed Action. Therefore, cumulative impacts are not anticipated to result from the Proposed Action. None of the alternatives is expected to cause or contribute to any cumulative transmission line safety and nuisance impacts, because, if a line is built pursuant to the alternative, incremental impacts would be the same as those of the Proposed Action and, if no line is built, no line-related impacts would result.

Regarding EMF exposure, when field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or countervailing, depending on prevailing conditions. Since the Proposed Action's transmission line would be designed, built, and operated according to applicable SCE field-reducing guidelines (as currently required by the CPUC for effective field management), any contribution to cumulative area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. The action alternatives would contribute to cumulative EMF conditions, as could No Action/No Project Alternative scenarios that might include a transmission line. If no transmission line were developed, pursuit of the alternative would not generate EMF.

4.11.7.4 Summary of Mitigation Measures

The implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following mitigation measures address impacts on transmission line safety and nuisance:

TLSN-1, TLSN-2, TLSN-3, TLSN-4

4.11.7.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.7.6 Unavoidable Adverse Impacts

None are expected.

4.11.8 Traffic and Transportation Safety

4.11.8.1 Impact Assessment Methodology

The Traffic and Transportation analysis focuses on:

1. Whether construction and operation of the Genesis Solar Energy Project (GSEP) would result in traffic and transportation impacts
2. Whether the GSEP would be in compliance with applicable LORS (see Table 1-1).

In this analysis potential impacts are identified related to the construction and operation of GSEP on the surrounding transportation systems and roadways, and, when applicable, 6mitigation measures are proposed.

4.11.8.2 Direct and Indirect Impacts

Roadway Safety

In addition to the standard equipment, several pieces of equipment that exceed roadway or size limits would need to be transported to the GSEP site via I-10 during construction. This equipment includes the steam turbine generator and main transformers. The equipment would be transported using multi-axle trucks from US-95 to I-10.

To transport the equipment, the Applicant must obtain special ministerial permits from Caltrans to move oversized or overweight materials. In addition, the Applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts, including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary.

Hazardous materials to be used by GSEP consist of heat transfer fluid (Therminol VP-1™) as well as diesel fuel, mineral insulating oil, and lube oil. Tanker trucks would use I-10 to make deliveries to the site. Federal and state regulations include specific procedures for transporting hazardous materials. See Table 1-1 for information about applicable LORS.

Alternatives

Action Alternatives

Construction and operation of the Reduced Acreage Alternative and Dry Cooling Alternative would have similar aviation and roadway safety impacts as those described for the proposed GSEP since the facilities under these alternatives would generally be the same, with only a reduction of one solar unit or a 50 percent reduction in the overall acreage. Therefore, there would be no substantial change in impacts from a roadway safety perspective under these alternatives.

No Action Alternative A and No Project Alternative C

Under No Action Alternative A, the site would become available to other uses that are consistent with BLM’s land use plan, including another solar project. Under No Project Alternative C, the Proposed Action would not be implemented and BLM would allow for other solar projects on the site. Under these No Action/No Project scenarios, other renewable energy projects could be constructed to meet state and federal mandates, and those projects would likely require construction activities and facilities that would have similar aviation and roadway safety impacts to the Proposed Action.

No Project Alternative B

Under No Project Alternative B, the Proposed Action would not be implemented and BLM would make the area unavailable for future solar development. Under this No Project scenario, it is expected that the site would remain in its existing condition, with no new structures or facilities constructed or operated on the site. However, other uses consistent with the CDCA Plan use classification could be developed on the site. Such other uses could cause similar, greater or lesser aviation and roadway safety impacts than the Proposed Action.

4.11.8.3 Cumulative Impacts

Incremental traffic and transportation-related safety impacts resulting from construction, operation, maintenance and decommissioning of the GSEP could result in a cumulative effect in combination with past, present, or reasonably foreseeable future actions. The cumulative impacts area for traffic and transportation-related safety consists of the I-10 corridor. This geographic scope of cumulative impacts analysis was established based on the natural boundaries of the affected resources, i.e., where on-road traffic and transportation impacts of the Proposed Action could occur. Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3. Direct and indirect effects of the GSEP and alternatives are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Within the cumulative impacts area for traffic and transportation-related safety, there are 13 solar projects proposed along the I-10 corridor predominantly between Desert Center and Blythe. Based on the currently available data for these various projects (information obtained from Plans of Development and other project documents), and assuming all projects move forward, these projects would be under construction in the same general time frame as the Proposed Action (2011 to 2016). Other types of projects also could proceed during this timeframe and, thereby, affect the I-10 corridor.

Of these projects, two, in addition to the Proposed Action, are parabolic trough projects (i.e., the Blythe and Palen Solar Power Projects). Each would be anticipated to contribute incremental impacts that are similar in type, duration and intensity as the Proposed Action.

4.11.8.4 Summary of Mitigation Measures

The implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the GSEP also would avoid or reduce impacts. These mitigation measures are set forth in Appendix G. The following mitigation measures address impacts on transportation safety:

TRANS-1 TRANS-2, TRANS-3, TRANS-4, TRANS-5

4.11.8.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.8.6 Unavoidable Adverse Impacts

None are expected.

4.11.9 Worker Safety and Fire Protection

4.11.9.1 Impact Assessment Methodology

Two issues are assessed in Worker Safety-Fire Protection:

1. The potential for impacts on the safety of workers during demolition, construction, and operations activities, and

2. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by Cal/OSHA regulations. If all LORS are followed, workers will be adequately protected.

Regarding fire prevention matters, the on-site fire-fighting systems proposed by the Applicant have been analyzed and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, additional measures would be recommended. The local fire department capabilities and response time in each area have been reviewed and interviews have been conducted with local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant.

Other workplace hazards that could be associated with the Proposed Action are less traditionally industrial, and more specific to the nature of a utility-scale solar energy generation plant. This solar power plant would provide a work environment that includes a solar field located in the high desert. The solar field features thousands of mirrors that heat a heat transfer fluid (HTF) to approximately 750°F. The pipe containing the HTF will reach temperatures at the mirror focal point as high as 1,100 °F. Experience at existing solar generating stations shows that these mirrors break, the pipes age, and HTF can leak and catch fire from ball joints or frayed flex hoses. The area under the solar arrays must be kept free from weeds and thus herbicides will be applied as necessary. Exposure to workers via inhalation and ingestion of dusts containing herbicides poses a health risk. Finally, workers will inspect the solar array for HTF leaks and broken mirrors at least once each day by driving up and down dirt paths between the rows of mirrors and even under the mirrors. Cleaning the mirrors will also be conducted on a routine schedule. All these activities will take place year-round and especially during the summer months of peak solar power generation, when outside ambient temperatures routinely reach 115°F and above.

Consequently, it would be particularly important for the Applicant to have well-defined policies and procedures, training, and hazard recognition and control at GSEP facilities to minimize such hazards and protect workers. If the GSEP complies with all applicable LORS (Table 1-1), workers would be adequately protected from health and safety hazards.

Construction Safety and Health Program

Workers at the GSEP would be exposed to hazards typical of construction, operation and decommissioning of a solar thermal electric power generating facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements have been promulgated by Cal/OSHA, would apply to the construction phase of the Proposed Action, and would require the development of a Construction Safety and Health Program. Such a program would include the following:

1. Construction Injury and Illness Prevention Program (8 CCR 1509)

2. Construction Fire Prevention Plan (8 CCR 1920)
3. Personal Protective Equipment Program (8 CCR 1514 — 1522)
4. Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 CCR 3200-6184), Electrical Safety Orders (8 CCR 2299-2974) and Unfired Pressure Vessel Safety Orders (8 CCR 450-544) would include:

1. Electrical Safety Program
2. Motor Vehicle and Heavy Equipment Safety Program
3. Forklift Operation Program
4. Excavation/Trenching Program
5. Fall Protection Program
6. Scaffolding/Ladder Safety Program
7. Articulating Boom Platforms Program
8. Crane and Material Handling Program
9. Housekeeping and Material Handling and Storage Program
10. Respiratory Protection Program
11. Employee Exposure Monitoring Program
12. Hand and Portable Power Tool Safety Program
13. Hearing Conservation Program
14. Back Injury Prevention Program
15. Ergonomics Program
16. Heat and Cold Stress Monitoring and Control Program
17. Hazard Communication Program
18. Lock Out/Tag Out Safety Program
19. Pressure Vessel and Pipeline Safety Program
20. Solar Components Safe Handling Program

Operations and Maintenance Safety and Health Program

Prior to the start of operations at GSEP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

1. Injury and Illness Prevention Program (8 CCR 3203)
2. Fire Protection and Prevention Program (8 CCR 3221)
3. Personal Protective Equipment Program (8 CCR 3401-3411)
4. Emergency Action Plan (8 CCR 3220)

In addition, the requirements under General Industry Safety Orders (8 CCR 3200-6184), Electrical Safety Orders (8 CCR 2299-2974) and Unfired Pressure Vessel Safety Orders (8 CCR 450-544) would apply to the Proposed Action. Written safety programs for GSEP, which the Applicant would develop, would ensure compliance with the above-mentioned requirements and would assure that the impacts that otherwise could occur would be avoided or sufficiently minimized.

Safety and Health Program Elements

Elements for both a Construction Safety and Health Program and an Operations Safety and Health Program are described above. The measures in these plans are derived from applicable sections of state and federal law. Both safety and health programs would be comprised of six more specific programs and would require major items detailed in the following paragraphs.

Injury and Illness Prevention Program

The IIPP would include the following components as presented in the AFC (GSEP 2009a, Section 5.14.2):

1. Identity of person(s) with authority and responsibility for implementing the program;
2. Safety and health policy of the plan;
3. Definition of work rules and safe work practices for construction activities;
4. System for ensuring that employees comply with safe and healthy work practices;
5. System for facilitating employer-employee communications;
6. Procedures for identifying and evaluating workplace hazards and developing necessary program(s);
7. Methods for correcting unhealthy/unsafe conditions in a timely manner;
8. Safety procedures; and
9. Training and instruction.

Fire Protection

Although the need for fire department response to solar power plants is not expected to be frequent, experience has shown that there is a significant chance that response needs could arise. Development of the Proposed Action would be subject to requirements of the Riverside County Fire Department (RCFD), including access requirements. Further, implementation of the Proposed Action could require response or assistance from the RCFD’s hazardous materials response team, advanced life support/ paramedic services, or disaster preparedness and response during construction, operation and maintenance, or closure and decommissioning. The number of workers on site or traveling to and from the site for the project, and thereby could require RCFD assistance, is discussed in Section 4.13, Social Economics. The types of hazards that could trigger the need for an RCFD response are discussed above. The Applicant would develop and implement a fire prevention program for the GSEP and would be required to fund capital improvements and staffing for the RCFD. The Applicant also has coordinated with the Riverside County Fire Department to establish the level of fire-related risk that would be associated with the GSEP and to determine the appropriate level of response capability commensurate with that risk and consistent with applicable safety regulations. Based on this planning and coordination, the Proposed Action would not be expected to cause access-related difficulties for the RCFD or adversely affect its response capability.

Further, compliance with applicable LORS would avoid or reduce the potential for workplace accidents that otherwise would require emergency responders. For example, California regulations applicable to the Proposed Action would require the Applicant to prepare an Operations Fire Prevention Plan (8 CCR 3221) to determine general program requirements (scope, purpose, and applicability) and potential fire hazards; to develop good housekeeping practices, proper handling and materials storage, potential ignition sources and control measures for these sources, and the persons who would be responsible for equipment and system maintenance; to locate portable and fixed fire-fighting equipment in suitable areas; to establish and determine training and instruction requirements; and to define recordkeeping requirements. Applicable regulations also would require preparation of a Personal Protective Equipment (PPE) and first aid supplies whenever hazards are present that, due to process, environment, chemicals or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 CCR 3380-3400). All safety equipment would have to meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards, and would carry markings, numbers, or certificates of approval. Respirators would meet NIOSH and Cal/OSHA standards. Each employee would be provided with the following information pertaining to the protective clothing and equipment: Proper use, maintenance, and storage; when to use the protective clothing and equipment; benefits and limitations; and when and how to replace the protective clothing and equipment. Compliance with the PPE Program would ensure that the Applicant complies with applicable PPE requirements and provides employees with the information and training necessary to protect them from potential workplace hazards. Further, applicable regulations would require an Emergency Action Plan (8 CCR 3220), which would outline an emergency action plan (GSEP 2009a, Section 5.14.1). It is expected that the Emergency Action Plan would identify roles and responsibilities; determine emergency incident response training; develop emergency response protocols; specify evacuation protocols; define post emergency response protocols; and determine notification and incident reporting. Additional LORS) called *safe work practices* would apply to the Proposed Action. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs would include, but not be limited to, the programs discussed above. Employee safety training would include safe work practices.

Alternatives

Action Alternatives

Construction and operation of the Reduced Acreage Alternative and Dry Cooling Alternative would have similar worker safety impacts as those described for the Proposed Action since the facilities under these alternatives would generally be the same, with only a reduction of one solar unit or a 50 percent reduction in the overall acreage. Therefore, there would be no substantial change in impacts associated with worker safety under these alternatives.

No Action Alternative A and No Action Alternative C

Under No Action Alternative A, the site would become available to other uses that are consistent with BLM's land use plan, potentially including another solar project. Under No Project Alternative C, the Proposed Action would not be implemented and BLM would allow for other solar projects on the site. Under these No Action/No Project scenarios, other renewable energy projects could be constructed to meet state and federal mandates, and would likely require construction activities and facilities that would have similar worker safety impacts to the Proposed Action.

No Project Alternative B

Under No Project Alternative B, the site would be unavailable for future solar development. Under this No Project scenario, it is expected that the site would remain in its existing condition. However, other uses consistent with the CDCA Plan multiple use classification could be developed or occur. Such other activities could cause similar, greater or lesser worker safety impacts relative to the Proposed Action.

4.11.9.2 Cumulative Impacts

Incremental worker safety-related impacts of the GSEP would result in a risk level that would remain below thresholds of concern and, therefore, would not cause or contribute to any cumulative effect on worker safety. Regardless of the level of solar development or acreage developed under either of the action alternatives, the utility-scale solar energy development that would result would be subject to the same worker safety requirements as the Proposed Action and, therefore, also would not result in a risk level that could cause or contribute to any cumulative effect on such safety. The No Action/No Project Alternatives are not expected to require workers, and so would not be expected to affect worker safety.

For the fire safety-related issues of emergency medical and hazardous materials spill response, the incremental impacts of the GSEP could result in a cumulative effect when combined with the incremental impacts of other projects in the cumulative scenario. More specifically, a cumulative Worker Safety/Fire Protection impact would occur in the event of a simultaneous need for a fire department to respond to multiple locations such that its resources and those of the mutual aid fire departments (which routinely respond in every-day situations to emergencies at residences, commercial buildings, and heavy industry) are over-whelmed and cannot effectively respond. For purposes of this analysis, the cumulative impacts area for fire safety-related resources consists of the RCFD’s service area. Potential cumulative fire safety-related effects could occur over the course of 40 or more years, encompassing the entire lifespan of the GSEP, from construction and operation and maintenance, through closure and decommissioning, since people could be on, or en route to, the site throughout this timeframe.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3. Direct and indirect effects of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1 and include existing locations that might require a fire department response as well as facilities proposed for construction, operation or demolition. Any such location within the cumulative impacts area could require response from off-site fire departments for fire, hazardous materials, or emergency medical service emergencies. Cumulative impacts could occur despite the many safeguards implemented to both prevent and control fires, hazardous materials releases, and injuries/accidents, because of the great distances involved in response and expansive sites. Although the chances of two or more solar power plants requiring emergency response simultaneously may be low, a response to one distant site could impede or preclude a simultaneous response to another solar plant, residential or commercial location, or other location in demand. However, while cumulative impacts theoretically are possible, they are not likely given the 14-stations located within the RCFD's service area and mutual aid agreements. Emergency response capabilities would be adequate.

4.11.9.3 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the CEC as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following would address impacts on worker safety/fire safety:

> WORKER SAFETY-1, WORKER SAFETY-2, WORKER SAFETY-3, WORKER SAFETY-4, WORKER SAFETY-5, WORKER SAFETY-6, WORKER SAFETY-7, WORKER SAFETY-8, WORKER SAFETY-9

4.11.9.4 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.9.5 Unavoidable Adverse Impacts

None are expected.

4.11.10 Public and Private Airstrips/Airfields

As stated in Section 3.12.10, the nearest public airstrip is located approximately 15 miles east of the GSEP site. Thus, no aviation-related direct or indirect impacts would result from the GSEP or alternatives, no mitigation measures would reduce impacts, and no cumulative impacts, residual impacts, or unavoidable adverse impacts on aviation would result.

4.11.11 Geologic Hazards

4.11.11.1 Impact Assessment Methodology

The Proposed Action and alternatives are evaluated qualitatively in terms of their susceptibility to geologic and seismic hazards. Potential effects on these resources are assessed based upon existing publications and maps completed by regulatory agencies, such as the United State Geological Survey, California Geologic Survey, California Division of Mines and Geology and geotechnical engineers who have evaluated the site. The potential for damage to proposed structures or increased risk of injury due to geologic hazards is analyzed using available data from the aforementioned sources. In addition, the conclusions and recommendations provided in the geotechnical investigation are evaluated, and, where appropriate, incorporated into the analysis. Ground shaking, expansive soils, and hydrocompaction represent the main geological hazards at the proposed site.

The following issues were considered in the analysis of impacts related to geology and soils for the proposed action and each alternative:

1. Accelerated and/or environmentally harmful soil erosion;
2. Damage to project elements or increased exposure of the public to risks from rupture of a known earthquake fault;
3. Injury, death, or property damage as a result of earthquake induced ground deformations (e.g. lateral spreading, subsidence, liquefaction, or collapse), or otherwise unstable soils;
4. Injury, death, or property damage as a result of an onsite or offsite landslide;

4.11.11.2 Impact Analysis

Proposed Action

Groundshaking

The occurrence of relatively large earthquakes in the Mojave region demonstrates that the site is likely to be subject to moderately intense earthquake-related ground shaking in the future over the life of the GSEP. The anticipated level of shaking, based on the estimated peak ground acceleration (PGA) value at the site (see Section 3.12.11) could result in slight damage to older structures and would not likely result in damage to newer structures built according to current design standards. Several laws and policies impose stringent seismic safety requirements on the design and construction of new structures (see **Table 1-1**). While ground-shaking at the site would not constitute a major effect, mitigation should be implemented to the extent practical through structural designs consistent with the California Building Code and the site-specific geotechnical report that would be required for the GSEP to minimize risks associated with severe ground-shaking.

Secondary Earthquake Hazards.

Because the ground water table is greater than 40 feet deep across the property, and the shallow granular soils are very dense, the potential for liquefaction-induced settlement beneath the site during moderate seismic events is considered to be very low. Measures to mitigate significant damage due to liquefaction should be presented in a design-level, site-specific geotechnical report.

Because the proposed GSEP site is not subject to catastrophic liquefaction-induced settlement, the potential for lateral spreading during seismic events would be negligible due to the low relief and very shallow slopes at the proposed site surface. Lateral spreading potential on the proposed GSEP site should be addressed in a design-level project geotechnical report.

Subsidence and Settlement

The potential for local or regional ground subsidence resulting from petroleum, natural gas, or ground water extraction is considered to be very low. Local subsidence or settlement may also occur when areas containing compressible soils are subjected to foundation or fill loads. The relative density of site granular soils was determined to be very dense based on available penetration resistance blow counts in the preliminary geotechnical investigation (GSEP 2009f). Very dense soils are unlikely to experience significant subsidence due to foundation loading.

Hydrocompaction

The initial site geotechnical investigation indicates that subsurface alluvial deposits which underlie the proposed project linears contain soils that may experience hydrocompaction (GSEP 2009f). The final geotechnical site evaluation should further investigate the potential for hydrocompaction within the proposed project site and along its linears and, if necessary, provide design parameters necessary to mitigate hydrocompaction issues.

Expansive Soils

The preliminary geotechnical evaluation indicates near-surface soils at the proposed site are composed of granular soils with a low content of non-plastic fines, which are not considered to be expansive (GSEP 2009a). However, expansive clay soils were encountered at relatively shallow depths in the single boring located 1.5 miles west of proposed construction and could be present at shallow depths beneath the site. A site-specific, design-level geotechnical site investigation would further evaluate the presence of expansive soils within the proposed project site and along its linears and, if necessary, will provide routine design recommendations to mitigate expansive soil issues (GSEP 2009a).

Erosion

The preliminary stages of construction, especially site grading, excavation, and soil stockpiling would leave loose soil exposed to the erosive forces of rainfall and high winds. Because soil surface disturbance for the proposed project would be greater than one acre, specific erosion control measures would be identified as part of the National Pollutant Discharge Elimination System (NPDES) General Construction permit and Storm Water Pollution Prevention Plan (SWPPP) required for construction. During construction, erosion control measures would be implemented that utilize Construction Water Quality Best Management Practices (BMPs) to avoid or minimize soil erosion and off-site sediment transport. Examples of typical construction BMPs include scheduling or limiting activities to certain times of the year, in particular to avoid flash floods; installing sediment barriers such as silt fence and fiber rolls along the perimeter of the active construction area; maintaining equipment and vehicles used for construction; and developing and implementing a spill prevention and cleanup plan. The SWPPP (and associated BMPs) would be prepared and implemented prior to commencing construction, and BMP effectiveness would be ensured through the sampling, monitoring, reporting, and record keeping requirements contained in the construction general permit. In addition, the general construction permit required under the NPDES program would require that the topsoil be preserved in areas requiring grading in order to ensure proper implementation of post-construction BMPs for site restoration. Therefore, substantial or accelerated soil erosion or loss of topsoil during and following construction would be minor.

In sum, the main geologic hazards at this site include ground shaking, earthquake inducted settlement, hydrocompaction, expansive soils, and erosion. These potential hazards could be mitigated effectively through facility design by incorporating recommendations contained in a design-level geotechnical report.

Alternatives

Action Alternatives

The geologic units that would be disturbed by the Reduced Acreage Alternative and Dry Cooling Alternative are the same as those that would be disturbed by the Proposed Action. Each of the action alternatives would have similar geographic and physical relationship of faults and major geologic features. The main geologic hazards for each of the action alternatives would include ground shaking, hydrocompaction, earthquake induced settlement, expansive soils, and erosion. Therefore, no changes to the levels of impact, beyond those discussed for the proposed action, would be anticipated for either the Reduced Acreage Alternative or Dry Cooling Alternative.

No Action Alternative A

If No Action Alternative A were selected, the construction and operational impacts of the GSEP would not occur. There would be no grading of the site and no installation of power generation and transmission equipment. Geologic hazards would not affect public health and safety under No Action Alternative A.

No Project Alternative B

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, impacts related to geology could result from the construction and operation of a solar technology and would likely be similar to the impacts from the Proposed Action. Different solar technologies require different amounts of grading and maintenance; however, it is expected that all the technologies would require some grading and maintenance. As such, No Project Alternative B could result in impacts similar to those of the Proposed Action.

No Project Alternative C

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the geologic conditions of the site would not be expected to change noticeably from existing conditions and, as such, No Project Alternative C would not result in impacts to geologic resources that could occur during construction of the Proposed Action. However, in the absence of the GSEP, other renewable energy projects could be constructed to meet State and Federal mandates, and could have similar, or greater or lesser, impacts than the Proposed Action depending on their ultimate location.

4.11.11.3 Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the GSEP could result in a cumulative effect in connection with geologic resources and hazards with other past, present, or reasonably foreseeable future actions. Impacts associated with strong ground shaking and earthquake-induced settlement, hydrocompaction, and expansive soils are not cumulative in nature and would not add to potential cumulative impacts to the facility. Potential cumulative effects on geologic resources and hazards could occur at any time during the lifespan of the GSEP, from construction to decommissioning.

Existing conditions within the cumulative impacts assessment area of geologic resources and hazards reflect a combination of the natural condition and the effects of past actions and are described in Chapter 3. Direct and indirect effects of the GSEP are analyzed above. Briefly, however, the construction of the GSEP is not expected to require any significant amount of groundwater pumping; thus, impacts to regional subsidence are not expected. Construction of the GSEP is expected to cause minor and temporary contribution to erosion. The operation of the GSEP is expected to result in about a 200-ac-ft/yr increase in annual groundwater pumping. Since operation of the GSEP would only contribute a minor amount of additional groundwater withdrawal to the overall amount in the Chuckwalla Valley groundwater basin and since this cumulative amount is only a fraction of historic pumping levels that did not result in any documented subsidence, operation of the GSEP is not expected to impact regional subsidence in the Chuckwalla groundwater basin. Operation of the GSEP is not expected to require any significant excavation or grading such that cumulative impacts to soil resources are not expected. Finally, decommissioning of the GSEP is not expected to require any significant amount of groundwater pumping; impacts to regional subsidence are not expected. Decommissioning of the GSEP would include excavation and grading at the site. Compliance with the required NPDES General Construction Permit and proper implementation of applicable BMPs would insure that any erosion impacts are minor.

Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Although minor, the GSEP could contribute to cumulative geologic resource and hazard conditions.

Subsidence and Settlement

The cumulative change in storage over the construction and operational period (33 years) would amount to approximately -57,000 af, which would equate to less than 0.5 percent of the total amount of the estimated total recoverable groundwater in storage (15,000,000 af). However, the amount of water that is storage (estimated to be as much as 15,000,000 af) in the basin greatly exceeds the amount of cumulative overdraft (57,000 af). Additional information on groundwater withdrawal is contained in Section 4.19, Water Resources.

Erosion

Erosion resulting from implementation of past, present and reasonably foreseeable projects could result in impacts to soil and water resources. Increased development and areas covered with impervious surfaces in the vicinity of the GSEP could result in decreased stormwater infiltration. Decreased infiltration corresponds to increased runoff and erosion potential. Stormwater quality is regulated under the NPDES program. It is expected that all development projects in the vicinity of the GSEP would have to comply with NDPES program requirements, regardless of whether they fall under the primary jurisdiction of a federal, state or local agency. As a result, each project would implement BMPs, such as those discussed above, during and after construction in order to minimize erosion. Therefore, no substantial cumulative contribution to erosion is expected to result from the cumulative projects, including the GSEP.

Based on the above discussion, the potential for adverse cumulative impacts to the Proposed Action from geologic hazards during the project's design life is negligible and that the potential for impacts to geologic resources is very low. For the reasons discussed above, impacts of alternatives to the GSEP could contribute to cumulative geologic conditions and hazards in proportion to the extent to which they affect such conditions.

4.11.11.4 Summary of Mitigation Measures

Implementation of the mitigation measures imposed by the CEC as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following address impacts associated with geologic hazards:

CIVIL-1, CIVIL-2, CIVIL-3, CIVIL-4

STRUC-1

SOIL&WATER-1

4.11.11.5 Residual Impacts after Mitigation Measures were Implemented

None are expected.

4.11.11.6 Unavoidable Adverse Impacts

None are expected.

4.12 Impacts on Recreation

4.12.1 Impact Assessment Methodology

The GSEP is analyzed for its effects on recreational resources by assessing the impacts to land acreage as well as types of known recreational uses including hiking, backpacking and long term camping.

4.12.2 Discussion of Direct and Indirect Impacts

Proposed Action

For impacts to OHV users see Section 4.16 *Impacts on Transportation and Public Access – Off-Highway Vehicle Resources*.

Dispersed recreational activities and experiences on approximately 1746 acres within the footprint of the proposed action would be eliminated. While camping has not been observed in the project area by BLM Rangers, day users, hikers and RV campers would no longer be able to use the area if such recreation were desired. Construction associated noise, fugitive dust, truck and other vehicle movement, and visual intrusions may also impact visitors off-site but nearby, seeking experiences in a natural setting. Recreationists may compensate by substituting other desert lands in the vicinity for their recreational experiences and benefits. This could lead to higher user levels on adjacent public lands open for recreation use. Given the low recreation use on adjacent lands with similar resources or opportunities, additional impacts from displacement would be minimal. However, impacts may include habitat fragmentation, soil compaction, higher noise levels, and fugitive dust from their vehicles. The remaining open space leading to degradation of native vegetation, habitat fragmentation, soil compaction, higher noise levels, and fugitive dust from their vehicles.

The glint and glare from the solar troughs could draw the attention of recreation users, especially those who recreate on higher elevation lands in the wilderness areas and Areas of Critical Environmental Concerns (ACECs) that fall within the viewshed of the proposed action.

The Mule Mountains Long Term Visitor Area (LTVA) is located approximately 13 miles south of the site. Users coming to this LTVA are seeking opportunities for socialization with similar users in a semi-rural environment. The LTVA is at a great distance from the proposed action and is not within the viewshed of the proposed action. Thus, visitors would not be impacted by any degradation of air quality, such as fugitive dust, that may occur during construction.

It is anticipated that some construction crew members would reside in RV campers or trailers on public lands during the construction phase of the project. Although the BLM offers developed campgrounds within commuting distance of the project, only the LTVAs allow long-term camping. The Corn Springs Campground has nine sites and one group campground, all with a 14 day limit and camping is limited to the designated sites, thus would not be available for worker's use. The Midland and Mule Mountains LTVAs allow camping up to seven months

(September 14 to April 16) with a special use permit. Outside of these dates, the camping limit is 14 days. Depending on the number of authorized workers using the LTVA, use could impact the social setting or the physical infrastructure of the LTVA. However, the LTVAs are designed with minimal facilities given that campers must use self-contained RVs and there are no assigned or designated sites, except for the Wiley's Well and Coon Hollow Campgrounds within the Mule Mountain LTVA. Midland LTVA is 135 acres and averages 41 permits per year. Mule Mountain LTVA is 2,805 acres with an average of 135 permits per year. Except for the designated campsites at Wiley's Well and Coon Hollow, each LTVA can accommodate several hundred RV units with a minimum distance of 15 feet between units, which is well in excess of current use.

Impacts to LTVA's from maximum authorized use by construction workers would be to the social and recreation experience of winter users. If the LTVA's were used to a level that spacing and relative solitude is reduced, seasonal long-term visitors may move to other LTVA's in Arizona or Imperial County, thereby compounding crowding at these already popular sites. If there is significant use of the LTVA's by workers, then the BLM may need to increase law enforcement patrols at the LTVA's, thus reducing patrols on public lands elsewhere.

Impacts associated with the operation and maintenance of the additional acres could affect the recreational experience by increasing the acreage of intrusion into the area by utility-scale energy development with an almost industrial presence. Closure impacts associated with closure and decommissioning would likely be more beneficial on recreational values, since additional acres would be reclaimed and, thereby, made available for active or passive recreational use.

Alternatives

Reduced Acreage Alternative

If this alternative were selected, the only difference with regard to direct and indirect effects relative to the proposed action would correlate directly to the reduction of 50 percent of the proposed surface disturbance. Impacts associated with related noise and fugitive dust during construction, operations, maintenance and decommissioning would decrease based on the reduced acreage of the panels for the Reduced Acreage Alternative.

Dry Cooling Alternative

This alternative would result in the same direct and indirect effects as the proposed action because it would generally be constructed within the same footprint as the proposed action and would result in the same number of workers as the proposed action.

No Action Alternative A

If No Action Alternative A were selected, none of the anticipated recreation-related impacts of the proposed action would occur. Instead, the land on which the GSEP is proposed would become available to other uses consistent with CDCA Plan use opportunities, potentially including another renewable energy project. Thus, impacts of this alternative on recreation could be substantially similar to the proposed action.

No Project Alternative B

If No Project Alternative B were selected, the CDCA Plan would be amended to make the site unavailable for future solar development. Other use opportunities consistent with the CDCA Plan would remain available. Thus, recreation-related-impacts of this alternative would vary from no impacts (e.g., if the site were left in its existing condition and no structures built that might affect the recreational opportunities or experiences available from adjacent properties) to substantial impacts (e.g., if a more intense or intrusive use were made depending on what use ultimately remain in its existing condition, with no new structures or facilities constructed or operated on the site). Generally, for the two no project alternatives, there would be no direct or indirect impacts the recreational opportunities and experiences.

No Project Alternative C

If the No Project Alternative C, which would deny the ROW and amend the CDCA to find the proposed action area as suitable for any type of solar energy development, recreation opportunities would be impacted to the same degree and extent as the proposed action. For example, if the acreage of the future solar energy developed is 50 percent less and the technology is similar to the GSEP, then impacts to recreation opportunities would be 50 percent less. However, different solar technologies in the future could present different impacts on the recreational opportunities.

4.12.3 Discussion of Cumulative Impacts

In addition to the proposed GSEP, there are many past, present, or reasonably foreseeable future actions that contribute to impacts in recreation and visual sections. Development of highway access to the region has provided direct vehicular access to open desert scenery for residents throughout Southern California. This increased access improved the recreational experience for some users by making the area more accessible and detracted from the recreational experience for other users who preferred remote camping, hiking, and hunting away from populated areas. Numerous energy-related development projects, including the proposed action, would remove large acreages of land from existing or potential recreational use that would result in some users seeking out other areas of the desert for their activities, experiences, and benefits. However, most of the proposed projects are in areas with low recreation use or potential future opportunities. In some cases, the facilities themselves may become local or regional attractions for travelers or sightseers, especially if the projects include interpretive sites or visitor facilities. This would be a change in type of use, but could result in a net gain for recreation opportunities.

Although the proposed action’s effects on recreation would be low for the GSEP area, the combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects in eastern Riverside County would result in a change to recreation opportunities and experiences of users, communities, and regional populations.

4.12.4 Summary of Mitigation Measures

The following mitigation measures would be imposed by the BLM to avoid or reduce impacts on the quality of the human environment. The following mitigation measures would avoid or minimize impacts on recreation:

> *BLM-REC-1*: The Applicant shall prepare and distribute interpretative materials to users of the Mule Mountains LTVA's, Wiley Wells and Coon Hollow Campgrounds, and BLM kiosks stating the development of the solar facilities at the GSEP site and the temporary or permanent closure of the OHV route and related recreational experiences on approximately 1,746 acres of public land. The BLM authorized officer shall approve the draft materials prior to distribution.
>
> *BLM-REC-2*: The Applicant shall engage residents of Lake Tamerisk/Desert Center/Blythe, recreation user groups, interested public, organizations, and agencies to identify specific recreation management prescriptions to provide alternative recreational opportunities and experiences on the lands outside the GSEP site boundary. This effort shall delineate what BLM and its partners would do to provide any additional management, marketing, monitoring, and administrative actions to meet recreational benefit demands for this area.
>
> *BLM-REC-3*: No less than 60 days prior to construction, the Applicant shall coordinate construction activities and the GSEP construction schedule with the authorized officer for the recreation areas impacted. The Applicant shall schedule construction activities to avoid heavy recreational use periods in coordination with and at the discretion of the authorized officer. The Applicant shall locate construction equipment to avoid temporary preclusion of recreation areas in accordance with the recommendation of the authorized officer. The Applicant shall document its coordination efforts with the authorized officer and provide this documentation to the Lead Agencies and affected jurisdictions at least 30 days prior to construction.
>
> *BLM-REC-4*: The Applicant shall coordinate with the authorized officer for the applicable federal, State, or local parks and recreational facilities at least 60 days before construction in order to identify alternative recreation facilities that may be used by the public during construction. The Applicant shall post a public notice at recreation facilities that are to be closed or where access would be limited during project construction. The Applicant shall document its coordination efforts with the parks and recreation departments and provide this documentation to the Lead Agencies and all affected jurisdictions 30 days prior to construction.

4.12.5 Residual Impacts after Mitigation Measures were Implemented

There would be a loss of 1,746 acres of recreation opportunities and experiences within the site boundary.

4.12.6 Unavoidable Adverse Impacts

The surface disturbance that would occur from the GSEP would result in unavoidable adverse impacts on recreation resources by permanent removal of vegetation, landforms, and other nature features of the characteristic landscape for the life of the GSEP or until decommissioning and restoration occurs.

4.13 Social and Economic Impacts

4.13.1 Impact Assessment Methodology

The social and economic analyses of the proposed action effects complies with the National Environmental Policy Act (NEPA) requirements given the respective power plant licensing and land jurisdictions within the BLM. The social and economic impact analyses evaluate project-related changes on the existing local population and economy (including employment and the relationship to local housing conditions). The economic impacts of the GSEP-related construction and operation spending of the GSEP and other related socioeconomic impacts are also estimated. The proposed action's projected peak employment is used to analyze worst-case construction employment impacts to the local communities, their social character and their economies. The potential effects to the local area's social character are evaluated based on the findings of the economic impact analysis.

The impacts on public services related to health and safety (e.g. police protection, fire protection and emergency medical services) are analyzed in Section 4.11, Impacts on Public Health and Safety. Potential effects on parks and recreational opportunities are considered in Section 4.12, Impacts on Recreation.

The Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the NEPA (40 CFR Part 1500 - 1508) provides no specific thresholds of significance for socioeconomics impact assessments. Significance varies, depending on the setting of the proposed action (40 CFR 1508.27[a]), but 40 CFR 1508.8 states that indirect effects may include those that are growth-inducing and others related to induced changes in the pattern of land use, population density, or growth rate.

An input-output model (IMPLAN) was used to estimate the indirect economic impacts associated with construction- and operation-phase expenditures resulting from the GSEP that would benefit the eastern Riverside County region.

The cumulative impact analysis evaluated the socioeconomic impacts of the future combined implementation of the Solar Project identified in the Cumulative Project Scenario discussed in Section 4.1.

4.13.2 Discussion of Direct and Indirect Impacts

Proposed Action

Construction

Construction employment and spending for the proposed action would be the primary direct economic impact associated with the GSEP. As such, the construction employment and related spending effects would be a temporary impact lasting for the anticipated 37-month duration of the construction period. Given the absence of any significant current economic use of the site, the construction activities associated with the proposed action would represent a beneficial economic impact adding new employment and spending to the local economy.

Economic

As discussed in greater detail in Section 3.14, Social and Economic Setting, the origin of GSEP construction workers is a central factor determining the magnitude and extent of potential socioeconomic impacts to the local economy and communities associated with the proposed action. The direct benefits of employment and higher personal incomes primarily would benefit the communities from which construction workers and their families reside, since construction workers would likely spend the majority of their earnings in these communities. The workers' spending for goods and services would have an indirect socioeconomic impact on the communities and economies where that spending occurs. In addition, if there is an insufficiency of suitable local workers to staff the GSEP, then the GSEP could attract individuals to relocate to the area (either temporarily or permanently), which could consequently result in an increased demand for housing and local services. If there is insufficient housing or service capacity, then adverse indirect social and economic impacts could result. People permanently (or in some cases even only temporarily) moving into the area for work could encourage the construction of new homes, extension of roads and/or other infrastructure development and/or could increase the existing demand for public services. Informal worker lodging or camping in the local area would likely be a particular concern. Given the relatively long commute distances that some workers could face, some could seek to save travel-related time and costs by choosing to camp at existing public camp sites or, informally, on nearby public or private lands.

Project Construction Labor Needs

The availability of the local and regional workforce to meet the GSEP's construction labor needs has been analyzed to determine whether the GSEP would induce population growth. Consistent with the geographic demarcations for the local and regional study areas, the "local workforce" consists of employable residents living in relatively close proximity to the site (i.e., the cities of Blythe, California or Quartzite, Arizona; or the community of Ehrenburg, Arizona).[1] The "regional workforce" consists of all potential employable adults currently living up to a two-hour commute (one-way) to the site. As discussed in Section 3.14 and shown in Figure 3.14-1, the regional labor force consists of the employable adults living in the cities west of the site along I-10 as far as, and including, the City of Banning.

The Applicant expects that construction would last 37 months, with an average of about 646 daily construction workers with a peak employment of 1,085 workers during month 16 of construction (GSEP 2009a, p. 5.11-14). Generally, increased employment represents a beneficial economic impact on local communities from the new job opportunities and increased income generated for the local economy. However, in rural areas such as Blythe and/or projects with more skilled/specialized job requirements, increased labor demand can have adverse indirect

[1] In addition, residents living in the unincorporated areas near these communities or within an hour's commute of the project would also be considered local labor force. However, given the very limited data on the unincorporated residents, it is conservatively assumed that all the unincorporated population identified in Section 3.14 are regional but not local residents.

socioeconomic impacts on the local communities if it causes significant in-migration that the existing local housing, infrastructure and/or other public services cannot support. The estimated peak employment of 1,085 is used to analyze worst-case construction employment related impacts from potential in-migration.

Labor Force Supply

Table 4.13-1 shows Year 2006-2016 occupational employment projections for the Riverside/ San Bernardino/Ontario MSA[2] by construction labor skill as compared to the estimated number of total construction workers by craft needed during the peak month (month 23) as presented in the Application for Construction (AFC) (Solar Millennium 2009a, p 5.11-26). The primary trades required for construction of the proposed action will include pipefitters, skilled and unskilled laborers, electricians, carpenters, equipment operators, ironworkers, and truck drivers.

TABLE 4.13-1
TOTAL LABOR BY SKILL IN RIVERSIDE/SAN BERNARDINO/ONTARIO MSA (2006 and 2016 Estimate) AND PROJECT REQUIRED CONSTRUCTION BY CRAFT PEAK MONTH

Trade	Total # of Workers for Project Construction by Craft – Peak Month	Riverside/ San Bernardino/Ontario MSA 2006	Riverside/ San Bernardino/Ontario MSA 2016
Operator	60	4,790	5,460
Insulators	24	27,930[a]	32,080[a]
Laborer	96		
Teamster	38		
Painter	15		
Solar Field Craft	305		
Carpenter	44	28,850	32,390
Pipe Fitter	200	4,630[b]	5,330[b]
Electrician	105	6,740	7,600
Cement Finisher	4	4,110	4,690
Ironworker	70	19,460	20,800
Millwright	22	2,630[c]	2,960[c]
Construction Staff	102	10,990[d]	12,380[d]
Total	***1,085***	***111,550***	***125,360***

NOTES:
[a] "Construction Laborers" category was used.
[b] "Plumbers, Pipefitters, and Steamfitters" category was used.
[c] "Machinists" category was used.
[d] "Supervisors, Construction and Extraction Workers" category was used.
[e] "Helpers - Construction Trades" category was used.

Source: Solar Millennium 2009a, Tables 5.11-8, 5.11-11, and 5.11-17.

[2] Metropolitan Statistical Areas (MSA) are geographic entities defined by the U.S. Office of Management and Budget (OMB) for use by Federal and State statistical agencies in collecting, tabulating, and publishing socioeconomic statistics. The Riverside/San Bernardino/Ontario MSA consists of Riverside and San Bernardino Counties combined. As such, the MSA population and labor force estimates include a major portion of individuals residing outside the likely daily commuting range from the site.

Table 4.13-1 shows that there is a very large population of suitably skilled construction workforce for the proposed action currently living within Riverside and San Bernardino Counties.[3] However, only a portion of these workers could be expected to be currently living within the region. Based on the regional study area's estimated 2010 population of 559,193 residents, compared to a corresponding Riverside and San Bernardino population of 4,212,684, the regional study area's skilled labor force would total approximately 13.3 percent of the skilled workforce shown in Table 4.13-1. Overall, that would suggest a total skilled labor force of approximately 15,755 workers (13.3 percent of approximately 118,455 total skilled construction workers)[4] living within the regional study area.

Applying the current local unemployment levels of 12.7 percent within the regional study area would suggest that approximately 2,000 unemployed skilled workers may currently reside in the regional study area. Compared with the required average project employment need of 646 workers, the proposed action could employ up to approximately 32.3 percent of the estimated currently unemployed construction workers. During peak construction, 1,085 workers would be needed, which would employ up to nearly 54.3 percent of the estimated available unemployed skilled workforce. While this would represent a major proportion of the region's skilled workforce, there also could be individuals amongst the region's estimated nearly 30,240 unemployed (i.e. 32,240 total regional unemployed – 2,000 regional skilled unemployed construction workers) that have or could obtain the necessary training to perform the facility construction. Also, it is likely that some of the currently employed skilled local construction workers would change their jobs in order to work closer to home and their positions could be filled by other workers living outside of the regional study area.

Consequently, it is expected that most, if not all, of the construction employment for the GSEP would consist of construction workers who live within a two-hour commute from the site. Employee ride sharing, and the relatively long duration of the work would likely encourage workers to commute considerable daily distances to work on the project.

Housing and Lodging Impacts within the Local Study Area

As shown in Table 3.14-2, the current published vacancy rates for the cities of Blythe, California; Ehrenberg, Arizona; and Quartzsite, Arizona are 16.1, 34.9, and 41.9 percent, respectively. These vacancy rates indicate that some currently vacant housing could be available for construction workers who choose to relocate within the local study area. Altogether, it is conservatively estimated that up to approximately 2,480 existing housing units could be available as potential housing for future construction workers (this estimate does not account for other potential available housing within the unincorporated local study area). The extent to which construction workers choose to rent local housing would depend on the rental prices and the condition of the available housing. Especially if construction workers would be willing to share rental

3 Given its more rural character and the far smaller size of its labor force, only a very minor proportion of future construction workers would be expected to originate from La Paz County in Arizona. For this analysis, it is conservatively assumed that all construction workers for the GSEP would be California residents.

4 Using the average of 2006 and 2016 skilled labor force estimates shown the Table 3.14-1.

TABLE 4.13-2
GSEP CONSTRUCTION ECONOMIC BENEFITS (2010 Dollars)

Fiscal Benefits	
State and local sales taxes	$4.0 million ($1.3 million average per year)
GSEP Construction Spending	
Labor	$165.0 million ($53.5 million average per year)
Materials, equipment and services	$14.5 million ($4.7 million average per year)
Total	$179.5 million ($58.2 million average per year)
Direct, Indirect, and Induced Benefits	
Direct	
Economic Output	$179.5 million ($58.2 million average per year)
Jobs	646 jobs (monthly average)
Indirect	
Economic Output	$37.2 million ($12.1 million average per year)
Jobs	89 jobs
Induced	
Economic Output	$99.6 million ($32.3 million average per year)
Jobs	269 jobs
Total	
Economic Output	$316.3 million ($102.6 million average per year)
Jobs	1,004 jobs

SOURCE: Solar Millennium, 2009a; ESA, 2010.

accommodations, rental housing could be an option for workers wishing to relocate or, more likely, commute weekly to work at the site.

In addition, as discussed in Section 3.14, analysis of the current motel and hotel businesses and their occupancy rates suggests that lodging could be available to accommodate construction workers who choose to stay temporarily at a local motel or hotel to be close to the site. There are approximately 1,000 hotel/motel rooms within the local study area (i.e., the Cities of Blythe and Quartzite and community of Ehrenburg) (GSEP 2009a, p. 5.11-27).

Other lodging opportunities also could be available at privately-owned RV/campgrounds and public campground areas within the local study area. However, during the high season (December to March) these facilities can be popular with visitors and, therefore, could have only limited availability for construction workers. In addition, most of the public campgrounds (including the BLM administered Long Tern Visitor Areas) are intended for recreational use; construction workers might not be permitted to use these areas. Consequently, it is unlikely that the public RV/campgrounds would be very suitable or attractive lodging options for most GSEP construction workers who seek local accommodations.[5] However, BLM may allow temporary

5 Except for construction workers that already own their own RV or camper trailers.

LTVAs to be established on site for construction workers for the duration of project construction as temporary lodging facilities.

Furthermore, particularly during the non-winter season, it is likely that there would be considerable housing opportunities within the local area for construction workers seeking temporary accommodations. Lodging facilities within the local study area could include both rental housing for workers seeking longer term local housing and motel lodging for those looking for more occasional or shorter stay accommodations. The relatively high vacancy rates also would ensure that any GSEP-related temporary housing needs would be met with existing housing or lodging facilities. As a result, no new housing or motel development would be expected to be induced by the proposed action and the increased use of these under-utilized housing or motel lodging would be considered beneficial for local property owners.

Construction Worker Expected Commuting Patterns

Given the major skilled labor force residing within the areas of Riverside and San Bernardino Counties, and the common construction worker commuting habits (ESRI, 1982; CEC, 2010), it is reasonable to expect that GSEP construction workers residing outside the regional study area would commute weekly to the local area rather than in-migrate with their families. Consequently, any such workers who choose to reside temporarily in the local area would have a limited service impact on local public services and infrastructure. Furthermore, given that existing housing and/or lodging facilities would be used to accommodate the few (if any) construction workers who choose to stay temporarily in the local area, the local transient occupancy tax revenues, local rental home owners' property, and/or business taxes payments should account for their limited local infrastructure and public service usage.

Therefore, it is concluded that the proposed action would not induce substantial growth or concentration of population in either the regional or local study areas. Furthermore, construction of the proposed action would not encourage people to relocate to the area and, thereby, would not result in new and unplanned growth or land use changes.

Construction Spending Impacts

Construction of the proposed action would create a temporary, positive impact on the local economic base and fiscal resources. Construction workers wages and salaries would provide additional income to the area, as would expenditures within the local and regional study areas for construction materials and services. An IMPLAN input-output model was used to estimate economic impacts within eastern Riverside County based on the construction-phase GSEP-related expenditures that would be expected to occur within the regional study area.

IMPLAN is an economic impact modeling tool that uses region-specific input/output accounts by industry to estimate secondary impacts of economic changes. Secondary impacts include: (1) indirect impacts that occur due to the purchase of goods and services by firms involved with construction and operation; and (2) induced impacts, which result from household spending by project- related employees. Secondary impacts can occur in the form of employment, income, output, and taxes.

Social Accounting Matrices (SAM) multipliers were used for the impact analysis. SAM multipliers are recommended by the writers of the IMPLAN software because an induced effect estimate using a SAM multiplier is based on information in the social account matrix, which accounts for social security and income tax leakage, institution savings, and commuting. The multipliers for the impact analyses for the proposed action were derived based on specific industry data for the Riverside County study area in the IMPLAN Professional input/output relationships to represent the direct economic impacts associated with the proposed action (e.g., estimated annual construction cost and annual operation cost). Zip code level IMPLAN data was obtained to enable both Riverside County and sub-County area analysis of the spending impacts from future project construction and operation. IMPLAN Sector 36, "Construction of other new non-residential structures," was selected as the IMPLAN sector most closely corresponding to the North American Industry Classification System Code 21, which is used for "Power plants, new construction." All figures are in presented in 2010 dollars. Table 4.13-2 summarizes the IMPLAN analysis findings.

The proposed construction labor payroll has been estimated at approximately a total of $165 million over 37 months ($53.5 million estimated annually). Capital expenditures and local spending on construction materials, equipment, and service are estimated to total approximately $14.5 million over 37 months ($4.7 million estimated annually). For this analysis, it was assumed that the construction material and equipment purchases would include standard construction materials and services that would mostly be obtained from within the IMPLAN study area.[6] These GSEP expenditures were used to estimate the economic benefits to the local and regional economies. The IMPLAN model also assumes that all of the construction workers for the proposed action would be from within the regional study area of eastern Riverside County.

The proposed solar facility construction is expected to directly create an average of 646 annual full-time employees over 37 months, with a peak monthly employment of 1,085 full-time employees. This new employment would create both indirect and induced secondary employment in the regional study area. Indirect employment is defined as employment that would be generated by the purchase of goods and services required for the facility's development. Induced employment is defined as employment that would be generated by the purchase of goods and services by businesses that are indirectly supported by the proposed action.

As shown in Table 4.13-2, according to the IMPLAN analysis, construction of the GSEP could be expected to have the direct beneficial economic impact of generating an average of $58.2 million in annual spending on construction labor within the regional study area for the duration of the construction period. In addition, an average of approximately $12.1 million would be spent annually on construction materials, equipment, and services from businesses within the regional study area. Together, the construction spending is expected to generate up to an additional $44.4 million per year in indirect and induced economic output for other businesses in eastern Riverside County.

6 The costs for specialized solar materials and equipment (e.g., panels) that would have to be purchased from outside Riverside County are not included, since their acquisition from out-of-County or out-of-State suppliers/manufacturers would have minimal economic benefit to local or regional businesses.

The actual future economic impact for eastern Riverside County could be smaller than the total economic benefits shown in Table 4.13-2. GSEP-related spending would benefit eastern Riverside County and the local economies depending on the extent that workers live and spend their earnings at businesses locally and elsewhere in eastern Riverside County. Given the local study area's rural character, most of the projected benefits would likely be received by the larger cities and communities located elsewhere in eastern Riverside County, outside the local study area. The economic benefits to both local and regional businesses could be less than those estimated by the IMPLAN model if greater sales leakage occurs assumed for by the IMPLAN model. Irrespectively, the net short-term economic impact on the local and regional economies would be considerable.

In terms of economic output impacts, the primary local industries that would benefit the most include the following: rental housing, architectural and engineering services, wholesale and retail trade businesses, real estate establishments, physicians and other medical professionals, food service, and hotel/motel businesses.

Social

The potential for GSEP-related impacts to the local study area's social character are determined by the nature of economic impacts of the construction activity and any GSEP-related in-migration.

As discussed above, construction of the GSEP could be expected to generate considerable economic benefits directly for both construction workers and local businesses providing materials and services for construction. In addition, major indirect and induced spending benefits for the local and eastern Riverside County economies would be generated by subsequent spending of the construction workers and construction businesses' income within the local and regional economy. The economic benefits are expected to extend widely within the local and regional economy but would most benefit food, retail, lodging, real estate, and medical related businesses.

The additional new income for the local economy from the GSEP would have a positive, but short-term, contribution towards supporting local business and maintaining the economic vitality of the City of Blythe and other neighboring communities. The positive effect for the local economy would be increased given the local study area's recent and on-going economic weaknesses as a result of both longer term changes and the more recent economic downturn. The continued viability of Blythe's local business community is essential for its long term well-being. Increased local employment opportunities would improve local residents' standard of living and will help retain younger residents who otherwise would be more likely to leave the community if there are insufficient local employment opportunities. The local community's positive social attitudes to the proposed action may generally be expected to increase based on the extent that local residents are employed (either directly or indirectly) or otherwise benefit from the GSEP.

GSEP-related in-migration of new residents could affect the social character of the local study area. An influx of new individuals with different values, lifestyles, and/or socio-demographic backgrounds could have a positive or negative influence on the quality life and/or community values. The existing community members' attitudes and opinions to any such changes could vary greatly among individuals. However, in general, the magnitude of the in-migration would need to be relatively substantial for the social environment to be noticeably altered. Furthermore, social changes typically require, or are most commonly associated with, permanent changes to the community's composition and/or attitudes rather than as the result of short-term influences or changes.

As discussed above, the majority of construction workers for the GSEP would be expected to commute daily to the site. Given that most workers would likely travel to the site from their homes located west of Blythe, local residents may have little daily interaction with most workers. It is possible that some construction workers could chose to commute weekly from their homes and stay within the local area at local hotels/motels or perhaps rent homes. In this case, after the workday is over, these individuals would be more likely to interact with existing residents at local businesses or community facilities. However, given the very limited number of construction workers expected to stay in the local area during the work week, the presence of these individuals would not be expected to result in substantial or long-term adverse effects to the local area's social composition and character.

Therefore, in general, given the expected new local employment opportunities and economic benefits to local business and relatively limited temporary in-migration of construction workers, most local residents and stakeholder groups would be expected to be supportive or, at a minimum, would not oppose the solar facility's construction. Consequently, the GSEP would be expected to have a minor and largely positive impact on the social character of the local study area for the temporary duration of facility construction.

Alternatives

Reduced Acreage Alternative

Construction spending and employment for the Reduced Acreage Alternative would be expected to be lower than for the proposed action and, consequently, the social and economic impacts would be similarly reduced in magnitude.

No Action Alternative A

The social and economic impacts associated with the proposed action would likely only be delayed by selecting No Action Alternative A, since this region of the United States has extremely positive characteristics for solar power generation. If the proposed action were not approved, another application for a different solar generating facility or a different type of solar generating facility would likely be filed at some time in the future. An application could also be filed for a wind energy facility or any other kind of use and impacts would result based on the specific use requested.

No Project Alternative B

The social and economic impacts resulting from the proposed action would not occur under No Project Alternative B since the application would be denied and the subsequently amended plan would identify the land as unsuitable for solar energy generation. However, the land would remain open to other types of rights-of-way and/or land use authorizations, resulting in potential impacts specific to a future use other than solar energy generation.

No Project Alternative C

Impacts associated with the proposed action would likely only be delayed under No Project Alternative C, since this region of the United States has extremely positive characteristics for solar power generation. If this proposed action were not approved, another application for a different solar generating facility would likely be filed at some time in the future.

Operation

Economic

As discussed in greater detail in Section 3.14, the origin of GSEP workers is a central factor determining the magnitude and extent of potential socioeconomic impacts to the local economy and communities from the proposed action. The direct benefits of employment and higher personal incomes primarily would benefit the communities where the workers and their families reside, since that would likely be where they spend the majority of their earnings. Workers' spending for goods and services would have an indirect on the communities and economies where that spending occurs. In addition, if there are an insufficient number of suitable local workers available to staff the GSEP, then the GSEP could attract individuals to relocate to the area, which, in turn, could result in an increased demand for housing and local services. If there is insufficient housing or service capacity to meet the new demand, then adverse indirect social and economic impacts could result.

For this analysis, the GSEP would "induce substantial population growth" if workers permanently (or in some cases even only temporarily) move into the local area for employment at GSEP facilities and, thereby, encourage the construction of new homes, extension of roads, other infrastructure development, and/or increase demand for public services.

Project Operations Labor Needs

The employment and spending by the proposed action's future operations would be the primary direct long-term economic impact associated with the GSEP. The proposed action is expected to require a total of up to 65 permanent full-time employees (GSEP 2009, p. 5.8-23). Table 4.13-3 shows Year 2006-2016 occupational employment projections for the Riverside/ San Bernardino/Ontario MSA by operational labor skill as compared to the estimated number of total operational workers needed.

**TABLE 4.13-3
TOTAL LABOR BY SKILL IN RIVERSIDE/SAN BERNARDINO/ONTARIO MSA (2006 and 2016 Estimate) AND PROJECT REQUIRED OPERATION**

Trade	Total # of Workers for Project Operation	Riverside/ San Bernardino/Ontario MSA 2006	Riverside/ San Bernardino/Ontario MSA 2016
Maintenance and Repair Workers, General	--	11,920	13,690
Plant and System Operators	--	2,030	2,380
Total	***65***	***13,950***	***16,070***

SOURCE: GSEP,2009; EDD, 2010.

Approximately a third of the operations jobs would be lower skilled positions. All employees would be provided with necessary training. The basic job requirements for the lower skilled operations workers would likely be high school diplomas and basic mechanical equipment operating abilities. Former agricultural equipment operators, construction laborer, and many other manual labor jobs would be expected to have transferrable skills.

The other more skilled operations would generally require some secondary education and greater mechanical/electrical equipment experience than the lower skilled operation position. Project construction workers and more experienced farm or other equipment operators would be expected to have transferrable skills suitable to those required for these positions. On-the-job training could be expected to enable, over time, some lower skilled employees to gain the expertise necessary to staff the more skilled operations positions. In addition, local community colleges (Palo Verde College in Riverside and College of the Desert in Palm Desert) as well as University of California - Riverside have recently developed Utility Job Training Courses with federal funding support specifically designed to provide its students with the training necessary to qualify for the higher skilled operations jobs.

As shown in Table 4.13-3, data for the Riverside/San Bernardino/Ontario Metropolitan Statistical Area (MSA) indicates that in the 2006, the “Maintenance and Repair Workers, General” and “Plant and System Operators” employment sector contained a total of 13,950 workers, with 2016 forecasts for these employment sectors to grow to a total of 16,070 employees. The existing labor force of currently qualified plant and system operators within Riverside and San Bernardino counties is relatively limited and likely reflects the current level of available employment opportunities. As discussed in the previous estimate of the proportion of construction work living in the regional study area, on a per capita basis, it may reasonably be assumed that approximately 13.3 percent of these Riverside MSA operators and general maintenance workers would live within the regional study area. These would correspond to approximately 2,135 maintenance workers and plant operators,[7] of which, based on the regional unemployment levels, approximately 263 would be expected to be currently unemployed.

[7] Using the average of 2006 and 2016 skilled labor force estimates shown the Table 4.13-3.

While the demand for 44 more skilled plant operators for the facility's future operations would likely exceed the region's existing supply of unemployed plant operators, the demand would also correspond to less than a fifth of the estimated unemployed general maintenance workers in the region. In addition, there would also be individuals amongst the region's estimated other nearly 24,077 unemployed (i.e. 24,340 total regional unemployed – 263 unemployed general maintenance / plant operators) that have or could obtain the necessary training to perform the facility operations. Also, it is likely that some of the currently employed workers would change their jobs to obtain a better paying job and/or to work closer to home. Given the region's high unemployment levels, any currently employed worker switching jobs could expect to have their vacated position filled by other workers (possibly including others living outside of the regional study area).

According to the Applicant, at least 50 percent of workers would be expected to come from within the regional study area workforce (GSEP, p. 5.8-23), resulting in a potential influx of up to 33 workers in communities within the proposed action's regional and local study areas (Solar Millennium 2009a). Consequently, it is expected that most of the facility's operations employment would be provided by workers living within the regional study area from the site. Future GSEP-related in-migration may occur but would be expected to be very minor with at most 55 employees relocating to the local study area. Furthermore, depending on the success of local training programs and possible interest amongst project construction workers or other more skilled local residents, actual in-migration may be lower or unnecessary except for a few top plant management and supervisory positions.

Housing Impacts within the Local Study Area

There would be greater incentive for future operations workers to live closer to the site since the operations job opportunities at the solar facility would be permanent positions. These operations jobs also could encourage workers to seek permanent homes in the local area. As shown previously in Table 4.13-2, the most current published vacancy rates for the cities of Blythe, California; Ehrenberg, Arizona; and Quartzsite, Arizona are 16.1, 34.9, and 41.9 percent, respectively. These vacancy rates indicate that there is likely currently considerable vacant housing, which could be available to future operations workers who choose to relocate to the local study area. Altogether, it is conservatively estimated that up to approximately 2,480 existing housing units could be available as potential housing for future construction workers (the estimate does not account for other potential available housing within the unincorporated local study area).

Currently, home and rental prices within the City of Blythe and the other communities within the local area are relatively affordable and there is considerable available housing supply. These vacancy rates and the relatively minor number of GSEP employees likely seeking local housing indicates that more than sufficient existing local housing would be available for any future operational employees choosing to relocate to the local area. Therefore, no new housing or infrastructure growth would be necessary to provide housing or public services for the GSEP's operations workforce.

Future facility operations would encourage, at most, a small number of people to relocate to the area. The small magnitude of the potential action-related in-migration would be readily accommodated by the local area's existing housing and, consequently, would not result in new and unplanned growth or land use changes. Therefore, it is concluded that the proposed action would not induce substantial growth or concentration of population in the local study areas.

Consequently, the GSEP's future operations would not be expected to result in population growth either directly or indirectly that would be major in magnitude or adverse in nature.

Operations Spending Impacts

The future facility operations would have a long-term, positive impact on the local economic base and fiscal resources. Operations workers' wages and salaries would provide additional income to the area, as would expenditures within eastern Riverside County for construction materials and services.

As discussed in the construction spending impact analysis, an IMPLAN input-output model was used to estimate the indirect and induced economic impacts for eastern Riverside County based on the operation-phase GSEP expenditures that would be expected to occur within the regional study area.

The same IMPLAN model was used to estimate the GSEP's operations impact on the eastern Riverside County economy although IMPLAN Sector 31, "Electric power generation, transmission, and distribution," was used to estimate spending impacts for operations labor since it most closely corresponds to the North American Industry Classification System Code 221119, which is used for, "Electric power generation: solar." For this analysis, it was assumed that the operations material and equipment purchases would be for standard construction materials and services that would mostly be obtained from within the IMPLAN study area. These GSEP expenditures were used to estimate the economic benefits to the regional study area economy. The IMPLAN model also assumes that all of the GSEP's operations workers would reside within the regional study area of eastern Riverside County.

GSEP operations would create a permanent, positive impact on the local economy and fiscal resources. Operations employees' salaries would provide additional income to the area, as would expenditures within the multi-county study area for operations and maintenance materials and services. Table 4.13-4 summarizes the IMPLAN analysis findings for the future GSEP operations.

The annual expenditures of the GSEP were assumed to be $0.5 million for materials, equipment, and supplies; and $6.0 million in payroll annually. These figures were used as inputs into the model to predict economic and employment impacts.

GSEP operations are expected to directly employ 65 full-time employees. This employment would create both indirect and induced secondary employment in the region. Indirect employment is defined as employment that would be generated by the purchase of goods and services required by

TABLE 4.13-4
GSEP OPERATIONS ANNUAL ECONOMIC BENEFITS (2010 Dollars)

Fiscal Benefits	
Estimated annual property taxes	$628,000[1]
State and local sales taxes	$430,000
School Impact Fee	$18,330
Project Operations Spending	
Labor	$6.0 million
Operations and maintenance supplies	$0.5 million
Total	$6.5 million
Direct, Indirect, and Induced Benefits	
Direct	
Economic Output	$6.5 million
Jobs	65 jobs
Indirect	
Economic Output	$0.4 million
Jobs	3 jobs
Induced	
Economic Output	$3.5 million
Jobs	29 jobs
Total	
Economic Output	$10.4 million
Jobs	97 jobs

NOTES:
[a] At present, there is no property tax assessed on solar components (mirrors, solar boiler, heat exchangers) improvements by law (Section 73 of the California Taxation and Revenue Code). Components included under the exemption include storage devices, power conditioning equipment, transfer equipment, and parts. The first operational year would generate an estimated $400,000 in annual property taxes.

SOURCE: GSEP, 2009; ESA, 2010.

the GSEP. Induced employment is defined as employment that would be generated by the purchase of goods and services by businesses that are indirectly supported by the GSEP.

As shown in Table 4.13-4, according to the IMPLAN analysis, GSEP operations could have the direct beneficial economic impact of generating a total of $6.5 million in annual spending on labor and materials within eastern Riverside County. This operations spending would be also expected to generate up to $3.9 million in new indirect and induced economic output and earnings for other businesses and residents within eastern Riverside County.

The actual future economic impact for eastern Riverside County could be smaller than the total economic benefits shown in Table 4.13-2. GSEP related spending would benefit eastern Riverside County and the local economies depending on the extent that workers live and spend their earnings at businesses locally and elsewhere in eastern Riverside County. Given the local study area’s rural character most of the projected benefits likely would be received by the larger cities and communities located elsewhere in eastern Riverside County outside the local study area. The economic benefits to both local and regional businesses could be less than estimated if greater sales leakage occurs than that expected by the IMPLAN model. Irrespectively, the net annual economic impact would be a minor and positive benefit on the local and eastern Riverside County economies.

In terms of economic output impacts, the primary local industries that would benefit the most include: rental housing, architectural and engineering services, wholesale and retail trade businesses, real estate establishments, physicians and other medical professionals, and food service businesses.

Social

The potential for proposed action-related impacts to the local study area's social character are determined by the nature of economic impacts of the GSEP and any related in-migration.

As discussed above, the GSEP could generate considerable economic benefits directly for both workers and local businesses providing materials and services for the project. In addition, major indirect and induced spending benefits for the local and eastern Riverside County economies would be generated by subsequent spending by the workers and businesses income within the local and regional economy. The economic benefits are expected to extend widely within the local and regional economy but would most benefit food, retail, lodging, real estate, and medical-related businesses.

The additional new income for the local economy from the GSEP would have a positive contribution towards supporting local business and maintaining the economic vitality of the City of Blythe and the other neighboring communities for the lifetime of the project. The positive effect for the local economy would be increased given the local study area's recent and on-going economic weaknesses as a result of both longer term changes and the more recent economic downturn. The continued viability of Blythe's local business community is important for the City's long-term well-being. Increased local employment opportunities would improve local residents' standard of living and would help retain younger residents that otherwise would be more likely to leave the community if there are insufficient local employment opportunities. The extent of the local community's positive social attitudes towards the GSEP could be expected to increase as more local residents gain employment (either directly or indirectly) or otherwise benefit from the GSEP.

Project-related in-migration could affect the social character of the local study area. An influx of new individuals with different values, lifestyles and/or socio-demographic backgrounds could have a positive or negative influence on the quality life and/or community values. The existing community members' attitudes and opinions to any such changes could vary greatly between individuals. However, generally, the magnitude of the in-migration would need to be relatively substantial to noticeably alter the prevailing social environment. Furthermore, social changes typically require or are most commonly associated with permanent changes to the community's composition and/or attitudes rather than as the result of short-term influences or changes.

The majority of the facility's permanent workforce is expected to commute daily to the site. Given that most workers would likely travel to the site from their homes located west of Blythe, local residents would have little daily interaction with most workers. It is possible that some workers would choose to commute weekly from their homes and stay at local hotels/motels or perhaps rental homes. In the latter case, before or after the workday is over, these individuals would be more likely to interact with existing residents at local businesses or community facilities. However, given the very limited number of workers expected to stay in the local area during the work week, their presence would not be expected to result in substantial or long-term adverse effects to the local area's social composition and character.

Therefore, generally, given the expected new local employment opportunities and economic benefits to local business and relatively limited in-migration of permanent workers, most local residents and stakeholder groups would be expected to be supportive or at a minimum not opposed to GSEP operation. Consequently, the proposed action is expected to have a minor impact and largely positive impact on the social character of the local study area's economy for the 30-40 year duration of the GSEP.

Alternatives

Reduced Acreage Alternative

The operations spending and employment for the Reduced Acreage Alternative would be expected to be reduced from that for the proposed action and, consequently, the social and economic impacts would be similarly lesser in magnitude.

No Action Alternative A

The social and economic impacts associated with the proposed action would likely only be delayed by selecting No Action Alternative A, since this region of the United States has extremely positive characteristics for solar power generation. If this proposal were not approved, another application for a different solar generating facility or a different type of solar generating facility would likely be filed at some time in the future. An application could also be filed for a wind energy facility or any other kind of use and impacts would result based on the specific use requested.

No Project Alternative B

The social and economic impacts resulting from the proposed action would not occur under No Project Alternative B, since the application would be denied and the amended plan would classify the land as unsuitable for solar energy generation. However, the land would remain open to other types of rights-of-way and/or land use authorizations, resulting in potential impacts specific to a future use other than solar energy generation.

No Project Alternative C

Impacts associated with the proposed action would likely only be delayed by selecting No Project Alternative C, since this region of the United States has extremely positive characteristics for solar power generation. If this proposed action were not approved, another application for a different solar generating facility would likely be filed at some time in the future.

Decommission

Economic

The anticipated lifespan of the GSEP is estimated to be 30 to 40 years. Closure- and decommissioning-related social and economic impacts would be related to both the discontinuation of the solar operations and the short-term effects of the necessary facility deconstruction and subsequent site reclamation activities.

The direct economic impact associated with discontinuation of the solar energy generation site would result in job losses for the operations workforce, which would no longer be needed to maintain the facility’s daily operations and/or repair the solar power generation equipment and related infrastructure. Closure would also directly reduce future revenues to any local material, equipment, and service suppliers previously supporting the facility’s daily operations.

In addition, closure would have the additional adverse economic effect of reducing the employment and revenues for other local or regional businesses that rely on spending by the GSEP’s operations staff or suppliers. As a result of the reduced income and revenues of these affected businesses, the GSEP’s staff and support businesses would make few purchases from other local businesses, which, in turn, would reduce these businesses and its employees’ income and purchasing ability.

Deconstruction activity could, however, result in a short-term increase in local spending from the employment, equipment, and materials required to both dismantle the solar facility and reclaim the site. The cost and duration for the deconstruction activities is likely to be roughly comparable to that of the construction; except that the amount of labor and materials would be less than that required for the facility development because the facility would not need to be operational. The magnitude and duration of the resulting short-term economic benefits would likely be proportional to the extent of the deconstruction activity required for the facility’s removal. The economic benefits to the local and regional economy would also likely be of a similar type and magnitude as those projected for construction, unless there is significant change to the local and regional economy during the interim period.

Given a reasonable expectation of considerable increased solar-related local business development and employment, it could be expected that there would be an increased number and variety of businesses that could provide necessary solar-related services. This would, in turn, ensure that the local and regional economies would be able to retain a greater proportion of benefit from the future decommissioning spending since a smaller proportion of the work would be performed by out-of-region businesses and, hence, leak out the region’s economy.

Consequently, the economic impacts associated with the ultimate decommissioning could be initially positive from the increased employment and business spending over the relatively brief duration of the deconstruction and site restoration activities. However, following the completion of the decommissioning process, there would be minor adverse long-term economic impacts to the local economy from the lost of the solar facility's employment and annual spending.

Social

As discussed in the economic analysis above, ultimate closure and decommissioning would result in the reduced local employment opportunities and decreased revenues for businesses supplying the materials, equipment, and services required to operate and maintain the GSEP. In addition, there would be secondary economic losses for local residents and businesses that benefit from sales and employment by the GSEP employees and supplier businesses.

The potential for adverse social impacts would depend on the magnitude of the facility-related economic losses. Future decommissioning the proposed action alone would be expected to have, at most, a very minor adverse social impact. Given a reasonable expectation that a considerable number of other solar developments would occur within the region as well as an increase in other solar-related local business development and employment, the loss of an individual project would have a reduced potential to result in adverse social impacts. For substantial adverse social impacts to occur, the scale of employment and/or business economic losses would need to be of a type and magnitude that worker relocation and/or business closures would occur so that the local quality of life is reduced or the local communities' social character is adversely altered. Furthermore, the potential for adverse social impacts could be significantly reduced or eliminated if proposed decommissioning is anticipated and planned appropriately. In addition, the potential for adverse social impacts would also be significantly reduced if alternative employment and business opportunities develop, thereby reducing the economic impacts to the workers and businesses affected by the closure.

Consequently, future decommissioning of the GSEP could result at most in a very minor adverse long-term social impact from the reduced local employment and spending. It is also very possible that future decommissioning of the GSEP would result in a negligible adverse future social impact.

4.13.3 Discussion of Cumulative Impacts

The potential for cumulative socioeconomic impacts exists where there are multiple projects proposed in an area that have overlapping construction schedules and/or project operations that could impact similar resources. Projects with overlapping construction schedules and/or operations could collectively result in a demand for labor that cannot be met by the region's labor pool, which could lead to an influx of non-local workers and possibly their dependents. This population increase could impact social and economic resources if there are insufficient housing resources and/or infrastructure and public services to accommodate the new residents' needs.

Section 4.1 identifies current solar and non-solar projects which could be developed in the foreseeable future within both eastern Riverside County and elsewhere in Riverside County or the surrounding counties. While a large number of projects may be planned and, therefore, considered to be possible for future development, not all of them are expected to actually be built due to construction funding constraints, schedule, and/or delays. Many of the currently proposed projects in the local region anticipate participation in federal funding programs and/or assistance for project development. Given the uncertain and challenging economic circumstances facing both federal and state economies, it is far from assured that future funding and other governmental support will be sufficiently available for all the proposed projects within the projected schedules.

As shown in Table 4.1-1, currently more than a dozen BLM renewable energy projects are identified in the Cumulative Project Scenario for the social and economic analysis. In addition, six smaller BLM authorized actions are also identified. Finally, the Blythe Airport Solar 1 and Chuckwalla Valley Raceway projects are two other developments expected to occur or be completed within eastern Riverside County.[8]

There are 13 solar projects proposed along the I-10 corridor predominantly between Desert Center and Blythe. Based on the currently available data for these various projects (information obtained from Plans of Development and other project documents), and assuming all projects move forward, these projects would be constructed in the same general timeframe as the proposed action (i.e. between 2011and 2016).

The cumulative analysis conservatively assumes that all the proposed solar projects would be completed (or at least begin major construction) within the five-year cumulative timeframe. This cumulative impacts discussion is based on available data with respect to both construction schedules and the projects' labor requirements. If construction and operating labor requirements are not known for some projects, average work force levels of other comparable projects and professional judgments have been used to develop conservative estimates of expected cumulative labor requirements for these projects.

Economic

Construction

Cumulative Construction Labor Needs

If all of the 13 major BLM Solar Projects identified in eastern Riverside County are constructed, a total of 6,108 MW of new solar power would be developed. The average solar power project would be approximately 470 MW in size and may be expected to require approximately 1,926 full time equivalents (FTE) construction workers to be built.[9] Full build-out of all 13 BLM solar projects would require approximately 25,040 FTE of construction worker employment over the cumulative analysis's five year time-frame. This labor demand would be roughly equivalent to an average of 5,000 FTE of construction workers per year annual. This level of construction worker labor demand would represent the minimum employment impact on the regional study area since

8 The Chuckwalla Valley Raceway project is scheduled for completion in late 2010 and therefore would not be expected to add any significant construction labor need during the 2011 to 2016 cumulative analysis time period.

9 This is based on an estimated average construction labor need of approximately 4.1 construction workers (FTE) per MW of solar power production capacity.

it assumes that all the BLM solar project construction work would be evenly performed over the five year period.

However, it will be solar projects' peak construction employment needs that would place the highest demand on the regional construction labor supply and have the greatest potential for cumulative socioeconomic impacts. The peak construction labor requirements for solar projects are estimated to average 1.86 workers per MW. In which case, during its period of peak construction, a typical 470 MW solar project would employ approximately 875 construction workers. Under the extremely improbable circumstance that peak construction of all 13 planned BLM solar projects happening concurrently, a maximum of 11,360 construction workers would be required in the region.

The actual cumulative construction labor force demand within the study region will be higher than the 5,000 FTE minimum and likely considerably lower than the 11,360 FTE maximum. The average construction period for BLM solar projects is estimated to be approximately 43 months or 3.6 years. Furthermore, project developers will likely seek to minimize the construction occurring during the hottest summer months and may stagger their construction periods accordingly. Consequently, some seasonality may be expected to occur as developers favor more construction during the region's cooler winter months. Therefore, conservatively assuming that all the projects would be completed with the five-year cumulative scenario period, the regional labor need for a realistic "worst case condition" would be for four projects to have peak labor needs during the same year.[10]

Given an average construction period of 3.6 years, it would be expected that at least nine of the 13 BLM solar projects would be occurring at any one time and, more likely, at least 11 would be ongoing during the expected peak labor demand period of 2012 to 2014. Therefore, the peak construction labor demand for the cumulative analysis is estimated to be equivalent to the total construction labor demand for seven solar projects under average construction conditions and four solar projects during peak construction. Altogether, such a rate of solar construction would be expected to require a total of 7,180 construction workers for the various BLM solar projects along the I-10 corridor during the years of major solar project development.[11]

In addition, there also could be demand for construction workers from the planned non-BLM solar project proposed for the Blythe Airport. This 100 MW solar project could contribute approximately 150 construction workers annually over the course of a multi-year construction period. The future construction needs of the various other non-solar projects on BLM land in the region are not known but, altogether, reasonably could be expected to have an annual construction labor need roughly comparable to another solar project (i.e., 530 construction workers).

[10] The peak construction requirement typically occurs during mid-construction, suggesting that 2012 – 2014 would be most likely to experience peak labor demands.

[11] This assumes a typical 470 MW solar projects requiring 527 workers under average construction conditions and 873 workers during their shorter periods of peak construction.

Therefore, 7,880 construction workers is very conservatively estimated to represent the maximum possible future cumulative labor force demand from the region's planned solar and non-solar development. This estimate assumes all the identified projects would be developed within the five year cumulative analysis period.[12] The proposed action's maximum potential contribution to this cumulative effect would be approximately 13.8 percent during its peak construction period. The project's average contribution to the cumulative impact would be approximately 8.2 percent during its non-peak construction.

Regional Labor Force Supply

As discussed earlier in the social and economic analysis, the total work force of skilled construction workers currently living in eastern Riverside County is estimated to be approximately 14,665. Future demand for 7,880 construction workers would be equivalent to employment for more than half (53.7 percent) of the current skilled labor force. Such demand for construction workers far exceeds the current unemployed construction labor force. Approximately, an additional 850 skilled construction workers are currently expect to be added to the eastern Riverside County labor force by 2016 (based on past job projections shown in Table 4.13-1). The cumulative labor force demand would still represent more than half the region's currently forecasted future skilled construction labor force.

The current unemployed labor force within eastern Riverside County is estimated to be 32,240. The construction worker demand would represent approximately a 24.4 percent decrease in the regional study area's unemployment level. Although many of the region's currently unemployed residents may lack transferable skills or have the physical aptitude to acquire the necessary skills required by cumulative labor demand, many residents could be adequately trained to be employable. Furthermore, some of the construction work would be more entry-level positions which may be suitable for less skilled workers.

Some of the regional workforce currently employed in other sectors also could have the capabilities to qualify for GSEP construction work. In such cases, some job transferring may occur, especially since the construction jobs may be expected to be relatively well-paid and attractive for many local residents. The less skilled or desirable jobs vacated by individuals transferring to construction work could be filled by other less skilled unemployed residents. Finally, the cumulative labor force demand on eastern Riverside County also could be partly reduced as projects located to the west would be closer to cities and potential workers outside the GSEP's regional study area. Consequently, these projects could meet some of their labor needs from residents from San Bernardino, Riverside or Moreno Valley.

Housing and Lodging Impacts within the Local Study Area

Nonetheless, there could be demand for specialized construction trades that exceed the available labor supply for that specialty within eastern Riverside County. In which case, it is assumed that those job positions would be filled by workers relocating into the region from elsewhere.

[12] In actuality, construction labor shortages (and related wage escalation) would also be expected to become a possible constraint reducing the pace of future development occurring.

Given the numerous factors discussed above, it is difficult to project the extent of future weekly commuting or other in-migration that would be necessary to meet the future cumulative labor needs within the region. However, as a conservative assumption, other social and economic impacts analyses for solar projects have suggested that a 15 percent rate of in-migration would be a conservative and reasonable assumption. Such a proportion of in-migration applied to the projected maximum future cumulative labor force demand would suggest that up to 1,165 construction workers could require temporary housing in the local, or possibly, regional study area.

As discussed earlier, the skilled construction labor force within Riverside County is estimated to be approximately 69,100. This suggests that there is likely to be a considerable additional potential labor force available that could be willing to commute weekly or temporarily relocate to the local area. Consequently, from a broader geographic and labor force perspective, no significant shortages of adequately skilled construction workers, if foreseen, provide adequate and/or suitable housing available for relocating near the projects' sites.

The cumulative influx in construction labor to the area could create demand for temporary housing that is greater than the existing supply of temporary lodging. As discussed in the previous construction impact analysis, private and public RV/campgrounds are not expected to be suitable or attractive lodging options for most project construction workers seeking local accommodations. There are expected to be some suitable and available temporary lodging at local hotel/motel lodging. Although, room availability and prices could be higher during the winter months, based on County-wide vacancy rate estimates, nearly 300 rooms could be available in the local area. Given that some construction workers might be willing to share rooms and save on their lodging costs, the existing local hotel/motels could be able to satisfy up to 450 future construction workers seeking local temporary housing. If construction workers are willing to commute 1 to 1.5 hours daily to the site, the supply of potential hotel/motel increases dramatically to an estimated 8,285 rooms, which would correspond to 2,420 rooms. This would be more than sufficient temporary housing for an expected 1,165 construction workers seeking temporary housing.

In addition to the available lodging in the local area, there are also potentially considerable under-utilized homes in the local area that may be suitable for rent by construction workers seeking local housing. Within the City of Blythe, approximately 880 homes are currently estimated to be vacant and another 1,594 local housing units may be available within the cities of Ehrenburg and Quartzite in Arizona. Given that some construction workers could be willing to share homes to reduce their lodging costs, these housing units could provide more sufficient housing for the projected cumulative local housing demand.

Some of the solar developers might also choose to develop onsite housing facilities for their construction work forces. For example, on-site worker accommodations are planned as part of the Rice Solar project by its developer.[13] The Eagle Crest Pumped Storage project near Desert Center

[13] Development of temporary worker housing facilities is more likely to be possible at projects (such as Rice), which are located on private property.

is located at a former mine site that has housing previously used by mine workers. Project documents indicate that the possible use of the onsite housing for the pumped storage project is under consideration. In addition, BLM may allow temporary LTVAs to be established on site for construction workers for the duration of project construction as temporary lodging facilities.

Irrespective of the availability of temporary housing, it may be expected that, even under future cumulative conditions, a relatively small proportion of construction workers would choose to permanently relocate to the local communities where they are employed during construction. This is because many construction workers could choose to commute relatively long distances to their work sites and may expect to seek work within the more populated areas of Riverside and San Bernardino Counties in the future.

Furthermore, during the same time period with the greatest potential for adverse impacts resulting from the cumulative demand for construction worker housing, there also would be a major positive economic stimulus to the Blythe area and eastern Riverside County economies associated with the solar development which could likely offset any adverse impacts.

In summary, there is potential for short-term adverse cumulative social and economic impacts in the Blythe area associated with the demand for skilled construction labor for the dozen solar projects proposed for future development within eastern Riverside County. Analysis suggests that future construction labor demand would be greatest from 2012 to 2014 and may be sufficient to exceed the existing local work force within eastern Riverside County. In which case, there may be increased demand for temporary local housing from construction workers seeking to commute weekly to the local area. However, given the estimated availability of lodging and possible rental housing, it is expected that there will adequate and suitable housing to meet any future construction worker temporary housing demand. Therefore, no major adverse social or economic impacts would be expected to result.

Operations

If all of the 13 major BLM Solar Projects identified are constructed, a total of 6,108 MW of new solar power would be developed. The average solar power project is estimated to require approximately 0.21 operations workers for each MW of solar power production. Consequently, if full build-out of the planned solar development occurs, the future cumulative operations labor employment in the region would be approximately 1,280. The GSEP’s operations employment of 65 jobs represents approximately a 5.2 percent contribution to the cumulative operations labor need.

As discussed in the earlier operations analysis, there is currently only a limited population of skilled plant workers living in the eastern Riverside County. However, the transferability of construction worker skills, on-the-job and local community college training opportunities, as well as the lower skilled qualification requirements for half the operations job suggest that there would be many local and eastern Riverside County residents who would be able to meet the cumulative operations labor needs.

Even conservatively assuming that up to 25 percent of the future operations labor force could be recruited from non-region residents, there would be an in-migration population of 320 operations workers. There is more than sufficient available local housing to accommodate the housing needs of these workers and their families. Furthermore, the relatively limited number of new residents would not be expected to result in any noticeably change to the local communities' social composition or character. The future operations of the solar projects will also generate significant annual economic benefits in local employment, direct and indirect spending at local businesses as well as positive sales and other tax benefits for the local area. Consequently, the cumulative social and economic effect of the future operations of the solar projects would be minor and beneficial.

Decommissioning

Evaluating the proposed action's cumulative impacts when future facility decommissioning occurs is highly speculative. Ultimate decommissioning is expected to occur in 30 to 40 years' time. It is not possible to project with any confidence the likely future social and economic conditions of the local and regional study area. Similarly, it is very difficult to envision the future cumulative scenario conditions that appropriately represent the context within which the GSEP would dismantle its facilities and site reclamation would occur. Simply stated, any presumptions of the future status for the other solar projects (e.g., continued operation, replacement or decommission) would directly determine the nature of the impact that discontinuation of the proposed action would be expected to have.

In any case, the proposed action is expected to be one of many similar solar projects within the eastern Riverside County region. As such, the proposed action's contribution and influence on the region's social and economic conditions would likely be proportional to: (a) its magnitude relative to the other developments projects in the region; and (b) the collective size and relationship of the combined development projects to the region's social and economic conditions. Consequently, from the current perspective and based on the currently and foreseeable future circumstance for the project and the region, there is no evidence to suggest that future decommissioning of the GSEP would have anything but at most a very minor adverse cumulative impact on the local and regional area's economic or social environment.

Social

Construction

The cumulative impact of the many proposed future solar and non-solar development projects in Eastern Riverside County would result in considerable short-term construction activity at many locations throughout the region. Future cumulative demand for construction workers for these projects could exceed the available supply of skilled construction workers living in the region. In this case, construction workers from elsewhere in Riverside County, Southern California, or Arizona could be attracted to the area by the construction employment opportunities. The potential for adverse social impacts would be decreased if there is a sufficient suitable supply of housing and lodging to satisfy these workers' local housing demand. Therefore, in this case, no new residential or lodging growth would be expected to occur.

The ongoing construction activity in the region, influx of construction workers both commuting daily to the site, and the more limited number who could choose to temporarily live in the local area could noticeably alter the social character and environment within Blythe and the other communities within the local area. A construction worker population of 7,780 would be equivalent to nearly approximately 29 percent of the estimated total local study area population and, consequently, would be cumulatively likely to be very noticeable.

The potential influx of construction workers to the local area would be accompanied by an increase in economic activity from their spending in local business establishments. In addition, the planned new development projects would also make purchases from local businesses for construction materials and supplies, various kinds of services, etc.

The effects of the increased activity on local attitudes and quality of life may vary amongst residents. While some residents may be displeased by increased traffic, new visitors and temporary residents (particularly those employed or otherwise benefiting economically from the construction) could welcome the development.

However, an influx of new workers also could increase the demand for certain kinds of government services and infrastructure (e.g., police and fire services and medical facilities and services). There have been other past instances of rapid growth in rural areas as a result of energy-related development, most notably the energy boom in the 1970s in states such as Wyoming. A number of communities, such as Rock Springs and Gillette, Wyoming, became known as “boomtowns,” and the local economic benefits from the new energy development in the region were accompanied by some social changes that were not seen as positive by many existing residents. These included changes such as growth in number of bars, higher crime rates, and perceived (by some) aesthetic degradation due to rapid growth occurring to accommodate the sudden increase in population.

The presence of existing larger communities (such as Indio and Coachella) that are within possible commuting range for construction workers could suggest that circumstances may differ substantially from those facing the more isolated Wyoming boomtown communities 35 years ago. However, there would remain a potential for temporary impacts in the Blythe area, particularly if the possibility of such social and economic impacts are not unanticipated and are not managed.

Operations

As discussed in the corresponding economic cumulative analysis, the proposed action’s future operations would be expected to have a minor and beneficial effect on the local and eastern Riverside County economy. Even conservatively assuming that up to 25 percent of the future operations labor force could be recruited from non-region residents, there would be an in-migration population of only 320 operations workers. There is likely to be more than sufficient available local housing to accommodate the housing needs of these workers and their families. Furthermore, the relatively limited number of new residents would not be expected to result in any noticeably change to the local communities’ social composition or character. The future operations of the solar projects also would generate significant annual economic benefits in local employment, direct and indirect spending at local businesses as well as positive sales and other tax benefits for the local area. Consequently, the cumulative social and economic effect of the future operations of the solar projects would be minor and beneficial.

Decommissioning

As discussed in the corresponding economic cumulative analysis, there is insufficient information to reliably project the conditions when decommissioning of the proposed facilities would occur in 30 to 40 years in to the future. Consequently it is highly speculative to attempt to characterize the future situation and circumstances under which facility decommissioning would occur.

In any case, the proposed action is expected to be one of many similar solar projects within the eastern Riverside County region. Consequently, from the current perspective and based on the currently and foreseeable future circumstance for the project and the region, there is no evidence to suggest that the future project decommissioning would have anything but at most a very minor adverse cumulative impact on the local and regional area’s social environment.

Alternatives

Reduced Acreage Alternative

The construction spending and employment for the Reduced Acreage Alternative would be expected to be reduced from that for the proposed action and, consequently, the cumulative impact would be similarly reduced in magnitude.

No Action Alternative A

The social and economic impacts associated with the proposed action would likely only be delayed by selecting No Action Alternative A, since this region of the United States has extremely positive characteristics for solar power generation. If this proposal were not approved, another application for a different solar generating facility or a different type of solar generating facility would likely be filed at some time in the future. An application could also be filed for a wind energy facility or any other kind of use and any cumulative impacts would result based on the specific use requested.

No Project Alternative B

The social and economic impacts resulting from the proposed action would not occur under No Project Alternative B since the application would be denied and the plan amended to identify the land as unsuitable for solar energy generation. However, the land would remain open to other types of rights-of-way and/or land use authorizations, resulting in potential cumulative impact specific to a future use other than solar energy generation.

No Project Alternative C

Cumulative impacts associated with the proposed action would likely only be delayed by selecting No Project Alternative C since this region of the United States has extremely positive characteristics for solar power generation. If this Project were not approved, another application for a different solar generating facility would likely be filed at some time in the future.

4.13.4 Summary of Mitigation Measures

No mitigation is required.

4.13.5 Residual Impacts after Mitigation Measures were Implemented

No mitigation measure would be implemented and therefore no residual impacts would remain.

4.13.6 Unavoidable Adverse Impacts

No unavoidable adverse social or economic impacts would be expected to be associated with the proposed action.

4.14 Impacts on Soil Resources

4.14.1 Impact Assessment Methodology

Climatological data provided by the Western Regional Climate Center and soil data provided by the USDA soil survey were used to determine impacts affecting soil resources.

4.14.2 Discussion of Direct and Indirect Impacts

Proposed Action

Erosion

Erosion is the displacement of solids (soil, mud, rock, and other particles) by wind, water, or ice and by downward or down-slope movement in response to gravity. Due to generally flat terrain, the GSEP site is not prone to significant mass wasting (gravity-driven erosion and non-fluvial sediment transport).

Grading of the GSEP site would result in a less than one percent slope downward from the north to the south of the site. Earthwork associated with the GSEP would include excavation for foundations and underground systems, and the total earth movement that would occur is approximately 1,000,000 cubic yards. Cut and fill would be balanced on site and there would be no need to either import or export earthen material.

The vast majority of the GSEP grading and excavation would occur on the GSEP site with only minor grading and excavation needed for the transmission line (at the locations of the monopoles) as well as the gas pipeline and access road. Known onsite soil types that would be affected by GSEP grading and excavation are listed in Section 3.15. The wind erosion hazard is moderate to high. During construction, the area within the plant site fence line (1,800 acres) would be disturbed. There also would be small, localized disturbance at the specific locations where transmission structures would be installed.

During construction, the surface of the disturbed areas would be devoid of vegetation and there would be the highest potential for erosion, as well as associated effects including soil loss and increased sediment yields downstream from disturbed areas.

Wind Erosion

The potential for soil loss by wind erosion was estimated using the Wind Erosion Prediction System (WEPS) model for pre-development (undisturbed), during construction, and operational conditions.

The area of the GSEP site and GSEP-related off-site linears has a moderate to high potential for wind and water erosion. According to WEPS simulations, wind erosion rates at the GSEP site are an order of magnitude higher than soil erosion by rainfall runoff at this location due to the relatively low annual rainfall amount and the presence of fine, sandy soils. The results are presented in Table 4.14-1 presented below.

TABLE 4.14-1
ESTIMATE OF SOIL LOSS BY WIND EROSION USING WIND EROSION PREDICTION SYSTEM (WEPS) MODEL

Description	Acres	Predicted Soil Loss (tons per acre per year)	Wind Erosion Soil Loss (tons per year)
No GSEP	1,800	72.88	131,184
On-Site GSEP Construction (no BMPs)	1,800	27.82	50,076
On-Site GSEP Construction (with BMPs)	1,800	1.25	2,250
Off-Site Linear Construction (with BMPs)	61	0.63	11
GSEP Operation (with BMPs)	1,650	1.25	2,063

SOURCE: CEC, RSA (June 2010) Soil & Water Table 14.

Under current conditions, these processes are in relative equilibrium with ongoing depositional processes and soil loss is estimated at approximately 72.88 tons per acre per year or 131,184 tons for the proposed GSEP area of 1,800 acres (WPAR, 2009). Construction without implementation of BMPs would result in a potential for soil loss of about 50,000 tons; however, the implementation of BMPs is expected to reduce water and wind erosion of soils during construction to less than 2,250 tons. Based on the conceptual grading plan (WPAR, 2009; see Appendix A in WPAR) for the GSEP site, construction would require cut and fill activities on the GSEP site, but import/export of earthen materials to and from the GSEP site would not be required.

Roads and paved areas would be kept free of dust, dirt and visible soil materials. Materials would be kept on site to implement temporary control measures during the operational life of the GSEP.

Impacts of GSEP operations on the proposed rerouted desert washes are discussed in the Vegetation Resources Section of this chapter (Section 4.17).

A solar thermal project must keep dust to a minimum, as a film on the collectors of the solar array would reduce their efficiency for power production. Dust control would be achieved by a combination of soil stabilizers, water from the collector washing and waste cooling water, and compaction of the driving surface over time. Therefore, operational controls designed to control dust are expected to reduce the overall soil erosion in the area. Therefore, potential construction and operational-related impacts to onsite soils would be confined to the GSEP site and related off-site linears.

Water Erosion

For potential soil loss associated with water erosion, it was assumed that 100 percent of the GSEP site would be graded. Those estimates are detailed in Table 4.14-2.

To address the management of sediment transport, erosion, and sedimentation during operation, the GSEP design would incorporate diversion berms, channels, and detention basins. Dirt roads and exposed surfaces would be periodically treated with dust palliatives as needed to reduce wind

TABLE 4.14-2
ESTIMATE OF SOIL LOSS BY WATER EROSION
USING REVISED UNIVERSAL SOIL LOSS EQUATION (RUSLE2)[a]

Feature (acreage)[b]	Activity	Duration (months)[c]	Soil Loss (tons/yr) w/o BMPs	Soil Loss (tons/yr) with BMPs	Soil Loss (tons/yr) No GSEP
GSEP Site (1,800 acres total graded)	Grading Construction	6 9	441.0 1,396.5	6.93 21.95	1.53 ---
Roads (15.76 acres)	Grading Construction	3			
Transmission lines (9.18 acres for construction; 0.05 acres for pole footprints)	Grading Construction	2 4	0.0041 1.499	0.000064 0.0236	0.00043 ---
Natural Gas Pipeline (36.36 acres for construction; 2.91 acres for trench)	Grading Construction	2 3	0.238 4.454	0.0037 0.0699	0.00247 ---
GSEP Soil Loss Estimates (Construction)	All activities listed above	29[d]	1,845.63	29.00	1.16
GSEP Annual Soil Loss Estimate (Operation) (1,650 acres exposed soil)		12		12.71	

NOTES:

[a] Water Erosion Soil losses (tons/acre/year) are estimated using RUSLE2 software. (NRCS, 2002) The soil characteristics were estimated using RUSLE2 soil profiles corresponding to the mapped soil unit. Estimates of actual soil losses use the RUSLE2 soil loss times the duration and affected area. The No Project Alternative estimate does not have a specific duration, and loss is given in tons/year.

[b] Project Acreages based on the assumption that 100 percent of the project site will be graded. Off-site area acreages are based on project disturbance table for acreage outside the project footprint.

[c] Duration of activities based upon assumptions in the Plan of Development (Genesis Solar, LLC, 2009).

[d] Activities would not all be concurrent.

RUSLE2 ASSUMPTIONS:

100-ft slope length, 2 percent slope

Construction and Grading soil losses assume the following inputs: Management - bare ground; Contouring - None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

Construction and Grading with BMP and Annual Operational soil losses assume the following inputs: Management – Silt fence; Contouring - Perfect, no row grade; Diversion/terracing - None; Strips and Barriers- 2 fences, 1 at end of slope.

No Project soil losses assume the following inputs: Management - Dense grass, not harvested; Contouring -None, rows up and down hill; Diversion/terracing - None; Strips and Barriers - None.

SOURCE: CEC, RSA (June 2010) Soil & Water Table 14; WPAR 2009.

erosion. Construction and maintenance of the proposed drainage and sediment management system at the GSEP site is expected to reduce water and wind erosion at, and downstream of, the GSEP site to less than significant levels.

Geomorphology

The GSEP involves a series of solar arrays within a roughly 1,800 acre rectangular shaped parcel and linears (access road, gas line, transmission lines) involving approximately 90 acres. The method of construction is important in assessing the potential impact to geomorphological conditions associated with the solar arrays and linears. Solar array construction would involve mass grading that would require drainage to be intercepted up-gradient and routed around the arrays to the down-gradient side of the facility to continue flow. Construction of the linear facilities would involve placement of an underground gas line, electric transmission line towers, and an access road. The underground gas line's finish grade would be close to existing ground surface contours and thus would have a minimal affect on aeolian systems. The overhead transmission lines would have a minimal effect on aeolian systems and only in areas of the proposed tower foundations. The current design for the proposed access road involves a low relief road close to existing contours that would not adversely affect aeolian sand migration but may require some special design considerations where it crosses existing drainages.

Impacts to the Qal

The Holocene Quaternary alluvium (Qal) and Pleistocene Quaternary alluvium (Qoa) are relatively stable surfaces, with little evidence of active sand transport. The presence of the gravel with desert pavement and varnish is evidence that these surfaces are also stable from a fluvial perspective (i.e., that the small channels, while potentially prone to lateral migration and avulsion across the stable surface, do not tend to cut vertically into the surface). From a geomorphic perspective, construction of the GSEP on the Qal and Qoa areas should have relatively little off site impact. Because there is little sediment transport occurring on these surfaces, construction of the proposed GSEP does not appear likely to disrupt the movement of sediment to habitat areas elsewhere. No mitigation is required or proposed.

Impacts to the Qsr

The relict Quaternary sand (Qsr) is a relatively stable surface, with little evidence of active sand transport. The presence of the soil horizons and surface lag is evidence that this surface is also stable from a fluvial perspective (i.e., that the small channels, while laterally active, do not tend to downcut or fill vertically). From a geomorphic perspective, construction of the GSEP on the Qsr area should have relatively little off site impact. Because there is little sediment transport occurring on this surface, construction of the proposed GSEP does not appear likely to disrupt the movement of sediment to habitat areas elsewhere. No mitigation is required or proposed.

Impacts to the Qsad/Chuckwalla Sand Transport Corridor

The western array avoids the Chuckwalla sand transport corridor as mapped by Dr. Kenney (WPAR, 2010). The eastern array intrudes into the corridor by approximately 1,600 feet at a point where the corridor is 24,000 feet wide. This intrusion represents about 7 percent of the Chuckwalla sand corridor width. This part of the corridor does not appear to be the most active with regard to sediment transport rates (based on the amount of sand in storage on the ground, evidence for sand transport from ripples and coppice dunes, etc.), so the reduction in sediment transport capacity is not considered a significant impact. Based on the degree of intrusion into the corridor and the length of the intrusion, it was estimated that an area of 157 acres of vegetated sand dune (Qsad) downwind of the intrusion might be expected to experience moderate impacts from loss of sand due to the GSEP site.

It is recommended that the GSEP minimize encroachment of the main footprint into the Qsad/sand transport corridor.

Impacts to the Palen-McCoy Sand Transport Corridor

As originally configured, the eastern solar array of the GSEP intruded into the outer edges of the Palen-McCoy Valley Sand Transport Corridor, which delivers sand to Mojave fringe-toed lizard habitat downwind. The Applicant estimated that the easternmost end of the GSEP's eastern solar array extended approximately 1000 feet (19 percent) of the width of this corridor (Worley Parsons 2010c). The Applicant recently revised their GSEP footprint (TTEC 2010o) to eliminate 41.4 acres of the easternmost array, thus avoiding intrusion into the Palen-McCoy Valley Sand Transport Corridor.

Although the magnitude of impact to the entire wind transport corridor is relatively low, the area of off-site impacts immediately downwind of the GSEP is large: the lee area downwind of the GSEP that is likely to experience sand depletion is 309 acres. Since there are 13 acres of overlap from both wind shadows, the combined area impacted by intrusions into both corridors is 453 acres. This area would be expected to experience deflation (loss of sand from the existing vegetated dunes over time) and armoring (coarsening of the sand and gravel as fine sand is eroded by the wind).

Impacts to the Qsa

The Qsa is the active area of sand dunes supplied by wind and water transport from the Palen – McCoy Valley sand corridor. This corridor supplies significant sand dune habitat downwind. This area is crossed by the laterals near Wiley Wells Rest Stop.

The main GSEP footprint should avoid this area completely since large scale obstruction of this unit would be hard or impossible to mitigate for. The GSEP should be able to avoid or minimize impacts created by the laterals within this zone by avoiding creation of barriers to wind and water transport. Most wind-borne transport of sand occurs within 3 feet of the ground, so infrastructure should be constructed flush with the surrounding ground surface and without ground level obstructions. Power pylons should not pose a significant problem due to their small surface area at ground level. Water and gas pipelines should be buried below ground. Road surfaces should be flush with the ground surface. There should not be drainage ditches running perpendicular to the wind direction (approximately north-south in the northern section of the lateral route, shifting to west-east in the southern area).

Alternatives

Reduced Acreage Alternative

This Alternative would essentially be Unit 1 of the proposed GSEP. The Alternative is analyzed for two major reasons: (1) it eliminates about 50 percent of the proposed GSEP area so all impacts are reduced, and (2) by eliminating the eastern solar field, it would reduce the water required for wet cooling by 50 percent.

Soil erosion could be impacted as a result of the construction and operation under this alternative. Impacts related to soil erosion from wind and surface water are anticipated to be similar to those associated with the proposed GSEP; an exception would be Aeolian erosion and transport, which would be reduced to near zero through elimination of the eastern solar array.

The GSEP construction activities would disturb soils at the site and along the linear facilities route(s). It is at the time of this disturbance that there would be the highest potential for erosion, as well as associated effects including soil loss and increased sediment yields downstream from disturbed areas. It is expected that BMPs would be utilized to minimize the impacts of soil erosion during construction to less than significant.

The Alternative removes the proposed eastern solar array from the GSEP. Since the main geomorphic impacts identified in this report are associated with the eastern solar array this alternative would have lower impacts, with no impact on the Chuckwalla and Palen-McCoy sand corridors or on the eastern wash complex. No mitigation is required or proposed.

Dry Cooling Alternative

Approximately 18 fans would be required for each air-cooled condenser (ACC). The 18 fans would operate when the ambient temperature is above 50 degrees Fahrenheit. When the temperature is below 50 degrees only 10 of the fans would be used (GSEP 2009f). The ACC described in the GSEP cooling study would have a length of approximately 279 feet, a width of approximately 127 feet, and a height of 98 feet (GSEP 2009f). However, based on the ACC preliminary designs for nearby solar thermal projects in similar ambient temperatures, an additional 11,690 square feet could be required. In addition to the ACC and fans, NextEra would use a small Wet Surface Air Cooler when needed to provide auxiliary cooling during extremely hot days (GSEP 2009f). This alternative is analyzed because it would reduce the amount of water required for steam turbine cooling from 822 acre-feet per year (ac-ft/yr) to 66 ac-ft/yr). This reduction in water use would primarily reduce impacts to water and biological resources.

This alternative is located entirely within the boundaries of the proposed GSEP. It simply eliminates the use of wet-cooling towers and incorporated the use of air-cooled condensers (ACC) in the same location. As a result, the environmental setting would be the same as for the proposed GSEP.

Wet cooling maximizes power plant fuel efficiency by providing a continuous source of effective cooling for the plant’s steam condensers. Dry cooling would typically provide less effective cooling of the condensers, reducing the efficiency of the steam cycle portion of the power plant, and thus the overall fuel efficiency of the facility.

The FSA for the Beacon Solar Energy Project (08-AFC-2; BSEP 2009 as cited in the CEC RSA June 2010) showed that annual average fuel efficiency would be reduced 5-7 percent compared to a wet cooling system. The GSEP applicant stated that use of dry cooling would result in a 7.4 percent decrease in total annual net megawatt hours compared with a wet cooling system (GSEP 2009a).

The GSEP applicant states that the proposed GSEP has been optimized for the land available, and therefore solar field expansion infeasible (GSEP 2009a). However, the power block and solar arrays would occupy approximately 1,360 acres of the 1,800-acre site. Evaporation ponds, access roads, administration buildings, and other support facilities would require a portion of the 1,800-acre site, and there is also remaining open space (GSEP 2009a). Additionally, use of dry-cooling would require smaller evaporation ponds opening up additional land for solar field expansion. A 12 percent increase in the solar field would require approximately an additional 150 acres. While it is uncertain whether the entire 150 acres is available for use and would comply with the engineering requirements for GSEP, it is clear from the site plan that there is some available land immediately adjacent to existing solar trough rows and this land could be used to offset all or a portion of the efficiency loss due to the use of dry-cooling.

Because the ACC system would not require any additional ground disturbance other than what would be required for the proposed GSEP with the use of wet-cooled towers, impacts to soil resources from use of the Dry-Cooling Alternative would be expected to be similar as for the proposed GSEP. Erosion impacts would be expected to be similar; however, the ACC system would potentially require some increase in truck traffic and related erosion due to the larger size of the system.

No Action Alternative A

Under this alternative, the proposed GSEP would not be approved by the BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the impacts to soils and water from the construction and operation of the proposed GSEP would not occur. However, the land on which the GSEP is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and federal mandates, and those projects would have similar impacts in other locations.

No Project Alternative B

Under this alternative, the proposed GSEP would not be approved by the BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, impacts to soils and water would result from the construction and operation of the solar technology and resulting ground disturbance and would likely be similar to the impacts to soils and water from the proposed GSEP, including erosion impacts and impacts to jurisdictional waters. Different solar technologies require different amounts of grading; however, it is expected that all solar technologies would require grading and maintenance. As such, this No Project Alternative could result in impacts to soils and water similar to the impacts under the proposed GSEP.

No Project Alternative C

Under this alternative, the proposed GSEP would not be approved by the BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no soil erosion impacts or impacts to jurisdictional waters. As a result, this No Project Alternative would not result in the impacts to soils and water under the proposed GSEP. However, in the absence of this GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.14.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance, and decommissioning of the GSEP could result in a cumulative effect on soils resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for soils consists of the Mojave Desert Air Basin, since soils could be transported offsite by wind, and the watershed boundary, since surface flows also could carry eroded soils off-site. Potential cumulative effects on soil resources could occur at any point during the overall lifespan of the GSEP, from pre-construction activities to the conclusion of facility closure and site reclamation.

Existing conditions within the Area of Potential Effects (APE) reflect a combination of the natural condition and the effects of past actions and are described in this PA/FEIS Chapter 3. Direct and indirect effects of the GSEP are discussed above. In general, construction of the proposed action would result in temporary changes at the site that could incrementally increase local wind-borne soil erosion and storm water runoff during construction. However, the GSEP would be expected to contribute only a small amount to any possible short-term cumulative impacts related to soil erosion, because the Applicant would be required to implement the mitigation measures specified below. Operation of the proposed action would result in permanent changes at the GSEP site. These changes could incrementally increase local soil erosion and storm water runoff. The proposed action would not be expected to cumulatively contribute to these possible long-term operational cumulative impacts because potential GSEP related soil erosion and increased sedimentation resulting from storm water runoff are expected to be reduced to an acceptable level through implementation of the mitigation measures specified below. Nonetheless, these incremental contributions to air- or water-borne erosion and sedimentation could combine with the incremental impacts of other past, present, and reasonably foreseeable future actions making up the cumulative scenario (see Section 4.1). Construction or maintenance activities, including grading, compaction, drilling, back-filling, driving on unpaved roadways, etc., could disturb soils at any work site, regardless of the type of project and regardless of the phase of its development. However, the combined vegetation removal anticipated as a result of the numerous proposed utility-scale renewable energy projects, including the GSEP, could expose soils to higher wind-borne erosion rates than the area otherwise would be exposed to. This also could exacerbate runoff rates, especially during high intensity, short duration rainfall events. The Reduced Acreage Alternative, Dry Cooling Alternative, the No Action Alternative, and No Project Alternatives could be expected to contribute to a cumulative impact on soil resources in proportion to the amount of soil disturbance that could occur pursuant to each.

4.14.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following mitigation measures would avoid or minimize impacts on soil resources:

SOIL&WATER-1, SOIL&WATER-3, SOIL&WATER-4, SOIL&WATER-5
SOIL&WATER-11, SOIL&WATER-14, SOIL&WATER-17

4.14.5 Residual Impacts after Mitigation Measures were Implemented

Residual soil resource impacts are the increased soil loss from construction and operation as outlined in Tables 4.14-1 and 4.14-2.

4.14.6 Unavoidable Adverse Impacts

None.

4.15 Impacts on Special Designations

4.15.1 Impact Assessment Methodology

This section was prepared using information contained within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO)

4.15.2 Discussion of Direct and Indirect Impacts

Proposed Action

The proposed action would have no direct effects on special designations, since the site is not subject to any such designation, no new designations or amendments to existing designations are proposed; however, it could affect values inherent to five specially designated wilderness areas: the Palen/McCoy Wilderness, Chuckwalla Mountains, Joshua Tree, Palo Verde Mountains and Little Chuckwalla Mountains Wilderness areas. The proposed action would not impact the seven ACECs located in the vicinity of the site or other special designations, such as wilderness study areas, national trails, or wild and scenic rivers.

Visitor experience within the south portion of the Palen/McCoy Wilderness could be affected by the proposed action. The Palen-McCoy Wilderness abuts the northern boundary of the GSEP site. This wilderness does not have maintained trails or trail heads, and is scarcely visited by the public (BLM Greg Hill, 2009). Nevertheless, because the wilderness area is physically accessible, it may be visited on rare occasions by backcountry hikers. Such visitors within sight of the project area could experience negative impacts from construction noise, fugitive dust, vehicle movement, and other “non-natural” construction activities and structures caused by the proposed action. These impacts could affect wilderness users’ perception of solitude, naturalness and unconfined recreation. Upon project completion, the solar arrays and associated infrastructure would be visible to visitors within the south portion of the wilderness, thus affecting their perception of naturalness, solitude and unconfined recreational experiences.

The Chuckwalla, Joshua Tree, Palo Verde Mountains and Little Chuckwalla Mountains wildernesses are located within a 20-mile radius of the GSEP site. The Chuckwalla Mountains Wilderness is approximately 7 miles southwest; the Little Chuckwalla Mountains Wilderness is approximately 8 miles south; the Joshua Tree Wilderness is 15 miles northwest; and the Palo Verde Mountains Wilderness is 15 miles southeast. Users of these wilderness areas would experience a more industrialized valley, but the industrialized valley is not within the wilderness area and opportunities for solitude and unconfined recreation would not be greatly affected. Reduction in groundwater levels would have an indeterminate affect on wilderness values within the basin.

The proposed action would not impact the seven ACECs located in the vicinity of the site (i.e., the Mule Mountains, Chuckwalla Valley Dune Thicket, Palen Dry Lake, Chuckwalla Desert Wildlife Management Area, Desert Lily Preserve, Corn Springs and Alligator Rock ACECs) as these were established to protect cultural and biological resources, and visitor use to these areas is a secondary resource benefit. The Mule Mountains ACEC is located approximately 12 miles southeast of the site; the 2,273-acre Chuckwalla Valley Dune Thicket ACEC is located approximately five miles south of the site, the Palen Dry Lake ACEC abuts the southwest corner of the GSEP total proposed right of way, but is five miles west of the proposed area of disturbance; the Chuckwalla Desert Wildlife Management Area is five miles south of the site; the Desert Lily Preserve ACEC is 15 miles northwest of the site; the Corn Springs ACEC is 15 miles southwest of the site; and the Alligator Rock ACEC is located 15 miles west of the site. Recreation uses allowed in ACECs are discussed in FEIS Section 3-13. Since the nearest ACEC is roughly five miles west of the proposed area of disturbance, these ACEC's can be considered to be isolated from potential impacts that could be caused by construction, operation and maintenance, and closure and decommissioning of the proposed GSEP.

The proposed action would not impact other special designations, such as wilderness study areas, national trails, or wild and scenic rivers because no such areas are located in the vicinity of the GSEP site.

The project is within a former WSA that has wilderness character. The project area is in a natural condition, with the imprints of man substantially unnoticeable. However, the project area has outstanding opportunities for solitude and primitive kinds of recreation only in conjunction with the contiguous Palen/McCoy Wilderness area to the north. The 1,800 acres of development on the project site would be very apparent and obliterate all natural character on the site. After the project is phased out, reclamation of those drainage basins followed by flooding of indeterminate frequency would ameliorate those imprints of man. The vegetative community would restore to a density comparable to adjacent areas in an uncertain, but estimated to be several decades, time thereafter.

Alternatives

Reduced Acreage Alternative

Assuming that this alternative retained the same vertical height for the tallest structure as the proposed action, then the viewshed would be the same as the proposed action and views from within the Palen/McCoy Wilderness would be the most directly impacted. Reduction in groundwater levels would have an indeterminate affect on wilderness values within the basin.

The project is within a former WSA that has wilderness character. The project area is in a natural condition, with the imprints of man substantially unnoticeable. However, the project area has outstanding opportunities for solitude and primitive kinds of recreation only in conjunction with the contiguous Palen/McCoy Wilderness area to the north. The 900 acres of development on the project site would be very apparent and obliterate all natural character on the site. After the project is phased out, reclamation of those drainage basins followed by flooding of indeterminate frequency would ameliorate those imprints of man. The vegetative community would restore to a density comparable to adjacent areas in an uncertain, but estimated to be several decades, time thereafter.

Dry Cooling Alternative

The dry cooling alternative would result in the same impacts to existing special designations as the proposed action. All facilities proposed under this alternative would generally be located within the GESP facility footprint. Therefore the viewshed would be the same as the proposed action and views from within the Palen/McCoy Wilderness would be the most directly impacted. Reduction in groundwater levels would have an indeterminate affect on wilderness values within the basin.

The project is within a former WSA that has wilderness character. The project area is in a natural condition, with the imprints of man substantially unnoticeable. However, the project area has outstanding opportunities for solitude and primitive kinds of recreation only in conjunction with the contiguous Palen/McCoy Wilderness area to the north. The 1,800 acres of development on the project site would be very apparent and obliterate all natural character on the site. After the project is phased out, reclamation of those drainage basins followed by flooding of indeterminate frequency would ameliorate those imprints of man. The vegetative community would restore to a density comparable to adjacent areas in an uncertain, but estimated to be several decades, time thereafter.

No Action Alternative A and No Project Alternative B

Under No Action Alternative A and No Project Alternative B, the ROW application would be denied and the ROW grant would not be authorized. Under No Action Alternative A, the CDCA Plan would not be amended; by contrast, under No Project Alternative B, the CDCA Plan would be amended to identify the application area as unsuitable for any type of solar energy development. Regardless of whether the CDCA Plan amendment occurs, neither of these alternatives would result in direct or indirect impacts to special designations. Groundwater levels would have not be affected and there would be no effect on wilderness values within the basin. Wilderness characteristics on the project site would be retained.

No Project Alternative C

If No Project Alternative C were selected, the ROW application would be denied, the ROW grant would not be authorized, and the CDCA Plan would be amended to identify the application area as suitable for any type of solar energy development. Consequently, No Project Alternative C could impact special designation values to the same degree and extent as the proposed action. However, it also could have a greater or lesser impact than the proposed action, depending on the type (different technologies could have different height, area, reflectivity or other characteristics), acreage (different technologies or proposals could require more or less land) and intensity of future development on the site. Wilderness characteristics on the project site would be retained. Groundwater levels would have not be affected and there would be no effect on wilderness values within the basin. Wilderness characteristics on the project site would be retained.

4.15.3 Discussion of Cumulative Impacts

Incremental impacts on wilderness areas resulting from the GSEP could combine with the incremental impacts of past, present, or reasonably foreseeable future actions to cause or contribute to a cumulative impact. The cumulative impacts area for potential cumulative impacts on these designated areas includes the range of areas from which sights, sounds, structures and other activities or developments could affect wilderness users' opportunities for solitude, naturalness and unconfined recreation within the Palen/McCoy, Big Maria Mountains, and Little Chuckwalla Mountains Wilderness Areas. Potential cumulative impacts could occur for the entire duration of the proposed action, from the initiation of construction to the conclusion of facility closure and site restoration.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in FEIS Chapter 3. Indirect effects of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Numerous energy-related development projects, including the proposed action, would adversely affect the viewscape by adding structures, fences and other features that could cause glint or glare or otherwise interrupt landscape views; would cause increased noise caused by equipment required for construction and operation, motor vehicle use, voices, music or other worker-related sounds; and would add facilities and structures to the landscape that are not currently present. Any of these activities individually or in combination could cause some users to seek out other areas of the desert for their wilderness activities and experiences.

These potential cumulative impacts on specially-designated wilderness areas could, in turn affect visitor attraction to other specially-designated areas along the I-10 corridor, including the ACECs mentioned above, since the myriad projects in the cumulative scenario, in combination, would add large- and small-scale industrial, utility-related and other uses in the region. To the extent that No Action Alternative A and No Project Alternative B would not result in development of the site, no cumulative impact on special designations would occur.

4.15.4 Summary of Mitigation Measures

All water sources within the wilderness areas in the basin will be inventoried. All federal and other appropriations will be identified. The US will identify as a federal reserved water right all remaining, as of October 31, 1994, un-appropriated water within the wilderness areas.

4.15.5 Discussion of Cumulative Impacts

Incremental impacts on specially-designated wilderness areas resulting from the GSEP could combine with the incremental impacts of past, present, or reasonably foreseeable future actions to cause or contribute to a cumulative impact. The cumulative impacts area for potential cumulative impacts on these specially designated areas includes the range of areas from which sights, sounds, structures and other activities or developments could affect wilderness users' opportunities for solitude, naturalness and unconfined recreation within the Palen/McCoy Wilderness, Big Maria

Mountains and Little Chuckwalla Mountains Wilderness Areas. Potential cumulative impacts could occur for the entire duration of the proposed action, from the initiation of construction to the conclusion of facility closure and site restoration.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in FEIS Chapter 3. Indirect effects of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1.Numerous energy-related development projects, including the proposed action, would adversely affect the viewscape by adding structures, fences and other features that could cause glint or glare or otherwise interrupt landscape views; would cause increased noise caused by equipment required for construction and operation, motor vehicle use, voices, music or other worker-related sounds; and would add facilities and structures to the landscape that are not currently present. Any of these activities individually or in combination could cause some users to seek out other areas of the desert for their wilderness activities and experiences.

These potential cumulative impacts on specially-designated wilderness areas could, in turn affect visitor attraction to other specially-designated areas along the I-10 corridor, including the ACECs mentioned above, since the myriad projects in the cumulative scenario, in combination, would add large- and small-scale industrial, utility-related and other uses in the region. To the extent that No Action Alternative A and No Project Alternative B would not result in development of the site, no cumulative impact on special designations would occur.

4.15.6 Summary of Mitigation Measures

None.

4.15.7 Unavoidable Adverse Impacts

Unavoidable impacts to designated wilderness areas would result because construction and operation of the proposed action would alter the adjacent scenery to a more industrial setting, as viewed from within the wilderness. The existing landscape setting would be restored upon reclamation. Thus, the effects on wilderness experiences would continue until project facilities are dismantled and the desert vegetation and landforms of the site reclaimed.

4.16 Impacts on Transportation and Public Access – Off Highway Vehicle Resources

4.16.1 Impact Assessment Methodology

Public Access

The CDCA and NECO Plan, which includes a detailed inventory and designation of open routes in the vicinity of the GSEP, was reviewed to determine impacts to open routes.

Transportation

This analysis focuses on potential impacts related to the construction, operation and decommissioning of the GSEP on the surrounding transportation systems and roadways based on the Energy Commission's Revised Staff Assessment (CEC RSA, June 2010). For impacts to local transportation systems, the Energy Commission evaluated impacts based on level of service (LOS) determinations, which is a generally accepted measure used by traffic engineers, planners, and decision-makers to describe and quantify the congestion level on a particular roadway or intersection in terms of *speed*, *travel time,* and *delay.*

In addition, the Energy Commission used methodology contained in the *Highway Capacity Manual 2000* to determine potential impacts to intersections from operations of the proposed action. This methodology was used to assess delays at an unsignalized intersection for movements operating under traffic control—a stop sign, for example. For an intersection at which the only stop-sign is placed at a side street, delay would be reported for movements controlled by the stop sign. The delay then would be assigned a corresponding letter grade to represent the overall condition of the intersection or level of service. These grades range from LOS A, free-flow, to LOS F, poor progression.

The assessment of transportation-related impacts is based on evaluations and technical analyses designed to compare the pre-GSEP conditions to the post-GSEP conditions.

4.16.2 Discussion of Direct and Indirect Impacts

Proposed Action

Public Access

OHV Routes

The proposed linear ROW would cross five (5) approved open routes. This route crosses the southeastern end of the proposed linear ROW (see Figure 3.13-1). All open route crossings are within the immediate vicinity of I-10 with multiple alternate access points. Observations by BLM staff and Law Enforcement Rangers indicate that use is relatively low on routes within the vicinity of the GSEP site, not exceeding 200-300 visits per year. Construction of the proposed linear routes across these open NECO routes would result in temporary disruptions to motorized vehicle use along these routes. In addition, transmissions poles may be constructed within the route, which may result in temporary closure of the route during construction. Users of the established route would not be allowed to detour onto the linear ROW and would not disturb native plants and animals. The western portion of the requested ROW also crosses three NECO routes; however, because the Proposed Action, Dry Cooling Alternative, nor the Reduced Acreage alternative involves construction in the western ROW, none of these three routes would be impacted temporarily or permanently.

Washes Open Zones

The GSEP is within a Washes Open Zone, however there are no navigable washes identified in the project area.

Transportation

Construction

Workforce. Construction of the GSEP would be completed over an approximately 37-month period beginning in late 2010. The construction workforce would peak during month 23 at approximately 1,100 workers per day and average approximately 650 workers over the course of construction. Construction of the transmission line is expected to require a limited crew with fewer than 25 workers during peak periods. However, the transmission line construction schedule would not coincide with the peak of plant site construction employment.

The worst-case scenario, where all workers commute in automobiles with only one occupant per vehicle, yields a peak trip generation of approximately 1,100 inbound trips during the morning peak period and another 1,100 outbound trips during the evening peak hour. In the worst-case scenario, one-way worker trips would peak at 2,200 trips per day and an average of 1,400 one-way trips per day. Construction would also generate an average of approximately 15 to 20 one-way, truck trips per day with a peak of approximately 50 to 75 truck trips per day. The peak time for truck travel would occur during the construction of the foundation for the plant site and would not coincide with the peak onsite worker commute timeframe (month 23 in 2012).

To accommodate the worst-case scenario, a temporary parking area of approximately eight acres would be required for construction personnel parking (assuming 350 square feet per vehicle) with additional area required for the staging and laydown of equipment, materials, and supplies. The project would include onsite laydown and parking areas during construction. Those areas would be relocated around the site as construction progresses. Safety and efficiency concerns require on-site parking and laydown areas. That is, a traffic hazard could occur if workers were to park on public roadways or if public roadways were used for the staging and laydown of equipment, materials, and supplies. Such a hazard could adversely impact the LOS on I-10 as well as the safety of the workers and drivers.

The construction workforce would be drawn from the surrounding local and regional area, including a small number from the greater Los Angeles Basin. See FEIS Section 4.13. Project construction traffic from the Los Angeles, Palm Springs, and Indio areas is expected to follow

I-10 east to the site. Workers traveling from Blythe and the Arizona towns of Quartzsite, Ehrenberg, and Cibola would follow I-10 west to the site.

A large portion of the construction workforce is expected to come from or at least be temporarily housed in the Blythe and Indio areas (including Coachella, Thermal, and Mecca). These workers would also approach the site following I-10 from the west. Drivers approaching from Blythe itself would generally follow I-10 westerly to Wiley Well Road where they would exit to the north and follow the proposed access road to the site.

Traffic from the Brawley/ El Centro area is expected to follow State Route 78 north to I-10 and I-10 west to Wiley Well Road. Traffic from the Indio/ Palm Springs area and points west would follow I-10 east to Wiley Well Road and the site.

In addition, several pieces of equipment that exceed roadway load or size limits would need to be transported to the site via I-10 during construction. This equipment includes the steam turbine generator and main transformers. The equipment would be transported using multi-axle trucks. To transport this equipment, the Applicant must obtain special ministerial permits from Caltrans to move oversized or overweight materials. In addition, the Applicant must ensure proper routes are followed; proper time is scheduled for the delivery; and proper escorts, including advanced warning and trailing vehicles as well as law enforcement control are available, if necessary. These roadways could be damaged due to GSEP-related construction activities.

See the following Traffic and Transportation tables for information about traffic volumes for roads and intersections used to access the site:

1. Table 4.16-1, Comparison Construction Year (2012) Roadway Segment Level of Service
2. Table 4.16-2, Comparison of Standard Operations (Year 2012) Traffic on Study Roadways
3. Table 4.16-3, Standard Operations (Year 2012) Roadway Segment Level of Service Summary

As Table 4.16-1 depicts, the LOS in 2012 for the three study intersections without the project would remain at LOS A. With the addition of GSEP construction traffic, LOS would change from A to B at one intersection, the I-10 interchange at Wiley’s Well Road east of the project site. LOS B is an acceptable level of service on California state highways.

This decrease in the LOS at this intersection is consistent with the proposed construction traffic patterns as it is anticipated approximately 75% of the traffic would utilize the eastbound Wiley’s Well Road Interchange. Traffic volumes would increase from 3,700 ADT to 4,520 ADT. As a result of this increase, vehicles could become stacked as drivers exit I-10.

While traffic volumes would increase, the LOS at the study intersections and roadway segments would remain within the LOS thresholds identified by the state and local jurisdictions. All study roadway segments and intersections are expected to operate at LOS A and at LOS B at one intersection with the GSEP-related construction traffic as shown in Table 4.16-1.

TABLE 4.16-1
COMPARISON OF CONSTRUCTION YEAR (2012) ROADWAY SEGMENT LEVEL OF SERVICE

	2012 Conditions without GSEP Construction Traffic[a]			2012 Conditions with GSEP Construction Traffic[b]		
Roadway Segment	ADT	Capacity	LOS	ADT	Capacity	LOS
I-10 at Wiley's Well Road, West of the Project Site	3,350	6,800	A	3,623	6,800	A
I-10 at Wiley's Well Road, East of the Project Site	3,700	6,800	A	4,520	6,800	B
US-95 at Hobsonway, North of Blythe	450	2,000	A	655	2,000	A

NOTES:
[a] Year 2008 traffic volumes expanded to Year 2012 at historical rates from Year 2004 to 2008 (3.8% for Wiley's Well Road west; 6.8% for Wiley's Well Road east and 8.6% for US-95).
[b] Month 23 peak construction traffic with 1,093 workers (Assumes 75% traveling from the east and 25% traveling from the west.)

SOURCE: RSA 2010.

TABLE 4.16-2
COMPARISON OF STANDARD OPERATIONS (YEAR 2012) TRAFFIC ON STUDY ROADWAYS

	Standard Operations Year 2012 Without GSEP[a]		Standard Operations Year 2012 With GSEP[b]		Percent Change Associated with GSEP
Roadway Segment	ADT	Capacity[c]	ADT	Capactiy[c]	
I-10 at Wiley's Well Road, West of the Project Site	3,350	6,800	3,367	6,800	0.5%
I-10 at Wiley's Well Road, East of the Project Site	3,700	6,800	3,750	6,800	1.35%
US-95 at Hobsonway, North of Blythe	450	2,000	462	2,000	2.7%

NOTES:
[a] Year 2008 traffic volumes expanded to Year 2012 at historical rates from Year 2004 to 2008 (3.8% for Wiley's Well Road west; 6.8% for Wiley's Well Road east and 8.6% for US-95)
[b] Project operations with 66 employees (Assumes 75% traveling from the east and 25% traveling from the west; split shifts spread over a 24 hour period.)
[c] Two-way capacity in vehicles per hour.

TABLE 4.16-3
STANDARD OPERATIONS (YEAR 2012) ROADWAY SEGMENT LEVEL OF SERVICE SUMMARY

	Standard Operations Year 2012 Without GSEP[a]		Standard Operations Year 2012 with GSEP[b]	
Roadway Segment	ADT	LOS	ADT	LOS
I-10 at Wiley's Well Road, West of the Project Site	3,350	A	3,367	A
I-10 at Wiley's Well Road, East of the Project Site	3,700	A	3,750	A
US-95 at Hobsonway, North of Blythe	450	A	462	A

NOTES:
[a]- Year 2008 traffic volumes expanded to Year 2012 at historical rates from Year 2004 to 2008 (3.8% for Wiley's Well Road west; 6.8% for Wiley's Well Road east and 8.6% for US-95)
[b] Project operations with 66 employees (Assumes 75% traveling from the east and 25% from the west; split shifts over a 24 hour period.)

Construction Truck Traffic

GSEP construction is expected to generate approximately 15 to 20 one way truck trips per day peaking at approximately 50 to 75 trucks per day. The peak truck travel would not coincide with the peak month 23 construction timeframe.

In addition to the standard equipment, several pieces of equipment that exceed roadway or size limits would need to be transported to the GSEP site via I-10 during construction. This equipment includes the steam turbine generator and main transformers. The AFC indicated this equipment would have been delivered via the Arizona and California Railroad Company at either Vidal, California or Parker, Arizona. However, as previously discussed, rail service has since been eliminated. As a result, the nearest siding to the project site would be the Parker site. The equipment would be transported using multi-axle trucks from US-95 to I-10. To transport this equipment along highway corridors, the applicant must obtain special permits from the Department of Transportation (Caltrans) to move oversized or overweight materials. The Department of Transportation (Caltrans), District 8, commented that GSEP would be required to obtain permits for vehicles/load exceeding limitations on size and weight.

Oversized or overweight trucks with unlicensed drivers could be hazardous to the general public and/or damage roadways.

Parking Capacity

The project would include a temporary parking area of approximately nine acres for construction workers, based on 350 square feet per vehicle. The parking area would be relocated around the site as construction progresses. An additional area would be required for staging and laydown of equipment, materials and supplies. This staging and laydown area would also be relocated around the site as construction progresses.

The parking area would accommodate all construction workforce vehicles if workers commuted individually; however, based on the traffic control plan which would include staggered work hours and incentives for carpooling, such as employer-sponsored Commuter Check Program, this parking area would be oversized.

During operations, employees would park on-site in a combined administration/parking area. Figure 2-2 depicts the administration and warehouse covering approximately 39,000 square feet. Approximately 23,100 square feet would be required for the parking area, based on 350 square feet per vehicle which would accommodate approximately 66 vehicles. This would adequately accommodate the 66-employee workforce, as employees would not be on-site simultaneously as they would work different shifts to staff the GSEP 24 hours a day, 7 days a week.

With the proposed construction parking area on-site as well as on-site parking for operational employees, the project would not result in any parking spill-over to sensitive areas.

Operation Impacts

Due to the nature and remote location of the GSEP project, a relatively minor amount of traffic would be generated to and from the site during standard operations.

Operation of the facility would require a labor force of up to 66 full-time employees operating round-the-clock. In a worst-case scenario, where all workers commute with only one occupant per vehicle, would generate 132 employee commute trips spread over a 24-hour period.

In addition, GSEP would generate approximately 38 truck trips per month (average of one to two truck trips per day) for delivery of materials and supplies. Approximately 15 of these truck trips per month would be for the delivery of hazardous materials. Delivery drivers and workers would use the Wiley's Well Road interchange from either eastbound or westbound I-10 to access the site.

These trip additions of employees or deliveries would not cause a significant impact to the highways. It is anticipated the LOS will remain at LOS A. Table 4.16-2 includes information regarding the expected traffic volumes during standard operations with the base traffic volumes on the study roadway segments. The average daily traffic (ADT) volumes are expected to remain low. As indicated, the study roadway segments are expected to experience a nominal increase in GSEP-related traffic.

Table 4.16-3 includes information regarding the level of service of the study roadway segments during standard operations. As shown, the study roadway segments are expected to operate at the same condition, LOS A, as in existing conditions.

Alternatives

Reduced Acreage Alternative

Public Access

Impacts to the OHV open route located within the proposed linear ROW would generally be the same as the proposed action because under this alternative, the proposed linear facilities would still cross the OHV open route. Impacts related to construction, operation and maintenance, and closure and decommissioning of this alternative would be similar to the proposed action.

Transportation

Since implementation of the Reduced Acreage Alternative does not significantly affect the number of workers needed for construction and operation, impacts would be similar to the proposed action.

Dry Cooling Alternative

Public Access

Impacts to the OHV open route located within the proposed linear ROW would be the same as the proposed action because under this alternative, the proposed linear facilities would still cross the OHV open route. Impacts related to construction, operation and maintenance, and closure and decommissioning of this alternative would be similar to the proposed action.

Transportation

Since implementation of the Dry Cooling Alternative does not significantly affect the number of workers needed for construction and operation, impacts would be similar to the proposed action.

No Action Alternative A and No Project Alternative B

Public Access

Generally, for the No Action Alternative A and No Project Alternative B, there would be no direct or indirect impacts to OHV routes and values.

Transportation

If No Action Alternative A or No Project Alternative B were selected, none of the anticipated transportation-related impacts of the proposed action would occur. Instead, the land on which the GSEP is proposed would become available to other uses consistent with CDCA Plan use opportunities, potentially including another renewable energy project. Thus, impacts of these alternatives on transportation could be substantially similar to the proposed action.

No Project Alternative C

Public Access

For the No Project Alternative C, where the ROW for the proposed action would not be granted but the CDCA would be amended to find the proposed action area suitable for any type of solar energy development, impacts to OHV open route and associated affects could be similar to the proposed action; however, dependent on the technology and site layout, impacts to OHV designated routes could be avoided or minimized.

Transportation

For the No Project Alternative C, where the ROW for the proposed action would not be granted but the CDCA Plan would be amended to find the proposed action area suitable for any type of solar energy development, impacts to transportation could be similar to the proposed action.

4.16.3 Discussion of Cumulative Impacts

Public Access

In addition to the proposed GSEP, there are many past, present, or reasonably foreseeable future actions that contribute to impacts on OHV use. During the CDCA and NECO planning process, a detailed inventory and designation of routes was developed. This route designation system, along with other land management actions such as ACECs and the designation of national parks and wilderness, has resulted in significant changes to OHV recreation opportunities in eastern Riverside County. Since the passage of FLPMA in 1976, the changes or reduction to OHV opportunities in Riverside County likely improved the recreational experience for some users who preferred remote camping and hiking and decreased the recreational experience for some users who prefer open OHV use areas rather than designated routes. Numerous energy-related development projects, including the proposed action, would result in the closure of some OHV open routes that may result in some users seeking out, legally or illegally, other areas of the desert for their activities and experiences. Therefore, the combined effect of the overall cumulative past, present, and proposed and reasonably foreseeable projects in eastern Riverside County could adversely affect OHV opportunities through closures, rerouting, and use restrictions.

Transportation

Construction

A number of solar projects are projected to be built within approximately 100 miles of the I-10 corridor (Desert Center to Blythe). The Palen, Blythe and Desert Sunlight projects currently are proposed to be constructed on BLM land and currently are under review by BLM. These projects, as well as other projects in the vicinity of the GSEP, could affect the I-10 corridor between Desert Center and Blythe due to construction traffic.

Construction of the GSEP is scheduled to overlap with the construction schedules of three other projects in the area, two solar energy generation parabolic trough projects, the Palen Solar Power Project and Genesis Solar Energy Project as well as the Desert Sunlight Photovoltaic Project. These three projects plus the GSEP would result in approximately 3,623 workers travelling on I-10 to their work sites at the same time. The overlapping construction schedules of these projects would result in cumulatively considerable impacts to I-10 as well as to local streets, highways, and intersections in the vicinity of the GSEP site.

Operations

Truck travel as well as other non-employee site visits would be very small and typically would occur during non-peak periods. Consequently, cumulative operational impacts would not be significant and would not require mitigation.

4.16.4 Summary of Mitigation Measures

Public Access

BLM-OHV-1: No less than 60 days prior to construction, the Applicant shall coordinate with the authorized officer administering any NECO Plan-designated open routes to establish temporary closure of the route to avoid construction area hazards, if the route is deemed unsafe to use during construction. The Applicant shall post a public notice of the temporary route closure and penalties for any off route OHV activities. The Applicant shall document its coordination efforts with the authorized officer and submit this documentation to the BLM and other agencies affected at least 30 days prior to construction.

Transportation

The mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following mitigation measures would avoid or minimize impacts on Transportation:

TRANS-1, TRANS-2, TRANS-3, TRANS-4, TRANS-5

4.16.5 Residual Impacts after Mitigation Measures were Implemented

Public Access

OHV users would be displaced and could illegally substitute other natural, undisturbed desert areas for their riding experiences and benefits causing impacts to sensitive desert resources including biological and/or cultural resources.

Transportation

LOS within the vicinity of the GSEP would be at LOS C, greater than existing LOS A.

4.16.6 Unavoidable Adverse Impacts

Public Access

Reflected sun from the solar troughs would produce glint and glare that could distract OHV users in the surrounding areas.

Transportation

There would be no unavoidable adverse impacts related to transportation.

4.17 Impacts on Vegetation Resources

4.17.1 Impact Assessment Methodology

This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (GSEP 2009a); Data Adequacy Supplement (GSEP 2009c) and Data Adequacy Supplement 1A (GSEP 2009d); responses to CEC staff data requests (GSEP 2009f, TTEC 2010f); CEC staff workshops held on November 23 and 24, December 18 and 31, 2009 and January 6, 11, and 12, February 10 and 18, 2010, April 19, 20, and 21 and May 5, 2010; site visits by CEC staff on October 27, 2009, December 10, 2009, January 12 and February 25, 2010; the Applicant’s December 2009 Notification of a Lake or Streambed Alteration (TTEC 2009d); revisions to the Notification of a Lake or Streambed Alteration (TTEC 2010j, TTEC 2010l); the Applicant’s Aeolian Transport Evaluation and Ancient Shoreline Delineation Report for the GSEP (Worley Parsons 2010c); the applicant’s Interim Preliminary Aeolian Sand Source, Migration and Deposition Letter Report for GSEP (Worley Parsons 2010d); PWA’s Geomorphic Assessment of the Genesis Solar Project Site (CEC Revised Staff Assessment Soil and Water Appendix A; PWA 2010a); the Applicant’s Incidental Take of Threatened and Endangered Species Permit Application (TTEC 2009c); the Applicant’s draft mitigation plans including the Draft Desert Tortoise Relocation/Translocation Plan (TTEC 2010a), Draft Weed Management Plan (TTEC 2010g), Draft Revegetation Plan (TTEC 2010i), and Draft Common Raven Monitoring, Control and Management Plan (TTEC 2010k); preliminary 2010 survey data (TTEC 2010m) and other supplemental information (TTEC 2010r as cited in the CEC RSA June 2010, TTEC 2010p); information about minor changes to the GSEP (TTEC 2010o); communications with representatives from the California Department of Fish and Game (CDFG), Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (USFWS); and information contained within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO). Information used to update this FEIS section is found in an updated Biological Resources Technical Report that includes findings from spring, 2010, surveys (TTEC 2010p) and the Revised Staff Assessment Supplement from the CEC.

4.17.2 Discussion of Direct and Indirect Impacts

Proposed Action

Direct impacts are those resulting from a proposed action and occur at the same time and place. Indirect impacts are caused by the action, but are later in time or farther removed in distance while still reasonably foreseeable 40 CFR 1508.8. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the proposed action.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the desert ecosystems the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). In this analysis, an impact is considered temporary only when there is evidence to indicate that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years.

Sonoran Creosote Bush Scrub

Direct impacts include permanent loss of acreage; fragmentation of adjacent wildlife habitat and native plant communities. Indirect impacts include disturbance (noise, lights, dust) to surrounding plant and animal communities; spread of non-native invasive weeds; changes in drainage patterns downslope of the GSEP; erosion and sedimentation of disturbed soils.

Ephemeral Drainages (including Waters of the State)

Direct impacts include loss of hydrological, geomorphic, and biological functions and values of Desert Dry Wash Woodland (microphyll woodland). Indirect impacts include permanent loss of hydrological connectivity downstream of the GSEP, including unvegetated ephemeral washes; head-cutting on drainages upslope; and erosion and sedimentation downslope. Table 4.17-1 summarizes the direct and indirect impacts to ephemeral drainages as a result of GSEP construction.

Grading within the GSEP Disturbance Area and its ephemeral drainages would directly impact and permanently eliminate ephemeral drainages and their hydrological, biogeochemical, vegetation, and wildlife functions. Drainages would be temporarily impacted by construction of linear facilities and access roads associated with those facilities.

Desert washes downstream from the GSEP area would also be indirectly impacted as a result of changes to upstream hydrology, with downstream vegetation in washes deprived of flows or receiving lower or higher volumes and velocities of water than current conditions at discharge points along the stormwater conveyance channel. Diversions could substantially alter the hydrology and wash-dependent vegetation of any features that may occur downstream of the GSEP area, an effect that is quite apparent below Interstate 10 (I-10) near the Corn Springs Exit. On the northern side of I-10 broad expanses of desert wash trees and shrubs have died in response to the construction of I-10 and the diversion of smaller channels into collector ditches on the southern side of I-10.

The Applicant has provided drainage plans that conceptually discuss how diffusers at the downstream end of the engineered channels would restore sheet flow downslope of the GSEP disturbance area. However, as discussed in Section 4.19 (Water Resources), the drainage report does not provide sufficient information to establish the post-GSEP flooding conditions or to determine the potential impacts to vegetation downstream. Other potential indirect effects of the changed proposed drainage plans are erosion and resulting root exposure leading to the eventual death of vegetation. Washes upstream of the GSEP area may also be impacted by head-cutting and erosion; however, bank stabilization measures are proposed for the intake portion of the

TABLE 4.17-1
ACREAGE OF DIRECT AND INDIRECT IMPACTS TO VEGETATION RESOURCES BY ALTERNATIVE

Resource	Proposed Action (acres)	Dry Cooling (acres)	Reduced Acreage (acres)	No Action/No Project A, B, C (acres)
Sonoran Creosote Bush Scrub	1,773	1,773	1,039	0
Stabilized/Partially Stabilized Sand Dunes – Direct Impacts				
Direct Impacts[c,g]	7.5	7.5	7.5	**0**
Playa and Sand Drifts Over Playa				
Direct Impacts[c,g]	38	38	44	0
Indirect Impacts [d,h]	151	151	76	0
Total Dune types	***196.5***	***196.5***	***127.5***	***0***
Ephemeral Drainages (State Waters* - - Direct Impacts[e])				
Desert Dry Wash Woodland (Microphyllous Riparian Vegetation)	16	16	16	0
Unvegetated Ephemeral Dry Wash	53	53	51	0
Ephemeral Drainages (State Waters- -Indirect Impacts[f])				
Unvegetated Ephemeral Dry Wash	21	21	21	0
Total State Waters	90	90	88	0

a From Application for Incidental Take Permit (TTEC 2009c).
b From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities"); includes impacts to Sonoran creosote bush scrub.
c From CEC 2010d; includes direct permanent impacts to stabilized and partially stabilized sand dunes and sand drifts over playas.
d From CEC Genesis Revised Staff Assessment Soil & Water Appendix A, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.
e From TTEC 2010l (TetraTech memo "Revisions to Jurisdictional Waters for the Genesis Solar Energy Project").
f From Appendix D, Lake and Streambed Alteration Agreement Application (TTEC 2009d).
g From TTEC 2010o (Tetra Tech memo "Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility").
h PWA 2010a. (tn pending) PWA memo "Genesis Solar Energy Project, Analysis of Impacts to Sand Transport Corridor")...
* Reflects changes Also, the removal of the 'toe' from the plant site footprint would also reduce impact acreage to state waters; however these reduced impact calculation have not been provided to date and therefore, are not included in this table.
i Revised per TTEC 2010s (Supplemental Information Genesis Solar Energy Project June 18, 2010) to include 6.5 acres of impact to sand dunes from the six-pole extension of the gen-tie line north of the Colorado River Substation. Acreage of 3.2 acres of impact from construction of distribution/telecommunications line is not yet included here or in the Sonoran creosote scrub, pending clarification regarding the upland habitat types that will be impacted by the distribution/telecommunications line.
j Revised per TTEC 2010s (Supplemental Information Genesis Solar Energy Project June 18, 2010) to reduce the impact to state waters by 21 acres, reflecting elimination of the 41.4 acre "toe" at the easternmost solar field.
k Includes one additional acre of direct impact (rounded up from 0.84 acre) due to construction of the distribution/telecommunications line.

channel that would minimize or avoid this potential effect. All of the ephemeral washes occurring downstream of the GSEP boundaries would be affected, possibly adversely, by the proposed GSEP.

Direct and indirect impacts of the GSEP on ephemeral drainages would be substantial. The extensive ephemeral drainage network at the GSEP site currently provides many functions and values, including landscape hydrologic connections; stream energy dissipation during high-water flows that reduces erosion and improves water supply and water-quality filtering functions, surface and subsurface water storage, groundwater recharge, sediment transport and storage, and deposition aiding in floodplain maintenance and development, nutrient cycling, and wildlife habitat and movement/migration; and support for vegetation communities that help stabilize stream banks and provide wildlife habitat. The GSEP would eliminate all of these functions and values on ephemeral washes, and would temporarily impact these functions in additional areas.

To replace the flood conveyance function and some of the biogeochemical functions of the impacted desert washes, the Applicant has proposed to replicate the existing flow patterns and volume with three channels that would be constructed adjacent to, through, or across the site. Channel design, in particular the proposed plans for restoring sheet flow to the terrain downslope of the GSEP boundaries, has yet to be finalized.

The engineered channels would not replace the biological resource values and functions of the GSEP's ephemeral washes.

Stabilized/Partially Stabilized Sand Dunes and Playa and Sand Drifts Over Playa

Linear features such as powerlines and access roads would disturb the sand dune vegetation community. Disturbed acreage would be subject to additional weed establishment and possibility of wildfire affecting native vegetation. Weeds and/or fire may spread from the direct impact of the linear features of the GSEP.

Groundwater Dependent Vegetation Communities

The proposed GSEP's groundwater pumping would have an impact on groundwater levels within the zone of potential effect centered on the GSEP's pumping well. Considerable uncertainty remains as to the potential extent of the GSEP's impacts to groundwater and the potential adverse effects to groundwater dependent sensitive plant communities and to wildlife.

Groundwater-Dependent Vegetation During Construction and Operation

GSEP pumping during construction and operation could lower groundwater levels (Water Resources, Section 4.19), which could have a substantial impact once it lowers the water table below the reach of the deep-rooted, groundwater-dependent plants (phreatophytes) that are within the GSEP pumping impact zone. This zone includes an area extending 2 to 3 miles from the GSEP pumping well during construction and approximately 10 miles by the end of GSEP operation (Worley Parsons 2009, Figure 3).

The Applicant predicts that the maximum drawdown in the shallow water table (the water table that supports phreatophytes) associated with the GSEP is approximately 0.3 feet in the area of the pumping well. The area where drawdown exceeds 0.25 foot is limited to within approximately 2.5 to 3.5 miles of the GSEP wells (see Figure 4.19-1). The Applicant's analysis shows a minor drawdown in the deep water aquifer of 0.5 foot as much as 10 miles away at the end of GSEP operation (33 years); drawdown in the shallow aquifer would be considerably less (Worley Parsons 2009, Figure 3). See Section 3.18, Vegetation Resources, for discussion of the shallow and deep aquifers.

The proposed groundwater pumping is not expected to substantially affect the health or status of the creosote bush scrub, which dominates the drier portions of the valley floor and surrounding alluvial fans and pediments, because this plant community is hundreds of feet above the groundwater level. These drought-adapted and shallow-rooted species are supported by precipitation, not shallow or deep groundwater. The phreatophytic communities potentially affected by the proposed GSEP are described below.

Groundwater-Dependent Plants and Communities in the GSEP Pumping Zone

Phreatophytes are groundwater-dependent plants with deep root systems that can extend tens of feet below the ground surface to the underlying water table. The communities of desert phreatophytes found in the 10 mile radius around the GSEP pumping well include mesquite bosques, bush seep-weed-dominant chenopod scrubs (succulent chenopod scrubs), and ironwood and palo verde woodlands (microphyll woodlands). The dune scrubs occurring in areas of near-surface groundwater may also be affected by lowered groundwater tables. All of these communities are designated as rare natural communities by the CNDDB (CDFG 2003); and the Desert Dry Wash Woodland (a microphyll woodland), chenopod scrubs, and dune habitats are recognized sensitive plant communities in the BLM NECO Plan (BLM CDD 2002).

Ground waters are important to sustain vegetation for wildlife habitat in some areas where surface waters are not present (RWQCB 2006). Special-status wildlife has been documented within these phreatophytic communities in the GSEP area and around Palen Dry Lake including Mojave fringe-toed lizard, American badger, western burrowing owl, desert kit fox, and loggerhead shrike (GSEP 2009a; Solar Millennium 2009a). Two special-status plants, jack-ass clover and Palmer’s jack-ass clover, occur among the mesquite dunes around Palen Dry Lake and are known from only a few occurrences in California (CNDDB 2010; Silverman pers. comm.). Numerous rare plants were observed in the playa dunes and drifts at the southern tip of the lake (AECOM 2010d), including a new species of saltbush (*Atriplex* sp. nov. J. Andre).

The Applicant based its assumptions that no phreatophytes would be affected on the results of a reconnaissance-level assessment of the large stand of mesquite bosque at the northeast end of Palen Lake (TTEC 2009d). However, CEC staff found documentation of smaller stands of mesquite bosque at the southwest end of the lake (Evans & Hartman 2007) and observed the mesquite stands on recent aerial photos. Additionally, phreatophytic plant communities dominated or co-dominated by bush seep-weed (a phreatophyte) are found south of Palen Lake and sporadically along the southwest margins of Ford Dry Lake (AECOM 2010a) within the end-of-operation GSEP pumping zone, a 10-mile radius around the GSEP well. The effects of the proposed GSEP pumping well (AECOM 2010a) would be greater and be felt as much as a decade sooner than the end-of-operation effects of the GSEP.

Closer to the GSEP around Ford Dry Lake, the Applicant noted communities co-dominated by bush seep-weed and allscale (a xerophyte), with scattered woody phreatophytes such as blue palo verde and ironwood (TTEC 2009d). It is uncertain whether the phreatophytes around Ford Dry Lake are supported by the basin aquifer (from which the GSEP would draw its water) or mountain front aquifer, which the Applicant has stated would be essentially unaffected by pumping from the deeper—and at least partially contained—basin aquifer. Shallow water tables at Ford Dry Lake were measured at 80 feet in depth in the test well on site. Almost 10 miles away at Palen Dry Lake, the groundwater is considerably shallower, particularly at the northeast end of the lake. At the old growth ironwood forest in Palen Wash, approximately 5 miles north of the GSEP site, the predicted water table drawdowns are in the range of 0.05 to 0.2 feet (see Figure 4.19-1).

Groundwater can also be held near the ground surface in dune systems through capillarity and can influence both the vegetative cover and the morphology of the dunes. Recent research in New Mexico has confirmed that groundwater is one feature that influences dune morphology; dune fields are shaped by feedback between aeolian dynamics and groundwater chemistry (Langford et al. 2009). Consequently, some dune shrubs, when present in the dunes off the northeast corner of the GSEP project where the groundwater is much nearer to surface than at Ford Dry Lake, could also be affected by a drop in groundwater levels when the levels drop below the effective rooting depth of these shallower rooted species.

Preliminary investigations conducted at the GSEP site suggest that the aquifer that is proposed for development is under confined to semi-confined conditions and is separated in part from the shallow alluvial groundwater system by low permeability sediments (Worley Parsons 2009). Correspondingly, the Applicant’s assessment of impacts to these layers is based on the assumption that the confining layers are laterally continuous and maintain hydraulic separation away from the proposed pumping wells. There is concern about the level of uncertainty in such a prediction and the potential influence of groundwater pumping in the shallow aquifer when the low permeability layers are fractured, as they often are (Deacon et al. 2007).

Groundwater-Dependent Plant Responses to Lowered Groundwater Levels

A plant affected by competition for water displays signs of stress (e.g., Manning and Barbour 1988), and stress can be manifested as anything from diminished physiological processes to plant death. Shallower rooted herbs are the first affected and least able to withstand drought-stress; deep-rooted woody phreatophytes (such as mesquite) can take decades to die. Stress to woody species, such as mesquite, from declines in groundwater levels would be detected in measures of plant vigor, such as die-back, long before plant cover changes might be measurable in an aerial photo. As Elmore et al. (2006) and Manning (2007) show, total live plant abundance (plant cover) on a site decreases as the water table is lowered. This in turn increases wind and water erosion of soil, and the void left behind by the receding native plants is often colonized by invasive exotic plants (Patten et al 2007; Lovich 1999; Manning 2006). Lowering the local water table from groundwater pumping has also been demonstrated to induce habitat conversions (Manning 2006; 2007). Even modest drawdowns of 0.3 feet can adversely affect vegetation when groundwater drops below the effective rooting level; when the drop is sustained (so that plants never have an opportunity to recover); or when the groundwater lowering occurs not just in summer (when plants are dormant) but also occurs throughout early spring when plants need and utilize water most (Manning pers. comm.).

Increased soil erosion induced by the decreasing vegetative cover leads to a loss of nutrients, minerals, and the structure necessary for seed germination of plants that are adapted to prior groundwater conditions on the site. Non-native opportunistic “weed” species (e.g., Russian thistle) are better adapted to nutrient-poor soils and a wider variety of soil moisture regimes or conditions, and demonstrate a competitive edge. Animals, including mammals, reptiles, birds, and invertebrates, that may require certain plant species or a certain vegetation structure, may no longer find suitable food or living space. Local extirpations are compounded when the displaced animal is an important food source for another animal. The complex below-ground systems of bacteria, algae, and fungi, which provide many valuable ecosystem services (e.g. breakdown of organic matter, nitrogen fixation, carbon storage, and recycling of nutrients), are also disrupted when water tables are lowered. Ultimately, when groundwater levels are lowered beyond the normal reach of groundwater-dependent ecosystems, the decline in plant cover and change in species abundance can result in severe consequences, depending on the organism(s) involved or the prevailing ecosystem processes.

Importance of Spring Water Table in Maintaining Groundwater Dependent Plant Communities

The Applicant states that water table drawdowns of 0.3 feet or less are similar to or less than expected normal climatic, seasonal, or diurnal water table fluctuations (Worley Parsons 2009). However, inter-annual measurements or averages of water table fluctuations are misleading in predicting the effects of water level declines to groundwater-dependent plant communities, and do not take into account the ecological and physiological traits of arid region plant communities. In forecasting a plant community’s response to lowering groundwater tables, it is necessary to identify the quantity and timing of water availability necessary for healthy ecologic functioning (Eamus and Froend 2006). The extent to which water tables drop during the summer and fall dormant seasons is irrelevant for such forecasts; the only relevant measure of a plant community’s ability to withstand water table declines is the annual water table year-to-year fluctuations in early spring because the growing season is when plants need and utilize water most. In arid regions, most plants are dormant in summer and fall, and measures of fluctuating groundwater levels made during this time will not provide information about the ability of groundwater dependent plant communities to withstand reduced water tables. When, for example, water tables in April are reduced to the low levels associated with summer and fall (as a result of groundwater pumping), then adverse consequences would be expected (Manning pers. comm.). Groundwater dependent ecosystems experience measurable plant losses and other adverse changes when water tables fail to fill.

Sand Transport Corridor

The GSEP’s western solar array is located on land surface units that are relatively geomorphically stable and are not within an active wind transport corridor. As originally configured, the eastern solar array of the GSEP intruded into the outer edges of the Palen-McCoy Valley Sand Transport Corridor, which delivers sand to Mojave fringe-toed lizard habitat downwind. The Applicant estimated that the easternmost end of the GSEP’s eastern solar array extended approximately 1000 feet (19 percent) of the width of this corridor (Worley Parsons 2010c). The Applicant recently revised their GSEP footprint (TTEC 2010o) to eliminate 41.4 acres of the easternmost array, thus avoiding intrusion into the Palen-McCoy Valley Sand Transport Corridor.

The southwestern corner of the eastern solar array extends into another sand transport corridor, the PDL-Chuckwalla Valley Sand Transport Corridor, which moves sand from northeast to southwest. The intrusion extends into the corridor by approximately 1,600 feet at a point where the corridor is 24,000 feet wide, approximately 7 percent of the width of the corridor (Worley Parsons, 2010c).

GSEP intrusion within the PDL-Chuckwalla Valley Sand Transport Corridor would not result in a substantial reduction in sand transport capacity. However, the presence of the southwestern corner of the eastern solar array would diminish the input of sand to downwind areas, with adverse effects to the active sand layer that is crucial to Mojave fringe-toed lizard habitat. An area of vegetated sand dune habitat downwind of the intrusion within the PDL-Chuckwalla Valley Sand Transport Corridor would be adversely affected by interference with this sand transport corridor (PWA 2010a). This downwind area would receive reduced sand input because of interference from GSEP features, deflating downwind sand dunes and gradually diminishing their depth and extent over time as sand output exceeds sand input.

Habitat suitability for Mojave fringe-toed lizards would be gradually degraded as wind-borne sand is depleted and not replaced within these downwind areas. GSEP impacts to Mojave fringe-toed lizard as a result of these indirect habitat impacts are discussed below in the subsection on Special-Status Species: Impacts.

The GSEP would also have an indirect impact on the creation and maintenance of sand transport as a result of rerouting of the ephemeral drainages in the GSEP area. More than a hundred ephemeral washes cross the site from north to south. The boundaries of these shallow channels are typically subtle, and the presence of these channels in areas of desert varnish and soil horizons suggests that these channels are relatively stable (i.e., do not cut and fill vertically). The channels in the western portion of the GSEP area do not appear to transport much sediment, as evidenced by their shallow depth and the absence of scour features. However, larger washes at the eastern side of the GSEP area have braided channels that show more evidence of active sediment transport, with better-defined banks and some sand in the channel bottoms. Unlike the small washes that cross the western solar array site, the larger washes appear to supply a large amount of sand to the surrounding area. The Applicant has not provided a quantitative or qualitative assessment of the changes in fluvial sand transport as a result of re-routing the ephemeral drainages in the GSEP area, but the GSEP could result in a reduction in the water-borne sand available for transportation to downwind sand dune systems.

The GSEP linear facilities would pass through the core of the Palen-McCoy Valley Sand Transport Corridor, where considerable sand transport occurs (Worley Parsons 2010c). The GSEP should be able to avoid or minimize impacts created by the linear facilities within this zone; most wind-borne transport of sand occurs within three feet of the ground, so the buried gas pipeline and at-grade access roads would be flush with the surrounding ground surface and would not create ground level obstructions. Transmission line supports should not pose a problem due to their small surface area at ground level.

Invasive and Noxious Weeds

Construction activities and soil disturbance could introduce new noxious weeds to lands adjacent to the GSEP plant site and its linear facilities, and could further spread weeds already present in the GSEP vicinity. The spread of invasive plants is a major threat to vegetation resources in the Colorado Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species. Vehicles are the primary conduit for the spread of many invasive weeds, including Sahara mustard (*Brassica tournefortii*). It is also spread along transmission corridors, due to a combination of soil disturbance during construction, road construction and maintenance, and increased vehicle use in previously inaccessible areas. The Secondary Access Road, Distribution-Telecommunication Line, Redundant Telecommunications Line, and 6-pole transmission line extension could cause similar impacts as the other linear facilities mentioned above, although these features would occur along other linear disturbances or would add very few acres of impact.

Sahara mustard is regarded as one of the most invasive wildland pest plants in the Colorado and Mojave deserts, one of the most common invasive plants in desert tortoise habitat, and capable of dominating entire desert landscapes when no control actions are taken. Left uncontrolled, it out-competes and ultimately replaces native wildflowers that provide valuable forage for the desert tortoise. It forms dense thickets that can increase the frequency, intensity, and size of desert fires, increasing the threat to native plant communities, the desert tortoise, and other wildlife (Brooks 2010 as cited in the CEC RSA June 2010). In areas where Sahara mustard is particularly dense it may also impede desert tortoise movement (Berry pers. comm.). In the Colorado and Mojave Deserts, a single tortoise was necropsied that had died from renal failure, related to renal oxalosis, and the crystals present in the kidneys were identified as oxalates (Jacobson et al. 2009 as cited in the CEC RSA June 2010). One additional tortoise was later necropsied that died of oxalosis in the same region (Berry pers comm. 2010 as cited in the CEC RSA June 2010). Although many native plants in the Mojave and Colorado deserts contain oxalates, the oxalate-containing weed Sahara mustard is one of the most common invasives in desert tortoise habitat and is a suspected cause of the renal failure (Berry pers comm. as cited in the CEC RSA June 2010).

Salt cedar, Russian thistle, Sahara mustard, and Mediterranean grass are already present in the GSEP vicinity and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of these and other non-native species has dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not an important part of the Colorado Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either (see Fire Ecology section). The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire; the effects to these poorly-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Burned creosote bush and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986).

Dust on Plants

Disturbance of the soil's surface caused by construction traffic and other activities would result in increased wind erosion of the soil. Aeolian transport of dust and sand can result in the degradation of soil and vegetation over a widening area (Okin et al. 2001). Dust can have deleterious physiological effects on plants and may affect their productivity and nutritional qualities. The destruction of plants and soil crusts by windblown sand and dust exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Cacti, Yucca, and Native Trees

The two cacti species (beavertail cholla and Wiggins cholla) and three tree species (palo verde, cat-claw acacia, and ironwood) that occur within the GSEP area as well as the other cacti and native trees identified during field surveys, including buckhorn cholla, silver cholla, pencil cholla, ocotillo, fish-hook cactus, honey mesquite, and smoke tree (GSEP 2009a, Appendix C Biological Resources Technical Report), would to the extent practical, be salvaged by the Applicant during construction of the GSEP, and the salvaged plants would be used for revegetation of temporarily disturbed areas. The Applicant has prepared a draft Revegetation Plan that addresses the salvaging of cacti and native trees during initial vegetation grubbing of the GSEP site, as well as proper storage and treatment of salvaged plant material and seed collection, replanting of salvaged materials, and monitoring parameters including revegetation success criteria and performance standards for salvaged materials (TTEC 2010i).

Special Status Plants

The GSEP's direct and indirect impacts to Harwood's eriastrum and Harwood's milk-vetch are substantial, but impacts to ribbed cryptantha are not. While the direct effects of the GSEP on desert unicorn are minor, the impacts of all future projects in the NECO planning area are cumulatively considerable.

GSEP construction and operation could result in direct and indirect impacts to late season special-status plants, when present, and impacts to these and other species may be substantial.

Direct impacts include potential impacts to BLM Sensitive Harwood's eriastrum (CNPS 1B) from gen-tie construction near the substation; Harwood's milk-vetch (CNPS 2) on linear features and solar plant site; desert unicorn plant (CNPS 4) on the solar plant site; ribbed cryptantha (CNPS 4) on linear features and the solar plant site. Potential direct impacts to CNPS 1B, 2, 4 and any new taxa detected during late season surveys. These same species would also receive impacts from the Secondary Access Road, Distribution-Telecommunication Line, Redundant Telecommunications Line, and 6-pole transmission line extension could cause similar impacts as the other linear features mentioned above, although these features would occur along other linear disturbances or would add very few acres of impact.

Indirect impacts include fragmentation/isolation and reduced gene flow between isolated populations; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; potential disruption of sand transport systems that maintain habitat below the GSEP;

alteration of drainage patterns; herbicide drift; and disruption of photosynthesis and other metabolic processes from dust. Construction of the SCE substation could cause loss of over 1000 individuals of Harwood's eriastrum.

Spring 2009 and 2010 surveys of the GSEP transmission gen-tie line and the proposed SCE Colorado River Substation (AECOM 2010d) indicate that construction of the GSEP would directly impact four special-status plant species:

1. Harwood's eriastrum (also sometimes referred to as Harwood's phlox), (*Eriastrum harwoodii*), a BLM Sensitive species, CNPS List 1B (rare, threatened, or endangered throughout its range);

2. Harwood's milk-vetch (*Astragalus insularis* var. *harwoodii*), a CNPS List 2 (rare, threatened, or endangered in California but more common elsewhere);

3. Desert unicorn plant (*Proboscidea althaeifolia*), a CNPS List 4 (limited distribution; a 'watch list'), and

4. Ribbed cryptantha (*Cryptantha costata*), also a CNPS List 4.

The spring surveys also detected a single plant of Las Animas colubrina, a CNPS List 2; however, it occurs approximately one mile north (upstream) of the GSEP site and no substantial direct or indirect effects are expected. The GSEP's direct and indirect impacts to two special-status species—Harwood's eriastrum (a BLM Sensitive species) and Harwood's milk-vetch—are substantial. Although the impacts of all present and reasonable foreseeable future projects in the NECO planning area (see Appendix E), and projects throughout their range in California, to both plants and the desert washes that support them, are cumulatively considerable. Impacts to ribbed cryptantha are less-than-substantial because many occurrences representing tens of thousands of ribbed cryptantha have been documented during the spring surveys of three projects in the vicinity. Although the direct effects of the GSEP on desert unicorn plant are minor, the impacts of all present and reasonable foreseeable future projects in the NECO planning area (see Appendix E) on individual plants or on the sandy washes that support the species are cumulatively considerable.

Based on consultation with recognized experts in the flora of the California Desert region (J. Andre, T. LaDoux as cited in the CEC RSA June 2010, D. Silverman, A. Sanders, pers. comm. as cited in the CEC RSA June 2010), potentially substantial impacts to special-status plants could be missed unless additional late season surveys are conducted. Late-season plants regarded as having a moderate to high potential for occurrence in the GSEP area (including the proposed Colorado River Substation site) include the three species listed below; however, the under-surveyed and poorly-understood nature of the region suggests that unanticipated finds are also likely (Andre pers. comm.), including Arizona species not currently known to occur in California (Silverman pers. comm.):

1. Abram's spurge (*Chamaesyce abramsiana*) – CNPS List 2.1, NatureServe rank G4/S1.2;

2. Flat-seeded spurge (*Chamaesyce platysperma*) – BLM Sensitive, CNPS 1B.2, NatureServe rank G5/S1.2; and

3. Lobed ground cherry (*Physalis lobata*) – CNPS List 2.3, NatureServe rank G5/S1.3.

Several additional late-season species were identified with potential to occur; however, their blooming seasons overlap the spring survey window and it is expected that they could have been detected during a spring survey, if present. Nevertheless, summer-fall survey crews should be trained to recognize the following additional species: glandular ditaxis; California ditaxis; jack-ass clover, and Palmer's jack-ass clover (a proposed addition to the CNPS Inventory and known to occur at Palen Dry Lake in marginal dune habitats). Descriptions of these additional species are provided in the subsection C.2.4.1 of this section. Desert unicorn plant is typically easier to detect during late season surveys and impacts to this species are addressed below under the discussion of the spring survey results.

Assessment Methodology and Analytical Tools

In addition to state and federal-listed plant species, and BLM sensitive species, special-status plants also include CNPS List 1B, 2, 3 and 4 plants, and a few currently unlisted plants that are proposed additions to the CNPS Inventory. Additionally, a potentially new un-described taxon of saltbush (*Atriplex*) was discovered on the marginal dunes of Palen and Ford Dry Lakes in spring 2010, underscoring the region's under-surveyed and poorly understood flora. CNPS List 3 plants (plants of questionable taxonomic status) may be analyzed under CEQA when sufficient information is available to assess potential impacts to such plants. CNPS List 3 and 4 may be considered regionally substantial when, for example, the occurrence is located at the periphery of the species' range, exhibits unusual morphology, or occurs in an unusual habitat/substrate.

Several recognized experts in the region's rare plant flora during the preparation of the data requests were consulted for analysis of impacts to special-status plants (J. Andre, T. LaDoux as cited in the CEC RSA June 2010, D. Silverman, A. Sanders, pers. comm. as cited in the CEC RSA June 2010). Other sources consulted include the CNDDB (CNDDB 2010), the CNPS online inventory (CNPS 2009) and the BLM Palm Springs occurrence records (unpublished). The Consortium of California Herbaria (CCH 2010) was reviewed to determine when there were additional documented occurrences that were not already included in CNDDB. To improve the analysis, CEC staff loaded the occurrence data into an ESRI GIS-based web application that allowed CEC staff to view all CNDDB and CCH occurrences overlain on various jurisdictional, biological, landform, utility, USGS topographic maps and aerial imagery. This allowed CEC staff to better understand a species' threats and management vulnerabilities relative to probable future renewable energy projects throughout their range, their distance and proximity to projects or features, their peripheral status, potential for fragmentation and other indirect effects from nearby development, ownership and management threats to remaining occurrences and to see the variety of habitats and landforms associated with a given species occurrence. The following is a list of datasets that were utilized in the analysis:

1. PLATTS Transmission Data: licensed 3-rd party commercial transmission data)

2. CA State County boundaries: http://atlas.ca.gov/download.html?sl=casil
3. CNDDB RareFind: http://www.dfg.ca.gov/biogeodata/cnddb/cnddb_info.asp
4. BLM Renewables Projects: BLM online solar and wind project data: http://www.blm.gov/ca/gis/
5. CA STATSGO Soils: NRCS soil mapping from http://SoilDataMart.nrcs.usda.gov/
6. CA Cities boundaries: Part of PLATTS Transmission Data delivery
7. CA State Parks boundaries: http://atlas.ca.gov/download.html?sl=casil
8. Federal Wilderness boundaries: http://www.blm.gov/ca/gis/
9. Federal Lands ownership boundaries: http://www.blm.gov/ca/gis/
10. CA GAP Vegetation: http://www.biogeog.ucsb.edu/projects/gap/gap_data_state.html
11. Landforms NECO: from BLM Palm Springs Office – no Metadata – based on CA GAP but improved by BLM for NECO area
12. Landforms MDEP: Mojave Desert Ecosystem project: http://www.mojavedata.gov/datasets.php?&qclass=geo
13. Aerial Imagery – ESRI Data from ArcGIS.com
14. USGS Topo – ESRI Data from ArcGIS.com

Impacts to Special-Status Plants Found During Spring 2009 and 2010 Surveys

This section addresses the direct and indirect effects of the GSEP to plants found within the Project Disturbance Area and one-mile buffer during the spring 2009 or 2010 surveys. The spring 2009 surveys encompassed the entire Project Disturbance Area and the survey results are presented in the Biological Resources section of the AFC (GSEP 2009a). The tabular results and raw GPS data from the spring 2010 surveys of previously un-surveyed areas were submitted in May 2010 (TTEC 2010m) and are reflected in this analysis. The new areas surveyed during 2010 include the transmission line and surrounding buffer area, southward to the gen-tie location with the Blythe Energy Transmission Line Project and the SCE Colorado River Substation which was surveyed during 2010 for the Blythe Solar Power Project (AECOM 2010d). In addition to state- and federal-listed plant species, and BLM Sensitive species, special-status plants also include CNPS List 1B, 2, 3 and 4 plants, as well as unlisted plants with local or regional significance as defined in the 2009 CDFG protocols for botanical assessments (CDFG 2009).

Harwood’s Eriastrum

Harwood’s eriastrum, also sometimes referred to as Harwood’s phlox or Harwood’s woollystar, is a BLM Sensitive species, and CNPS List 1B.2 species, which indicates it is rare, threatened, or endangered throughout its range. It has a NatureServe (CNDDB) rank of 2, meaning it is an imperiled species. This spring annual is associated with sandy plains or dunes, but typically semistabilized habitat (versus active dunes) (CNPS 2010). Its global distribution and range is restricted to 14 known locations in San Diego, Riverside, and San Bernardino counties, typically in dunes associated with the margins around dry lakes such as Dale, Cadiz, and Soda lakes. Recently, surveys conducted in spring of 2010 for the Blythe Solar Project located this plant primarily in the sandy areas south of I-10, where 2,134 plants were located and mapped (AECOM 2010d, TTEC 2010o). The majority of these plants occur at the proposed Colorado River Substation site; however, plants could also be directly and indirectly affected by construction of the GSEP's gen-tie line in the vicinity of the substation.

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 2 occurrences that were not in the CNDDB (CCH 2010). Both of these are historical records from 1939 and 1958. Of the total of 14 occurrences in California (12 CNDDB plus two additional historic records), 3 of these are protected under National Park Service or State Park ownership. A total of three records are historical records. Four of these occurrences have documented threats, including OHV and non-native plant impacts.

Temporary direct impacts from construction of the Gen-tie line or the substation extension are likely, permanent direct impacts are possible, and indirect effects are likely. Indirect GSEP effects to Harwood's eriastrum in the vicinity of the GSEP gen-tie line include the spread of the non-native Sahara mustard across its dune habitat, which also degrades the habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also impact Harwood's eriastrum.

Harwood's Milk-Vetch

Harwood's milk-vetch is a CNPS 2.2 species, a rank that indicates it is fairly threatened in California but more common elsewhere. It is also a covered species under NECO. It is found in desert dunes and sandy or gravelly areas in portions of Imperial, Riverside, and San Diego counties (CNPS 2009). Herbarium collections for this species are from Ogilby Road in Imperial County and three locales west of Blythe, the Pinto Basin, and Chuckwalla Basin in Riverside County. Harwood's milk-vetch has also been reported from Baja California, Sonora Mexico, and portions of Yuma County, Arizona (Reiser 1994). There are several CNDDB records for this species within the GSEP area (CNDDB 2010) and a 10-mile radius of the GSEP area. There is a record in the Consortium of California Herbaria database from Wiley's Well Road between McCoy and Mule Mountains from 400 feet elevation (CCH 2010). The Harwood's milk-vetch populations in the southern deserts are presumed stable given limited disturbance to their desert habitats (Reiser 1994), but the recent push for renewable energy development threatens a large portion of its habitat in Chuckwalla Valley and the broader NECO planning area. What remains of the Chuckwalla population would be fragmented by the many future projects proposed and subject to the indirect effects of invasive pest plants, which quickly colonize.

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 3 occurrences that were not in the CNDDB. All three are historical occurrences. Of the total 46 occurrences in California (CNDDB plus the additional occurrences), 9 are protected under National Park Service or State Park ownership. A total of 11 records are historical records.

Sixteen of these occurrences have documented threats including development, OHV, agriculture, transmission lines, road maintenance, and trash dumping.

Spring 2010 surveys identified several hundred (700+) plants of Harwood’s milk-vetch along the transmission line and buffer area (TTEC 2010m). In addition, several Harwood’s milk-vetch occurrences of unknown size were identified in the vicinity of the proposed SCE Colorado River Substation, south of I-10 at the southeast end of Chuckwalla Valley. Spring 2009 surveys identified twelve plants of Harwood’s milk-vetch within the GSEP Area, only two of which occurred within the plant site Disturbance Area, and 10 plants within linear Disturbance Area. Substantial indirect effects anticipated include alteration of the hydrology and sediment transport of the desert washes, as well as spread of Sahara mustard across its habitat, which also degrades its habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas are also likely. Global warming is also anticipated to adversely affect this and other desert annuals by delaying the fall rains beyond the optimum germination temperatures for many desert annuals in the Sonoran Desert region. Although many new occurrences have been found around the Chuckwalla Valley and Palo Verde mesa, many are also impacted by renewable energy projects, which fragment the remaining habitat, disrupt gene flow, and render the remaining occurrences more vulnerable to future impacts. The direct and indirect impacts of the GSEP to Harwood’s milk-vetch would be substantial~~.~~

Desert Unicorn Plant

Desert unicorn plant is documented from at least 37 occurrences in Riverside, Imperial, San Bernardino, and San Diego Counties, several of which are from the Chuckwalla Mountains and Desert Center area; however, occurrences are relatively small and many of the local occurrences may be directly or indirectly affected by proposed solar Projects between Blythe and Desert Center. Although the direct effects of the GSEP on desert unicorn plant are minor, the impacts of all present and future projects (see Appendix E) on sensitive plants or on the sandy washes and important sediment transport that support the species on desert washes along the eastern base of the McCoy Mountains and the Palo Verde Mesa are cumulatively considerable. Indirect impacts to off-site (downstream) occurrences are also expected to indirectly affect the species habitat by altering the hydrology and sediment transport processes.

Ribbed Cryptantha

Ribbed cryptantha is a CNPS 4.3 species, meaning that it has limited distribution in California; however it is not very threatened in California. There are 116 records of this species from several locations throughout Riverside, Imperial, San Diego, and Imperial counties in the Consortium of California Herbaria database; the nearest collection is from the Palen Valley approximately three miles east of the Desert Center Airport (CCH 2010).

Spring 2009 surveys identified a single population of a few ribbed cryptantha northwest of the Wiley’s Well rest area at approximately 380 feet elevation from an area of mixed sand drifts, hummocks with Patton tank tracks with widely scattered shrubs (GSEP 2009f). Preliminary survey findings from spring 2010 estimated that several tens of thousands of individual plants and large populations of ribbed cryptantha along the transmission line and buffer area (TTEC 2010m). In addition, several ribbed cryptantha plants and a large occupied habitat area of this species were identified within the six-pole extension area needed for the gen-tie transmission line associated with the SCE Colorado River Substation site (TTEC 2010o).

Many similarly large occurrences of ribbed cryptantha have been found during the spring surveys totaling over 100,000 plants and possibly many more. Because of the local abundance of this species in the GSEP vicinity and its apparently stable population in its range in California, the impacts of the GSEP are considered less-than-substantial.

Special-Status Plants that May Be Detected During the Summer-Fall 2010 Surveys

Within the larger group of plants that can only be identified during late season surveys, there are two subgroups: 1) annuals that are triggered by warm summer rains of subtropical origin (typically minimum 10 mm events), and 2) perennials that bloom regardless of the summer rain, and are triggered instead by the appearance of cooler storms that originate in the Pacific northwest. This discussion includes an analysis of impacts to ‘potentially occurring’ late-season special-status plants and the triggers for mitigation and specific mitigation measures. These triggers were designed to ensure that any anticipated or unanticipated species detected during the summer-fall 2010 surveys would be mitigated to levels less than substantial. This mitigation would be achieved through a variety of avoidance and minimization measures, restoration (enhancement projects), and compensatory mitigation through the acquisition and protection of other occurrences and their habitat.

It has been estimated that 30 to 40 percent of the species in the California Desert flora reach their reproductive maturity in late summer or fall (J. Andre pers. comm.). However, there is a long-standing precedent of spring season surveys for special-status plants in California, based on the dry summers and summer-dormant flora of the Mediterranean climate that dominates California. There are exceptions, of course, for late-season blooming species, but the plant survey effort in California typically consists of a major spring survey with narrowly focused summer surveys for any late season species that may occur in the region. Regional botanical experts (J. Andre, T. LaDoux as cited in the CEC RSA June 2010, D. Silverman, A. Sanders, pers. comm. as cited in the CEC RSA June 2010) have concluded that significant finds could be missed in the absence of an additional late season botanical survey.

Because the region’s flora is so under-surveyed and poorly understood relative to other parts of the desert or state, and because its flora is so intertwined with its variable and unpredictable climate, it is difficult to predict accurately what special-status plants have potential to occur in this region. This is evidenced by the discovery of a potentially new taxon of saltbush on Palen Dry Lake (Andre pers. comm.), a new undescribed species of lupine on a renewable energy project near Barstow, a recent discovery of a new perennial spurge in the Orocopia Mountains (LaDoux pers. comm. as cited in the CEC RSA June 2010), and several unanticipated range extensions of special-status plants have been found, such Utah vining milkweed, and a slight range extension for Harwood’s eriastrum. Additionally, some rare plants have been found in habitats not previously known to occur in. For example, lobed ground cherry was recently discovered growing outside of its characteristic playa margin habitat in uplands (Andre pers. comm.).

Three late-season special-status plants were identified with moderate to high potential for occurrence based on the presence of suitable habitat and known occurrences in the region; their rarity, status, and known distribution are discussed below (Abram's spurge, flat-seeded spurge, and lobed ground cherry).

Several additional perennial species were identified with potential to occur; however, their bloom seasons overlap the spring survey window and it is expected that they would have been detected during a spring survey, if present. Nevertheless, summer-fall survey crews should be trained to recognize the following additional species: glandular ditaxis; California ditaxis; jack-ass clover, and Palmer's jack-ass clover (a proposed addition to the CNPS Inventory and known to occur at Palen Dry Lake in marginal dune habitats).

Abram's Spurge

Abram's spurge (CNPS List 2) has a NatureServe rank of G4/S1.2; i.e., it is 'critically imperiled' within its range in California. It is a summer annual that is triggered to germinate by significant summer monsoonal rains; consequently, its year-to-year population size is highly variable. It was not detected during the 2009 or 2010 spring surveys; however, the washes and other low-lying areas could support this species. This species is known to occur in halophytic flats, playas, and along inlets and floodplains of playas. It tends to prefer the lower floodplain ecotone but can also extend higher up along the washes that feed the playa (Silverman, pers. comm.). The blooming period is described in the CNPS Inventory (CNPS 2009) as September through November but it could be detected earlier if a significant (>0.10mm) summer rain event occurred in June. On average, August receives the most rainfall, but the warm monsoonal rains sometimes overlap the start of the fall-winter rains of Pacific Northwest origin.

When present, impacts to Abram's spurge would be considered substantial unless only a minor portion of its local population was affected. Even when found off-site in the playa margins, it could be indirectly affected by the diversion of the channels that support it, and the alteration of the site hydrology and sediment transport in the channels, which provide fresh, loose seed beds for many of the areas rare species. Global warming is expected to adversely affect annual species like Abrams spurge in the Sonoran Desert as rains are predicted to occur later in the fall when temperatures are cooler and not adequate for germination.

The CNDDB (CNDDB 2010) lists 15 occurrences of this plant in Riverside, Imperial, San Bernardino, and San Diego counties in California, east through Nevada to Arizona, and as far south as Baja California, Mexico. Of the total of 15 occurrences in California, 7 are protected under Park Service, CDFG, or State Park ownership. A total of 4 records are historical (pre-1972) that have not been confirmed since collected. One of these occurrences is described as threatened by grazing. A recent 2000 CNDDB record is from a location approximately 0.50 mile east of Ford Dry Lake on Gasline Road just south of I-10 and the occurrence was reported as a "substantial population" (CNDDB 2010).

When present, implementation of the off-site mitigation measures described in BIO-19, and the avoidance and minimization measures would be required to mitigate effects to Abram's spurge to a level less-than-substantial. Under certain conditions (see BIO-19), the level of protection would be increased and some onsite avoidance may be required.

Atriplex sp. nov

A potentially new taxon of saltbush (*Atriplex*) was discovered on the saline playa margins of Palen Dry Lake last year by a botanist with the U.C. Reserve System (Andre and La Doux, pers comm). The BLM State Botanist and Plant Conservation Program Lead (Lund pers. comm.) indicated that BLM would treat all new taxa as BLM Sensitive species. The new taxon was not detected during the GSEP spring 2010 surveys but it is not clear whether it was included by field crews as a potentially occurring special-status plants. It could be detected during the summer-fall 2010 surveys, if present. No suitable habitat is present for this taxon in the solar fields but it could be indirectly affected by alterations of the surface drainage patterns between the solar fields when it occurs in the playa margins of Ford Dry Lake.

Flat-seeded Spurge

Flat-seeded spurge is a CNPS List 1 B.2 species, meaning it is rare, threatened, or endangered throughout its range and it is fairly threatened in California. It is also a BLM Sensitive species and has a NatureServe rank of G3/S1.2. Some experts have speculated that it may be a "waif" in California, or a species that is not naturalizing, and note that it is more common in Arizona and Mexico (CDFG 2010). When present, impacts to flat-seeded spurge would be considered substantial unless only a minor portion of its local population was affected.

CEC staff reviewed the occurrence data in the Consortium of California Herbaria and detected 1 occurrence that was not in the CNDDB. This occurrence is a historical record from 1933. Of the total five occurrences in California (CNDDB plus new additional occurrences), only 1 is protected under State Park ownership. A total of three records are historical records. None of these occurrences have documented threats and the threat rank indicates that its distribution in California is relatively stable at this time. Likely indirect effects include the spread of Sahara mustard and Russian thistle across its habitat, and the premature stabilization of the dunes that support it. Channel diversion and the interruption of aeolian and fluvial sediment transport are also likely. Global warming is expected to disproportionately (and adversely) affect low elevation annual species like flat-seeded spurge in the Sonoran Desert.

BLM requests 100 percent on-site avoidance for BLM Sensitive plants but the BLM State Botanist will decide the level of avoidance on a case-by-case basis, when present.

Lobed Ground Cherry

Lobed ground cherry is a CNPS List 2.3 species, meaning that is rare, threatened, or endangered in California, but more common elsewhere; the threat rank indicates that it is not very endangered in California. It has a NatureServe rank of G5/ S1.3, indicated that it is very rare in California but relatively stable outside of California. It occurs largely on alkaline dry lake beds but it has also been found in drier, less saline-alkaline environments on decomposed granitic soils in Mojave desert scrub habitat.

Occurrence data were reviewed in the Consortium of California Herbaria and detected 2 occurrences that were not in the CNDDB. Both of these are more recent occurrences, including one from Joshua Tree National Monument and one in the eastern Mojave Desert. Of the total 6 occurrences in California (CNDDB plus new additional occurrences), none are protected under Park Service or other agency land ownership. None of these are historical records and none have documented threats.

Impacts to this very rare species in California would be substantial, unless only a minor portion of its local population was affected. Such an occurrence would also represent a significant range extension. Likely indirect effects, when present, would include the spread of Russian thistle across its habitat and potential OHV impacts from the creation of new access roads into its habitat. Even when found off-site in the playa margins, it could be indirectly affected by the diversion of the channels that support it, and the alteration of the site hydrology and sediment transport systems that support the dunes. Additionally, global warming is expected to adversely affect this annual species as rains are predicted to occur later in the fall (and thus in cooler temperatures not adequate to germinate many of the desert annuals). Implementation of the off-site mitigation measures described in BIO-19, and the avoidance and minimization measures would be required to mitigate the effects to a level less-than-substantial. Under certain conditions (see BIO-19), the level of protection would be increased and some onsite avoidance may be required.

Indirect Impacts to Special-Status Plants

The anticipated indirect impacts to special-status plants, i.e., impacts outside the Project Disturbance Area or that occur following construction include: introduction and spread of invasive plants; alteration of the surface hydrology and basic geomorphic processes that support rare plants and their habitat (e.g., disrupted aeolian and fluvial sand transport processes from obstructions and diversions); population fragmentation and disruption of gene flow; potential impacts to pollinators; increased risk of fire; erosion and sedimentation of disturbed soils which render the habitat vulnerable to invasion by pest plants; disturbance of the structure and ecological functioning of biological soil crusts which affect seed germination, reduce soil nutrition, carbon sequestration, and render the soil vulnerable to water and wind erosion (Belnap & Eldridge 2001 as cited in the CEC RSA June 2010); herbicide and other chemical drift; and disruption of photosynthesis and other metabolic processes from fugitive dust during construction and operation of the GSEP.

Following construction, exotic species that are characteristically opportunistic could occupy disturbed soils within the Project Disturbance Area and spread into adjacent vegetation communities. Invasive weeds with severe ecological impacts such as Sahara mustard can quickly colonize disturbed soils following construction. The primary conduit for spread, however, is along roads and transmission corridors. The dramatic increase in vehicle use of the GSEP vicinity roads and construction of transmission corridors and new roads is expected to increase the spread of this highly invasive wildland pest. Sahara mustard has shown a clear negative impact on native flora (Barrows et al. 2009). Sahara mustard can form dense stands and potentially crowd out native annual plants. Sahara mustard plants growing early in the season may dominate available soil moisture which may adversely affect native annuals which start growing a little later in the season (Barrows et al. 2009). Barrows et al. (2009) found that native annuals growing under a canopy of Sahara mustard were often taller and were etiolated, at the expense producing branches, flowers, and fruits. This led to a shift in the dominance of the following year's species composition from native annuals to Sahara mustard.

Tamarisk, Russian thistle, Sahara mustard and Mediterranean grass are already present in the GSEP area and are expected to increase as a result of construction- and operation-related disturbance. The proliferation of many non-native plants has dramatically increased the fuel load and frequency of fire in many desert ecosystems (Lovich & Bainbridge 1999). Unlike other ecosystems in California, fire was not an important part of the Mojave Desert ecosystems and most perennials are poorly adapted to even low-intensity fires, and the animals that coevolved are not likely to respond favorably to fire either. The potential spread or proliferation of non-native annual grasses, combined with the proximity to ignition sources could potentially increase the risk of fire, and the effects to these poor-adapted desert communities would be harmful, particularly to cacti and most native shrubs species. Burned creosote and other native shrubs are typically replaced by short-lived perennials and non-native grasses (Brown & Minnich 1986). The spread of invasive plants is a major threat to vegetation resources in the Colorado Desert because non-native plants can displace native plants, increase the threat of wildfire, and supplant wildlife foods that are important to herbivorous species.

Wildfires (caused by construction or downed transmission lines) are rare but the increase in daily vehicle use in the area from an anticipated 200 new jobs during operation and up to 1,000 jobs during construction would substantially increase the risk of ignition. Other temporary and permanent impacts from the GSEP could occur to surrounding vegetation communities from grading activities creating air-born, fugitive dust, sedimentation, and erosion, which could result in disruption of photosynthesis and other metabolic processes. The destruction of plants and soil crusts by windblown sand and dust also exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Alternatives

Table 4.17-1 shows differences between alternatives for direct and indirect impacts, if quantified. For the No Action/No Project Alternatives, no impacts would be anticipated to vegetation communities and Special Status Plants in the short term though impacts similar to those discussed for the Proposed Action or Reduced Acreage or Dry Cooling Alternatives could occur in the long term for No Action Alternative A and No Project Alternative C.

Dry Cooling Alternative

Because this alternative would occupy essentially the same footprint as the Proposed GSEP, the impacts remain the same between the two except for impacts to groundwater-dependent ecosystems. The Dry Cooling Alternative would use over 87 percent less groundwater than the Proposed GSEP. Indirect impacts to groundwater-dependent ecosystems under the Proposed GSEP are expected to be substantial if the water tables drop below the baseline spring water table levels necessary for healthy ecological functioning. Under the Dry Cooling Alternative, impacts to groundwater-dependent vegetation would not be substantial.

The direct and indirect impacts from the Proposed GSEP to Desert Dry Wash Woodland would be the same as the impacts to these resources under the Dry Cooling Alternative.

Reduced Acreage Alternative

The Reduced Acreage Alternative would have smaller impacts on many of the vegetation resources within the GSEP area, including unvegetated ephemeral dry washes. The Reduced Acreage Alternative would have substantially less impact on stabilized and partially stabilized sand dunes because the Reduced Acreage Alternative does not extend into the sand transport corridor, and therefore has no indirect downwind impact to sandy habitats outside of the Disturbance Area (Table 4.17-1). In addition, the Reduced Acreage Alternative would use approximately 50 percent less groundwater than the Proposed GSEP, though it would still use a substantial amount. Both the Proposed Action and the Reduced Acreage Alternative would impact groundwater-dependent ecosystems through this use of groundwater. Because the linear facilities for the Proposed Action and the Reduced Acreage Alternatives share the same route, impacts associated with this corridor are very similar; impacts to Desert Dry Wash Woodland remain the same for both the Proposed Action and this alternative for this reason. In addition, although the Reduced Acreage Alternative represents fewer acres of impacts, it would indirectly impact desert washes that currently flow through the area.

Direct and indirect impacts from the Proposed Action and the Reduced Acreage Alternative are similar (aside from differences in impact acreage) for most impacts associated with the Proposed Action, including those to Desert Dry Wash Woodland. While impacts from the Reduced Acreage Alternative are substantially less to desert washes, these impacts would still be considered substantial under this alternative as well as under the Proposed Action and Dry Cooling Alternative. There is insufficient information to fully assess indirect and cumulative impacts to groundwater-dependent vegetation, but these impacts may be considered substantial under the Proposed Action and the Reduced Acreage Alternative.

No Action Alternative A

Under this alternative, the Proposed GSEP would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site, and no impacts to sensitive vegetation resources. However, the land on which the GSEP is proposed would become available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment, with potentially similar impacts as described for the Proposed Action, Dry Cooling, and Reduced Acreage Alternatives. In addition, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects may have some similar impacts in other locations.

No Project Alternative B

Under this alternative, the Proposed GSEP would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, new impacts to vegetation resources would not occur, as such, this No Project Alternative would not result in impacts to vegetation resources that would occur under the Proposed GSEP. However, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects may have some similar impacts in other locations.

No Project Alternative C

Under this alternative, the Proposed GSEP would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, sensitive vegetation resources would be impacted. Different solar technologies require different amounts of land, placement, grading and maintenance; however, it is expected that all the technologies would require a large area of land. As such, this No Project Alternative could result in biological resource impacts similar to the impacts under the Proposed Action, Dry Cooling, and Reduced Acreage Alternatives.

4.17.3 Discussion of Cumulative Impacts

Cumulative impacts are analyzed in detail in **Appendix E**. Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

Cumulative Impacts

Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

Construction and operation of the GSEP would have effects on a number of vegetation resources that are individually limited but cumulatively considerable. In conducting the cumulative effects analysis, a quantitative, GIS-based analysis of direct impacts to habitat, and a qualitative analysis of indirect effects, were employed. Geographic scope varied between vegetation resources, but most analyses were based on the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries. Substantial cumulative effects were identified to: desert washes in the Chuckwalla-Ford Dry Lake watershed and the broader NECO planning area; desert tortoise habitat; golden eagle foraging habitat; Mojave fringe-toed lizards and their habitat; habitat for American badger, desert kit fox, and burrowing owl; Le Conte's thrasher habitat; Couch's spadefoot toad range; habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants; wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe-toed lizard, dunes, and playa); Mojave and Sonoran creosote bush scrub; desert dry wash woodland; playa and sand drifts over playa; and dunes. Implementation of proposed mitigation measures would reduce the GSEP's contribution to cumulative effects to a level that is not cumulatively considerable. The detailed cumulative effects analysis is included in Genesis Appendix E, Biological Resources Detailed Cumulative Effects Analysis.

Construction and operation of the GSEP would have effects on a number of vegetation resources that are individually limited but cumulatively considerable. The cumulative effects analysis employed a quantitative, GIS-based analysis of direct impacts to habitat, and a qualitative analysis of indirect effects (e.g., increases in predators, noxious weeds, etc.). In many cases, the anticipated indirect effects are more substantial, or adverse, than the direct loss of habitat, but are more difficult to quantify. Geographic scope varied between vegetation resources, but most analyses were based on the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries (BLM CDD 2002).

Substantial cumulative effects (including indirect effects) were identified in a number of biological resource areas where the GSEP contributes—at least incrementally—to the cumulative effect. These include: desert washes in the Ford Watershed and the broader NECO planning area; habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants; wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe-toed lizard, dunes, and playa); Mojave and Sonoran creosote bush scrub; desert dry wash woodland (microphyll woodland); playa and sand drifts over playa; and dunes (active and stabilized). Table 4.17-2 summarizes these cumulative impacts.

Implementation of proposed Mitigation Measures would reduce the GSEP's contribution to cumulative effects to a level that is not cumulatively considerable. There may be cumulative effects after mitigation is implemented by all projects, but due to the mitigation implemented by the GSEP, its contribution would be less than cumulatively considerable. These residual cumulative effects from all future projects could be addressed through a regional and coordinated planning effort aimed at preserving and enhancing large, intact expanses of wildlife habitat and linkages, including maintaining connections between wildlife management areas and other movement corridors.

TABLE4.17-2
SUMMARY OF CUMULATIVE IMPACTS TO VEGETATION RESOURCES

Biological Resource	Cumulative Impact
Sonoran Creosote Bush Scrub & Associated Wildlife	Contributes 0.8% to cumulative loss from probable future projects within the NECO planning area.
Ephemeral Drainages (including Waters of the State) & Associated Sensitive Plant Communities	Contributes 2.9% to cumulative loss from future projects within the NECO planning area; contributes 4.6% to cumulative loss from future projects within the Chuckwalla- Ford Dry Lake watershed.
Special-status Plants • Harwood's eriastrum • Harwood's milk-vetch • Ribbed cryptantha • Desert unicorn plant • Late-season special-status plants	Contributes to cumulative loss of plants and habitat, and indirect effects to Harwood's eriastrum, Harwood's milk-vetch, desert unicorn plant and ribbed cryptantha from other I-10 corridor projects and throughout range. Contributes 0.7% to cumulative loss of Harwood's milk-vetch habitat from future projects within the NECO Planning Area. Contributes cumulative loss of dune-, playa-, and wash habitat for other special-status species in Chuckwalla Valley: 4.6% desert washes in Chuckwalla Valley; 1.7% dunes and sand fields; 0.2% playa.
Groundwater-Dependent Plant Communities	Degradation of groundwater-dependent plant communities (e.g., mesquite bosque, bush seep-weed) from water table drawdown

[a] From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities").
[b] From TTEC 2010l (TetraTech memo "Revisions to Jurisdictional Waters for the Genesis Solar Energy Project").
[c] From TTEC 2010j (TetraTech Notification of a Lake or Streambed Alteration Agreement Application, Appendix D).
[d] From TTEC 2009c (TetraTech Application for Incidental Take of Threatened and Endangered Species).
[e] From Soil & Water Appendix A, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.
[f] From TTEC 2010o (Tetra Tech memo "Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility").

Reasonably Foreseeable Development Scenario: Southern California Edison Colorado River Substation

This subsection provides an overview of potential impacts to biological resources from construction of Southern California Edison's (SCE's) proposed 230 kV expansion of the already-permitted (but not yet constructed) 500 kV Colorado River Substation. Unlike the transmission line that would go from the GSEP power plant to the Colorado River Substation (the "gen-tie") SCE's Colorado River Substation is not part of the GSEP description. Rather, SCE would acquire a permit from the California Public Utilities Commission, and would construct, own and operate the Colorado River Substation to serve several projects in the area. SCE would provide an analysis of impacts to biological resources and mitigation for those impacts resulting from construction of the Colorado River Substation. However, because the proposed expansion of the Colorado River Substation is a reasonably foreseeable development, a description of the expansion and potential impacts to biological resources is included here. The purpose of the discussion in this subsection is to inform all interested parties of the potential for impacts to biological resources that may result from other actions related to the GSEP.

Impacts to Biological Resources from Colorado River Substation Expansion

The Colorado River Substation expansion would be constructed within sand dune habitat. The basis for this inference is Figure DR-BIO-51-2 from the Data Response submitted for the Blythe Project (AECOM 2010e). This figure shows, at a scale of 1 inch = 6000 feet, the approximate location of the proposed Colorado River Substation and depicts it as being entirely within stabilized and partially stabilized sand dune. Based on the information from the Blythe Project 2010 surveys (TTEC 2010o, Attachment A, Figure 2 - Preliminary Results Botany Rare Plants Spring 2010 Surveys, and Figure 4 - Incidental Wildlife Observations Spring 2010 Surveys and TTEC 2010p), a number of sensitive sand dune-dependent species are likely to be directly impacted by expansion of the Colorado River Substation. Many Mojave fringe-toed lizards were detected in and near the proposed Colorado River Substation, as well as numerous rare plants, including Harwood's eriastrum, Harwood's milk-vetch, winged cryptantha and ribbed cryptantha.

Harwood's eriastrum, a California endemic and BLM Sensitive species, has a global distribution restricted to the southeast corner of California, and it is known from only 14 documented locations. As described above in the subsection on impacts to special-status plants, direct or indirect impacts to Harwood's eriastrum or Harwood's milk-vetch would be substantial. Late summer/fall botanical surveys might also reveal the presence of additional sensitive plant species in the vicinity of the proposed substation expansion.

Even when the substation expansion avoided direct impacts to these sensitive sand dune species, indirect impacts are likely to occur. Alterations in drainages could adversely affect special-status plant populations that occur downstream of the project area. Other indirect effects include the spread of the non-native Sahara mustard and other non-native invasive species, which degrade sand dune habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also adversely affect sand dune dependent plant and animal species.

4.17.4 Summary of Mitigation Measures

The mitigation measures imposed by the California Energy Commission as Conditions of Certification for the GSEP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix F. The following mitigation measures would avoid or minimize impacts on vegetation resources[1]:

> BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-7, BIO-8, BIO-14, BIO-19, BIO-22, BIO-23, BIO-24, BIO-25, BIO-26, BIO-29

Moreover, to address potential impact to Climate Change, the BLM would require, in concert with BIO-7, the following:

> **BLM BIO-7a:** The Applicant shall ensure that monitoring accomplished under BIO-7 and other mitigating measures use available climatalogical data when analyzing project effects or resource trends.

Tables 4.17-3 and 4.17-4 summarize the recommended compensatory mitigation identified for Vegetation and Wildlife Resources from this project's Proposed Action, Dry Cooling Alternative, and Reduced Acreage Alternative. These tables also apply, in part, to Section 4.21, Wildlife Resources, but are not duplicated there.

[1] The CEC document intertwined vegetation and wildlife resources in the mitigation measures and these have not been modified because as a whole they mitigate the impacts to vegetation and wildlife resources.

TABLE 4.17-3
ACREAGE OF DIRECT AND INDIRECT IMPACTS TO VEGETATION AND WILDLIFE RESOURCES AND RECOMMENDED COMPENSATORY MITIGATION FOR PROPOSED ACTION

Resource	Acres Impacted	Mitigation Ratio	Recommended Mitigation Acreage
Desert Tortoise Habitat – Direct Impacts			
Within DWMA/Critical Habitat[a]	24	5:1	120
Outside Critical Habitat[b,g]	1,750	1:1	1,750
Total Desert Tortoise Mitigation			***1,870***
Stabilized/Partially Stabilized Sand Dunes – Direct Impacts			
Direct Impacts[c,g]	7.5	3:1	22
Playa and Sand Drifts Over Playa			
Direct Impacts[c,g]	38	3:1	114
Indirect Impacts to MFTL Habitat[d,h]	151	0.5:1	76
Total Mojave Fringe-toed Lizard Mitigation			***212***
Ephemeral Drainages			
State Waters[i] – Direct Impacts[e]			
Microphyllous Riparian Vegetation	16	3:1	48
Unvegetated Ephemeral Dry Wash	53	1:1	53
State Waters – Indirect Impacts[f]			
Unvegetated Ephemeral Dry Wash	21	0.5:1	10
Total State Waters Mitigation			***111***

a From Application for Incidental Take Permit (TTEC 2009c).
b From CEC 2010d (TetraTech table “Anticipated Direct and Indirect Impacts to Vegetation Communities”); includes impacts to Sonoran creosote bush scrub.
c From CEC 2010d; includes direct permanent impacts to stabilized and partially stabilized sand dunes and sand drifts over playas.
d From CEC Genesis Revised Staff Assessment Soil & Water Appendix A, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.
e From TTEC 2010l (TetraTech memo “Revisions to Jurisdictional Waters for the Genesis Solar Energy Project”).
f From Appendix D, Lake and Streambed Alteration Agreement Application (TTEC 2009d).
g From TTEC 2010o (Tetra Tech memo “Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility”).
h PWA 2010a. (tn pending) PWA memo “Genesis Solar Energy Project, Analysis of Impacts to Sand Transport Corridor”)...
i Reflects changes Also, the removal of the ‘toe’ from the plant site footprint would also reduce impact acreage to state waters; however these reduced impact calculation have not been provided to date and therefore, are not included in this table.
9 Revised per TTEC 2010s (Supplemental Information Genesis Solar Energy Project June 18, 2010) to include 6.5 acres of impact to sand dunes from the six-pole extension of the gen-tie line north of the Colorado River Substation. Acreage of 3.2 acres of impact from construction of distribution/telecommunications line is not yet included here or in the Sonoran creosote scrub, pending clarification regarding the upland habitat types that will be impacted by the distribution/telecommunications line.
10 Revised per TTEC 2010s (Supplemental Information Genesis Solar Energy Project June 18, 2010) to reduce the impact to state waters by 21 acres, reflecting elimination of the 41.4 acre “toe” at the easternmost solar field.
11 Includes one additional acre of direct impact (rounded up from 0.84 acre) due to construction of the distribution/telecommunications line.

4.17.5 Residual Impacts after Mitigation

The Proposed Action, Dry Cooling, and Reduced Acreage Alternatives would have substantial impacts to vegetation resources, eliminating all of the Sonoran creosote bush scrub and other native plant communities within the approximately 1,800-acre site, including 90 acres of desert washes. Without mitigation the GSEP would contribute to the cumulatively substantial loss of vegetation resources within the Chuckwalla Valley and the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) area. Recommended avoidance and minimization measures as well as compensatory mitigation to offset direct, indirect, and cumulative impacts to

TABLE 4.17-4
COMPARISON OF COMPENSATORY MITIGATION REQUIREMENTS FOR PROPOSED ACTION, DRY COOLING, AND REDUCED ACREAGE ALTERNATIVE[a]

Resource	Mitigation Ratio	Proposed Proposed Action/ Dry Cooling Alternatives (acres)	Reduced Acreage Alternative (acres)
Microphyll woodland – Direct Impacts	3:1	48	48
Unvegetated, ephemeral dry wash – Direct Impacts	1:1	53	51
Unvegetated, ephemeral dry wash – Indirect Impacts	0.5:1	10	10
Total state waters mitigation		***111***	***109***
DT habitat within CHU[b]	5:1	120	120
DT habitat outside CHU[c]	1:1	1,750	1,016
Total desert tortoise mitigation		***1,870***	***1,136***
MFTL habitat (sand dunes) – Direct Impacts[d]	3:1	22	22
MFTL habitat (playa and sand drifts over playa) – Direct Impacts	3:1	114	132
MFTL habitat (sand dunes, playa, other) – Indirect Impacts[e]	0.5:1	76	0
Total sand dune/MFTL mitigation		***212***	***154***

a Reflects revised acreage impacts from TTEC 2010m, CEC Revised Staff Assessment Supplement
b From Application for Incidental Take Permit (TTEC 2009c).
c *Proposed Project*: From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities"). *Reduced Acreage Alternative*: Estimate only, from Biological Resources Appendix E and TTEC 2009d.
d Stabilized and partially stabilized sand dunes, see source information for **Biological Resources Table 7**
e From CEC Genesis Revised Staff Assessment Soil and Water, Appendix A and PWA 2010a**.**

natural plant communities, sensitive communities, and special-status plant species, would assure compliance with state and federal laws such as the federal and state endangered species acts and regulations protecting waters of the state. With implementation of proposed mitigation measures, GSEP impacts to vegetation resources would be reduced, although net losses in vegetation resources would occur.

4.17.6 Unavoidable Adverse Impacts

The GSEP and other action alternatives would result in substantial impacts to sensitive vegetation resources, and would permanently diminish the extent and value of native plant and animal communities in the region.

Under the technology proposed in the three action alternatives (the Proposed Action, Dry Cooling, and Reduced Acreage Alternatives), natural vegetation communities and individuals and local populations of special-status plants not otherwise avoided under proposed mitigating measures would be lost from the GSEP area, totaling 1,746, 1,746, and 950 acres, respectively. The GSEP would result in loss of an extensive network of desert washes comprising 90 acres of state jurisdictional waters, and would substantially alter the hydrology of the area by re-routing ephemeral drainages through engineered channels. Dunes and sand transport would be affected as well. Despite mitigating measures, the chance of invasion and spread of weeds and the chance of human-caused wildfires would persist to the areas surrounding the GSEP, threatening the surrounding vegetation and special status plant species.

4.18 Impacts on Visual Resources

This section discusses effects on visual resources that would occur with implementation of the proposed action and alternatives, cumulative effects, and mitigation measures to avoid or reduce visual effects. Overall, the GSEP would result in long-term visual alteration to approximately 1,746 acres of land with a scenic quality rating of C[1], a high visual sensitivity, and within the foreground distance zone. As discussed in Section 3.19, the GSEP would result in visual disturbance within BLM land with an Interim VRM Class III rating.

4.18.1 Impact Assessment Methodology

Visual resource effects are created when the physical characteristics of facilities associated with proposed actions contrast with natural characteristics of the landscape setting. Contrast is measured by a systematic evaluation of the basic design elements of form, line, color, texture and scale, in accordance with the BLM's Handbook H-8431-1, Visual Resource Contrast Rating. It is the primary tool used to measure the intensity of adverse visual effects to visual resources. Should the contrast rating reveal nonconformance of the proposed action with the established Interim VRM Class objectives (see Section 3.19), and mitigation measures are insufficient to bring the project into compliance, then the design would need to be mitigated to the greatest extent possible, and would need to meet the VRM Class objective at a minimum. If the project cannot be mitigated to meet the VRM Class objective, then the project application may not be approved, or may be redesigned or relocated to meet the objective.

The GSEP is evaluated for conformance with the following MUC and VRM objectives:

- *Multiple-Use Class M* (Moderate Use) is based upon a controlled balance between higher intensity use and protection of public lands. This class provides for a wide variety or present and future uses such as mining, livestock grazing, recreation, energy, and utility development. Class M management is also designed to conserve desert resources and to mitigate damage to those resources which permitted uses may cause.

- *VRM Class III* objective is to "***partially retain*** the existing character of the landscape. The level of change to characteristic landscape should be ***moderate***. Management activities may attract attention but ***should not dominate the view*** of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape."

Since the overall VRM goal is to minimize visual impacts, mitigating measures must be prepared for all adverse contrasts that can be reduced, even if the proposed action meets VRM objectives. Further, in addition to permanent visual contrast created in the landscape, the GSEP is analyzed for adverse effects due to lighting and glare, as well as temporary construction disturbances.

[1] Scenic quality is rated in three categories from A (most scenic) to C (least scenic). See Section 3.19 for a discussion of scenic quality ratings.

Visual Contrast Rating Process

The degree to which the GSEP adversely affects the visual quality of a landscape is directly related to the amount of visual contrast between it and the existing landscape character. The degree of contrast is measured by separating the landscape into major features (land/water, vegetation, structures) then assessing the contrast introduced by the project in terms of the basic design elements of form,[2] line,[3] color, and texture. The contrast of the GSEP with landscape elements is then rated as none, weak, moderate or strong, as defined in Table 4.18-1. The purpose of this method is to reveal elements and features that cause the greatest visual impact, and to guide efforts to reduce the visual impact of a proposed action or activity. This process is described in detail in Handbook H-8431-1, Visual Resource Contrast Rating, and documented using BLM Form 8400-4 (see Appendix F).

TABLE 4.18-1
VISUAL CONTRAST RATINGS

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

SOURCE: BLM Manual 8431

The criteria for visual contrast are aligned with the management objectives for each Interim VRM Class. For example, if a project results in a weak visual contrast, it is likely to be in conformance with Interim VRM Class II, whereas a project that results in a moderate contrast would likely be in conformance with VRM Class III objectives but would not conform to VRM Class II objectives. Only surface disturbances resulting in a strong visual contrast would not be in conformance with VRM Class III objectives.

Selection of Key Observation Points

The contrast rating is completed from the most critical viewpoints, or Key Observation Points (KOPs). The intent of establishing KOPs is to visualize the contrast created by the proposed action from locations most representative of how the public perceives the affected landscape. The “public” may include highway travelers, travelers on local roads, off-highway vehicle users, dispersed recreational users such as RV campers and hikers in surrounding wilderness areas, or users of BLM facilities, such as long-term visitor areas. The sensitivity of these diverse user

[2] Contrast in form results from changes in the shape and mass of landforms or structures. The degree of change depends on how dissimilar the introduced forms are to those continuing to exist in the landscape.

[3] Contrasts in line results from changes in edge types and interruption or introduction of edges, bands, and silhouette lines. New lines may differ in their sub-elements (boldness, complexity, and orientation) from existing lines.

groups to changes in the landscape are influenced by a number of factors, including how prominent the view of the proposed project is (in terms of scale, distance and angle of observation), the frequency and duration that viewers are exposed to the view, and whether the viewer groups are aware of their surroundings or expectant of high-quality views.

Based on the above factors, and in consultation with BLM staff, three KOPs (Figure 4.18-1) were selected to evaluate the GSEP site's existing conditions and potential visual contrast. No KOPs were selected in the BLM Palen-McCoy Wilderness, located immediately to the north, because while technically accessible, the wilderness does not have maintained trails or trail heads, and is scarcely visited by the public (BLM Greg Hill, 2009). However, to demonstrate how the scale and dominance of the GSEP changes with angle of view and elevation differences, this analysis includes an oblique aerial perspective of the GSEP. In addition, there is no KOP to simulate the proposed transmission line as it crosses I-10. However, a visual simulation of the transmission line for the proposed Blythe Solar Power Plant, located 10-15 miles to the east in the same landscape setting is used to approximate the visual contrast created by the GSEP transmission line from a viewpoint along I-10. The location and characteristics of each KOP is summarized in Table 4.18-2.

TABLE 4.18-2
KOP LOCATION AND CHARACTERISTICS

ID	Name	Distance to GSEP and View Direction[a]	Distance Zone[b]	Primary User Type	Description
KOP 1	Ford Dry Lake Bridge Over I-10	3.2 to 4.9 miles, north view	Foreground/ Middleground	Interstate Travelers	Point on I-10 that is nearest to the proposed project, KOP is on elevated bridge.
KOP 2	Wiley's Well Bridge Over I-10	8.4 to 12.5 miles, northwest view	Background	Interstate Travelers / Rest Area	Point is on Wiley Well Road over I-10. The exit contains a rest area, and a local road which leads south to the Ironwood and Chuckwalla Valley Prisons, as well as the Mule Mountains LTVA.
KOP 3	Corn Springs BLM Road	9.0 to 14.25 miles, east view	Background	Recreation/ Camping	This is a road that leads to the BLM Corn Springs Campground.

[a] Distance includes closest distance and furthest distance to the GSEP site
[b] Distance zones as defined by BLM convention (0 to 5 miles is foreground/middleground, and 5 to 15 miles is background

The basis of selecting these three KOPs was that each one displays a different location from which sensitive receptors can view the Project, and accurately represents how the Project would appear when seen from different distance zones (foreground/middleground, or background). While several local roads lead to campgrounds, as indicated in the description for KOP 2 and 3; the GSEP would not be visible from these campgrounds due to the distances involved, topographic screening, and low elevation differences.

Visual Simulations

Photographs were taken at each viewpoint and each KOP with a Canon-50D digital camera equipped with a zoom lens with the focal length set so that it provides a “normal view,” thereby eliminating distortion. For comparison to this “normal lens,” a wide angle lens makes background features appear unrealistically small and farther away, while a telephoto lens makes background features unrealistically larger and closer in the photograph. The normal lens makes all landscape features appear in their proper perspective and size, relative to each other. When on 8½x11-inch paper and held approximately 10 inches from the eye, each photograph appears “life-size” as viewed from on the ground at the exact camera location.

Computerized visual simulations were prepared using AutoCAD and 3DStudio software to create accurate, computerized depictions showing the visual effects of the Project. Using the computerized visual simulations, predicted future visual effects of the Project for each KOP are described in the section below, and contrast rating forms were completed based on the visual simulations (and included in Appendix F).

4.18.2 Direct and Indirect Impacts

Proposed Action

There are no indirect impacts of the GSEP with respect to visual resources.

Project Appearance

The proposed action would convert approximately 1,746 acres (about 2.8 square miles) of naturally-appearing desert plain to an industrial facility characterized by complex, geometric forms and lines and industrial surfaces that are dissimilar to the surrounding natural landscape character. Much of the developed area would be covered with the arrays of parabolic mirrors that would be used to collect heat energy from the sun. Figure 4.18-2 presents an image of the Kramer Junction SEGS project solar troughs, which are smaller in scale than those proposed for GSEP, but provide a visual example of a solar plant using parabolic mirrors. In addition, Figure 4.18-3 presents aerial views of existing solar trough energy projects. Table 4.18-3 provides a list of the major project features that would contribute to the apparent visual change of the landscape, including their height and color. The arrays of solar collector assemblies, which would be a maximum of 22 feet high, would occupy most of the disturbed area. Two identical power blocks would occupy smaller areas, but would contain various buildings and structures needed for electrical generation, several of which would be as high as 50 feet. The proposed transmission lines leading away from the main generation facility would be approximately 75 feet high, would cross I-10 from north to south at Wiley’s Well Road, and would join the Blythe Energy Project Transmission Line a short distance south of I-10 along Wiley’s Well Road.

Chapter 2 provides a detailed description of the power plant civil/structural features. Generally, the collector field consists of multiple single-axis parabolic trough solar collectors, aligned on a north-south axis. Each parabolic trough focuses the sun’s rays on a linear, length-wise heat collection element at the parabolic focal point. The primary project features include:

TABLE 4.18-3
APPROXIMATE DIMENSIONS OF GSEP STRUCTURES

Structure	Quantity	Height (ft)	Length (ft)	Width (ft)	Color[a]
Water Treatment Building	2	50	75	60	Tan
Electrical Building	2	20	60	40	Tan
Cooling Tower Electrical Buildings	2	12	30	20	Tan
Heat Transfer Fluid Pump Area	2	5	60	25	Gray
Demineralization Water Tank	2	17	N/A	20	Tan
Raw/Fire Water Tank	2	28	N/A	55	Tan
Treated Water Tank	2	38	N/A	75	Tan
Waste Water tank	2	27	N/A	40	Tan
Control Room/Warehouse in Power Block	2	50	60	60	Tan
HTF Expansion Tanks	8	25	50	14 (diameter)	Tan
Auxiliary Boiler	2	13	26	12	Gray
Emergency Diesel Generator	2	15	32	12	Gray
Fire Pump House	2	25	33	11	Tan
Generator Step-Up Transformer	2	25	40	30	Gray
Administration/Warehouse Building	1	50	225	60	Tan
Cooling Tower Chemical Feed	2	20	50	25	Gray
Steam Turbine Generator Building	2	30	100	15	Tan
Solar Collectors	1760	Varies	492	Varies	Gray bottom & mirror top
Transmission Line Monopoles and Arms	59	75	N/A	N/A	Dulled Galvanized Steel

NOTES:
[a] Colors of exterior building surfaces will be selected in consultation with BLM.

1. Two power blocks, one per plant, including steam turbine generators and related equipment;

2. An administrative building and warehouse shared between the two power plants; a control building within each power block; a water treatment building and other structures with an overall area of approximately 39,000 square feet (0.9 acre);

3. Two 500,000 gallon cooling water storage tanks; a 1,250,000 gallon treated water storage tank; a 250,000 waste water storage tank; a 40,0000 gallon demineralized water storage tank;

4. Two wet cooling towers;

5. A 270-by-400-foot switchyard;

6. Thirty five acres of paved area;

7. And two 24-acre of evaporation ponds (one per generation unit, located between the two mirror fields).

Construction-Phase Impacts

During the construction period, earth-moving activities and construction materials, equipment, trucks, and parked vehicles, all could be visible on the site and along the transmission line ROW. Construction would occur over a 39 month period, during which a number of activities would take place, including large-scale vegetation removal, earthwork, as well as foundation and equipment installation. From the more common viewpoints (e.g. I-10), these construction activities would generally result in a high degree of visual contrast within the landscape, which would be similar to or the same as the discussion of visual contrast ratings discussed under operation-phase impacts.

However, certain visual effects will be specific to construction activities, and could include the generation of large quantities of airborne dust, nighttime construction lighting, and the establishment of offsite staging/laydown areas. The affected viewers would be primarily motorists on I-10, users of the Wiley's Well Rest Area, and dispersed recreational users accessing campgrounds via Wiley Well Road and Corn Springs Road to the south of I-10. Although the construction period is estimated to be over three years, construction would be phased, so that it would not occur in any one place for the entire period. Activities that would generate dust, such as earthmoving, would occur episodically throughout the construction period, and nighttime construction lighting, if required, would not be needed on a continuous basis. There are no permanent residences in the vicinity of the site; and thus few, if any viewers would be subject to all of the construction-related visual effects. However, the visual effects of construction activities could be considered visually unappealing and adverse for dispersed recreational users, or particularly sensitive users of Wiley Well Rest Area.

To address these potential impacts, construction activities would be conducted in a manner that minimizes (visible) dust emissions, as described in Mitigation Measure AQ-SC3 and AQ-SC4. These measures would include limiting the speed of vehicles, surfacing construction access roads, and controlling wind erosion on soil stockpiles and exposed earth. When nighttime construction activities take place, illumination would be provided that meets state and Federal worker safety regulations. The nighttime construction lighting would be directed downward or toward the area to be illuminated and would incorporate fixture hooding/shielding, as described in Mitigation Measure VIS-2. Task-specific lighting would be used to the extent practical while complying with worker safety regulations. Disturbed areas that would not be needed during operation and maintenance of the GSEP would be revegetated according to Mitigation Measure BIO-24, as well as VIS-6. Mitigation Measure BIO-24 includes a performance standard that the coverage and species composition of the restored areas be the same as that which naturally occurs in the adjacent desert scrub or dune habitats. Further, Mitigation Measure VIS-6 requires that temporarily disturbed areas be recovered with soil, brush, rocks, and natural debris. This would reduce the contrast of temporarily disturbed areas until vegetative restoration is achieved.

In addition, laydown for construction of the proposed transmission line is proposed near the Wiley's Well Rest Area. Because of proximity to potential viewers, this laydown area could potentially be visually prominent, and represent an adverse effect on the visual quality of the rest area for the visitors to this facility over the period of transmission line construction. Although the visual impact would only be experienced temporarily while motorists stop at the rest area, due to the high number of potentially affected viewers, this could represent an adverse visual effect. In order to minimize these impacts, Mitigation Measure VIS-5 would include screening of the laydown area with earth berms, opaque fencing, and/or other measures to minimize visibility from within the main rest area. After completion of construction, the laydown area would be revegetated and restored in accordance with Mitigation Measure BIO-24 and VIS-6, as described above. With these recommended measures, visual impacts from the laydown area would be reduced to minor levels.

In summary, the generation of large quantities of airborne dust, nighttime construction lighting, and the use of the staging area near Wiley's Well Rest could result in temporary adverse visual impacts to motorists on I-10 and the rest area. Because the level of dispersed recreational use in the area is low, and the highway travelers would only be exposed to the adverse construction related effects briefly, the impact would be considered moderate. These impacts would be reduced with implementation of Mitigation Measures AQ-SC3, AQ-SC4, VIS-2, VIS-5, VIS-6 and BIO-24. These mitigation measures would reduce the visual impacts from airborne dust generation, nighttime construction lighting, and staging area disturbances to minor levels.

Operation-Phase Impacts

During the operation of the project, visual effects would be caused by the visible elements of the GSEP. The discussion below is divided between visual effects that are not captured by visual simulations (nighttime lighting, reflected sunlight/glare, and visible vapor plumes), and the visual contrast ratings of the project simulated in each KOP.

Light and Glare (all KOPs)

While the potential for glint or glare, as well as nighttime lighting, is a component of visual contrast, these issues are treated separately because the simulations used in the visual contrast rating process model the daytime visual change, and do not consider the effect of temporary glare. Analysis of potential light and glare impacts with regard to visual resources considers the following:

1. *Artificial sky glow*: The brightening of the night sky attributable to human-created sources of light.

2. *Glare*: Light that causes visual discomfort or disability or a loss of visual performance.

3. *Spill light*: Light from a lighting installation that falls outside of the boundaries of the property on which the installation is sited.

4. *Light trespass*: Spill light that because of quantitative, directional, or type of light causes annoyance, discomfort, or loss in visual performance and visibility.

5. *Glint*: Light that is reflected at an angle from a surface or light that gives off a reflection in brilliant flashes.

In the Project vicinity, the current nighttime views of the sky are of high quality. The only existing fixed light sources are found at the California State Prisons south of I-10 at the Wiley's Well Road Exit and at the Wiley's Well Rest Area. Lighting levels are high at the two state prisons and nighttime sky glow from the prisons can be seen for several miles along I-10. Lighting levels at the Wiley's Well Rest Area are low and constrained to the immediate area of the comfort station building and parking area. There are no interchange lights at any of the following I-10 interchanges in the Project vicinity: Corn Springs, Ford Dry Lake, or Wiley's Well. Other than these two fixed sources of nighttime light (California State Prisons and Wiley's Well Rest Area) there are no existing street lights or yard lights within the Project vicinity that produce fixed nighttime light sources. Transitory nighttime light and glare is produced by headlights from moving vehicles on I-10. Otherwise, the area is generally very dark after sunset.

Operational Lighting. GSEP operations would require onsite nighttime lighting for safety and security. The GSEP would be in an area with very few existing structures, and the use of uncontrolled or excessive lighting could be noticed by nearby motorists or users of the Wiley's Well Rest Area. The affected viewers would more likely be distracted by light sources from traffic on I-10, the rest area or the prison complex south of I-10, than the operational lighting needed for the GSEP. Nevertheless, as described in Mitigation Measure VIS-2, to reduce offsite lighting impacts, lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be hooded, and lights would be directed on site so that light or glare would be minimized. This would prevent facility lighting from being directed upwards such that the night sky would be affected. Low-pressure sodium lamps and fixtures of a non-glare type would be specified. Switched lighting would be provided for areas where continuous lighting would not be required for normal operation, safety, or security. The implementation of these measures would minimize the amount of lighting potentially visible off site. While these measures would not totally eliminate the light visible by surrounding user groups, facility lighting would be minimized and controlled such that it would not be a nuisance and would not detract from the ability for affected viewers to enjoy their surroundings.

Glare from Parabolic Mirrors. The large fields of parabolic mirrors could produce glint[4] and glare[5] at various times of the day. Potentially affected receptors would be travelers along I-10 and nearby local roads; users of the Wiley's Well Rest Area; and low numbers of dispersed recreational users in the vicinity. It is possible that the back reflected light or light not absorbed by both the envelope and steel annulus of the Heat Collecting Element (HCE) could produce glare, particularly when the viewer is positioned in line with the sun. This glare is more apparent as the viewer increases in distance and elevation relative to the GSEP. This glare could occur in any one place for several hours (e.g. a sunny afternoon) and would be similar in brightness and reflectivity as a water body or lake. At the time of moving into or out of stow position; the troughs also have the potential to produce glint, which is the product of spread reflection of the direct image of the sun. This glint would be much more intense than the glare produced by diffused reflections, but would be momentary, and limited to periods shortly after dusk and

[4] A flash of light, also known as a specular reflection, produced as a direct reflection of the sun in the parabolic mirror surface.
[5] A continuous source of excessive brightness, relative to ambient lighting, also known as diffused reflections.

shortly before dawn. During such periods, the bright spot would move as the observer changes position relative to the sun and mirror, with the result that the bright spot appears to “follow” the observer.

Figure 4.18-4 provides examples of solar trough spread glare from the Nevada Solar One and the Kramer Junction SEGS projects, which are smaller in scale than the proposed GSEP, but provides examples of spread reflections of the sun that could occur momentarily, as trough systems rotate from stow position to tracking position in the morning and the reverse in the evening. These photographs provide examples of glare that may occur at close viewing distances unlikely to be experienced by the public in the case of the GSEP. The closest part of I-10 to the GESP is just under three miles, and the level of glare apparent in the example photographs would likely be diminished in intensity than if viewed from up close, and would occupy a significantly smaller portion of the view.

While affected observers would not experience the glare effects of the solar arrays for extended periods, it would likely be more intense than any other glint or glare in the observer’s perspective. The GSEP would be visible to a motorist traveling along I-10 for approximately 20 miles (about 15-20 minutes at highway speeds). During most of this time, the site would be within background views, but would come within far middle-ground views briefly in the vicinity of KOP-1. Glint from the solar arrays could be distracting or nuisance-causing, even from locations relatively distant from the GSEP. Glare produced by diffuse reflections would increase the visual contrast of the GSEP in the landscape, but would not be quite as intense or distracting. Because the design and operation of the solar arrays is integral to generating power for the GSEP, the face of the parabolic mirrors cannot be color treated or dulled.

Several measures are available that would reduce the potential for and frequency of intense or distracting glare from the solar fields. Mitigation Measure VIS-4 would require slatted perimeter fencing around the perimeter of the site. Based on the relative difference in elevation between the GSEP and likely viewers along I-10 and at Wiley’s Well Rest Area, this measure would prevent bright spot reflections for the majority of affected viewers. Mitigation Measures VIS-1 and BLM-VIS-1 would ensure that reflective surfaces be painted or treated so long as it would not impair proper function of the equipment or structure. This would include treating the backs of parabolic mirrors with non-reflective paint compatible with surrounding landscape colors.

These mitigation measures would reduce bright spot reflection associated with moving in and out of stow position, as well as the extent of reflective surfaces within the solar fields. However, the mitigation measures cannot prevent or reduce spread reflection off the face of the parabolic mirrors when out of stow position, especially for dispersed recreational users in the surrounding mountains. The contribution of glint and glare will be considered in the contrast discussion of each KOP below.

Glare from Power Block Buildings, Administrative Buildings, and Transmission Lines. Potential glare from power block facilities and the high-voltage transmission lines would be less intense and distracting, and can be reduced by applying mitigation measure VIS-1, and BLM-VIS-1. This would require that transmission lines be finished with non-specular and non-reflective material, and the insulators to be non-reflective and non-refractive. Building and structure paints and finishes would be selected to blend with the landscape. These measures would prevent glare or reduce glare to minimal levels that would not be noticeable to potential viewers.

Visible Vapor Plumes

The GSEP would include cooling towers that could emit visible vapor plumes with potentially adverse visual affects for surrounding viewers. The two meteorological factors that are most significant in determining the potential for vapor plume formation are the ambient temperature and the relative humidity. Given the dry, desert location, relative humidity tends to be low and ambient temperature warm during the daytime hours. Consequently, any visible vapor plumes will tend to form during periods with lower temperatures and high humidity such as during periods of winter precipitation. Thus, it is expected that the visual impacts of vapor plumes from the Project will be limited and concentrated during periods of inclement weather when the ambient conditions already will likely be contributing to reduced visibility.

Visible plumes that occur during daylight hours have the potential for producing an impact on visual resources. The Project's cooling tower is a potential source of visible water vapor plumes. Based on a conservative analysis of potential visible vapor plumes from the wet cooling towers, it is estimated that visible water vapor plumes from the GSEP would occur during 10.75 percent of seasonal daylight clear hours. However, based on other analyses done on similar solar energy projects, the approximate facility size of over 1800 acres, and the location of the cooling tower in the power block in the center of the site, the daytime cooling tower plume length is not expected to extend beyond the site boundaries in any case. Thus, the contribution of vapor plumes to the visual contrast of the GSEP would be minor.

Visual Contrast Ratings

To analyze the visual contrast in the landscape created by the GSEP, the proposed action is simulated in photographs of the area for each of the KOPs described in Section 4.18.1. Figures 4.18-5 through 4.18-7 present both the existing and simulated conditions at each of the three KOPs. Further, Figure 4.18-8 presents an elevated simulation of the GSEP project, not as a KOP (since the perspective would not be experienced by common viewers), but as an example of how scale and dominance increase along with elevation differences and increased view angles. Conclusions on the visual contrast of the GSEP presented below do not take into consideration the nighttime contrast (lighting), which are discussed above, but do consider the contribution of glint and glare. Documentation of the visual contrast ratings (BLM Form 8400-4, Visual Contrast Rating Worksheet) is included in Appendix F.

KOP-1 – Ford Dry Lake Bridge Over I-10. KOP-1 represents the view from Ford Dry Lake Bridge over I-10, and represents the closest viewing distance from the highway to the project site (Figures 4.18-5A and 4.18-5B). Use of the local road is low, and views from I-10 itself would be comparatively less elevated. The GSEP is approximately 3.2 to 4.9 miles north of this camera position. The BLM uses a distance of 3-5 miles as a general rule of thumb for defining a foreground/middleground distance zone. However, the outer boundary of the foreground/

middleground zone is more precisely defined as the point where the texture and form of individual plants are no longer apparent in the landscape (BLM Manual H-8410-1). As seen in Figure 4.18-5B, in the context of the flat desert floor, the GSEP would be more appropriately characterized as being either on the outer fringe of the middleground zone, or in the background distance zone.

The distance and the low angle of view greatly diminish the dominance and scale of the GSEP in views of the landscape. This is due to perspective foreshortening, which reduces the apparent size of surfaces of areas or objects, when seen obliquely or at low viewing angles. Further, the line contrast created by the GSEP is moderate because it is nearly coincident with the flat horizon line of the valley floor or with the edge line created by the outer fringe of the Ford Dry Lake. From the vantage point in Figure 4.18-5B, the GSEP could appear as a distant lake, which would be out of character with the desert landscape, but would not necessarily detract from scenic quality. The form, texture, line and color of the solar fields are in weak contrast to the characteristic of the surrounding landforms and vegetation, due primarily to the narrow profile of the GSEP. The largest vertical element in the Project would be the administration building and warehouse (one building). Because of its size and relative position on the south side of the site, this building attracts some attention as seen from KOP-1. However, because this building would be painted a color sympathetic to the surrounding desert environment, as evaluated in the field with a BLM Color Chart (see Mitigation Measure VIS-1, AND BLM-VIS-1), the color contrast would be reduced, thereby also decreasing the contrast in form and line. The power block of Unit 1 is farther away from KOP-1 and does not attract attention.

The GSEP, as seen from KOP-1, would result in a weak visual contrast in form, texture, line and color. The dominant landscape composition is of a panoramic desert landscape punctuated by prominent mountains in the background. The GSEP does not significantly detract from this landscape composition due to the low angle of view, and would not attract the attention of the casual observer, except during times when the solar arrays generate substantial glint (bright spot reflection). The simulation for this KOP demonstrates a minor adverse affect on visual resources, and conformance with Interim VRM Class III Interim VRM objectives.

However, at times when the solar fields generate glint or glare, the GSEP would be a major focus of viewer attention, and would not conform to Interim VRM Class III objectives. Although the GSEP would be narrow, it would occupy a wide horizontal area in the landscape. Any glint from the GSEP would begin to dominate the general landscape character and would result in a momentarily strong visual contrast in the landscape. The visual contrast created by the GSEP shall be reduced by applying Mitigation Measures VIS-1, BLM-VIS-1, and VIS-4. These mitigation measures would reduce bright spot reflections and general glare effects through color treatment and installation of a slatted perimeter fence. The slatted perimeter fence would reduce bright spot reflections for motorists along I-10 in the vicinity of KOP-1, resulting in conformance with Interim VRM Class III objectives, even during times of glint and glare.

KOP-2 – Wiley’s Well Bridge Over I-10. KOP-2 represents the view on the bridge over I-10 at the Wiley’s Well Road Exit (Figures 4.18-6A and 4.18-6B). The affected viewers would be motorists on I-10, users of the Wiley’s Road Rest Area, and low numbers of motorists accessing the Mule Mountains LTVA via Wiley Well Road. The Project site is approximately 8.4 to 12.5 miles northwest of this camera position, making this a background viewing distance. The elevated camera position on the bridge provides a panoramic view of the flat desert plain that is constrained by the mountainous backdrop. Most viewing locations in the vicinity would be at lower elevations and thus this elevated viewpoint is where the project would be most exposed. It is likely that the GSEP would be even less visible from the rest area or interstate.

At this location, the analysis of visual contrast for the design elements of form, line, color, and texture is similar as described above for KOP-1. Only the viewing distance has increased further, and thus the general visibility of the project has decreased, as well as the apparent portion of the view affected. The elements of form, line, color, and texture of the existing natural landscape are not degraded by the Project. The administration building and warehouse is seen, but is barely visible in the simulation, thereby providing weak visual contrast. The Project would not create moderate or strong visual contrasts, but rather would create weak visual contrasts as seen from KOP-2. Thus, the simulation for this KOP demonstrates a minor adverse affect on visual resources, and conformance with Class III Interim VRM objectives.

However, at times when the solar fields generate glint, the GSEP would momentarily have a moderate visual contrast in the landscape. Even though the portion of view that the GSEP would occupy is narrow and in the background, it would begin to attract attention if glint is observed. A moderate visual contrast would still conform to Interim VRM Class III objectives. Mitigation Measures VIS-1, BLM-VIS-1, and VIS-4 would help reduce bright spot reflections and general glare effects through color treatment. However, from this distance and elevation, a slatted perimeter fence may not be able to shield possible momentary bright spot reflections. From this KOP, implementation of these mitigation measures would not appreciably reduce the visual contrast of the GSEP in the landscape, and the visual effect would be moderate during momentary periods of glint.

KOP-3 – Corn Springs BLM Road. KOP-3 represents the view on Corn Springs Road, south of I-10 (Figures 4.18-7A and 4.18-7B). The affected viewers would consist of low numbers of dispersed recreational users accessing a trailhead in the Chuckwalla Wilderness and the Corn Springs Campground. The Project site is approximately 9.0 to 14.25 miles east of this camera position, making this a background viewing distance. While low in number, these viewers would be fairly sensitive to changes in the landscape.

At this location, the analysis of visual contrast for the design elements of form, line, color, and texture is similar as described above for KOP-2, but the magnitude of contrast is further diminished by the decrease in the apparent size and scale of the GSEP within the scene. The elevated camera position on the fluvial plain at the lower slopes of the Chuckwalla Mountains provides a panoramic view of the flat desert plain that is only constrained by the mountainous backdrop of the Palen and McCoy Mountains. At this distance, the solar fields appear like a small water body or lake, and are visible but would not be noticed by casual observers of the landscape. Even viewers that are sensitive to changes in the landscape may notice the visual change, but are unlikely to find it visually distracting. From this KOP, the project would not attract attention and would be in conformance with Interim VRM Class III objectives (and would even meet VRM Class II objectives), thus resulting in a minor affect on visual resources.

However, at times when the solar fields generate glint, the GSEP would momentarily have a moderate visual contrast in the landscape. Even though the portion of view that the GSEP would occupy is small, it would begin to attract attention if glint is observed. A moderate visual contrast would still conform to Interim VRM Class III objectives. Mitigation Measures VIS-1, BLM-VIS-1, and VIS-4 would help reduce bright spot reflections and general glare effects through color treatment. However, from this distance and elevation, a slatted perimeter fence may not be able to shield possible momentary bright spot reflections. From this KOP, implementation of these mitigation measures would not appreciably reduce the visual contrast of the GSEP in the landscape, and the visual effect would be moderate during momentary periods of glint.

Elevated Views and Designated Wilderness. As discussed in Section 3.19, the Palen- McCoy Wilderness is immediately north of the GSEP, but the area with views of the project is seldom visited and features neither trails nor trailheads. Nevertheless, because the wilderness area is physically accessible, it may be visited on rare occasions by backcountry hikers. Due to the size and scale of the GSEP, any increase in elevation or angle of view substantially increases the prominence of the project within views of the valley floor, as demonstrated in Figure 4.18-8. The perspective is not intended to be a realistic view that would be experienced by the public, but to demonstrate the importance of elevation differences, distance, and angle of view in the prominence and apparent scale of the GSEP in the desert landscape.

This shows what may be intuitively obvious—that the rare recreational user in the mountains of the Palen-McCoy Wilderness is likely to observe a greater degree of visual contrast within the landscape compared to the views presented in KOPs 1 through 3 above. However, because of the low level of use, higher elevation areas of the Palen-McCoy Wilderness does not warrant establishment of a KOP. Further, while the visual contrast created by the GSEP in the landscape would be greater than viewpoints in the valley, the available views would be panoramic and unencumbered, resulting in a lesser ability for large-scale visual changes to dominate the scene. For these reasons, the GSEP is judged to have a moderate adverse impact on visual resources for the low number of dispersed recreational users in the Palen-McCoy Wilderness. Several mitigation strategies are available to aid in reducing the moderate adverse effects, including BLM-VIS-1 and VIS-1 through VIS-6, but they cannot feasibly eliminate the scale and contrast created by the GSEP with respect to the design elements of line, color and texture. For this reason the visual impact remains moderate for the rare visitors to the Palen-McCoy Wilderness, except when the GSEP generates glint or strong glare.

During periods glint or strong glare (most likely shortly after dusk and before dawn), the visual contrast would be strong, because the GSEP would attract attention and may potentially be distracting from scenic overlooks (e.g. ridges, mountaintops). This effect would temporarily cause non-compliance with Interim VRM Class III objectives. Mitigation Measures VIS-1, BLM-VIS-1, and VIS-4 would help reduce bright spot reflections and general glare effects through color treatment. However, from this distance and elevation, a slatted perimeter fence would not be able to shield possible momentary bright spot reflections. From elevated viewpoints in the wilderness, implementation of these mitigation measures would minimally reduce the visual contrast of the GSEP in the landscape, and the visual effect would remain strong during momentary periods of glint, and would still be in non-conformance with Interim VRM Class III objectives.

The Mule Mountains Wilderness, the Chuckwalla Wilderness, Little Chuckwalla Mountains Wilderness, and the Palo Verde Mountains Wilderness south of I-10 could also have views of the project site (see Figure 3.19-3). The level of dispersed recreational use of these mountains is higher due to the presence of the Coon Hollow, Wiley Well, and Corn Springs Campgrounds, as well as the Bradshaw Trail (see Section 4.12 – Impacts to Recreation). The nature of visual impacts would be similar as described above for the Palen-McCoy Wilderness, except that elevated views from these wilderness areas are located far enough away that the GSEP would have a weak contrast in views towards the Chuckwalla Valley and would represent an small and narrow portion of the view, if visible at all. During times of glint and glare, the visual contrast would be increased to moderate, but would still be in conformance with Class III objectives.

Transmission Lines. The GSEP includes a gen-tie line that would be routed in a southeasterly ROW eventually connecting to the Southern California Edison (SCE) 500-230 kV Colorado River substation via the existing Blythe Energy Project Transmission Line (BEPTL) between the Julian Hind and Buck substations. This transmission line would 75 feet high, and would be in close proximity to and cross I-10 in the vicinity of the Wiley Well Road interchange. As shown in Figure 3.19-2, the area surrounding the Wiley Road interchange with I-10 contains numerous cultural modifications, such as highway signs, existing transmission lines, and a utility tower. As such, the landscape character is currently characterized by a moderate amount of visual clutter that is visually discordant with the surrounding landscape.

While no KOP was prepared for the transmission line feature of the GSEP, Figure 4.18-9 presents a visual simulation for the Blythe Solar Power Project transmission line (taller, about 140 feet), located along I-10 approximately 9 miles to the east. The scenic quality rating unit as described in Section 3.19 is the same, although fewer cultural modifications are apparent in the simulation of the Blythe Solar Power Project transmission line. As evident in the simulation, the transmission line is would add industrial features with prominent vertical and curvilinear lines to the foreground landscape. Although the strong vertical lines of the steel poles would contrast with the prevailing horizontal lines of the mesa and the irregular ridgelines of the mountains beyond, nearby transmission line structures do exhibit similar linear characteristics, though at a smaller and less noticeable scale. The resulting visual contrast caused by these industrial characteristics and contrasting features would be moderate, because it would be only briefly experienced by motorists as the power line comes into foreground views along the highway.

The high voltage power line has a moderate contrast, and is quite prominent in the view, and thus may attract the attention of some highway travelers. However, because I-10 is a utility corridor, is paralleled by an existing transmission line, and contains scattered structures shown in Figure 3.19-2, it is unlikely that the casual observer would pay particular attention to the structure. Further, the foreground view of the transmission line in the highway setting would not significantly alter the character of the landscape. For these reasons, the GSEP transmission line, expected to be similar in appearance and setting as the simulation in Figure 4.18-9, would be in conformance with Class III objectives, which allows for moderate visual contrast.

However, because of the proximity to the highway and the large number of motorists that would be exposed to foreground views of the transmission line, Mitigation Measures VIS-1 and VIS 3 are proposed to help reduce the contrast created by the transmission poles. These mitigation measures would require the applicant to set back the transmission line at least 1/2 mile from Highway I-10. In addition, to reduce contrast and prominence of the transmission line, lattice-style transmission towers shall be utilized, and painted in non-reflective natural tones to blend with the visual background. Re-alignment of the transmission line shall be consistent with any cultural or biological constraints identified in the applicable portions of this DEIS. In the event of conflict, cultural or biological constraints shall prevail.

Decommissioning

The purpose of decommissioning is to remove GSEP-related structures and infrastructure so that affected lands could naturalize. However, until vegetative restoration is achieved as required in Mitigation Measure BIO-23 and BIO-24, adverse visual impacts would be similar to those described in the operation-phase impacts, because large areas would be devoid of desert scrub vegetation. Visual effects from the proposed transmission lines would be likely to remain, however, since it seems likely that, once in use, such lines would remain in use regardless of whether the energy they transfer is generated by the BSPP or another project. Because the solar fields would be dismantled, the effects of glint and glare would be eliminated, and thus the general visual contrast of the project area would range from weak to moderate depending on the viewpoint, resulting in conformance with Interim VRM Class III objectives even without mitigation. The impacts of decommissioning would be somewhat reduced in intensity, however, as compared to construction, because the contrast in color created by the power block structures and solar arrays would be removed. The contrast in the design elements of form and line would remain. Disturbed areas would be revegetated according to Mitigation Measure BIO-23, BIO-24, as well as VIS-6. Mitigation Measure BIO-24 includes a performance standard that the coverage and species composition of the restored areas be the same as that which naturally occurs in the adjacent desert scrub or dune habitats. Further, Mitigation Measure VIS-6 requires that temporarily disturbed areas be recovered with soil, brush, rocks, and natural debris. This would reduce the contrast of temporarily disturbed areas until vegetative restoration is achieved.

Alternatives

Reduced Acreage Alternative

The degree to which visual impacts are reduced due to the reduced acreage alternative depends on the viewing location. From I-10, as shown in the simulations for KOP 1 and 2 (Figures 4.18-5 and 4.18-6), the length of the middleground/background zone occupied by the GSEP would be reduced by up to half. This effect would be less apparent from KOP 2 because most of the visual changes in the view are due to power block 1, whereas, from KOP 1, the visual changes are equally due to power block 1 and power block 2. From the perspective of KOP-3, the effect would be minor because the project is so minimally visible. From elevated viewpoints, the area occupied by the GSEP would be reduced, thereby reducing the size and scale of the project; however, the degree of visual contrast created in the landscape, in terms of color, line and texture, would remain the same. Thus, the conclusions on visual contrast for the reduced acreage alternatives would generally be similar, albeit somewhat less intense than the proposed action.

Dry Cooling Alternative

The dry cooling alternative would contain a dry cooling tower for each power block that would exceed the height of any other building, and could be as high as 120 feet. Otherwise, the visual appearance of the project would remain similar as that analyzed under the proposed action. From viewpoints close to the GSEP, such as KOP-1, this increase in height may be noticeable, but further away as the GSEP becomes part of background views; the addition of a taller structure is unlikely to be noticed due to significant perspective foreshortening. From KOP-1 the dry cooling alternative would result in a minor increase in the visual contrast determined under the proposed action. It could slightly increase the contrast in form and line within the existing landscape. However, Mitigation Measure VIS-1 AND BLM-VIS-1 would equally be able to reduce the effect by painting the exterior with colors compatible with the landscape, which would reduce both color and line contrast. The conclusions on visual contrast for the dry cooling alternatives would generally be similar, albeit slightly greater in intensity than the proposed action.

No Action Alternative A

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, none of the construction- or operation-related visual resources impacts from the proposed action would occur.

No Project Alternative B

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the visual resources of the site would not be expected to change noticeably from existing conditions and, as such, No Project Alternative B would not result in visual resources impacts.

No Project Alternative C

Under No Project Alternative C, future solar energy development could be expected to affect visual resources to the same degree and extent as referenced in the proposed action. For example, if the acreage of the solar energy developed is 50 percent less than the proposed action, then impacts to visual resources would be 50 percent less intense. As discussed in the reduced acreage alternative, the degree of change in impact intensity would vary based on location and geometry chosen.

4.18.3 Discussion of Cumulative Impacts

Impacts resulting from construction, operation, maintenance and decommissioning of the GSEP could result in a cumulative effect on visual resources with other past, present, or reasonably foreseeable future actions. The geographic scope of the cumulative effects analysis for visual resources consists of the I-10 corridor (where visual impacts could be synergistic), and locations from which a viewer could see the proposed action along with views of other projects (where visual impacts could be additive). This geographic scope of cumulative impacts analysis was established based on the natural boundaries of the affected resource, i.e., potential shared viewsheds, and not on jurisdictional boundaries. Potential cumulative effects on visual resources could occur during the GSEP's proposed 39-month construction period (e.g., from cumulative construction disturbances), during the projected 30-40 year lifespan of the proposed action (e.g., project contrast with the landscape, glint and glare), or result from closure and decommissioning (e.g., until restoration efforts return the landscape to its original condition).

Existing conditions within the area of cumulative effects analysis reflect a combination of the natural condition and the effects of past actions and are described in FEIS Chapter 3. Direct and indirect effects of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. Among them, projects such as the Chuckwalla Valley Raceway, the Blythe, Rice, Palen and Desert Sunlight solar power projects are expected to result in synergistic visual impacts for travelers along I-10, as well as visual impacts to dispersed recreational users in the surrounding mountains.

Motorists on I-10

Visual changes as a result of other projects in the cumulative scenario would not be within the line of sight for travelers along I-10 viewing the GSEP. However, the combined effect of large-scale landscape alterations that would be visible along the length of I-10 within the CDCA Plan area could substantially degrade the visual character and the general scenic appeal of the landscape.

Numerous existing cultural modifications are visible from the I-10 corridor, including transmission lines, pipelines, 4-wheel drive tracks, and widely scattered facilities and structures; however, the general character is of an unimpaired, isolated desert landscape. The cumulative scenario includes many large-scale solar plants whose scale, potential glare, and pervasiveness would have adverse cumulative effects. If all the cumulative projects included in Section 4.1 were to be implemented (which is considered unlikely), they would convert about 123,592 acres along the I-10 corridor between roughly Desert Center and Blythe (approximately 50 miles) from an undeveloped desert viewshed to a more industrialized appearance (mostly with large solar array fields using both thermal and photovoltaic technologies).

In many cases, the apparent scale of the projects from motorists' perspective would be diminished greatly by favorable topographic relationships. The cumulative projects are at the same or similar elevation as the highway, and are reduced in prominence due to their distance from the highway and low angle of view. In many cases, the other projects in the cumulative scenario would blend in with the horizon line of the valley floor, and the rugged mountains would remain the dominant visual features in the landscape. In spite of this, because the landscape is currently undeveloped and valued by visitors for its isolated and unspoiled condition, the addition of numerous new large-scale solar projects would substantially degrade the scenic experience for many travelers along I-10, due to the projects' industrial character and visual contrast. Mitigation measures are available that reduce the color contrast of structures, or the line contrast of vegetation clearing; but the measures reduce the contrast of certain features of the projects at various distances. No mitigation measure is available that would be sufficient to address features of the project that result in the most contrast in the landscape: the large-scale, color, glare and reflectivity of the GSEP's solar fields. Thus, the cumulative scenario would present an *unavoidable and adverse* impact for travelers along I-10.

Dispersed Recreational Users in Surrounding Mountains

Dispersed recreational users in the Palen-McCoy Wilderness, and other mountains surrounding the GSEP—due to their elevated position and access to unencumbered, panoramic views of the valley below—could experience both additive and synergistic impacts in the cumulative scenario. The GSEP, along with other projects in the cumulative scenario, would not result in direct visual alteration to BLM wilderness areas; but the scale and contrast created by numerous renewable energy projects would greatly alter views of the valley floor experienced by wilderness users. Existing cultural modifications on the valley floor are largely limited to linear alignments (e.g., roads and transmission lines), or other structures that are diminished in importance due to the considerable distance from which they are viewed. However, the cumulative scenario presents numerous large-scale renewable energy projects that would be readily apparent to most wilderness users. The GSEP, in combination with other projects, would make the valleys surrounding the Palen-McCoy Mountains Wilderness appear increasingly industrialized, and could substantially diminish the remote and isolated character of the landscape. While use levels in the mountains and wilderness surrounding the GSEP are generally low, the remote and isolated character of the landscape is highly valued by its users, and likely represents the primary attraction. Large scale visual alterations to the valley floor would substantially impair the ability of a small, but highly sensitive viewer group to enjoy their surroundings.

Available mitigation measures could not feasibly reduce the scale and contrast created by the projects in the cumulative scenario, especially from elevated viewpoints. Thus, the cumulative scenario presents an unavoidable and adverse impact for dispersed recreational users in surrounding, higher-elevation wilderness areas.

Alternatives

Cumulative impacts would vary by alternative to the GSEP only to the degree to which direct and indirect impacts would vary by alternative.

4.18.4 Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following address impacts on visual resources.

VIS-1, BLM-VIS-1, VIS-2, VIS-3, VIS-4, VIS-5, VIS-6, AQ-SC3, AQ-SC4, BIO-24

In addition, the following mitigation measure would be imposed by the BLM to avoid or reduce impacts on the quality of the human environment. The following mitigation measures would avoid or minimize impacts on visual resources:

> **BLM-VIS-1:** The project owner shall paint power block structures and other vertical construction colors sympathetic to the surrounding desert environment, such as covert green. The appropriate color shall be evaluated and determined in the field using a BLM Color Chart. The backs of solar troughs shall also be color treated to minimize color contrasts.

4.18.5 Residual Impacts after Mitigation Measures were Implemented

Residual impacts of the GSEP after implementation of mitigation measures would come from effects on the size and scale of the project. While mitigation measures BLM-VIS-1, and VIS-1 through VIS-6 are helpful in reducing the level of contrast in form, line, color and texture for individual project features; the ability of these measures to reduce visual impacts decreases as the size and scale of the project in views increases. Thus, very few of the identified impacts are altogether eliminated through application of the proposed measures; however, the contrast in glare, color and texture would be substantially reduced from all of the KOPs, with application of BLM-VIS-1 and VIS-1. Further, the impact of lighting and reflected glare, while not eliminated, also would be reduced substantially by implementation of BLM-VIS-1, VIS-3 and VIS-4. However, as the angle of view increases, the size and scale of the GSEP solar arrays would become the dominant contrasting factor because the surface of the parabolic mirrors could not be treated or painted to blend in with the landscape.

4.18.6 Unavoidable Adverse Impacts

The GSEP would cause one long-term substantial adverse impact that cannot be mitigated: adverse cumulative impacts for travelers along I-10 and dispersed recreational users in the Palen-McCoy Wilderness and other surrounding mountains. When viewers experience glint or bright spot reflections, the impact would be temporarily adverse and unavoidable from KOPs 2 and 3, as well as the rare dispersed recreational user in the Palen-McCoy Mountains.

4.19 Impacts on Water Resources

4.19.1 Impact Assessment Methodology

This analysis is based on available information and data that has been provided in support of the Application for Certification (AFC), Supplement to the AFC, the Staff Assessment and Draft Environmental Impact Statement, and the Revised Staff Assessment, which were all prepared in support of the proposed action for compliance with state and federal regulations. Technical reports and studies associated with these documents were also reviewed and considered in the preparation of this analysis. The assessment methodology reviews potential direct and indirect impacts that could result from implementation of the proposed action, and reviews mitigation measures that would be applied in order to minimize potential impacts.

4.19.2 Discussion of Direct and Indirect Impacts

Construction and Operations

The GSEP has proposed to utilize underlying groundwater to supply GSEP water needs during construction. There is a concern that the water demand of the GSEP would exceed the groundwater basin budget and lead to overdraft conditions.

A comparison was made between the average annual basin budget with the anticipated GSEP water production requirements. **Table 4.19-1** presents the anticipated GSEP's water requirements along with the average annual basin budget for the 39-month construction period. Currently, the Chuckwalla Valley Groundwater Basin (CVGB) balance is positive by approximately 2,608 ac-ft/yr whereby inflow (approximately 13,719 ac-ft/yr) is slightly greater than estimated outflows (approximately 11,111 ac-ft/yr). Approximately 1,200 ac-ft/yr of the outflow is attributed to outflow to the adjacent Palo Verde Mesa Groundwater Basin (PVMGB) and the Colorado River System.

TABLE 4.19-1
ESTIMATED CHANGE TO CHUCKWALLA VALLEY GROUNDWATER BASIN BUDGET (AVERAGE YEAR CONDITIONS)

GSEP Component	Years	Annual Basin Budget Balance	GSEP Requirements (ac-ft/yr)	Net Budget Balance (ac-ft/yr)
Construction	1	2,608	1,368	1,240
	2	2,608	616	1,992
	3	2,608	616	1,992
Operations	4-33	2,608	1,644	964

It is anticipated that groundwater extraction during construction (~616 to 1,368 ac-ft/yr) and operation (~1,644 ac-ft/yr) would not impact the CVGB balance as the 1,368 ac-ft/yr during construction and the 1,644 ac-ft/yr during operations would not exceed the positive yearly balance of 2,608 ac-ft/yr.

The GSEP's pumping could also have an effect on the PVMGB by reducing or eliminating outflow to that basin or even inducing inflow from the Colorado River. Given the location of the GSEP and the anticipated annual GSEP water requirements, the GSEP would impact the PVMGB and the Colorado River Basin. We note that water use in the CVGB may be governed by the U.S Bureau of Reclamation (USBR), which could require the GSEP to acquire an allotment of water from the Colorado River, and/or require other actions to mitigate potential reductions to the Colorado River System. Herein, the Colorado River Basin is defined under the Colorado River Compact of 1922 (affirmed by 547 U.S. 150 [2006]) as, "…all of the drainage area of the Colorado River System," where the term "Colorado River System" is defined as the Colorado River and its tributaries. . Finally, tributaries to the Colorado River were defined as, "all stream systems the waters of which naturally drain into the mainstem of the Colorado River below Lee Ferry." For additional discussion of issues associated with the Colorado River, in regards to groundwater pumping and use by the GSEP, please refer to **Chapter 3.20**.

Water in the Colorado River Basin is fully appropriated. According to the Consolidated Decree of the Supreme Court of the United States in the case of *Arizona v. California, et al*. entered Match 27, 2006, (547 U.S. 150 (2006)), "Consumptive use from the mainstream within a State shall include all consumptive uses of water of the mainstream, including water drawn from the mainstream by underground pumping." The mainstream was indicated as "the mainstream of the Colorado River downstream from Lee Ferry within the United States, including the reservoirs thereon." The Supreme Court Decree went on to state that the State of California is enjoined "from diverting or purporting to authorize the diversion of water from the mainstream the diversion of which has not been authorized by the United States for use in the respective States; provided, however, that no party named in this Article and no other user of water in said States shall divert or purport to authorize the diversion of water from the mainstream the diversion of which has not been authorized by the United States for its particular use."

The U.S. Geological Survey has indicated that the CVGB lies within a basin tributary to the Colorado River and that wells drawing groundwater within those groundwater basins could be considered to be withdrawing water from the Colorado River Aquifer (Wilson et al., 1994). The USGS developed an accounting surface for determination of whether water was being drawn from the mainstream of the Colorado River. The accounting surface for the GSEP site ranged from 248 to 252 feet mean sea level (msl). Consequently, the GSEP has the potential to divert Colorado River water without any entitlement to the water, and all groundwater production at the site should be considered Colorado River water.

Groundwater Levels

The GSEP has the potential to lower groundwater levels as a result of water production during both construction and operation. The lowering of groundwater levels could have an impact if the lowering of the groundwater levels: 1) impacts existing water wells in the basin, 2) reduces outflow to the PVMGB and the Colorado River Basin, 3) lowers the water table in areas where deep-rooted phreatophytes are prevalent (see Section 4.17 for impacts related to biological resources), 4) affects surface water features including springs, and/or 5) induces permanent ground subsidence.

Drawdown imposed by a well on another nearby pumping well can have adverse affects on the performance of that well and is referred to as interference drawdown or well interference. Specific potential adverse affects evaluated in this study include the following:

- Interference drawdown can result in the water level of an aquifer being drawn down below the screen of the well (i.e., the well goes dry);
- Interference drawdown can result in the water level of an aquifer being drawn down to a point where the affected well's capacity to pump water is decreased and the well can no longer produce the amount of water that is needed for a particular use, or the well and related equipment is at risk of becoming damaged and unusable over time due to exposure of the well's screen above the water table and resulting aeration;
- Interference drawdown can result in the water level in the affected well being drawn down to near the intake of the well's pump, requiring lowering of the pump intake in order for the well to remain operational;
- Interference drawdown can cause a decrease in groundwater level or water table in the affected well such that the well and pump can continue to operate and produce adequate amounts of water, but pumping must occur at either greater frequency or duration, and/or water must be lifted to a greater height, resulting in greater operational and maintenance costs; and/or
- Water quality in the affected well may be reduced if interference drawdown removes a layer of higher-quality water that overlays lower-quality water.

The extent and type of well interference experienced by an affected well is dependent on hydrogeologic conditions in the aquifer as well as the characteristics of the affected well. These include the following:

- The amount of interference drawdown that is applied (which varies with the distance of the impacted well from the GSEP well(s);
- The depth and screened interval of the affected well;
- The thickness of saturated sediments penetrated by the affected well;
- Local variations in the transmissivity of the saturated sediments in which the affected well is completed, if any;
- The condition and efficiency of the affected well;
- The affected well's pump specifications, including its rating curve, the depth at which the pump intake is set, and the resulting pumping water level in the well during operation; and
- The minimum required water production rate of the well.

Phreatophyte trees such as mesquite, ironwood or palo verde have deep root systems that can extend tens of feet below the ground surface to the underlying water table. In addition, wet playas can harbor halophyte plant communities that depend on a shallow water table for their moisture. Lowering of the water table below the root depth of these plants could result in stress or death. There is additional discussion of this issue in the Impacts on Vegetation Resources sections (Sections 3.18 and 4.17).

Ground subsidence can occur as a result of water level decline in aquifer systems. When the fluid pressure in an aquifer is reduced as a result of changes in the groundwater level, a shift in the balance of support for the overlying materials causes the “skeleton” of the aquifer system to deform slightly. Reversible deformation occurs in all aquifer systems as a result of the cyclical rise and fall of groundwater levels associated with short and longer term climatic cycles. Permanent ground subsidence can occur when pore water pressures in the aquifer fall below their lowest historical point, and the particles in the aquifer skeleton are permanently rearranged and compressed. Soils particularly susceptible to such consolidation and subsidence include compressible clays in a confined or semi-confined aquifer system. This type of deformation is most prevalent when confined alluvial aquifer systems are overdrafted.

Construction and Operation

Preliminary investigations conducted at the GSEP site suggest that the aquifer proposed for development (the Bouse Formation) is under confined to semi-confined conditions and is separated in part from the shallow alluvial groundwater system by low permeability sediments. For purposes of analysis of impacts to water levels, a numerical model was developed by Worley-Parsons (WPAR, 2010) that separated the impacts between two water-bearing zones, the shallow alluvial zone (referred to as Layer 1), and the deeper Bouse Formation (referred to as Layer 11 and Layer 12). Correspondingly, impacts to these layers varied due to the assumption that the confining layers are laterally continuous and maintain hydraulic separation away from the proposed pumping wells. For additional discussion of relevant confining conditions, refer to Chapter 3.20, Water Resources. For additional detail regarding model parameters, assumptions, and modeling procedures, please refer to WPAR (2010).

The maximum predicted water table (Layer 1) drawdown associated with the GSEP is approximately 0.3 feet in the area of the pumping wells, and the area where drawdown exceeds 0.25 feet is limited to within approximately 2.5 to 3.5 miles of the GSEP wells (**Figure 4.19-1**) (WPAR, 2010). The maximum predicted drawdown in the Bouse Formation (Layer 12) associated with the GSEP is approximately 10 feet in the area of the pumping wells, and the area where drawdown exceeds 1 foot is limited to within approximately 7 to 10 miles of the GSEP wells (**Figure 4.19-2**). Recall that the Bouse formation is a confined to semi-confined aquifer. Changes in water table levels (e.g. in the upper aquifer) are shown in **Figure 4.19-1**.

Based on the general geology of the Chuckwalla Valley, the Riverside County General Plan Safety Element designates basin fill sediments in the valley as being susceptible to subsidence (Riverside County, 2008). . Although the applicant’s supposition that no subsidence would be caused by the GSEP is based upon historical response of the CVGB to groundwater level declines that took place in the western portion of the basin and may not be applicable beneath the GSEP located in the eastern portion of CVGB, the potential for subsidence associated with the pumping of groundwater for the GSEP is considered low, based on well drilling data and other data concerning aquifer sediment composition.

The nearest potential wetland or halophyte communities would be near Palen Lake. BLM has identified an ironwood woodland community approximately 5 miles north of the GSEP site.

Predicted water table drawdowns beneath this woodland are in the range of 0.05 to 0.2 feet. Section 4.17 describes potential impacts to vegetation that may be dependent on shallow groundwater table conditions.

Given the current understanding of the hydrogeology of the Quaternary Alluvium, the Bouse Formation and the fanglomerate, as well as the current understanding concerning existing wells that may be affected by GSEP-induced drawdown, it is unlikely that groundwater pumping for the GSEP would cause any nearby wells to go dry or be severely impaired or rendered unusable by declining groundwater levels.

Groundwater levels near the GSEP's water supply wells would decline during the GSEP pumping. While preliminary studies and calculations have been made to assess the potential for local impact, the quantification of the impact is an estimate and would not be able to be accurately quantified until actual long-term groundwater production occurs.

Groundwater Quality

There is a potential that groundwater quality impacts could occur during construction if contaminated or hazardous materials used during construction were to be released and migrate to the groundwater table. Given the proposed implementation of a hazardous material management plan during construction (Hazardous Materials Management section), no impact is expected.

There is a potential that GSEP extraction of groundwater may induce vertical flow of high saline groundwater from beneath Ford Dry Lake to lower aquifers being used for water production located beneath the site. Lateral transport of high TDS groundwater may occur as a result of the GSEP and the vertical transport of high saline groundwater downward may slightly increase TDS concentrations in some limited areas. Under State Water Resources Control Board (SWRCB) Resolution 88-63, the brackish water underlying the GSEP site that exceeds TDS concentrations of 3,000 mg/L or 250 mg/L chloride would not be considered a potential source of drinking water; and would be suitable only for potential industrial use.

The impact upon water quality due to GSEP pumping was completed by simulating transport of chloride in groundwater using the MT3D transport model. Groundwater velocity data output from the groundwater flow model impact assessment was utilized by the MT3D transport model for this assessment. Chloride was selected as the preferred solute, as it is conservative (e.g., does not undergo chemical reactions or attenuation) and is a dominant anion in groundwater in the GSEP area for which baseline analytical data is available for the lower aquifers being used for water production. In addition, chloride can be directly related to TDS concentration with a reasonable degree of accuracy. Chloride concentrations in groundwater in the eastern portion of the basin are approximately 38 percent of the TDS concentration. For additional details regarding modeling analysis, parameters, and assumptions, please refer to WPAR (2010a).

The water quality impact model was run for a period of 33 years to simulate the expected duration of GSEP operations, and the modeled concentrations of chloride in groundwater extracted from the well were recorded. Chloride in the model would migrate with the groundwater that is being extracted, and increases in chloride concentrations imply vertical or lateral migration of high chloride, and hence high TDS groundwater into lower concentration areas, thus potentially degrading water quality (WPAR, 2010a).

During the 33-year pumping simulation, chloride concentrations in the shallow aquifer are projected to decrease slightly, from a baseline concentration of approximately 1,600 mg/L to approximately 1,470 mg/L at the end of the simulation. This is a decrease of approximately 8 percent and is likely due to the dilution of groundwater in the GSEP area by lower TDS groundwater drawn in from the north and east of the GSEP site.

Implementation of the mitigation measures listed at the end of this section is expected to minimize impacts to groundwater quality to low levels.

With regard to the operation of the Land Treatment Unit (LTU) on the GSEP site, the material that would be placed in the LTU consists of soil that is impacted with Therminol® VP1 HTF as a result of minor leaks or spills (Hazardous Materials Management Section) that occur during the course of daily operational or maintenance activities. The LTU would cover an area of approximately 600 feet by 725 feet, including the staging area, and would cater to both 125 MW units. The LTU would be constructed with a prepared base consisting of two feet of compacted, low permeability, lime treated material and be surrounded on all sides by a minimum two foot high compacted earthen berm with slopes of approximately 3:1 (horizontal:vertical) that would serve as a protective barrier to the downward movement of contaminants from the LTU.

At ambient temperatures, HTF is a highly viscous material (crystallizes at ~54°F) that is virtually insoluble in water (solubility of ~25 mg/L [WPAR, 2009]). The LTU would be surrounded on all four sides by berms that would protect the LTU from surface water flow. Because of the viscous and insoluble nature of HTF, it is not likely to mobilize from the soil downwards to the water table (approximately 70-90 feet bgs), and any contaminants that may escape the LTU are not expected to impact surface water or groundwater quality beneath the site. Compliance with the requirements of CCR Title 23, Division 3, Chapter 15; Title 27, Section 2000 et seq.; Title 23, Section 2510 et seq.; and mitigation measure **WATER-6** would minimize potential impacts to groundwater quality to below the level of significance.

In summary, because of the viscosity of HTF at ambient temperatures, the insolubility of HTF, the presence of a low-permeability layer lining the LTU, the depth of the water table, and the placement of protective berms around the LTU, it is expected that surface water and groundwater quality beneath the site would not be impacted by LTU operation.

Each 125 MW unit would have three double-lined evaporation ponds. Each pond would have a nominal surface area of eight acres resulting in a total of 24 acres of evaporation ponds for each unit or a total of 48 acres of ponds for both 125 MW units. The ponds would be designed and permitted as Class II Surface Impoundments in accordance with CRBWQCB requirements, as well as the requirements of the California Integrated Waste Management Board (CIWMB). Multiple ponds are planned to allow plant operations to continue in the event that a pond needs to be taken out of service for some reason, *e.g.*, needed maintenance. Each pond would have enough surface area to allow the evaporation rate to exceed the cooling tower blowdown rate at maximum design conditions and annual average conditions.

The average pond depth would be eight feet, and residual precipitated solids would be removed approximately every seven years to maintain a solids-depth no greater than approximately three feet for operational and safety purposes. The precipitated solids would be sampled and analyzed to meet the characterization requirements of the receiving disposal facility. The characteristics of the precipitated solids would determine the transportation and disposal methodology. It is anticipated the pond solids and other non-hazardous wastes would be classified as Class II Designated Waste, a non-hazardous industrial waste, and thus could be shipped to a standard landfill for disposal. Genesis Solar, LLC would test the pond solids using appropriate test methods in advance of removal from the evaporation ponds to confirm this determination; however, preliminary data estimates show the material would be non-hazardous. Should pond residue be determined to be hazardous, it would be shipped to an appropriately certified landfill for disposal. Approximately 6,150 tons of evaporative residue would be accumulated yearly, which equates to approximately 50,000 tons of evaporative residue being removed during each cleanout and a total estimated amount of 214,500 tons over 30 years.

The pond liner system would consist of a 60 mil high density polyethylene (HDPE) primary liner and a secondary 40 mil HDPE liner. Between the liners would be a synthetic drainage geonet and collection piping to be used as part of the leachate collection and removal system (LCRS), which would be directed back to the pond. There would be a hard surface protective layer on top of the 60 mil HPDE which would consist of a non-woven geotextile, a one foot thick granular fill/free draining material, and a one foot thick hard surface such as roller-compacted concrete. The hard surface provides protection against accidental damage to the HDPE from falling objects, varying climatic conditions, and worker activities during cleanout and maintenance. Monitoring of the evaporation ponds would be required to detect the presence of liquid and/or constituents of concern. Based on the experience of the existing SEGS plants, it is expected the constituents of concern for this monitoring would include chloride, sodium, sulfate, TDS, biphenyl, diphenyl oxide, potassium, selenium, and phosphate. Due to the aforementioned construction and operational procedures of the surface impoundments along with mitigation measure **WATER-20**, groundwater quality is not anticipated to be affected as a result of disposal of this waste stream and impacts to groundwater quality would be below the level of significance. The ponds would be covered by netting, designed to exclude birds and other wildlife from drinking, foraging or landing on the water of the ponds.

Additional requirements for mitigation of potential groundwater quality impacts would also be included as a part of the waste discharge requirements for the surface impoundment that would be included in mitigation measure **WATER-6.**

The use and application of septic fields is an established practice as a method of wastewater treatment. The closest septic field to a privately owned parcel of land is in excess of ½ mile. The septic system would have no effect on the surface water in or around the GSEP site. The septic system would be installed approximately 5-6 feet deep. In addition, the Riverside County Department of Environmental Health has a Technical Guidance manual for Onsite Wastewater

Treatment Systems and this requires a setback of 100 feet between this type of system and the nearest groundwater well.

It is assumed that individual septic systems and leach fields are planned for each of the two power blocks in support of the GSEP's administrative, warehouse, and control room and facilities. The proposed septic systems and leach fields for the various facilities are hydraulically up-gradient approximately 3 miles from the nearest offsite well. Therefore, operation of the septic systems and leach fields from these areas is not expected to impact groundwater quality at the nearest offsite wells.

The septic system and leach fields for the GSEP would be constructed in accordance with the requirements of Riverside County:

1. Ordinance 650.5 (amending Ordinance 650, which regulates the discharge of sewage in unincorporated areas of the County of Riverside and incorporates by reference Ordinance 725),
2. Title 15 Section 15.24.010 (the Uniform Plumbing Code) Appendix K for Private Sewage Disposal – General and Disposal Fields, and
3. Title 8 Section 8.124.030 (Approval and Construction Permit for Sewage Discharge) and Section 8.124.050 (Operation Permit for Sewage Disposal).

Table 4.19-2 lists septic system and leach field minimum setbacks as required by the County of Riverside and the GSEP setbacks for the GSEP site.

TABLE 4.19-2
SANITARY FACILITY SET-BACKS REQUIREMENTS

County of Riverside Requirement	Minimum Set Back	GSEP Set Back	Reference
Minimum Distance Between Groundwater and Leach Lines	5 feet	175 feet	Riverside County Ordinance 650.5 (& OWTS Guidance Manual)
Minimum Horizontal Distance From Water Supply Wells	50 feet	250 feet	2007 California Plumbing Code (adopted by Reference as Riverside County Title 15, Chapter 15)

SOURCE: CEC, RSA (June 2010) Soil and Water Table 18.

Groundwater quality in the vicinity of the GSEP site could be impacted as a result of the operation of the LTU, surface impoundments and septic fields. Preliminary studies and calculations have been made to assess the potential for impact. These studies suggest that there is a low potential to impact groundwater quality in the vicinity of the GSEP site.

Implementation mitigation measures**WATER-5** through**WATER-7** and **WATER-20** are anticipated to minimize impacts below a level of significance. Additional requirements for mitigation of potential groundwater quality impacts would also be included as a part of the waste discharge requirements for the LTU and surface impoundment that would be included in **WATER-6.**

Surface Water Hydrology

The impacts of the GSEP on the local surface water hydrology are directly related to proposed onsite grading and the construction and operation of a network of engineered collector/conveyance channels designed for the purpose of protecting the GSEP from flooding. The GSEP would change both the extent and physical characteristics of the existing floodplain within the GSEP site and downstream of the GSEP site. A change in sediment transport and depositional characteristics at and downstream of the GSEP site would also occur.

The Concept Drainage Study (GSEP 2009a) provides a summary of discharges at the downstream property boundary which compares existing total outflow at the GSEP boundary with post-development outflows at the GSEP boundary. The post-development discharges from the GSEP site watersheds would be higher than existing conditions as shown on **Table 4.19-3.** This is to be expected given the change to surface conditions, including soil compaction and a more efficient drainage system. The study indicates that the increase in discharge is to be mitigated by the use of detention basins and spreading fields located at each of the solar fields. These basins would be sized and designed to operate in a manner as to reduce the post-development discharges to pre-development conditions.

TABLE 4.19-3
SUMMARY OF EXISTING AND PROPOSED PEAK FLOW RATES AT DOWNSTREAM GSEP BOUNDARY

Sub-basin ID	Existing Q_{100}	Developed Q_{100}
1	4070	1156
2	2203	4086
3	10,022	2006
A (onsite)	519	1295
B (onsite)	419	1127

SOURCE: CEC, RSA (June 2010) Soil and Water Table 19.

The use of detention basins can be of concern as they tend to allow for the deposition of sediment, leaving the discharged flow in a sediment deficient condition. This situation can favor downstream erosion as the more concentrated flows balance their sediment load. The Conceptual Grading Plans (GSEP 2010a) for the GSEP do provide for erosion control downstream of the outlet in the form of an engineered energy dissipater and downstream riprap splashpad comprised of 6” rock. The proposed splashpad is not compatible with the wildlife traversability requirements for the GSEP and the design would need to be modified during the formal construction plan process. The velocity and depth of flow off of the energy dissipater structure would need to be reviewed within the context of allowable non-erosive velocities based on site specific soil conditions.

Engineered drainage channels would be constructed along the GSEP boundary wherever the potential for the interception of offsite surface flows exists. These channels would intercept offsite flows and convey them around and through the GSEP site for discharge along the southern GSEP boundary. Onsite flows would be discharged directly into detention basins via a series of smaller internal swales and channels. The conceptual layout of the drainage system is provided on **Figure 4.19-3** as well as on Sheets 1 through 7 of the Conceptual Grading Plans (GSEP 2010a). Discharge of flow along the downstream GSEP boundary would be through the use of flow dispersion structures in the form of pipes and weirs. The intent of these structures is to reduce flow velocities and allow flow to be released/spread out in a manner that mimics existing sheet flow conditions downstream of the GSEP.

Releasing flow back to native ground in a manner similar to existing conditions is of concern for two primary reasons. The first is that flow collected from a large area and discharged in a more concentrated area may result in the potential for increased erosion. The second potential concern is that the change in flow patterns may essentially "dry-up" discreet areas downstream of the GSEP, potentially resulting in an impact to the existing biological resources beyond the GSEP boundary. This issue is discussed further in Section 4.17.

Alteration of Drainage Patterns

Onsite Drainage

All existing washes and floodplains within the GSEP boundary would be completely eliminated by the grading of approximately 1,800 acres to provide the flat, uniform and vegetation-free topography required for the construction and operation of the solar mirror array. The existing natural drainage system would be replaced with a system of constructed swales and channels designed to collect and convey onsite flows to designated points of discharge from the GSEP. Onsite stormwater from the GSEP would be discharged offsite through constructed detention basins which would provide for attenuation of increased discharges due to site development.

Offsite Drainage

The GSEP would not impact the existing natural drainage system upstream of the GSEP boundary as there are no plans for any diversions, basins, dams or other surface water controls beyond the upstream limits of the GSEP. However, there is the potential for erosion of offsite areas upstream due to the formation of headcuts which could migrate laterally from the engineered channels if they are not stabilized and protected.

Physical modifications to the natural drainage system downstream of the GSEP boundary are not proposed. However, there would be changes to both the existing drainage patterns and sediment transport characteristics as the result of the concentration and diversion of flows upstream of the GSEP, and the subsequent release of those flows at discreet locations on the downstream side of the GSEP. Certain downstream areas would receive more flow than under existing conditions, while other areas may no longer receive any surface flow beyond what may be the result of direct precipitation. The release of concentrated flows at the proposed dispersion structures may have the potential for increased erosion.

The assessment of the impacts to the existing surface flow patterns requires a detailed analysis utilizing FLO-2D or a similar model to clearly delineate the pre- and post-GSEP conditions. Information obtained from such an analysis is critical to assess the extent and adequacy of the proposed flood control measures on the northern eastern GSEP boundaries as well as along the downstream GSEP boundary where flow is released from the engineered channels onto existing ground. The applicant completed FLO-2D modeling for existing conditions and provided the results of that analysis in a Technical Memorandum. The modeling confirmed extensive sheet flow conditions along the entire upstream GSEP boundary. The applicant also provided preliminary FLO-2D modeling for proposed conditions to demonstrate how flow would be released from the downstream GSEP boundary back onto native ground. A conceptual diagram showing flow patterns downstream of the GSEP site is provided on **Figure 4.19-4.** The design for the outlet structures from the downstream engineered channel would allow for flexibility for where flow is released and how much is released at discreet locations.

Implementation of mitigation measures**WATER-10** and**WATER-11** is anticipated to minimize impacts related to surface drainage associated with construction and operation of the GSEP to below the level of significance.

Flood Hazards

Construction

The GSEP would be protected from flooding from offsite sources through the construction of engineered channels along upstream GSEP boundaries. These channels would capture and convey up to the 100-year flow through and around the GSEP and discharge it along the southern GSEP boundary. The Concept Drainage Study (GSEP 2009a) and Conceptual Grading Plans (GSEP 2010a) for the GSEP provide information on the layout and geometry of the proposed channels as well as the design discharges for each reach. Cross-sections for each channel were also provided which show how the channels would tie into existing grade and into the proposed facility. Given the extremely flat nature of the site, there do not appear to be any major grading related issues that would favor erosion, such as large cut slopes to accommodate a terraced GSEP design. Channel profiles and flow analyses to determine flow depth and velocity were not provided in support of this impact analysis.

A summary of the proposed channel geometry and hydraulic characteristics as provided in the Concept Drainage Study (GSEP 2009a) and Conceptual Grading Plans (GSEP 2010a) is provided in **Table 4.19-4**. Hydraulic data were not provided for the 10-year flow, which is usually used to demonstrate reasonable channel velocities. However, the 100-year hydraulic data does indicate that most channel reaches do meet, or likely meet, established and reasonable guidelines for allowable channel velocities. Special consideration would need to be given in those sections that do not meet these guidelines for the 10-year flow event.

The Conceptual Grading Plan provided in the DESCP (GSEP 2009a) provides typical channel sections for the proposed collector and conveyance channels. These details show fully armored slopes utilizing gabions or riprap. These materials are not consistent with GSEP requirements for traversability by wildlife and should not be utilized. Soil cement is the preferred method of channel stabilization. The typical sections in the Conceptual Grading Plan (GSEP 2009a) show 3:1 slopes are predominant for the larger channels. Experience has shown that anything steeper than approximately a 4:1 slope is impractical for a “slope paving” type of construction. At steeper slopes, the soil cement is difficult to place and compact within industry accepted specifications, especially in channels which are more than a few feet deep. The other option is to construct the soil cement in lifts, which would increase material quantities and most likely construction time.

TABLE 4.19-4
SUMMARY OF PROPOSED COLLECTOR AND CONVEYANCE CHANNEL HYDRAULIC CHARACTERISTICS

Channel ID	Design Discharge (cfs)	Approximate Length (ft)	Bottom Width (ft)	Channel Depth (ft)	Side Slopes (H:V)	100-Year Velocity Range (ft/s)
A	1,156	7,500	20’-43’	3’ to 4’	3:1	4.5 to 5.1
B	4,086	8,000	31’-150’	3’ to 4’	3:1	5.6 to 9.6
C	2,006	3,800	20’ to 45’	3’ to 4’	3:1	3.0 to 3.7
B/C	6,092	5,000	150’ to 156’	4’ to 5’	3:1	5.7 to 7.2
D	2,600	7,500	24’ to 91’	3’ to 6’	3:1	5.5 to 9.6
E	254	1,300	20’	3’	3:1	3.2 to 8.6
D/E	2,854	3,500	95’	5’	3:1	5.7

SOURCE: CEC, RSA (June 2010) Soil and Water Table 20.

Operation

During operation, the proposed collector and conveyance channels along the northern and eastern GSEP boundaries would be exposed to incoming flows along most of their extent. These inflows could include concentrated runoff at the more defined drainages, shallow sheet flow, and smaller more localized flows. All of these elements have the ability to cause erosion of unprotected channel banks and berms as well as to create headcutting which would extend roughly perpendicular from the outer channel bank into the adjacent floodplain. These headcut features have the potential to achieve the same depth as the main collector channel and can extend upstream for several hundred feet over time due to numerous smaller flow events, or can occur very quickly from a single large event depending on the magnitude of flow at a given location. Impacts to areas beyond the GSEP boundaries can occur due to these erosional features. Appropriate bank stabilization measures must be implemented to ensure that headcutting is prevented at all locations where flow enters the engineered channels.

Operation of the proposed channels and erosion mitigation measures would require inspection and maintenance over the life of the facility to ensure that the channels are operating as intended and that potential and observed erosion issues are addressed promptly to minimize damage to the facility and areas beyond the GSEP boundary. Relatively small problems and erosional features which develop during smaller and more frequent events can become the focal point for problems during larger events. The applicant has prepared a Draft Channel Maintenance Plan which addresses some of the potential issues associated with long term operation of the channels.

However, the plan does not adequately address the issue of the collection of offsite flows or the use of soil cement along areas subject to inflows from offsite watersheds, and updates to the plan are included as required mitigation.

Channel Maintenance Program

The main goals of the Channel Maintenance Program would be to maintain the diversion channels to meet its original design to provide flood protection, protect offsite areas form erosion, support GSEP mitigation, protect wildlife habitat and movement/migration, and maintain groundwater recharge. Compliance mitigation measure **WATER-13** would reduce the impacts below the level of significance.

Surface Water Quality

GSEP storm water may encounter soil or chemicals deleterious to aquatic and terrestrial plant and wildlife. The GSEP Applicant proposes to implement BMPs for managing potentially harmful storm water and protect water quality. Potential water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. Although the GSEP would alter natural storm water drainages, it would use BMPs to reduce potential impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. Recognizing these potential impacts, the applicant has prepared a draft industrial SWPPP required by the general waste discharge requirements for industrial activity.

Construction

Potential threats to surface water quality related to construction on the GSEP site as well as linear features would include: potential increases in sediment loads to adjacent streams and washes; and accidental spills of hydrocarbon fuels and greases associated with construction equipment as well as HTF or other fluids transported to and stored onsite during construction.

Operation

Potential threats to surface water quality related to operations include: potential increases in sediment loads to adjacent washes; accidental spills of hydrocarbon fuels and greases (including HTF fluid) associated with operations equipment, and accidental releases from the HTF treatment area and the surface impoundments, including wastewater from the pre-treatment and RO procedures.

Implementation of mitigation measures **WATER-1**, **WATER-2**, **WATER-12**, and **WATER-13** is anticipated to reduce impacts to surface water quality to below the level of significance. Additional requirements for mitigation of potential surface water quality impacts would also be included as a part of the waste discharge requirements for the LTU and surface impoundment that would be included in mitigation measure **WATER-6.**

Alternatives

Reduced Acreage Alternative

This alternative is located entirely within the boundaries of the proposed GSEP. It simply eliminates effects to the eastern 125 MW solar field and relocates the gas yard approximately 1.75 miles northwest of its present location. As a result, the environmental setting consists of the western portion of the proposed GSEP, as well as the area affected by the linear GSEP components.

Groundwater Basin Balance

Groundwater basin balance in the vicinity of the Reduced Acreage Alternative site could be impacted as a result of the construction and operational water use. The potential impact would be approximately 50 percent less than the proposed GSEP as the Reduced Acreage Alternative uses approximately 50 percent less water than the proposed GSEP.

As previously stated, the GSEP has the potential to indirectly impact flow in the Colorado River by inducing underflow into the PVMGB and the Colorado River Basin. Implementation of the mitigation measure**WATER-15** specified in is anticipated to reduce the potential for impacts from water drawn from the Colorado River through groundwater pumping to be low.

Groundwater Levels

Groundwater levels could be impacted as a result of construction and operational water use. The potential impact is expected to be approximately 50 percent less than the proposed GSEP as the Reduced Acreage Alternative would use approximately 50 percent less water than the proposed GSEP.

Groundwater levels near the GSEP's water supply wells would decline during the GSEP pumping. Local decline of groundwater levels within the cone of depression could affect nearby wells. While preliminary studies and calculations have been made to assess the potential for impact, the quantification of the impact is considered an estimate and cannot be accurately quantified until actual long-term groundwater production occurs. In spite of this, implementation of mitigation measures **WATER-3** through **WATER-5** is expected to minimize impacts to groundwater levels.

The applicant would be required to implement mitigation measure**WATER-17** that requires a Subsidence Monitoring and Action Plan to assess and mitigate potential effects of non-elastic subsidence associated with groundwater extraction in the vicinity of the proposed production wells.

Mitigation for potential impacts to groundwater-dependent vegetation is discussed in Section 4.17.

Groundwater Quality

Groundwater quality could be impacted as a result of the operation of the LTU, surface impoundments, and septic fields. The potential impact would be similar to that of the proposed

GSEP. Implementation of mitigation measures**WATER-5** through **WATER-7** and **WATER-20** is expected to minimize impacts to groundwater levels below the level of significance.

Surface Water Hydrology and Drainage

The impacts and mitigation measures would be similar to the proposed GSEP, except proportionately smaller in scale with regards to overall natural area lost to mass grading. All existing washes within the smaller developed portion of the site would be eliminated by onsite grading and replaced with a system of engineered swales and channels. Mitigation of potential erosion and headcutting in the engineered channels would still be required as would a careful design along the downstream GSEP boundary to ensure the diverted flows are released in a manner which does not increase offsite erosion. However, the overall volume of offsite flow that would need to be collected and conveyed around the GSEP would be less due to the reduced footprint, and impacts to the floodplain downstream would also be proportionately reduced.

Surface Water Quality

Surface water quality could be impacted as a result of surface grading. In addition, potential water quality impacts could occur during construction or operations if contaminated or hazardous materials were to contact storm water and drain offsite. Moreover, the GSEP would alter natural storm water drainages and would impact surface water quality downslope. The potential impacts from these sources would be reduced by roughly half in this alternative as compared to the Proposed Action.

Dry Cooling Alternative

In this alternative, approximately 18 fans would be required for each ACC for the two solar fields. The 18 fans would operate when the ambient temperature is above 50 degrees Fahrenheit. When the temperature is below 50 degrees Fahrenheit, only 10 of the fans would be used (GSEP 2009f). The ACC described in the GSEP cooling study would have a length of approximately 279 feet, a width of approximately 127 feet, and a height of 98 feet (GSEP 2009f). However, based on the ACC preliminary designs for nearby solar thermal projects in similar ambient temperatures, an additional 11,690 square feet could be required for siting of the ACCs up to 120 feet in height. In addition to the ACC and fans, NextEra would use a small Wet Surface Air Cooler when needed to provide auxiliary cooling during extremely hot days (GSEP 2009f). This alternative is analyzed because it would reduce the amount of water required for steam turbine cooling from 1,600 acre-feet per year (ac-ft/yr) to 202 ac-ft/yr for the two 125-MW power plants combined. This reduction in water use would reduce impacts to water and biological resources.

This alternative is located entirely within the boundaries of the proposed GSEP. It simply eliminates the use of wet-cooling towers and incorporates the use of air-cooled condensers (ACC) in the same location. As a result, the environmental setting would be the same as for the proposed GSEP.

Wet-cooling maximizes power plant fuel efficiency by providing a continuous source of effective cooling for the plant’s steam condensers. Dry cooling would typically provide less effective cooling of the condensers, reducing the efficiency of the steam cycle portion of the power plant, and increasing operational electrical demand from 10% to 12% of STG output.

The FSA for the Beacon Solar Energy Project (08-AFC-2; BSEP 2009) showed that annual average fuel efficiency would be reduced 5-7 percent compared to a wet cooling system. The GSEP applicant stated that use of dry cooling would result in a 7.4 percent decrease in total annual net MWh compared with a wet cooling system (GSEP 2009a).

Groundwater Levels and Basin Balance

The Dry Cooling Alternative would reduce operational use of water from 800 ac-ft/yr to approximately 101 ac-ft/yr per 125 MW power block (NextEra 2010). The Dry Cooling Alternative would include a Wet Surface Air Cooler (WSAC) to provide auxiliary cooling during extremely hot days.

A minimum of two groundwater supply wells would be utilized. The Project well field would include a sufficient number of standby wells to provide the Project with water in the event the primary wells are shut down for maintenance. As currently planned, the wells would pump groundwater from the Bouse Formation within the CVGB and would be screened approximately between 800 to 1,200 feet below ground surface. Based on investigations performed for the project, water quality is expected to be brackish and near 3,000 parts per million total dissolved solids (TDS).

The Bouse Formation and fanglomerate are apparently confined aquifers, so drawdown impacts realized when pumping from these formations would be spread out over a greater distance than in an unconfined aquifer, and impacts to the overlying water table would be similarly diffused. Impacts from pumping groundwater from the Bouse Formation as a source of water supply were investigated and determined to be minor.

A comparison was made between the average annual basin budget balance with the anticipated GSEP water production requirements in this alternative and the Proposed Action. **Table 4.19-5** presents the anticipated GSEP's water requirements along with the average annual basin budget balance for the 37-month construction period. Currently, the CVGB balance is positive by approximately 2,608 ac-ft/yr whereby inflow (approximately 13,719 ac-ft/yr) to the basin is slightly greater than estimated outflows (approximately 11,111 ac-ft/yr) to the basin. Approximately 1,200 ac-ft/yr is attributed to subsurface outflow to the adjacent PVMGB and the Colorado River.

It is anticipated that groundwater extraction during construction (~616 to 1,368 ac-ft/yr) and operation (~202 ac-ft/yr) would not impact the CVGB balance as the 1,368 ac-ft/yr during construction and the 202 ac-ft/yr for power plant operation plus an additional 16 ac-ft/yr for potable use during operations would not exceed the positive yearly balance of 2,608 ac-ft/yr.

Construction and operation of the GSEP would have an impact on basin balance in the CVGB. The GSEP's pumping could also have an effect on the adjacent PVMGB by reducing or eliminating outflow to the PVMGB or even inducing inflow from the Colorado River into the PVMGB. Given the location of the GSEP, the anticipated annual GSEP water requirements, the GSEP could impact the PVMGB.

TABLE 4.19-5
ESTIMATED CHANGE TO CHUCKWALLA VALLEY GROUNDWATER BASIN BUDGET (AVERAGE YEAR CONDITIONS)

GSEP Component	Years	Annual Basin Budget Balance (ac-ft/yr)	GSEP Requirements (ac-ft/yr)	Net Budget Balance (ac-ft/yr)
Construction	1	2,608	1,368	1,240
	2	2,608	616	1,992
	3	2,608	616	1,992
Operations	4-33	2,608	218	2,390

NOTE: Operations includes water for WSAC cooling make-up, process water make-up, and other industrial uses such as mirror washing; this water would be supplied from on-site groundwater wells, which would also be used to supply water for employee use (*e.g.,* drinking, showers, sinks, and toilets).

The Applicant did not provide an analysis of the proportion of water originating from storage, from natural recharge, and/or underflow from the Colorado River. However, as previously stated, water in the Colorado River is fully appropriated and the Colorado River would be an impacted. The U.S. Geological Survey has indicated that the PVMGB and the CVGB lie within a basin tributary to the Colorado River and that wells drawing groundwater could be considered to be withdrawing water from the Colorado River Aquifer (Wilson et al., 1994). Consequently, the GSEP has the potential to divert Colorado River water without any entitlement to the water, and all groundwater production at the site would be considered Colorado River water.

The GSEP Applicant could choose to implement mitigation measure **WATER-19** to conduct a refined analysis of the quantity of water contributed by the Colorado River from GSEP groundwater extraction. This analysis may also be used to estimate the volume of water that must be replaced**.**

We note that future water use in the CVGB may be governed by impending regulations being formulated by the USBR. These are discussed in the section addressing LORS, below. Waste discharge to the evaporation ponds using the ACC is approximately 50 percent of the wet cooling option (92 gpm compared with the annual average of 182 gpm for the proposed GSEP using wet-cooling). As such, the Applicant estimates that approximately one 5-acre evaporation pond would be required for each 125 MW power block (GSEP 2009f). It is expected that residual precipitated solids would be removed from ponds approximately every twenty years to maintain a solids depth no greater than approximately three feet for operational and safety purposes. Approximately 400 tons of evaporative residue would be accumulated yearly, which equates to approximately 8,000 tons of evaporative residue being removed during the cleanout at year 20 and a total estimate of 12,000 tons over 30 years.

Other Potential Hydrologic Resource Impact Categories

Other potential hydrologic resource impact categories, including groundwater quality, surface water hydrology and drainage, and surface water quality, would be similar to those impacts described for the proposed GSEP. As discussed previously, the overall footprint of the facility would remain the same and other infrastructure would be the same, as compared to the proposed GSEP.

No Action Alternative A:

Under this alternative, the proposed GSEP would not be approved by the BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, the impacts to water resources from the construction and operation of the proposed GSEP would not occur. However, the land on which the GSEP is proposed would remain available to other uses that are consistent with BLM's land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and federal mandates, and those projects would have similar impacts in other locations.

No Project Alternative B:

Under this alternative, the proposed GSEP would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the GSEP site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, impacts to water resources would result from the construction and operation of the solar technology and resulting ground disturbance and would likely be similar to the impacts to water resources from the proposed GSEP, including water quality impacts and impacts to jurisdictional waters. Different solar technologies require different amounts of grading; however, it is expected that all solar technologies would require grading and maintenance. As such, this No Project Alternative could result in impacts to and water resources similar to the impacts under the proposed GSEP.

No Project Alternative C:

Under this alternative, the proposed GSEP would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the GSEP site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site and no water resources impacts.

As a result, this No Project Alternative would not result in the impacts to water resources under the proposed GSEP. However, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects would have similar impacts in other locations.

4.19.3 Discussion of Cumulative Impacts

Table 4.1-5 provides a listing of current and reasonably foreseeable renewable energy projects, other BLM authorized action/activities, and other actions/activities that BLM considers reasonably foreseeable. Most of these projects have, are, or would be required to undergo their own independent environmental review under NEPA. Even if the cumulative projects described in **Table 4.1-5** have not yet completed the required environmental review processes, they were considered in the cumulative impacts analyses in this SA/Draft EIS.

Reasonably Foreseeable Projects

Reasonably foreseeable projects that may impact the water resources of the area were deemed to include only those projects located in the CVGB. **Table 4.19-6** lists the foreseeable projects and the anticipated water use associated with each of the projects.

Construction and Operation

The construction of the proposed GSEP is expected to result in short term adverse impacts related to construction activities. It is expected that some of the cumulative projects described above which are not yet built may be under construction the same time as the proposed GSEP. In addition, it is expected that some of the future and foreseeable projects described above may be operational at the same time as the proposed GSEP. As a result, there may be substantial long term cumulative impacts during operation of these projects related to water resources.

There may be substantial short-term and long-term impacts during construction and operation of those cumulative projects related to: groundwater basin balance, water table levels, groundwater quality, surface water hydrology, and surface water quality; these are discussed below.

Groundwater Basin Balance

There is concern that the amount of groundwater used for both construction and operations would place the groundwater basin into overdraft. Groundwater overdraft is “the condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions” (CDWR 1998).

Any withdrawals that exceed the average natural recharge and exceed a percentage of the total amount of groundwater in storage would be an impact. The following discussion presents an analysis of the potential for overdraft and depletion of groundwater in storage to occur.

TABLE 4.19-6
REASONABLY FORESEEABLE PROJECTS AND ANTICIPATED WATER USE

						Water Use – Renewable Projects (ac-ft/yr)									
Project	**Proponent**	**BLM Serial ID**	**Technology**	**Source**	**Use**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019-2043**	**References**
Chuckwalla Solar I	Chuckwalla Solar I LLC	CACA 48808	Photovoltaic (200MW)	Chuckwalla Basin	Construction	20	20	10	--	--	--	--	--	--	Estimates
					Operation	--	5	7	10	10	10	10	10	10	
Eagle Mountain Soleil	enXco	CACA 49492	Photovoltaic (100MW)	Chuckwalla Basin	Construction	--	10	10	--	--	--	--	--	--	Estimates
					Operation	--	--	--	5	5	5	5	5	5	
Desert Lily Soleil	enXco	CACA 49494	Photovoltaic (100MW)	Chuckwalla Basin	Construction	--	20	20	--	--	--	--	--	--	Estimates
					Operation	--	--	--	5	5	5	5	5	5	
Desert Sunlight Solar Farm	First Solar	CACA 48649	Photovoltaic (550MW)	Chuckwalla Basin	Construction	27	27	27	--	--	--	--	--	--	Estimates
					Operation	--	--	--	4	4	4	4	4	4	
Eagle Mountain Pump Storage	Eagle Crest Energy Company, LLC	FERC 12509001	Pump – Storage (1276MW)	Chuckwalla Basin	Construction	--	308	308	8,066	8,066	8,066	8,066	--	--	Application to FERC
					Operation	--	--	--	--	--	--	--	2,688	1,763	
Genesis Solar Energy	Genesis Solar LLC	CACA 48880	Parabolic Trough (250MW)	Chuckwalla Basin	Construction	1,368	616	616	--	--	--	--	--	--	Application to Energy Commission
					Operation	--	--		1,644	1,644	1,644	1,644	1,644	1,644	
Mule Mountain Solar Project	Bullfrog Green Energy, LLC	CACA 49097	Photovoltaic (500MW)	Chuckwalla Basin	Construction	20	20	20	--	--	--	--	--	--	Estimates
					Operation	--	--	--	1	1	1	1	1	1	
Mule Mountain Soleil	enXco	CACA 49488	Photovoltaic (200MW)	Chuckwalla Basin	Construction	--	20	20	--	--	--	--	==	--	Estimates
					Operation	--	--		10	10	10	10	10	10	
Palen Solar Power	Palen Solar I, LLC	CACA 48810	Parabolic Trough (500MW)	Chuckwalla Basin	Construction	480	480	480	--	--	--	--	--	--	Application to Energy Commission
					Operation	--	--	--	303	303	303	303	303	303	
Total						1,915	1,526	1,518	10,048	10,048	10,048	10,048	4,670	3,745	

A comparison was made between the average annual basin budget with the anticipated foreseeable projects cumulative construction and operation water production requirements. **Table 4.19-7** presents the anticipated project's water requirements (Years 2011-2043) along with the average annual basin budget. Currently, the CVGB balance is positive by approximately 2,608 ac-ft/yr, whereby inflow (approximately 13,719 ac-ft/yr) to the basin is slightly greater than estimated outflows (approximately 11,111 ac-ft/yr) to the basin.

TABLE 4.19-7
ESTIMATED CHANGE TO CHUCKWALLA VALLEY GROUNDWATER BASIN BUDGET (AVERAGE YEAR CONDITIONS)

Years	Annual Basin Budget Balance	Cumulative Project Requirements (ac-ft/yr)	Net Budget Balance (ac-ft/yr)	Cumulative Budget Balance (af)	Cumulative Positive/Deficit as a Percent of Total Recoverable Storage[a]
2011	2,608	1,915	693	693	0.005%
2012	2,608	1,526	1,082	1775	0.012%
2013	2,608	1,518	1,090	2865	0.019%
2014	2,608	10,048	-7,440	-4575	-0.031%
2015	2,608	10,048	-7,440	-12,015	-0.08%
2016	2,608	10,048	-7,440	-19,455	-0.13%
2017	2,608	10,048	-7,440	-26,895	-0.18%
2018	2,608	4,670	-2,062	-28,957	-0.19%
2019	2,608	4,670	-2,062	-30,094	-0.20%
2043	2,608	3,745	-1,137	-57,382	-0.383%

[a] Based on a total recoverable storage of 15,000,000 af.

It is anticipated that groundwater extraction of foreseeable projects during construction of the GSEP would range from 1,915 ac-ft/yr in Year 2011 to a peak of 10,048 ac-ft/yr in Years 2014 through 2017, which would exceed the basin balance in Years 2014 through 2017 by 7,440 ac-ft/yr. The CVGB would be in overdraft conditions commencing in Year 2014. It is anticipated that groundwater extraction during operations of reasonably foreseeable projects would be approximately 3,745 ac-ft/yr, which would exceed the basin balance by 1,137 ac-ft/yr. The cumulative change in storage over the construction and operational period (33 years) would amount to approximately -57,000 af, which would equate to less than 0.5 percent of the total amount of the estimated total recoverable groundwater in storage (15,000,000 af).

However, the amount of water that is in storage (estimated to be as much as 15,000,000 af) in the basin greatly exceeds the amount of cumulative overdraft (57,000 af). In light of these facts, the GSEP's contribution to the cumulative impact to basin balance is less than cumulatively considerable.

Lastly, the I-10 corridor within the CVGB has been targeted for renewable energy projects that have not been identified or quantified as to amounts of water required for development. Given that perennial surface water sources are non-existent and the only available water source is groundwater, it is likely that these as yet unidentified projects could further develop the groundwater resources and exacerbate the cumulative overdraft conditions identified above. However, given the amount of total recoverable groundwater in storage (estimated at 15,000,000 af), the impact would be minimal.

In addition, the cumulative impact analysis conducted by the GSEP suggested that during the course of operations for all reasonably foreseeable projects, the subsurface outflow from the CVGB into the PVMGB and the Colorado River Basin would decline from approximately 400 ac-ft/yr to approximately 81 ac-ft/yr in 2043 (see WPAR, 2009b Table 2). Reduction of flows into the PVMGB from the CVGB could thereby result in a reduced volume of groundwater discharging into the Colorado River, and/or could induce underflow from the Colorado River into the adjacent groundwater basins. These conditions would result in a reduction in the volume of water available in the Colorado River Basin. However, implementation of the required mitigation, which includes measures to offset GSEP pumping with reductions in pumping elsewhere within the basin, would avoid these potential impacts.

Groundwater Levels

The regional model used by AECOM (2010a) is a two-dimensional superposition model developed using MODFLOW code (Harbaugh et al., 2000) for the Parker-Palo Verde-Cibola area, which includes the CVGB and the GSEP site. The model employed a simple vertical geometry and a large grid spacing to evaluate the impacts from groundwater pumping on the Colorado River.

The modeling results suggest (**Figure 4.19-5**) that during the life of all the reasonably foreseeable projects, groundwater level declines of five feet or more would be located at a distance of approximately 4 miles from the proposed production wells at the GSEP site. The closest existing well is located at a distance of 3 miles. In addition, water level declines of 1 foot or more could be observed up to eight miles from the proposed production wells. This modeling also suggests that impacts to groundwater will extend into the Palen McCoy Wilderness Area.

As stated in Section 706 of the California Desert Protection Act of 1994 (P.L. 103-433), Congress has reserved all water that is “necessary to fulfill the purposes” of all wilderness areas designated under the Act, including preservation of wildlife and ecosystems of the California desert, as long as the water was unappropriated as of October 31, 1994. Prior to publication of the ROD, the Applicant will need to demonstrate that groundwater extraction for the GSEP is unlikely to violate any reserved water rights associated with the adjacent Palen-McCoy wilderness area or any other wilderness areas in the Chuckwalla Valley.

Modeling conducted by the applicant indicated water level declines less than what is conservatively presented here. While preliminary studies and calculations have been made to assess the potential for impact, the quantification of the impact is considered an estimate and would not be able to be accurately quantified until actual long-term groundwater production occurs. Implementation of mitigation measures **WATER-3** through **WATER-5** is anticipated to mitigate potential impacts to groundwater users (wells) associated with the potential lowering of the groundwater table. Impacts and proposed mitigation associated with biological resources are discussed in Section 4.17**.**

Groundwater Quality

There is a potential that cumulative groundwater quality impacts could occur from the proposed GSEP as listed on **Table 4.19-6** during construction and operation if contaminated or hazardous materials used during construction and operations were to be released and migrate to the groundwater table.

The proposed GSEP would be expected to contribute only a small amount to the possible short-term cumulative impacts related to groundwater quality in the CVGB, given the distance to the groundwater table (70-90 feet bgs) and the proposed implementation of a hazardous material management plan and monitoring plans associated with operation of LTUs, surface impoundments, septic systems, and other various operations. With implementation of the mitigation measures **WATER-6** and **7** and **WATER-20**, cumulative impacts associated with the GSEP to groundwater quality are anticipated to be small.

Surface Water Hydrology

The cumulative impacts of the proposed GSEP and other projects listed in Table 4.19-6 on the local surface water hydrology are directly related to proposed onsite grading and the potential construction and operation of a network of engineered collector/conveyance channels designed for the purpose of protecting the various projects from flooding. The proposed projects could change both the extent and physical characteristics of the existing floodplains within and downstream of each project site. There is not enough information available on each site, nor has a regional study been completed, to define the extent of the cumulative effects of these projects on surface water within the watershed. However, it is assumed that each of these projects would be required to define their impacts and mitigate where required.

The proposed Project would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water hydrology because the implementation of the mitigation measures specified in Appendix G would reduce the project-specific impacts to low levels.

Surface Water Quality

The cumulative impacts of the proposed foreseeable projects as listed on **Table 4.19-6** could have an impact on surface water quality. It is expected that stormwater generated on the various project sites may encounter soil or chemicals deleterious to aquatic and terrestrial plants and wildlife. All of the projects would be required to implement BMPs for managing potentially harmful storm water and protecting water quality. Potential water quality impacts could occur during operations if contaminated or hazardous materials used during operations were to contact storm water and drain offsite. Therefore, implementation of the mitigation measures **WATER-1, 2, 8, 9, 10, 11** and **13** would be required.

All of the proposed projects would alter natural storm water drainages and the expected use of BMPs would reduce potential impacts related to concentrated drainage and ensuing soil erosion and sediment transport offsite. The proposed GSEP would be expected to contribute only a small amount to the possible short-term cumulative impacts related to surface water quality with implementation of the mitigation measures **WATER-1, 2, 8, 9, 10, 11** and **13**.

Closure and Decommissioning

The decommissioning of the proposed GSEP is expected to result in adverse impacts related to water resources similar to construction impacts. It is unlikely that the construction or decommissioning of any of the cumulative projects would occur concurrently with the decommissioning of the GSEP, because the decommissioning is not expected to occur for approximately 40 years. As a result, there may not be impacts related to water resources during decommissioning of the proposed GSEP generated by the cumulative projects. The impacts of the decommissioning of the proposed GSEP would not be expected to contribute to cumulative impacts related to water resources.

Summary of Mitigation Measures

The implementation of mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP also would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following address impacts on water resources:

WATER-1, WATER-2, WATER-3, WATER-4, WATER-5, WATER-6, WATER-7, WATER-8, WATER-9, WATER-10, WATER-11, WATER-12, WATER-13, WATER-14, WATER-15, WATER-16, WATER-17, WATER-18, WATER-19, WATER-20

Residual Impacts after Mitigation Measures were Implemented

Implementation of the mitigation measures identified above would address potential GSEP-related impacts on water resources. However, a small degree of residual impact could remain even following implementation of the proposed mitigation measures. The following text reviews the efficacy of the proposed mitigation measures, and discusses potential for residual impacts, as relevant.

Colorado River Effects (WATER-15 and WATER-19): Implementation of the proposed mitigation would ensure that either (1) potential effects on the Colorado River hydrology are avoided entirely, or (2) the applicant applies for and receives an allocation of water from the Colorado River. No residual impact would occur.

Groundwater Level Mitigation (WATER-3, WATER-4, WATER-5, WATER-16, and WATER-17): Implementation of these mitigation measures would ensure that wells are properly sited and installed; ensure that no more than 1,368 ac-ft/yr are used during construction and no more than 1,644 ac-ft/yr are used during GSEP operation; ensure implementation of a groundwater level monitoring, mitigation, and reporting plan during construction and operation; provide monetary or other reimbursement for potential impacts to wells; and provide for groundwater production reporting. As discussed previously, these measures would help ensure that potential reductions in groundwater levels are minimized. However, a relatively minor degree of residual groundwater level reduction would occur as a result of GSEP implementation, as discussed previously.

Water Quality (WATER-2, WATER-6, WATER-7, WATER-12, WATER-14, and WATER-20): These mitigation measures ensure compliance with applicable laws and other requirements related to stormwater discharges on site, design and operational requirements for the proposed septic system and leach field, drinking water standards, and documentation of groundwater quality during operations. Compliance with these measures would ensure that levels of construction-related sediment loading, erosion, and other water quality pollutants would be minimized, and that potential degradation of groundwater quality associated with the proposed septic system would be minimized. Although residual surface and groundwater quality impacts are not considered significant, a very small degree of residual surface and groundwater quality reduction is expected, in comparison to the No Project Alternative, due primarily to the introduction of treated leachates from the proposed septic system, but also associated with small amounts of HTF that are released into the environment.

Drainage and Flooding (WATER-1, WATER-8, WATER-9, WATER-10, WATER-11, and WATER-13): These mitigation measures ensure that potential GSEP drainage and flooding related impacts would be minimized. They include completion of a revised and updated Drainage Report that would include updated analysis and considerations for climate change related updates to the current Drainage Report; an updated hydraulic analysis; compliance with Riverside County guidelines for conveyance channels, revisions to preliminary grading and drainage plans, and implementation of a channel maintenance program during GSEP operations. These mitigation measures would ensure that potential impacts related to drainage and flooding are reduced to insignificant levels. Residual effects would be minor, but could include minor fluctuations in sediment transport along washes adjacent to and downstream of the GSEP.

Unavoidable Adverse Impacts

None.

4.20 Impacts on Wildland Fire Ecology

4.20.1 Impact Assessment Methodology

Impacts of fire on the wildlands in the GSEP area would be related to the changes to the footprint size of the GSEP. The incidence of human-vehicle-caused wildfire would be related to the numbers of vehicles accessing the site for construction, operations, and maintenance activities, as section 3.23 documents the primary causes of fire in the area are lightning and vehicles. For the No Action/No Project Alternatives, Proposed Action, Dry Cooling Alternative, and Reduced Acreage Alternative, differences in fire incidence and therefore impacts in the GSEP area would also vary by the relative ability and relative numbers of vehicles accessing the GSEP area in the short and long term. These estimates come from section 4.18, Transportation and Public Access.

4.20.2 Discussion of Direct and Indirect Impacts

Proposed Action

Direct impacts of wildfire would include mortality of plants and wildlife and loss of forage and cover. Annual plants and burrowing wildlife would be less affected in the short term because seeds in the soil and animals under the soil would not likely be consumed. Indirect impacts would result in changes to the vegetation communities and the wildlife supported by the communities. The spread of invasive plants, especially annual grasses, creates an increased potential for wildfires which can result in disastrous ecological change. Historically in the planning area, the occurrence of wildfires has been low. Repeated fires are known to decrease the perennial plant cover and to aid some invasive annual plants. In turn, where they gain widespread propagation, these invasive plants would provide fuel to carry flames, potentially resulting in larger fires in the future. Surface disturbing activities and vehicle use that promotes the introduction of invasive plants would increase the likelihood of larger fires in the future. Fires have not been common or large in the NECO planning area in the past, but may increase as the invasive, non-native grass cover increases.

Wildfires (caused by construction or downed transmission lines) are rare but the increase in daily vehicle use in the area from an anticipated 40-50 new jobs during operation and up to 1000 jobs during construction could increase the risk of ignition. Other temporary and permanent impacts from the GSEP could occur to surrounding vegetation communities from grading activities creating air-born, fugitive dust, sedimentation, and erosion, which disruption of photosynthesis and other metabolic processes. The destruction of plants and soil crusts by windblown sand and dust also exacerbates the erosion of the soil and accelerates the loss of nutrients (Okin et al. 2001).

Brooks (1998) performed the most in-depth analyses of the correlations between invasive annual plants and environmental impacts. He found that, despite comprising only 5 percent of the annual plant species in the desert, two invasive annual grasses--red brome (Bromus madritensis ssp. rubens) and Mediterranean split grass (Schismus spp.)--and one invasive forb--fileree (Erodium cicutarium)--accounted for 66 percent of total plant biomass during a high rainfall year.

Biomasses of each were positively correlated with disturbances from off-highway vehicles and sheep grazing combined. He concluded that invasive annual grasses out competed native species. Invasive annual grasses contributed greatly to fire fuels, and combustion of dry red brome produced flame lengths and temperatures sufficient to ignite perennial shrubs. He cited other literature (e.g., pp. 11-12) showing that around the world plant invasions are promoted by human disturbances. He also showed that soil nutrients played a significant role and that nitrogen deposition may enhance the rate of invasion.

Wildfire suppression efforts would result in reduced particulate (PM10) production and visibility impairment from smoke and wild-blown dust. Short term impacts from fire suppression potentially would increase levels of particulate from surface disturbance of fire fighting equipment and operations. Fire fighting efforts would use minimal ground distributing techniques such as aerial fire suppression and ground crews with hand tools. Successful fire suppression efforts minimize the number of acres burned, and result in less vegetative loss, and thereby, less wind erosion of particulate matter.

Alternatives

Although the Proposed Action, Dry Cooling Alternative, and Reduced Acreage Alternative would involve different acreages and configurations, the generating capacity and construction, operations, and maintenance vehicle use would be similar between these three alternatives. Long term operations and maintenance phases of these three alternatives would tend to decrease recreation-related vehicle access to and through the GSEP area, resulting in a reduced incidence of fire compared to No Project Alternative B.

With No Action Alternative A and No Project Alternative C, vehicle access to and through the GSEP area would be similar and, therefore, fire incidence and size would be similar in the short and long term, because future solar development would not necessarily be precluded. No Project Alternative B would result in potentially greater recreation-related vehicle access in the long term as solar energy development projects would be precluded from the GSEP area. Such vehicle access in the long term would increase along present trends and increase the incidence of vehicle-related wildfires compared to No Action Alternative A or No Project Alternative C.

The chance for exotic annual weeds to establish and change the fire regime in the GSEP area would vary with the slightly different footprint size of the Proposed Action, Dry Cooling Alternative, and Reduced Acreage Alternatives; 1,746 acres; 1,746 acres, and 950 acres, respectively.

4.20.3 Discussion of Cumulative Impacts

Incremental impacts of the GSEP could result in a cumulative effect on wildland fire risk in combination with other past, present, or reasonably foreseeable future actions. For purposes of this analysis, the geographic scope of the cumulative effects analysis for fire resources consists of eastern Riverside County, which includes about 2,800 square miles (about 1,792,000 acres). Although potential fires would not be constrained by political boundaries, the natural conditions and existing fire response infrastructure are such that it would be reasonable to assume that a fire could be contained within this area. This boundary also is consistent with the California Department of Forestry and Fire Protection's Fire Hazard Severity Zone boundaries (CDF 2010; CDF 2007). Potential cumulative wildfire effects could occur over the course of 40 or more years, encompassing the entire lifespan of the GSEP, from construction and operation and maintenance, through closure and decommissioning.

Existing conditions within the cumulative impacts area reflect a combination of the natural condition and the effects of past actions and are described in FEIS chapter 3. Direct and indirect effects of the GSEP are analyzed above. Past, present and reasonably foreseeable future actions making up the cumulative scenario are identified in Section 4.1. The installation and operation of transmission lines and the use of equipment (including motor vehicles) that could spark or otherwise provide an ignition source could combine to cause or create a cumulative impact. Further, renewable energy projects that use or would use solar trough technology (such as the Blythe and Palen solar projects) are expected to use heat transfer fluid (HTF) that would be heated to a high temperature (about 750 degrees Fahrenheit); management of this and other hazardous materials on site could complicate any necessary firefighting efforts. For example, in 1999, a 900,000 gallon HTF storage tank exploded at a solar power plant in the Mojave Desert, causing fire and related concerns about adjacent containers that held sulfuric acid and caustic soda. Additionally, the increased human presence and disturbance caused by the construction, operation and overall development that would occur under cumulative scenario could advance the rate of invasion by non-native vegetation and, thereby, contribute to fire fuel-loading that would burn with higher flames and hotter temperatures. Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative. In this case, the incremental impact of the action alternatives is not expected to vary materially from the proposed action, because similar types of construction, operation and maintenance and closure and decommissioning activities would occur. However, to the extent that development of the site for utility-scale power generation would preclude some OHV use, wildfire risks associated with recreational uses would diminish. Solar energy development of the site also could occur under No Project Alternative B; therefore, the incremental impact of this alternative is not expected to be materially different than the proposed action. For No Action Alternative A and No Project Alternative C, wildfire risks would continue to be associated with OHV and other recreational use of the area.

4.20.4 Summary of Mitigation Measures

The mitigation measures imposed by the Energy Commission as Conditions of Certification for the GSEP would avoid or reduce impacts on the quality of the human environment. These mitigation measures are set forth in Appendix G. The following mitigation measures would avoid or minimize impacts on wildland fire ecology:

BIO-6, BIO-7, BIO-8, BIO-14, BIO-19, BIO-24

4.20.5 Residual Impacts after Mitigation Measures were Implemented

Despite the mitigating measures which would be incorporated into the Proposed Action and its alternatives, the changes in vehicle use, i.e, site access for construction, operation, and maintenance and recreational vehicle access would increase the threat of wildfires in the area surrounding the GSEP to a slight, but unknown degree.

4.20.6 Unavoidable Adverse Impacts

The residual impacts described above would be unavoidable consequences of development.

4.21 Impacts on Wildlife Resources

4.21.1 Impact Assessment Methodology

This analysis is based, in part, upon information from the following sources: the Application for Certification (AFC) (GSEP 2009a); Data Adequacy Supplement (GSEP 2009c) and Data Adequacy Supplement 1A (GSEP 2009d); responses to CEC staff data requests (GSEP 2009f, TTEC 2010f); CEC staff workshops held on November 23 and 24, December 18 and 31, 2009 and January 6, 11, and 12, February 10 and 18, 2010, April 19, 20, and 21 and May 5, 2010; site visits by CEC staff on October 27, 2009, December 10, 2009, January 12 and February 25, 2010; the Applicant's December 2009 Notification of a Lake or Streambed Alteration (TTEC 2009d) revisions to the Notification of a Lake or Streambed Alteration (TTEC 2010j, TTEC 2010l); the applicant's Aeolian Transport Evaluation and Ancient Shoreline Delineation Report for the GSEP (Worley Parsons 2010c); the applicant's Interim Preliminary Aeolian Sand Source, Migration and Deposition Letter Report for GSEP (Worley Parsons 2010d); PWA's Geomorphic Assessment of the Genesis Solar Project Site (Soil and Water Appendix A; PWA 2010a); the Applicant's Incidental Take of Threatened and Endangered Species Permit Application (TTEC 2009c); the Applicant's draft mitigation plans including the Draft Desert Tortoise Relocation/Translocation Plan (TTEC 2010a), Draft Weed Management Plan (TTEC 2010g), Draft Revegetation Plan (TTEC 2010i), and Draft Common Raven Monitoring, Control and Management Plan (TTEC 2010k); preliminary 2010 survey data (TTEC 2010m) and other supplemental information (TTEC 2010r, TTEC 2010p); information about minor changes to the GSEP (TTEC 2010o); communications with representatives from the California Department of Fish and Game (CDFG), Bureau of Land Management (BLM), and the U.S. Fish and Wildlife Service (USFWS); and information contained within the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO). Information used to update this FEIS section is found in an updated Biological Resources Technical Report that includes findings from spring, 2010, surveys (TTEC 2010p)and the Revised Staff Assessment Supplement from the CEC. Additionally, golden eagle survey results from spring, 2010 and a golden eagle risk assessment, became available in time for preparation of this FEIS (TTEC 2010U; TTEC 2010v).

4.21.2 Discussion of Direct and Indirect Impacts

Proposed Action

Direct impacts are those resulting from a project and occur at the same time and place. Indirect impacts are caused by a project, but can occur later in time or farther removed in distance while still reasonably foreseeable and related to the project. The potential impacts discussed in this analysis are those most likely to be associated with construction and operation of the GSEP.

Impact analyses typically characterize effects to plant communities as temporary or permanent, with a permanent impact referring to areas that are paved or otherwise precluded from restoration to a pre-project state. In the desert ecosystems the definition of permanent impacts needs to reflect the slow recovery rates of its plant communities. Natural recovery rates from disturbance in these systems depend on the nature and severity of the impact. For example, creosote bushes can resprout a full canopy within five years after damage from heavy vehicle traffic (Gibson et al. 2004), but more severe damage involving vegetation removal and soil disturbance can take from 50 to 300 years for partial recovery; complete ecosystem recovery may require over 3,000 years (Lovich and Bainbridge 1999). In this analysis, an impact is considered temporary only when there is evidence to indicate that pre-disturbance levels of biomass, cover, density, community structure, and soil characteristics could be achieved within five years.

Desert Tortoise

Direct impacts include potential take of individuals during operation and construction; permanent loss of occupied desert tortoise habitat, designated critical habitat, and fragmentation of surrounding habitat.

Indirect impacts include increased risk of predation from ravens, coyotes, feral dogs; disturbance from increased noise and lighting; introduction and spread of weeds; increased road kill hazard.

Direct Impacts

During construction of the GSEP desert tortoises may be harmed during clearing, grading, and trenching activities or may become entrapped within open trenches and pipes. Construction activities could also result in direct mortality, injury, or harassment of individuals as a result of encounters with vehicles or heavy equipment. Other direct effects could include individual tortoises being crushed or entombed in their burrows, collection or vandalism, disruption of tortoise behavior during construction or operation of facilities, disturbance by noise or vibrations from the heavy equipment, and injury or mortality from encounters with worker’s or visitor’s pets. Desert tortoises may also be attracted to the construction area by application of water to control dust, placing them at higher risk of injury or mortality. Increased human activity and vehicle travel would occur from the construction and improvement of access roads, which could disturb, injure, or kill individual tortoises. Also, tortoises may seek shade by taking shelter under parked vehicles and be killed, injured, or harassed when the vehicle is moved.

The Applicant has recommended impact avoidance and minimization measures to reduce these direct impacts to desert tortoise, including installation of exclusion fencing to keep desert tortoise out of construction areas, relocating/translocating the resident desert tortoise from the GSEP site, reducing construction traffic and speed limits to reduce the incidence of road kills and worker environmental awareness training programs.

Impacts to Critical Habitat

The GSEP area overlaps with a portion of the 1,020,600-acre Chuckwalla Desert Tortoise Critical Habitat Unit. Critical habitat is defined as the specific areas supporting those physical and biological features that are essential for the conservation of the species and that may require special management considerations or protection (USFWS 2008a). The GSEP transmission line (2.8 miles), gas line (1 mile) and access road (1.8 miles) would intersect the edge of designated desert tortoise critical habitat (TTEC 2009c). All of the linear facilities are within the same corridor. Critical habitat would be directly impacted by construction of these facilities (TTEC 2009cImpacts of Relocation/Translocation

Capturing, handling, and relocating desert tortoises from the proposed site after the installation of exclusion fencing could result in harassment and possibly death or injury. Tortoises may die or become injured by capture and relocation when these methods are performed improperly, particularly during extreme temperatures, or when they void their bladders. Averill-Murray (2001) determined that tortoises that voided their bladders during handling had significantly lower overall survival rates (0.81-0.88) than those that did not void (0.96). When multiple desert tortoises are handled by biologists without the use of appropriate protective measures, pathogens may be spread among the tortoises, both resident and translocated animals. For those tortoise near but not within the Project Disturbance Area, removal of habitat within a tortoise's home range or segregating individuals from their home range with a fence would likely result in displacement stress that could result in loss of health, exposure, increased risk of predation, increased intraspecific competition, and death. Tortoises moved outside their home ranges would likely attempt to return to the area from which they were moved, therefore making it difficult to isolate them from the potential adverse effects associated with GSEP construction.

The risks and uncertainties of translocation to desert tortoise are well recognized in the desert tortoise scientific community. The Desert Tortoise Recovery Office (DTRO) Science Advisory Committee (SAC) has made the following observation regarding desert tortoise translocations (DTRO 2009, p. 2):

"As such, consensus (when not unanimity) exists among the SAC and other meeting participants that translocation is fraught with long-term uncertainties, notwithstanding recent research showing short-term successes, and should not be considered lightly as a management option. When considered, translocation should be part of a strategic population augmentation program, targeted toward depleted populations in areas containing "good" habitat. The SAC recognizes that quantitative measures of habitat quality relative to desert tortoise demographics or population status currently do not exist, and a specific measure of "depleted" (e.g., ratio of dead to live tortoises in surveys of the potential translocation area) was not identified. Augmentations may also be useful to increase less depleted populations when the goal is to obtain a better demographic structure for long-term population persistence. Therefore, any translocations should be accompanied by specific monitoring or research to study the effectiveness or success of the translocation relative to changes in land use, management, or environmental condition."

The Applicant has prepared a draft Desert Tortoise Relocation/Translocation Plan as part of the Incidental Take Permit application (TTEC 2010a) which includes measures to avoid and minimize adverse impacts to resident and translocated desert tortoise. This plan would be reviewed and approved by CDFG, USFWS, and CEC staff, and would be implemented to move any tortoises detected during clearance surveys. The Desert Tortoise Relocation/Translocation Plan includes an analysis to determine whether relocation or translocation is an appropriate action; the identification and prioritization of potentially suitable locations for translocation; desert tortoise handling and transport considerations (including temperature); animal health considerations; a description of translocation scheduling, site preparation, and management; and specification of monitoring and reporting activities for evaluating success of translocation.

Indirect Impacts

Ravens and Other Predators. Construction and operations activities associated with the GSEP could provide food or other attractants in the form of trash, road-killed animals, and water, which would draw unnaturally high numbers of desert tortoise predators such as the common raven, kit fox, and coyote to the GSEP area. GSEP structures would also provide new nesting and perching sites for ravens such as new transmission line towers and perimeter fencing. Development of new elevated perching sites as a result of GSEP construction could increase raven numbers locally, including the probability that young ravens remain in the area after maturing, which, in turn, could result in increased predation on desert tortoise in the vicinity of the Project Disturbance Area.

Common raven populations in some areas of the Mojave Desert have increased 1,500 percent from 1968 to 1988 in response to expanding human use of the desert (Boarman 2002). Since ravens were scarce in this area prior to 1940, the current level of raven predation on juvenile desert tortoises is considered to be an unnatural occurrence (BLM 1990, USFWS 2008a) and one of many anthropogenic contributors to desert tortoise population declines.

In addition to ravens, feral dogs have emerged as major predators of the tortoise. Dogs may range several miles into the desert and have been found digging up and killing desert tortoises (USFWS 1994; Evans 2001). Dogs brought to the GSEP site with visitors may harass, injure, or kill desert tortoises, particularly when allowed off leash to roam freely in occupied desert tortoise habitat. The worker environmental awareness training (BIO-6) and restrictions on pets being brought to the site required of all personnel (BIO-8) would reduce or eliminate the potential for these impacts.

Construction and operation of the GSEP would increase raven and coyote presence in the GSEP area. Ravens capitalize on human encroachment and expand into areas where they were previously absent or in low abundance. Ravens habituate to human activities and are subsidized by the food and water, as well as roosting and nesting resources that are introduced or augmented by human encroachment. Road kill along I-10 provides an additional attractant and subsidy for opportunistic predators/scavengers such as ravens. Road kills would mount with increased GSEP construction and operations traffic, further exacerbating the raven/predator attractions and increasing desert tortoise predation levels.

Increased Risk from Roads/Traffic. Vehicle traffic would increase as a result of construction and improvement of access roads, increasing the risk of injuring or killing desert tortoise. The potential for increased traffic-related tortoise mortality is greatest along paved roads where vehicle frequency and speed is greatest though tortoises on dirt roads may also be affected depending on vehicle frequency and speed. Census data indicate that desert tortoise numbers decline as vehicle use increases and that tortoise sign increases with increased distance from roads (Nicholson 1978; Hoff and Marlow 2002). Additional unauthorized impacts that may occur from casual use of the access roads in the GSEP area include unauthorized trail creation.

Impacts to Wildlife from Invasive and Noxious Weeds

Sahara mustard (*Brassica tournefortii*) is regarded as one of the most invasive wildland pest plants in the Colorado and Mojave deserts, one of the most common invasive plants in desert tortoise habitat, and capable of dominating entire desert landscapes when no control actions are taken. Left uncontrolled, it out-competes and ultimately replaces native wildflowers that provide valuable forage for the desert tortoise. It forms dense thickets that can increase the frequency, intensity, and size of desert fires, increasing the threat to native plant communities, the desert tortoise, and other wildlife (Brooks 2010 as cited in the CEC RSA June 2010). In areas where Sahara mustard is particularly dense it may also impede desert tortoise movement (Berry pers. comm. as cited in the CEC RSA June 2010). In the Colorado and Mojave Deserts, a single tortoise was necropsied that had died from renal failure, related to renal oxalosis, and the crystals present in the kidneys were identified as oxalates (Jacobson et al. 2009 as cited in the CEC RSA June 2010). One additional tortoise was later necropsied that died of oxalosis in the same region (Berry pers comm. 2010 as cited in the CEC RSA June 2010). Although many native plants in the Mojave and Colorado deserts contain oxalates, the oxalate-containing weed Sahara mustard is one of the most common invasives in desert tortoise habitat and is a suspected cause of the renal failure (Berry pers comm. as cited in the CEC RSA June 2010).

Sahara mustard spreads explosively during wet years but even during a 12-year drought in Riverside County (1989-1991), the population of Sahara mustard increased by nearly 35 times. Densities equivalent to as high as three million plants per acre have been recorded at Lake Mead National Recreation Area (Graham et al. 2003 as cited in the CEC RSA June 2010).

The spread of Sahara mustard from increased vehicle use of the area roads and from transmission construction (Berry pers comm)—its primary conduit for spread—may affect Mojave fringe-toed lizards and other wildlife by altering the availability of forage plants and characteristics of their habitat structure. For example, the Coachella Valley fringe-toed lizard (*Uma inornata*) is a dune-dependent species that requires fine, loose, windblown (aeolian) sand for survival (Zeiner et al. 1990). Much of the ephemeral sand field community within the Coachella Valley has become increasingly less fine and more gravelly over the past 25 years while there has also been a decline in Coachella Valley fringe-toed lizard populations over the past two decades (Barrows et al. 2010). Barrows et al. (2009) found the Coachella Valley fringe-toed lizard to be the only animal species of five vertebrates evaluated to demonstrate a negative response to Sahara mustard abundance.

Other Indirect Impacts

In addition to construction-related introduction of invasive plants that out compete native plants, other indirect impacts to desert tortoise could result from an increased incidence of accidental wildfires. This could be caused by construction or downed new transmission wires, but the potential for this is low due to the relatively small length of transmission lines proposed as part of the GSEP. With the addition of hundreds of new jobs, there will be an increased use of area roads that can increase the risk of ignition on roadsides. Both of these impacts could reduce adjacent habitat quality for desert tortoise. Potential deposition of sediment loads as a result of construction-related sediment mobilization during heavy rain events and flooding downstream would impact existing desert tortoise burrows outside of the Project Disturbance Area.

Mojave Fringe-toed Lizard

Direct impacts include mortality to individuals during construction and permanent loss of sand dune habitat and sand drift over playa habitat; increased road kill hazard from construction traffic; potential accidental direct impacts to adjacent preserved habitat during construction and operation.

Indirect impacts include disruption of sand transport corridor resulting in downwind impacts; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat; increased road kill hazard from operations traffic; harm from accidental spraying/drift of herbicides and dust suppression chemicals.

The GSEP would directly impact stabilized/partially stabilized sand dune habitat and playa/sand drifts over playa habitat (CEC 2010d as cited in the CEC RSA June 2010). In addition to this direct and immediate loss of habitat, the GSEP would indirectly affect Mojave fringe-toed lizard habitat downwind of the Project Disturbance Area (see CEC Revised Staff Assessment Soil & Water Appendix A; PWA 2010a). As discussed above, the southwestern corner of the eastern solar array extends south into the PDL-Chuckwalla Valley Sand Transport Corridor (Worley Parsons, 2010c).

The Mojave fringe-toed lizard relies on vegetated sand dunes and a regular supply of fine wind-blown sand for its habitat. Active sand dunes (i.e., dunes that have an active layer of mobile sand) exist in a state of dynamic equilibrium, continuously losing sand downwind due to erosion and transport and gaining new supplies from upwind. When the upwind sand supply is cut off the dunes deflate, losing sand downwind and shrinking in size and depth. The finest sand (which is most easily transported) is lost first with coarser sand and gravel being left behind to form an armor or lag. This lag does not support Mojave fringe-toed lizard habitat.

As discussed above, the GSEP may also have an impact on sand transport and Mojave fringe-toed lizard habitat by eliminating the network of desert washes throughout the site and replacing them with engineered channels (CEC Revised Staff Assessment Soil & Water Appendix A). GSEP construction on the alluvial fans and alteration of stream channels by channelization may reduce the amount of fluvial sediment reaching the depositional areas upwind of sand dunes and Mojave fringe-toed lizard habitat. Similar effects have been observed in the Coachella Valley, with adverse consequences for Coachella Valley fringe-toed lizard habitat (Griffiths et al. 2002). The extent of the GSEP impact to fluvial sand transport is unknown, but is expected to contribute at least incrementally to loss of Mojave fringe-toed lizard habitat.

Other potential indirect impacts of the GSEP to Mojave fringe-toed lizards include mortality from vehicle strikes; introduction and spread of invasive plants; erosion and sedimentation of disturbed soils; fragmentation and degradation of remaining habitat; increased road kill hazard from operations traffic; harm from accidental spraying or drift of herbicides and dust suppression chemicals; and an increase in access for avian predators (such as loggerhead shrikes) due to new perching structures.

The distribution of Mojave fringe-toed lizards is naturally fragmented because of its obligate habitat specificity to a patchy habitat type, and many local populations of this species are quite small, with small patches of sand supporting small populations of lizards. This fragmented pattern of distribution leaves the species vulnerable to local extirpations from additional habitat disturbance and fragmentation (Murphy et al. 2007). The Mojave fringe-toed lizard population in the Chuckwalla Valley, along with a very small population in Joshua Tree National Park's Pinto Basin, represents the southernmost distribution of this species (Barrows pers. comm.). This southern population may represent an important gene pool in light of the likely warming and drying that will occur in this region as a result of climate change; these southernmost lizards that may already be adapted to hotter and drier conditions than those further north and could represent a source of genetic variation that could stave off extinction of this species in selected refugia (Barrows pers. comm.). The direct and indirect effects of the GSEP to the Chuckwalla Valley Mojave fringe-toed lizard population would be substantial. Indirect effects include the reduction in sand supply to the sand transport corridor from alteration of GSEP area drainages as well as the sand shadow effect resulting from intrusion of the GSEP into the sand transport corridor.

Couch's Spadefoot Toad

Direct impacts include loss of breeding and upland habitat, mortality of individuals; disturbance to breeding ponds,

Indirect impacts include reduced flow to breeding areas, increased flow to upland habitat, construction noise could trigger emergence when conditions are not favorable.

Couch's spadefoot toads were recorded breeding in a pond south of I-10 near Wiley Well Road (Dimmitt 1977) that apparently overlaps with the GSEP's proposed transmission line corridor; in the absence of survey information indicating otherwise, we consider this species to be extant at this location. Couch's spadefoot toads require aquatic habitat for breeding and upland habitat for burrowing. This species does not breed every year, and therefore potential breeding habitat does not necessarily need to sustain surface water for an extended period of time (minimum approximately 9 days) every year. Burrowing habitat is considered any area with friable soil within the adult or juvenile dispersal distance for this species. This dispersal distance is largely unknown, though there is one record from Mayhew (1965) of a juvenile 0.25 miles from the closest breeding pond. Therefore, in the absence of more conclusive information, upland Couch's spadefoot toad habitat is considered to be all areas with friable soils within 0.25 miles of a potential breeding pond and other observations place them at least one mile from ponds (Dimmitt, pers. comm.). While little is known about the location and proximity of subterranean refuge sites, there is some indication that they are widely distributed and that breeding pond habitat is the limiting factor in their distribution (Dimmitt, pers. comm.).

Impacts to Couch's spadefoot toads could include loss of breeding habitat and direct mortality during grading or construction. Disturbance to breeding ponds, including new ponds incidentally created during construction activities, could also impact this species. In addition, construction, maintenance, and operation traffic could result in direct mortality on GSEP area roads. Indirect impacts could result from hydrology changes that reduce flow to breeding areas. In addition, construction noise could trigger emergence when conditions are not favorable. As discussed above, the GSEP transmission line corridor overlaps a recorded breeding site. While the exact location of the breeding pond is unknown, a review of aerial photos and a site visit identified a pond southwest of the intersection of Wiley Well Road and I-10 the area mapped in Dimmitt (1977). In addition, CEC staff has reviewed aerial photos of the linear route and solar facility site north of I-10. CEC staff agrees with the Applicant that it is unlikely the solar facility site supports breeding pond habitat thought it may provide habitat for subterranean burrows when there is a breeding pond within dispersal distance. CEC staff has identified areas along the linear route, however, that need further study to determine whether these areas are capable of sustaining surface water and therefore provide breeding habitat.

Without species-specific survey results and with limited occurrence information, it is difficult to assess the potential for direct and indirect impacts to Couch's spadefoot toads. However, based on a known occurrence in the GSEP area, and surface water visible in GSEP aerials and verified in the field, the pond southwest of Wiley Well Road and I-10 is breeding habitat for Couch's spadefoot toad. Further, based on a review of aerial photography CEC staff believes that additional breeding habitat for this species may occur north of I-10 along the proposed linear facility route.

The GSEP is located at the western border of the Couch's spadefoot toad range. The impacts to one of the few known breeding ponds for this species at the western boundary of its range would be a substantial impact. Construction activities could avoid the known breeding pond south of I-10 near Wiley Well Road. The Protection and Mitigation Plan would provide detailed guidance to implement the protection of the I-10 pond during GSEP construction and operation, and would extend that protection to any other ponds detected during habitat surveys conducted north of I-10 along the linear corridor.

Western Burrowing Owl

Direct impacts include permanent loss of foraging habitat; potential loss of eggs and young; degradation and fragmentation of remaining adjacent habitat from edge effects; disturbance of nesting and foraging activities for nesting pairs near the plant site and linear facilities. The Secondary Access Road, Distribution-Telecommunication Line, Redundant Telecommunications Line, and 6-pole transmission line extension could cause similar impacts as the other linear facilities mentioned above, although these features would occur along other linear disturbances or would add very few acres of impact.

Indirect impacts include increased road kill hazard from operations traffic; potential collision with mirrors; increased predation from ravens; disturbance of nesting activities from operations.

The 2009 biological field surveys indicated two burrowing owls were present within the GSEP area and burrowing owl sign (burrows, whitewash, feathers, and pellets) was observed at several locations throughout the GSEP area (GSEP 2009a, Appendix C). However, the 2009 surveys did not reveal the presence of burrowing owls or active burrows within in the Project Disturbance Area. Since owls and owl sign were found just outside of the Project Disturbance Area, there is some potential for burrowing owls to move into GSEP site to nest, and therefore could be directly impacted. In addition, burrowing owls near but not within construction areas could be impacted during construction activities. The potential for direct impacts to burrowing owl includes the loss of nest sites, eggs, and/or young (unless the birds are evicted prior to construction); permanent loss of breeding and foraging habitat; and disturbance of nesting and foraging activities for burrowing owl pairs within the GSEP site, buffer, or immediately surrounding area. Indirect impacts to burrowing owls during construction and operation can include increased road kill hazards, modifications to foraging and breeding activities, and loss of prey items and food sources due to a decreased number of fossorial mammals.

Burrowing owls detected nesting within the Project Disturbance Area, would need to be relocated prior to or after the nesting season to avoid direct impacts. There is much debate among state, federal, local, and private entities over the most practicable and successful relocation/translocation methods for burrowing owl. When passive relocation is used solely as an impact avoidance measure, it is generally only effective when burrowing owl nesting territories are directly adjacent to permanently protected lands (i.e., military reservation, airport, wildlife reserve, agricultural reserve with appropriate crop type such as alfalfa) (Bloom 2003). Passive relocation has been criticized as a relocation method because relocated or displaced owls are tenacious about returning to their familiar burrows and are inclined to move back to the impact site when the impact site is still visible to the owl and/or when the impact site is not completely graded (Bloom pers. comm.). Burrowing owls are put at increased risk when they are introduced to a new environment. The owls are naturally preyed upon by numerous diurnal and nocturnal avian and mammalian species and evicting owls from their familiar burrow, territory, and home range without a safe opportunity to become familiar with their new habitat increases the potential for predation (Pagel pers. comm.). Thus, many burrowing owls likely die during passive relocations used for permanent owl eviction.

For successful active or passive relocation, breaking the owl’s site fidelity is of utmost importance (Bloom 2003). The off-site location for the relocated owls should ideally have an existing burrowing owl colony and a large ground squirrel colony. Should neither colony already exist at the translocation site, artificial burrows should be installed (Bloom 2003). Active translocation of owls involves trapping owls, temporarily holding them in enclosures with supplemental feeding, and releasing at a suitable off-site location with existing or artificial burrows prior to breeding.

Golden Eagle

Direct and indirect impacts include loss of foraging habitat. Golden eagles can be extremely susceptible to disturbance during the breeding season (Anderson et al. 1990; USFWS 2009b), and adverse effects are possible from various human activities up to (and in some cases exceeding) one mile from a nest site (Whitfield et al. 2008). However, due to the distance of the GSEP from the surveyed nest sites (approximately 9 miles) and the fact that they are out of the line-of-sight, disturbance impacts due to construction or operation are not expected (TTEC 2010q). The GSEP would reduce the availability of foraging habitat in the GSEP area and could degrade foraging habitat by the introduction and spread of noxious weeds and an increase in human activity in the area. However the amount of habitat impacted within the 10 mile range from each nest is less than one percent and other habitat is comparable or better than the impacted habitat for eagle prey (TTEC 2010q).

Other potential causes of golden eagle mortality include collisions with the solar facilities, transmission lines, and electrocution. However, mortality is unlikely due to collisions with the solar facilities because of the lack of prey, and therefore hunting eagles, in the immediate vicinity of the operational facility. Mortality risk is low due to electrocutions at transmission lines because lines will follow American Power Line Interaction Committee guidelines (see discussion on electrocution under Additional Operational Impacts). The BLM is consulting with the FWS to determine whether construction and operation of the GSEP would be likely to take eagles. If so, then the FWS must determine whether an Avian Protection Plan (APP) would sufficiently minimize impacts to eagles. If the FWS indicates that an APP is not sufficient to avoid or minimize likely take resulting from the Proposed Action, the BLM authorized officer will not issue a Record of Decision or Decision Record approving the project. If the Applicant wishes to proceed, the Applicant must then identify an alternative project design to reduce the likely take to a level that is compatible with the preservation of eagles, and receive FWS concurrence for the revised APP. If, after coordination with the FWS, an APP is deemed appropriate and needed to sufficiently avoid and minimize take by the Proposed Action, the BLM authorized officer may issue a Record of Decision approving the project; however, the BLM authorized officer will not issue a Notice to Proceed until the FWS letter of concurrence for the APP is received for the project.

Migratory and Special-status Bird Species

Direct impacts include permanent loss of breeding and foraging habitat, including Sonoran creosote bush scrub and microphyll woodland; potential loss of eggs and young; disturbance of nesting and foraging activities for populations on and near the plant site and linear facilities; degradation and fragmentation of remaining adjacent habitat from edge effects. The Secondary Access Road, Distribution-Telecommunication Line, Redundant Telecommunications Line, and 6-pole transmission line extension could cause similar impacts as the other linear facilities mentioned above, although these features would occur along other linear disturbances or would add very few acres of impact.

Indirect impacts include increased road kill hazard from operations traffic and collision with mirrors; increased predation from ravens; disturbance from operations.

Several special-status species, such as black-tailed gnatcatchers, yellow warblers, and crissal thrashers, breed in the region, but would not breed on the site due to lack of suitable habitat. This region does not provide breeding habitat for Swainson’s hawks, northern harriers, short-eared owls, ferruginous hawks, or Brewer’s sparrows but may provide overwintering habitat or the species may be present during migration. The GSEP impacts to Sonoran creosote bush scrub and microphyll woodland would contribute to loss of foraging habitat, cover, and roost sites for these species on their migratory or wintering grounds, but would not contribute to loss of breeding habitat. The GSEP would have more substantial adverse effects to the resident breeding birds at the site, which include loggerhead shrike, California horned lark, and Le Conte's thrasher among others. These species would be adversely affected by the loss of microphyll woodland and Sonoran creosote bush scrub. Le Conte's thrasher, loggerhead shrikes and other wash-dependent species would in particular be affected by the loss of the cover, foraging and nesting opportunities provided by the structurally diverse and relatively lush dry washes and microphyll woodland. Dry washes contain less than five percent of the Sonoran Desert's area, but are estimated to support ninety percent of Sonoran Desert birdlife (CalPIF 2006). The loss of active bird nests or young is regulated by the federal Migratory Bird Treaty Act and Fish and Game Code section 3503, which protects active nests or eggs of California birds.

Bats

The GSEP site supports foraging and roosting habitat for several special-status bat species. Roosting opportunities for bats are available in tree cavities, soil crevices and rock outcroppings primarily within dry desert wash woodland habitats. Bats likely utilize habitats throughout the GSEP area for foraging but forage more commonly when water is present within the desert washes when insects are more abundant. Implementation of the GSEP would result in loss of these foraging and roosting habitat opportunities for special-status bats that might occur in the GSEP area.

American Badger and Desert Kit Fox

Direct impacts include permanent loss of foraging and denning habitat; fragmentation and degradation of remaining habitat, loss of foraging grounds, crushing or entombing of animals during construction; increased risk of road kill hazard from construction traffic.

Indirect impacts include disturbance from increased noise and lighting; introduction and spread of weeds; increased risk of road kill from operations traffic.

Construction of the GSEP could kill or injure American badgers by crushing with heavy equipment or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. Like badgers, desert kit fox are burrow dwellers and are similarly at risk of death or injury from construction activities. The desert kit fox is not a special-status species, but it is protected under Title 14, California Code of Regulations (section 460), and potential impacts to individuals of this species must be avoided. Badger burrows and kit fox burrow complexes were detected within the Project Disturbance Area, and the site includes suitable foraging and denning habitat for these species. Construction activities could also result in disturbance or harassment of individuals. The Secondary Access Road, Distribution-Telecommunication Line, Redundant Telecommunications Line, and 6-pole transmission line extension could cause similar impacts as the other linear facilities, reducing available habitat, increasing the threat of mortality due to vehicle collisions, although these features would occur along other linear disturbances or would add very few acres of impact.

The GSEP would permanently remove foraging and denning habitat for American badgers and kit foxes and would fragment and reduce the value of foraging and denning habitat adjacent to the

GSEP site. This habitat loss and degradation could adversely affect American badger and kit fox populations within the NECO Planning Area.

Nelson's Bighorn Sheep

The GSEP site is south of a bighorn sheep connectivity corridor between the Palen and McCoy Mountains, identified in the NECO (BLM CDD 2002). However because the distance from the mountain ranges, and the width of the valley at the GSEP site, the GSEP site is not expected to be an important movement corridor for this species. The Society for Conservation of Bighorn Sheep has recommended a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat. The GSEP site is over one mile from the base of either the McCoy Mountains or Palen Mountains, and the GSEP site is not expected to provide spring foraging habitat.

Also of interest are the potential impacts from GSEP groundwater extraction to seeps, springs, or other water resources that are currently available to bighorn sheep that occupy the Palen Mountains or could occupy the McCoy Mountains in the future. The Applicant has provided information (GSEP 2009f) about the closest water features, and has concluded that groundwater extraction for the GSEP would not affect these features. After reviewing the data provided in the Data Responses, the GSEP is unlikely to affect springs and seeps available for use by bighorn sheep.

The GSEP site does not represent substantial direct or indirect impacts to bighorn sheep habitat connectivity or foraging. Bighorn sheep may be impacted by construction noise, as discussed in the Construction Noise subsection.

Additional Operation Impacts

Operation Lighting

Collision hazards at the GSEP site would include several ancillary buildings (e.g., water treatment building, administration building, control room, steam turbine generator building) that range in height from 30 to 50 feet. The structures would be located within the power block, approximately in the center of each solar field and surrounded by solar arrays. The solar collection assemblies would vary in height depending on their position while tracking the sun; the tallest configuration would be approximately 25 feet tall. The tallest proposed structures are the transmission line monopoles, which are approximately 75 feet tall.

Operation of the GSEP would require onsite nighttime lighting for safety and security at the site. Existing sources of artificial lighting at night in the GSEP vicinity include intermittent vehicles traveling along Interstate 10 as well as fixed light sources at the California State Prisons south of I-10 at the Wiley's Well Road Exit and at the Wiley's Well Rest Stop. Given the lack of night lighting in this remote area, the overall change in ambient lighting conditions at the GSEP site may be substantial when viewed from nearby offsite locations. Night lighting close to the ground at the GSEP site could disturb the resting, foraging, or mating activities of wildlife and make wildlife more visible to predators.

To reduce lighting impacts, the applicant proposed several design features (GESP 2009a, Visual Design Feature 5). Lighting at the facility would be restricted to areas required for safety, security, and operation. Exterior lights would be shielded and oriented to focus illumination on the desired areas and minimize additional nighttime illumination in the site vicinity (GESP 2009a). Switched lighting would be provided for areas where continuous lighting is not required for normal operation, safety, or security. Implementation of these applicant-proposed measures would allow areas surrounding the GSEP to remain un-illuminated (dark) most of the time, thereby minimizing the amount of lighting potentially visible off site and minimizing the potential for lighting impacts to proximate wildlife. These features have been incorporated into Condition of Certification VIS-3 (Temporary and Permanent Exterior Lighting) and BIO-8. Bird collisions occurring at night would be less than substantial and no mitigation is proposed.

Collisions

Bird collisions with structures typically result when the structures are invisible (e.g., bare power lines or guy wires at night), deceptive (e.g., glazing and reflective glare), or confusing (e.g., light refraction or reflection from mist) (Jaroslow 1979). Collision rates generally increase in low light conditions, during inclement weather (e.g., fog, which is rare in the desert), during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing from danger, or diving after prey. Numerous golden eagle fatalities have been documented near transmission lines where collisions apparently occurred from striking unmarked wires while diving for prey (Kerschner pers. comm.).

Lighting plays a substantial role in collision risk because lights can attract nocturnal migrant songbirds and major bird kill events have been reported at lighted communication towers (Manville 2001) with most kills from towers taller than 300 to 500 feet (Kerlinger 2004). Many of the avian fatalities at communication towers and other tall structures have been associated with steady-burning, red incandescent L-810 lights, which seem to attract birds (Gehring et al. 2009). Longcore et al. (2008) concluded that use of strobe or flashing lights on towers resulted in less bird aggregation, and, by extension, lower bird mortality, than use of steady-burning lights.

As described above, operation of the GSEP would require onsite nighttime lighting for safety and security at the site. The transmission line support structures would not be lit and no red incandescent lighting is proposed.

However, relative to nighttime collisions with lighted facilities, the risk of bird collisions and other injuries from solar facilities during daytime is unstudied. In particular, bird response to glare from the proposed solar trough technology is not well understood. Although the proposed GSEP facilities are significantly shorter than 350 feet (the height above which is considered a collision danger for migrating birds), there is concern that the mirrors may appear to a bird as a no-hazard flight area. The mirrors reflect light and take on the color of the image being reflected (Ho et al. 2009). When viewed from an angle near the current direction of the sun, at a distance or an elevated position, the solar field at its most reflective point may appear like a waterbody or lake (GSEP 2009a). Diurnal birds could also be at risk of injury and fatality from burns when they flew into the reflected sunlight between parabolic troughs or landed on the collector tubes of heat transfer fluid.

The risk of such impacts is probably low, although very little research has been conducted on the risks of bird collisions at solar facilities. The only such research available is the bird fatality studies at the Solar One facility near Daggett, San Bernardino County (McCrary et al. 1986). Results of that study indicated that much of the bird mortality consisted predominantly of collisions with mirrors, in large part resulting from increased numbers of birds attracted to the adjacent evaporation ponds and agricultural fields. For the GSEP, without such a nearby attractant, bird numbers, and hence likelihood of bird collisions, would be low.

Although CEC staff does not think it likely that mirrors and other structures within the Project Disturbance Area pose a significant collision risk to resident or migratory birds at the GSEP site, there is insufficient information available to conclude with certainty that the GSEP would not be an ongoing source of mortality to birds for the life of the GSEP.

Lighting – Glare

The proposed solar mirrors and heat collection elements (HCEs or receiver tubes) are sources of bright light caused from the diffuse reflection of the sun. Glint and glare studies of solar trough technology found that pedestrians standing within 20 meters (60 feet) of the perimeter fence when the mirrors rotate from the stowed position to a vertical position may see a light intensity equal or greater to levels considered safe for the human retina (URS 2008). Any wildlife on the ground at a distance of 20 meters or closer could experience similar hazards from unsafe light intensity. Slatted fencing is recommended in the Visual Resources section of this analysis to mitigate the problem of bright spots on motorists.

Electrocution

Large raptors such as golden eagle, red-tailed hawk, and great horned owl, can be electrocuted by transmission lines when the bird’s wings simultaneously contact two conductors of different phases, or a conductor and grounded hardware. This happens most frequently when a bird attempts to perch on or take off from a structure with insufficient clearance between these elements. The majority of bird electrocutions occur on distribution lines between 1- and 60-kV; however, configurations greater than 60 kV typically do not present an electrocution potential because phase-to-phase and phase-to-ground clearances for lines greater than 60-kV are typically sufficient to prevent bird electrocution (APLIC 2006). The proposed transmission lines would be 230 kV; therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to avoid bird electrocutions.

Potential impacts to wildlife resulting from electrocution by transmission lines would be minimized by incorporating the construction design recommendations provided in Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 (APLIC 2006). Specifically, the phase conductors shall be separated by a minimum of 60 inches and bird perch diverters and/or specifically designed avian protection materials should be used to cover electrical equipment where adequate separation is not feasible (APLIC 2006).

Evaporation Ponds

The proposed GSEP includes six, eight-acre evaporation ponds that would collect blowdown water from the cooling towers (GSEP 2009a). A variety of waterfowl and shorebirds seasonally inhabit or utilize evaporation ponds as resting, foraging, and nesting areas. Evaporation ponds in the Sonoran Desert pose several threats to wildlife. First, creation of a new water source to an area where water is scarce would attract ravens to the GSEP, potentially increasing predation rates on juvenile desert tortoise in adjacent habitat. Second, waterfowl, shorebirds, and other resident or migratory birds that drink or forage at the ponds could be harmed by selenium or hyper-saline conditions resulting from high total-dissolved-solids concentrations (EPTC 1999; Lemly 1996; Windingstad et al. 1987). CEC staff, CDFG, and USFWS are concerned about these threats to wildlife posed by the evaporation ponds.

Dry cooling is being evaluated as an alternative to wet cooling (refer to the Alternatives section, chapter 2) and zero liquid discharge (ZLD) remains a viable wastewater disposal alternative to evaporation ponds. These alternatives would eliminate impacts from wildlife exposure to the evaporation ponds and is recommended by CEC staff, CDFG, and USFWS.

Alternatives

Two alternatives to the Proposed Action other than the No Action/No Project Alternatives, the Reduced Acreage Alternative and the Dry Cooling Alternative were considered. Direct and indirect impacts from the Proposed Action and both alternatives are similar (aside from differences in impact acreage) for most wildlife resources, including impacts to desert tortoise habitat, Couch’s spadefoot toad, microphyll woodland, and migratory birds. While impacts from the Reduced Acreage Alternative are substantially less to Mojave fringe-toed lizard habitat and desert washes, these impacts would still be considered substantial under this alternative as well as under the Proposed Action and Dry Cooling Alternative.

Direct and indirect impacts from the Proposed Action and both alternatives would be similar (aside from differences in impact acreage) for most wildlife resources, including impacts to desert tortoise habitat, Couch’s spadefoot toad, and migratory birds (Table 4.21-1). While impacts from the Reduced Acreage Alternative are substantially less to Mojave fringe-toed lizard habitat and desert washes, these impacts would still be considered substantial under this alternative as well as under the Proposed Action and Dry Cooling Alternative.

Dry Cooling Alternative

Because this alternative would occupy the same footprint as the Proposed Action, the impacts remain the same between the two except for impacts to groundwater-dependent ecosystems. The Dry Cooling Alternative would use over 87 percent less groundwater than the Proposed Action. Indirect impacts to groundwater-dependent ecosystems under the Proposed Action are expected to be substantial when the water tables drop below the baseline spring water table levels necessary for healthy ecological functioning. Under the Dry Cooling Alternative, impacts to groundwater-dependent vegetation would not be substantial.

TABLE 4.21-1
COMPARISON OF DIRECT AND INDIRECT IMPACTS TO WILDLIFE RESOURCES BY ALTERNATIVE

Resource	**Proposed Action (Acres)**	**Dry Cooling (Acres)**	**Reduced Acreage (Acres)**	**No Action/No Project A, B, C (Acres)**
Desert Tortoise Habitat – Direct Impacts				
Within DWMA/Critical Habitat	24	24	24	0
Outside Critical Habitat	1,750	1,750	1,016	0
Total Desert Tortoise	***1,774***	***1,774***	***1,039***	***0***
Mojave Fringe-toed Lizard Stabilized/Partially Stabilized Sand Dunes – Direct Impacts				
Direct Impacts	7.5	7.5	**1.3**	**0**
Playa and Sand Drifts Over Playa				
Direct Impacts	38	38	44	0
Indirect Impacts to MFTL Habitat	151	151	0	0
Total Mojave Fringe-toed Lizard	***196.5***	***196.5***	***45.3***	***0***
Special Status & Migratory Birds (Sonoran Creosote Bush Scrub + Desert Dry Wash Woodland)	**1,789**	**1,789**	**1,032**	**0**

NOTES:

a From Application for Incidental Take Permit (TTEC 2009c).
b From CEC 2010d (TetraTech table “Anticipated Direct and Indirect Impacts to Vegetation Communities”); includes impacts to Sonoran creosote bush scrub.
c From CEC 2010d; includes direct permanent impacts to stabilized and partially stabilized sand dunes and sand drifts over playas.
d From CEC Revised Staff Assessment **Soil & Water Appendix A**, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.
e From TTEC 2010l (TetraTech memo “Revisions to Jurisdictional Waters for the Genesis Solar Energy Project”).
f From Appendix D, Lake and Streambed Alteration Agreement Application (TTEC 2009d).
g From TTEC 2010o (Tetra Tech memo “Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility”).
h PWA 2010a. (tn pending) PWA memo “Genesis Solar Energy Project, Analysis of Impacts to Sand Transport Corridor”)...
* Reflects changes Also, the removal of the ‘toe’ from the plant site footprint would also reduce impact acreage to state waters; however these reduced impact calculation have not been provided to date and therefore, are not included in this table.
i Revised per TTEC 2010s (Supplemental Information Genesis Solar Energy Project June 18, 2010) to include 6.5 acres of impact to sand dunes from the six-pole extension of the gen-tie line north of the Colorado River Substation. Acreage of 3.2 acres of impact from construction of distribution/telecommunications line is not yet included here or in the Sonoran creosote scrub, pending clarification regarding the upland habitat types that will be impacted by the distribution/telecommunications line.
j Revised per TTEC 2010s (Supplemental Information Genesis Solar Energy Project June 18, 2010) to reduce the impact to state waters by 21 acres, reflecting elimination of the 41.4 acre “toe” at the easternmost solar field.
k Includes one additional acre of direct impact (rounded up from 0.84 acre) due to construction of the distribution/telecommunications line.

The direct and indirect impacts from the Proposed Action to desert tortoise habitat, Couch’s spadefoot toad, microphyll woodland, and migratory birds would be the same as the impacts to these resources under the Dry Cooling Alternative.

The GSEP would directly impact 38 acres of Mojave fringe-toed lizard habitat (including 1 acre of dunes and 37 acres of playa with sand drifts) and indirectly affect 151 acres of habitat downwind of the Project Disturbance Area. The indirect impact results from the GSEP solar arrays extending into the sand transport corridor, diminishing the input of sand to downwind areas and reducing the active sand layer that is crucial to Mojave fringe-toed lizard habitat. The Mojave fringe-toed lizards in the Chuckwalla Valley are at the southernmost portion of the species range, and the proposed GSEP could increase the risks of local extirpation of an already fragmented and isolated population. Reduced Acreage Alternative

The smaller Reduced Acreage Alternative would have fewer impacts on many of the wildlife resources within the GSEP area, including desert tortoise habitat, and migratory birds. The Reduced Acreage Alternative would have substantially less impact on Mojave fringe-toed lizard habitat both because of a decrease in impacts to stabilized and partially stabilized sand dunes and because the Reduced Acreage Alternative does not extend into the sand transport corridor, and therefore has no indirect downwind impact to sandy habitats outside of the Disturbance Area (Table 4.21-1). Because the linear facilities for the Proposed Action and the Reduced Acreage Alternatives share the same route, impacts associated with this corridor are very similar. Impacts to Couch’s spadefoot toad and microphyll woodland remain the same for both the Proposed Action and this alternative for this reason. In addition, although the Reduced Acreage Alternative does represent fewer acres of impacts, it is the same overall length as the Proposed Action, and therefore indirect impacts to desert washes that currently flow through the area remain similar.

Direct and indirect impacts from the Proposed Action and the Reduced Acreage Alternative are similar (aside from differences in impact acreage) for most impacts associated with the Proposed Action including impacts to desert tortoise habitat, Couch’s spadefoot toad, microphyll woodland, and migratory birds. While impacts from the Reduced Acreage Alternative are substantially less to Mojave fringe-toed lizard habitat and desert wash, these impacts would still be considered substantial under this alternative as well as under the Proposed Action and Dry Cooling Alternative.

No Action Alternative A

No action on proposed Action application and on CDCA land use plan amendment

Under this alternative, the Proposed GSEP would not be approved by the Energy Commission and BLM and BLM would not amend the CDCA Plan. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because there would be no amendment to the CDCA Plan and no solar project approved for the site under this alternative, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site, and no impacts to sensitive wildlife resources. However, the land on which the GSEP is proposed would become available to other uses that are consistent with BLM’s land use plan, including another solar project requiring a land use plan amendment. In addition, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects may have some similar impacts in other locations.

No Project Alternative B

No action on proposed Action application and amend the CDCA land use plan to make the area unavailable for future solar development

Under this alternative, the Proposed Action would not be approved by the Energy Commission and BLM and the BLM would amend the CDCA Plan to make the proposed site unavailable for future solar development. As a result, no solar energy project would be constructed on the site and BLM would continue to manage the site consistent with the existing land use designation in the CDCA Land Use Plan of 1980, as amended.

Because the CDCA Plan would be amended to make the area unavailable for future solar development, it is expected that the site would continue to remain in its existing condition, with no new structures or facilities constructed or operated on the site. As a result, new impacts to wildlife resources would not occur, as such, this No Project Alternative would not result in impacts to wildlife resources that would occur under the Proposed Action. However, in the absence of the GSEP, other renewable energy projects may be constructed to meet State and Federal mandates, and those projects may have some similar impacts in other locations.

No Project Alternative C

No action on proposed Action application and amend the CDCA land use plan to make the area available for future solar development

Under this alternative, the Proposed Action would not be approved by the Energy Commission and BLM and BLM would amend the CDCA Land Use Plan of 1980, as amended, to allow for other solar projects on the site. As a result, it is possible that another solar energy project could be constructed on the site.

Because the CDCA Plan would be amended, it is possible that the site would be developed with the same or a different solar technology. As a result, sensitive wildlife resources would be impacted from the Proposed Action. Different solar technologies require different amounts of land, placement, grading and maintenance; however, it is expected that all the technologies would require a large use of land. As such, this No Project Alternative could result in biological resource impacts similar to the impacts under the Proposed Action.

4.21.3 Discussion of Cumulative Impacts

Cumulative impacts would vary by alternative only to the degree to which direct and indirect impacts would vary by alternative.

Construction and operation of the GSEP will have effects on a number of wildlife resources that are individually limited but cumulatively considerable. The cumulative effects analysis employed a quantitative, GIS-based analysis of direct impacts to habitat, and a qualitative analysis of indirect effects (e.g., increases in predators, noxious weeds, etc.). In many cases, the anticipated indirect effects are more substantial, or adverse, than the direct loss of habitat, but are more difficult to quantify. Geographic scope varied between wildlife resources, but most analyses were based on the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) boundaries (BLM CDD 2002).

Substantial cumulative effects (including indirect effects) were identified in a number of biological resource areas where the GSEP contributes—at least incrementally—to the cumulative effect. These include: desert washes in the Ford Watershed and the broader NECO planning area; desert tortoise habitat; golden eagle foraging habitat; Mojave fringe toed lizard and their habitat; habitat for American badger, desert kit fox, and burrowing owl; LeConte's thrasher habitat; Couch's spadefoot toad range; habitat for Harwood's milk-vetch and other dune/playa-dependent special-status plants; wildlife habitat and connectivity within the Palen-Ford WHMA (for Mojave fringe toed lizard, dunes, and playa); Mojave and Sonoran creosote bush scrub; desert dry wash woodland (microphyll woodland); playa and sand drifts over playa, and dunes (active and stabilized). The detailed cumulative effects analysis is included in Genesis Appendix E 4-19, 4-24, Biological Resources Detailed Cumulative Effects Analysis.

Of particular concern are the cumulative effects of renewable energy projects within the geographic scope of the Chuckwalla Valley, which contains an isolated system of dunes and population of Mojave fringe-toed lizard. The direct loss of dune habitat and Mojave fringe-toed lizard is minor relative to the indirect downwind effects from obstructions within the active aeolian sand transport corridor, and the disruption of the fluvial processes that contribute sand to the system from the diversion of washes--approximately 63 miles of washes within the Chuckwalla-Ford Dry Lake watershed alone. The cumulative impact of all the proposed projects would be to increase the already fragmented distribution of the Mojave fringe-toed lizards, and to increase the risk of extirpation of isolated populations within the Chuckwalla Valley. In addition to the disruption of geomorphic processes, substantial indirect effects that can be reasonably expected to occur in the Chuckwalla system from future projects include: fragmentation and its effects on connectivity and gene flow; spread of invasive non-native plants; increase in avian predators; and an increase in vehicle-related wildlife mortality. Table 4.21-2 summarizes cumulative impacts to sensitive wildlife resources.

Ongoing collaborative efforts by federal and state agencies to develop a Desert Renewable Energy Conservation Plan and BLM's Solar Energy Development Programmatic EIS offer an appropriate forum for such planning. Appendix B describes the Desert Wildlife Management Area management strategies that could achieve the goals of preservation and enhancement of wildlife connectivity in the NECO planning area. These programmatic efforts represent an excellent means of integrating the State's and BLM's renewable resources goals and environmental protection goals.

4.21.4 Reasonably Foreseeable Development Scenario: Southern California Edison Colorado River Substation

This subsection provides an overview of potential impacts to biological resources from construction of Southern California Edison's (SCE's) proposed 230 kV expansion of the already-permitted (but not yet constructed) 500 kV Colorado River Substation. Unlike the transmission line that would go from the GSEP power plant to the Colorado River Substation (the "gen-tie") SCE's Colorado River Substation is not part of the GSEP description. Rather, SCE would acquire a permit from the California Public Utilities Commission, and would construct, own and operate

TABLE 4.21-2
SUMMARY OF CUMULATIVE IMPACTS

Biological Resource	Cumulative Impact
Desert Tortoise	Contributes to cumulative loss of low to moderate value desert tortoise habitat (2.0% to 0.1 habitat value, 2.9% to 0.2 habitat value, 0.1% to 0.3 habitat value) from future projects in the NECO planning area.
Mojave Fringe-Toed Lizard	Contributes 0.2% to cumulative loss from future projects within the NECO planning area; contributes 1.7% to cumulative loss from future projects within the range of the Chuckwalla Valley population.
Couch's Spadefoot Toad	Contributes 1.6% to cumulative loss of habitat from future projects within the NECO planning area.
Western Burrowing Owl	Contributes 0.5% to cumulative loss from future projects within the NECO planning area.
Golden Eagle	Contributes 7.4% to cumulative loss of Sonoran creosote bush scrub and 0.2% to loss of dry desert wash woodland, and 0.6% to loss of sand dune foraging habitat from future projects within the NECO planning area within 10 miles of the GSEP. Contributes 0.8% to cumulative loss of Sonoran creosote bush scrub and 0.03% to loss of dry desert wash woodland, and 0.6% to loss of sand dune foraging habitat from future projects within 10 miles of the nearest mountains.
Special-Status Birds & Migratory Birds	Contributes 0.6% to cumulative loss of habitat from future projects within NECO planning area (Le Conte's Thrasher).
Desert Kit Fox & American Badger	Contributes 0.5% to cumulative loss of habitat from future projects within the NECO planning area.
Nelson's bighorn sheep	None
Bats	Loss of foraging habitat.

NOTES:
[a] From CEC 2010d (TetraTech table "Anticipated Direct and Indirect Impacts to Vegetation Communities").
[b] From TTEC 2010l (TetraTech memo "Revisions to Jurisdictional Waters for the Genesis Solar Energy Project").
[c] From TTEC 2010j (TetraTech Notification of a Lake or Streambed Alteration Agreement Application, Appendix D).
[d] From TTEC 2009c (TetraTech Application for Incidental Take of Threatened and Endangered Species).
[e] From CEC Revised Staff Assessment Soil & Water Appendix A, calculation of the downwind impacts to Mojave fringe-toed lizard habitat from Project intrusion into sand transport corridors.
[f] From TTEC 2010o (Tetra Tech memo "Minor Changes to the Genesis Solar Energy Project Description: 6-pole Extension of Transmission Line; Inclusion of Distribution and Telecommunications Line; Removal of "Toe" Area from Plant Facility").

the Colorado River Substation to serve several projects in the area. SCE would provide an analysis of impacts to biological resources and mitigation for those impacts resulting from construction of the Colorado River Substation. However, because the proposed expansion of the Colorado River Substation is a reasonably foreseeable development, a description of the expansion and potential impacts to biological resources is included here. The purpose of the discussion in this subsection is to inform all interested parties of the potential for impacts to biological resources that may result from other actions related to the GSEP.

Impacts to Biological Resources from Colorado River Substation Expansion

The Colorado River Substation expansion would be constructed within sand dune habitat. The basis for this inference is Figure DR-BIO-51-2 from the Data Response submitted for the Blythe Project (AECOM 2010e). This figure shows, at a scale of 1 inch = 6000 feet, the approximate location of the proposed Colorado River Substation and depicts it as being entirely within stabilized and partially stabilized sand dune. Supporting inference that the substation expansion will be in sand dunes is the Applicant's submittal which included the 2010 preliminary survey results from the Blythe Project (TTEC 2010o, Attachment A). This submittal showed numerous records for species that occur on sand dune habitat (for example Mojave fringe-toed lizard and ribbed cryptantha) in and around the proposed Colorado River Substation location. Based on the information from the Blythe Project 2010 surveys (TTEC 2010o, Attachment A, Figure 2 - Preliminary Results Botany Rare Plants Spring 2010 Surveys, and Figure 4 - Incidental Wildlife Observations Spring 2010 Surveys and TTEC 2010p) Mojave fringe-toed lizards and a number of other sensitive sand dune-dependent species are likely to be directly impacted by expansion of the Colorado River Substation. Many Mojave fringe-toed lizards were detected in and near the proposed Colorado River Substation, as well as numerous rare plants, including Harwood's eriastrum, Harwood's milk-vetch, winged cryptantha and ribbed cryptantha.

Even when the substation expansion avoided direct impacts to these sensitive sand dune species, indirect impacts are likely to occur. Alterations in drainages could adversely affect special-status plant populations that occur downstream of the GSEP area. Other indirect effects include the spread of the non-native Sahara mustard and other non-native invasive species, which degrade sand dune habitat by prematurely stabilizing dunes. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could also adversely affect sand dune dependent plant and animal species.

No desert tortoise were detected on or within the one-mile buffer around the proposed substation site during the 2010 surveys (TTEC 2010o; TTEC 2010p), but given the proximity of good habitat in the immediate vicinity of the proposed substation desert tortoise could occur near the proposed substation expansion and could be directly or indirectly impacted. Transmission line maintenance activities and an increase in OHV use from the construction of roads into previously inaccessible areas could result in increased disturbance from human intrusions and increased risk of mortality from vehicle strikes and crushing of burrows. Construction activities and addition of new perching structures such as transmission poles and lines could result in increased raven numbers, and hence an increase in desert tortoise predation. Road construction could also increase the opportunities for non-native invasive plant species, with adverse effects to native plant and wildlife communities. Nesting birds, badger, kit fox, and burrowing owls could also be directly or indirectly affected by construction and operation of the expanded substation. We do not have information about the presence of ephemeral washes, desert dry wash woodland and other ephemeral drainages in the proposed substation expansion area. The proposed expansion and associated drainage modifications could result in direct and indirect impacts to state waters.

SCE's proposed expansion of the Colorado River Substation has the potential to result in substantial direct, indirect and cumulative impacts to biological resources, in particular for sensitive dune-dependent plant species such as Harwood's eriastrum. Implementation of appropriate mitigation measures such as those for the GSEP would avoid, minimize or compensate for many of the impacts.

4.21.5 Summary of Mitigation Measures

The following mitigation measures set forth in **Appendix G** would avoid or minimize impacts on wildlife resources[1]:

> BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, BIO-7, BIO-8, BIO-9, BIO-10, BIO-11, BIO-12, BIO-13, BIO-15, BIO-16, BIO-17, BIO-18, BIO-20, BIO-21, BIO-23, BIO-27, BIO-28, BIO-29

Moreover, to address potential impact to Climate Change, the BLM would require, as discussed in Section 4.17 Vegetation, in concert with BIO-7, the following:

> **BLM BIO-7a:** The Applicant shall ensure that monitoring accomplished under BIO-7 and other mitigating measures use available climatalogical data when analyzing project effects or resource trends.

4.21.6 Residual Impacts after Mitigation

The GSEP would have substantial impacts to wildlife resources, eliminating all of the Sonoran creosote bush scrub and other native plant and wildlife communities within the approximately 1,800-acre site, including 90 acres of desert washes. Without mitigation the GSEP would contribute to the cumulatively substantial loss of wildlife resources within the Chuckwalla Valley and the Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) area. In addition to direct loss of habitat, the GSEP would fragment and degrade adjacent native wildlife communities, and could promote the spread of invasive non-native plants and desert tortoise predators such as ravens through providing perches. Routes of wildlife movement along washes or fringes of sand dunes would be cut off or reduced due to perimeter fencing and the impacted washes. Wildlife trailing along the fence to find suitable routes would be subject to increased vulnerability to predation. Additionally, fencing would provide perches for predators that would forage beyond the GSEP, preying upon such species as Mojave fringe-toed lizards. Gaps in fencing, if not maintained to standards, could trap desert tortoises, burro deer, badgers, kit foxes. Recommended avoidance and minimization measures as well as compensatory mitigation to offset direct, indirect, and cumulative impacts to desert tortoise and other special-status species, would assure compliance with state and federal laws such as the federal and state endangered species acts and regulations protecting waters of the state. With implementation of proposed Mitigation Measures, GSEP impacts to wildlife resources would be reduced to less substantial levels. Nonetheless, losses would occur to habitat for, or individuals of, the desert tortoise, American badger, desert kit fox, golden eagle, migratory birds, burrowing owl and Mojave fringe-toed lizard.

Mitigation for Desert Tortoise

Mitigation Measures BIO-9 through BIO-11 would avoid and minimize potential take of desert tortoise during GSEP construction and operation. To offset the loss of desert tortoise habitat, mitigation measure BIO-12 recommends habitat compensation at a 1:1 ratio for desert tortoise

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[1] The CEC document intertwined vegetation and wildlife resources in the mitigation measures and these have not been modified because as a whole they mitigate the impacts to vegetation and wildlife resources.

1,749 acres (i.e., acquisition and preservation of one acre of compensation lands for every acre lost). For GSEP impacts to 23 acres within the Chuckwalla Desert Tortoise Critical Habitat Unit, the mitigation ratio would be 5:1. This compensatory mitigation is consistent with recommendations from the California Department of Fish and Game (CDFG), the U.S. Fish and Wildlife Service (USFWS), and BLM guidance in the NECO. Proposed mitigation measure BIO-12 also requires that the land acquisitions be within the Colorado Desert Recovery Unit, and or? have potential to contribute to desert tortoise habitat connectivity and build linkages between desert tortoise populations and designated critical habitat. These conditions satisfy the California Department of Fish and Game's requirements under Section 2081 of the California Fish and Game Code. To address GSEP-related increases in ravens, a desert tortoise predator, proposed Mitigation Measure BIO-13 requires implementation of a Raven Monitoring, Management and Control Plan, as well as contributions to the USFWS Regional Raven Management Program.

4.21.7 Unavoidable Adverse Impacts

The GSEP and the proposed alternative would result in substantial impacts to sensitive wildlife resources, and would permanently diminish the extent and value of native animal communities in the region. Under the technology proposed in the three GSEP alternatives, the proposed Action, Dry Cooling, and Reduced Acreage Alternative, the native wildlife communities would be permanently lost, totaling 1,746 acres, 1,746 acres, and 950 acres, respectively.

The GSEP site provides habitat for desert tortoise, a species listed as threatened under the federal and state endangered species acts. The GSEP would impact approximately 1,750 acres of desert tortoise habitat, including 24 acres within the Chuckwalla Desert Critical Habitat Unit. Construction and operation of the GSEP would therefore require state and federal endangered species "take" authorization. In addition to direct loss of habitat the GSEP would fragment and degrade adjacent native plant and wildlife communities, and could promote the spread of invasive non-native plants and desert tortoise predators such as ravens.

4.22 Irreversible and Irretrievable Commitment of Resources

The National Environmental Policy Act (NEPA) requires an analysis of the significant irreversible effects of a proposed action. Resources irreversibly or irretrievably committed to a proposed action are those used on a long-term or permanent basis. This includes the use of nonrenewable resources such as metal, wood, fuel, paper, and other natural or cultural resources. These resources are considered nonretrievable in that they would be used for a proposed action when they could have been conserved or used for other purposes. Another impact that falls under the category of irreversible and irretrievable commitment of resources is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

The GSEP would irretrievably commit resources over the 30-40 year life of the project. After 30-40 years, the GSEP is planned to be decommissioned and the land returned to its pre-project state. This would indicate that potentially some of the resources on site could be retrieved. However, 30-40 years is a long time and many variables could affect the project over that period. In addition, it is debatable as to how well the site can recover to its pre-project state. Open desert lands and sensitive desert habitats can take a long time to recover from disturbances such as development. The GSEP site currently is not entirely undisturbed due to the site's use as a military training ground.

The GSEP is a renewable energy project intended to generate solar energy to reduce reliance on fossil fuels. Over the 30-40 year life of the GSEP, this renewable energy project would contribute incrementally to the reduction in demand for fossil fuel use for electricity-generating purposes. Therefore, this incremental reduction in expending fossil fuels would be a positive effect of the commitment of nonrenewable resources to the GSEP.

4.23 Short-term vs. Long-term Productivity of the Environment

The short-term uses of the environment as a result of the GSEP and its built alternatives include those typically found with solar energy development. Short-term impacts associated with construction activities described elsewhere in Chapter 4, Environmental Consequences, include effects to the natural environment, cultural resources, and recreation resources. These can be compared to the long-term benefits of the proposed action and its built alternatives, all of which would provide for the production of clean, renewable energy consistent with Federal and State goals to increase production of renewable energy to help reduce dependence on fossil fuels.

As discussed earlier in Section 4.22, Irreversible and Irretrievable Commitment of Resources, the proposed action and alternative could permanently damage sensitive desert habitats, which in turn could adversely affect the long-term productivity of the area. However, these built alternatives would all also provide a long-term benefit by providing electric power with minimal increase in the use of non-renewable resources such as fossil fuels, which would result in a benefit to air quality and a reduction in carbon-based emissions.

CHAPTER 5
Consultation, Coordination and Public Involvement

5.1 Interrelationships

BLM's authority for the proposed action includes Federal Land Policy and Management Act (FLPMA) of 1976 [43 United States Code (U.S.C.) 1701 et seq.], Section 211 of the Energy Policy Act (EPAct) of 2005 (119 Stat. 594, 600), and BLM's Solar Energy Development Policy of April 4, 2007. The FLPMA authorizes BLM to issue right-of-way (ROW) grants for renewable energy projects. Section 211 of the Energy Policy Act of 2005 states that the Secretary of the Interior should seek to have approved a minimum of 10,000 megawatts of renewable energy generating capacity on public lands by 2015.

The BLM coordinates its fire management activities with the actions of related federal and state agencies responsible for fire management. The Federal Wildland Fire Policy is a collaborative effort that includes the BLM, USFS, National Park Service (NPS), USFWS, Bureau of Indian Affairs, the National Biological Service, and state wildlife management organizations. The collaborative effort has formulated and standardized the guiding principals and priorities of wildland fire management. The National Fire Plan is a collaborative interagency effort to apply the Federal Wildland Policy to all Federal Land Management Agencies and partners in state forestry or lands departments. Operational collaboration between the BLM, USFS, NPS, and USFWS is included in the Interagency Standards for Fire and Fire Aviation Operations 2003. This federally-approved document addresses fire management, wildfire suppression, fuels management and prescribed fire safety, interagency coordination and cooperation, qualifications and training, objectives, performance standards, and fire management program administration.

5.1.1 Department of Defense

BLM coordinates with Department of Defense prior to approval of ROWs for renewable energy, utility, and communication facilities to ensure that these facilities would not interfere with military training routes.

5.1.2 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (USACE) has jurisdiction to protect the aquatic ecosystem, including water quality and wetland resources under Section 404 of the Clean Water Act. Under that authority, USACE regulates the discharge of dredged or fill material into waters of the

United States, including wetlands, by reviewing proposed projects to determine whether they may impact such resources and, thereby, are subject to Section 404's permit requirement. Throughout the PA/DEIS process, the BLM has provided information to the USACE to assist the agency in making a determination regarding its jurisdiction and need for a Section 404 permit.

5.1.3 California Energy Commission

The Energy Commission has the exclusive authority to certify the construction, modification, and operation of thermal electric power plants 50 MW or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies and by federal agencies to the extent permitted by federal law (Pub. Res. Code Section 25500). The Energy Commission must review power plant AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Res. Code Section 25519), and compliance with applicable governmental laws or standards (Pub. Res. Section 25523 (d)). The Energy Commission staff's analyses were prepared in accordance with Public Resources Code, sections 25500 et seq.; Title 20, California Code of Regulations, sections 1701 et seq.; and CEQA (Pub. Res. Code Section 21000 et seq.; 14 Cal. Code Regs. § 15000 et seq.).

5.1.4 California Department of Fish and Game

The California Department of Fish and Game (CDFG) protects fish and aquatic habitats within the State through regulation of modifications to streambeds, under Section 1602 of the Fish and Game Code. The BLM and the Applicant have provided information to CDFG to assist the agency in its determination of the impacts to streambeds, and identification of permit and mitigation requirements. The Applicant filed a Streambed Alteration Agreement with CDFG. The requirements of the Streambed Alteration Agreement will be included as a recommended Condition of Certification/Mitigation Measure.

CDFG also has the authority to regulate potential impacts to species that are protected under the California Endangered Species Act (CESA) (Fish and Game Code Section 2050, et seq.). Accordingly, the Applicant has filed the appropriate incidental take permit applications. The requirements of the Incidental Take Permits will be included as a recommended Condition of Certification/Mitigation Measure discussed in the Biological Resources section of this document.

5.1.5 Mojave Desert Air Pollution Management District

The GSEP site is located in the Mojave Desert Air Basin[1] and is under the jurisdiction of the Mojave Desert Air Pollution Management District (District). Based upon the authorities in 40 Code of Federal Regulations (CFR) Part 52 and 40 CFR Part 60, the District is responsible for

1 The Mojave Desert Air Basin lies inland southeast of the San Joaquin Valley Air Basin, and northeast of the South Coast Air Basin. The desert portions of Kern, San Bernardino, Riverside, and Los Angeles counties are within its boundaries.

issuing the federal New Source Review (NSR) permit and has been delegated enforcement of the applicable New Source Performance Standard (Subpart IIII).

5.1.6 California Department of Transportation

The California Department of Transportation (Caltrans) has jurisdiction over encroachments to Caltrans facilities and related easements and rights-of way.

5.1.7 Riverside County

The County of Riverside has jurisdiction to issue building permits to the GSEP. Building permits issued by the County are ministerial. The County also has jurisdiction to issue discretionary approvals for any easements, rights-of-way and or encroachment permits where County facilities are concerned.

5.2 Describe Consultation Processes for ESA Section 7, NHPA Section 106, and Indian Tribes

5.2.1 U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over threatened and endangered species listed under the Endangered Species Act (ESA) (16 U.S.C. Section 1531 et seq.). Formal consultation with the USFWS under Section 7 of the ESA is required for any federal action that may adversely affect a federally-listed species. This consultation will be initiated through the preparation and submittal of a Biological Assessment (BA), which would describe the proposed action to the USFWS. Following review of the BA, the USFWS would be expected to issue a Biological Opinion (BO) that specifies mitigation measures, which must be implemented for any protected species.

5.2.2 Section 106 Compliance

Adverse effects that the proposed or alternative actions may have on cultural resources will be resolved through compliance with the terms of a Programmatic Agreement (PA) under Section 106 of the National Historic Preservation Act (NHPA) (16 USC Section 470). Analysis of impacts in this document and implementation of the terms of the PA would evidence BLM's compliance with NHPA Section 106 and NEPA.

In accordance with 36 CFR Section 800.14(b), PAs are used for the resolution of adverse effects for complex project situations and when effects on historic properties, resources eligible for or listed in the National Register of Historic Places (NRHP), cannot be fully determined prior to approval of an undertaking. The BLM would prepare a PA in consultation with the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, Indian tribes, and other interested parties. The PA would govern the conclusion of the identification and evaluation of historic properties (eligible for the NRHP), as well as the resolution of any adverse effects that may result from the proposed or alternative actions.

Treatment plans regarding historic properties that cannot be avoided by project construction will be developed in consultation with stakeholders as stipulated in the PA. When the PA is executed and fully implemented, the proposed action would have fulfilled the requirements of NEPA and Section 106 of the NHPA. The PA would be executed prior to BLM's approval of the Record of Decision for the ROW grant for the action.

5.2.3 Tribal Consultation for the GSEP

The BLM consults with Indian tribes on a government-to-government level in accordance with several authorities including NEPA, the NHPA, the American Indian Religious Freedom Act, and Executive Order 13007. Under Section 106 of the NHPA, the BLM consults with Indian tribes as part of its responsibilities to identify, evaluate, and resolve adverse effects on cultural resources affected by BLM undertakings.

The BLM invited Indian tribes to consult on the GSEP on a government-to-government basis at the earliest stages of project planning by letter in November 2009, and has followed up with an additional correspondence, communication, and other information since then. To date, 15 tribes or related entities have been identified and invited to consult on the proposed action, including those listed below. Tribes were also invited to a general information meeting and site visit, held on January 25, 2009. Letters to request consultation to develop a Section 106 Programmatic Agreement with tribes, the State Historic Preservation Officer, and the Advisory Council on Historic Preservation were mailed out to the below-listed tribes on February 25, 2010.

1. Ramona Band of Cahuilla Mission Indians
2. Torres-Martinez Desert Cahuilla Indians
3. Augustine Band of Cahuilla Mission Indians
4. Agua Caliente Band of Cahuilla Indians
5. Morongo Band of Cahuilla Mission Indians
6. Cabazon Band of Mission Indians
7. Twentynine Palms Band of Mission Indians
8. Quechan Tribe
9. Colorado River Indian Tribes
10. Chemehuevi Tribe
11. San Manuel Band of Serrano Mission Indians
12. Fort Mojave Indian Tribe
13. Cocopah Tribe

5.3 Implementation, Monitoring and Enforcement

5.3.1 Implementation

BLM will continue to involve and collaborate with the public during implementation of this proposed action. Opportunities to become involved during implementation and monitoring could include development of partnerships and community-based citizen working groups. BLM invites citizens and user groups within the vicinity of the proposed action to become actively involved in implementation, monitoring, and enforcement of decisions. BLM and citizens could collaboratively develop site-specific goals and objectives that mutually benefit public land resources, local communities, and the people who live, work, or play on the public lands.

5.3.2 Monitoring

BLM would monitor activities throughout the life of the proposed action to ensure that decisions are implemented in accordance with the approved ROD and ROW grant. Monitoring would be conducted to determine whether decisions, BMPs and approved mitigation are achieving the desired effects. Effectiveness monitoring would provide an empirical data base on impacts of decisions and effectiveness of mitigation. Effectiveness monitoring also would be useful for improving analytical procedures for future impact analyses and for designing or improving mitigation and enhancement measures.

5.3.3 Scoping

The Notice of Intent was published in the *Federal Register (Volume 74, No. 224)* on November 23, 2009. On December 11, 2009, BLM held its primary Scoping Meeting at the University of California-Riverside, Palm Desert Campus. A draft scoping report was released for public review and comment in January 2010. The Final Scoping Report is included as Appendix C.

5.4 Public Comment Process

5.4.1 Introduction

The California Energy Commission (CEC) and the United States Bureau of Land Management (BLM) distributed the joint Staff Assessment/Draft Environmental Impact Statement (SA/DEIS) for the Genesis Solar Energy Project (GSEP) for public and agency review and comment on April 9, 2010. The comment period ended July 8, 2010. Fourteen comment letters were received.

This Section 5 is organized as follows:

> **5.4.2 Format of the Responses to Comments:** This section describes the format and organization of the comments received on the SA/DEIS and the responses to those comments.
>
> **5.4.3 Index of Comments Received:** This section provides a list of the comments received on the SA/DEIS, by member of the public, agency, or organization, and lists the unique letter/number code for each comment.
>
> **5.4.4 Responses to the Comments:** This section lists the individual comment numbers for each comment and provides a response for each comment.

5.4.5 Comments: This section contains all the comments received on the SA/DEIS, with the individual numeric code assigned to each individual comment within each comment letter/email.

5.4.2 Format of the Responses to Comments

The comments received on the SA/DEIS are organized by agency, organization, or member of the general public. Each comment letter/e-mail is assigned a unique number. Individual comments/issues within each comment letter/email are numbered individually along the right-hand margins. Comments, so delineated, are provided in Appendix H.

5.4.3 Index of Comments Received

Table 5-1 lists all individuals, agencies and organizations that provided written comments on the SA/DEIS during and after the comment period. As described above, each comment letter, upon receipt, was assigned a unique number with each comment individually numbered as well. For example, comment 1-01 is the first substantive comment in Comment Letter 1. The "1" represents the commenter; the "01" refers to the first comment in that letter.

TABLE 5-1
COMMENT LETTERS ON THE GENESIS SOLAR ENERGY PROJECT
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Comment Letter	Commenter	Letter Available in Appendix H, Page
1	California Unions for Reliable Energy (CURE)	H-3
2	Metropolitan Water District of Southern California	H-35
3	NextEra Energy Resources, LLC; SolarReserve, LLC	H-41
4	Kaiser Eagle Mountain, LLC; Mine Reclamation, LLC (collectively, Kaiser)	H-44
5	Colorado River Board of California	H-46
6	CURE	H-50
7	Center for Biological Diversity	H-266
8	California/Nevada Regional Conservation Desert Committee of the Sierra Club (Sierra Club)	H-357
9	Western Watersheds Project	H-382
10	National Parks Service – Joshua Tree National Park	H-388
11	Brendan Hughes, Individual	H-397
12	US EPA Region IX	H-398
13	Tom Budlong, Individual	H-419
14	Galati Blek, LLP, for Genesis Solar	H-474

5.4.3.1 Letter 1 – Responses to Comments from CURE

1-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

1-002 The Applicant's construction and operation of the GSEP is subject to a myriad of separate and independent legal requirements, including NEPA, FLPMA, CEQA and the Warren-Alquist Act, which created and gives statutory authority to the California Energy Commission. The alleged noncompliance with CEQA and the Warren-Alquist Act is inapposite to the BLM's consideration of the proposed action under NEPA and FLPMA

1-003 See response to Comment 1-002.

1-004 See Response to Comment 1-002.

1-005 See Response to Comment 1-002.

1-006 See Response to Comment 1-002.

1-007 See Response to Comment 1-002.

1-008 See Response to Comment 1-002.

1-009 See Response to Comment 1-002.

1-010 See Response to Comment 1-002.

1-011 See Response to Comment 1-002.

1-012 See Response to Comment 1-002.

1-013 See Response to Comment 1-002.

1-014 See Response to Comment 1-002.

1-015 See Response to Comment 1-002.

1-016 See Response to Comment 1-002.

1-017 As noted in Response to Comment 1-002, the Applicant's construction and operation of the GSEP is subject to myriad separate and independent legal requirements, including requirements of the Regional Water Quality Control Board and the County of Riverside. Energy Commission approval of related documents does not govern the BLM's consideration of the proposed action under NEPA and FLPMA.

1-018 See Response to Comment 1-002.

1-019 See Response to Comment 1-002.

1-020 See Response to Comment 1-002.

1-021 See Response to Comment 1-002.

1-022 See Response to Comment 1-002.

1-023 See Response to Comment 1-002.

1-024 See Response to Comment 1-002.

1-025 See Response to Comment 1-002.

1-026 See Response to Comment 1-002.

1-027 See Response to Comment 1-002.

1-028 See Response to Comment 1-002.

1-029 See Response to Comment 1-002.

1-030 See Response to Comment 1-002.

1-031 See Response to Comment 1-002.

1-032 See Response to Comment 1-002.

1-033 See Response to Comment 1-002.

1-034 See Response to Comment 1-002.

1-035 See Response to Comment 1-002.

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1-037 See Response to Comment 1-002.

1-038 See Response to Comment 1-002.

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1-040 See Response to Comment 1-002.

1-041 See Response to Comment 1-002.

1-042 See Response to Comment 1-002.

1-043 See Response to Comment 1-002.

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1-050 See Response to Comment 1-002.

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1-060 See Response to Comment 1-002.

1-061 See Response to Comment 1-002.

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1-065 See Response to Comment 1-002.

1-066 See Response to Comment 1-002.

1-067 See Response to Comment 1-002.

1-068 See Response to Comment 1-002.

1-069 See Response to Comment 1-002.

1-070 See Response to Comment 1-002.

1-071 See Response to Comment 1-002.

1-072 See Response to Comment 1-002.

1-073 See Response to Comment 1-002.

1-074 See Response to Comment 1-002.

1-075 See Response to Comment 1-002.

1-076 See Response to Comment 1-002.

1-077 See Response to Comment 1-002.

1-078 See Response to Comment 1-002.

1-079 See Response to Comment 1-002.

1-080 See Response to Comment 1-002.

1-081 See Response to Comment 1-002.

1-082 See Response to Comment 1-002.

1-083 See Response to Comment 1-002.

1-084 See Response to Comment 1-002.

1-085 See Response to Comment 1-002.

1-086 See Response to Comment 1-002.

1-087 See Response to Comment 1-002.

1-088 See Response to Comment 1-002.

1-089 See Response to Comment 1-002.

1-090 See Response to Comment 1-002.

1-091 See Response to Comment 1-002.

1-092 See Response to Comment 1-002.

1-093 See Response to Comment 1-002.

1-094 See Response to Comment 1-002.

1-095 See Response to Comment 1-002.

1-096 See Response to Comment 1-002.

1-097 See Response to Comment 1-002.

5.4.3.2 Letter 2 – Responses to Comments from Metropolitan Water District of Southern California

2-001 The comment is correct: no MWD facilities have been identified on the proposed GSEP site. The BLM acknowledges that the proposed action could result in the installation of solar power generation facilities in general proximity to MWD aqueducts and other facilities. The GSEP would not draw water from any of MWD's facilities, and would not compete with MWD for water supplies. In terms of MWD's transmission system, the proposed action would not interfere with MWD's ability to transmit power along its existing transmission lines, and would not physically interfere with, disturb, or interrupt those lines. Therefore, the BLM anticipates that the GSEP would not have any direct or indirect effect on MWD's infrastructure or operations, and, therefore, would not interfere with MWD's ability to deliver water within its service area.

2-002 In terms of MWD's transmission system, the proposed action would not interfere with MWD's ability to transmit power along its existing transmission lines, and would not physically interfere with, disturb, or interrupt those lines. Potential impacts on transmission lines are discussed in PA/FEIS Section 4.12. Recommended separation between lines also is discussed in PA/FEIS Section 4.6, Lands and Realty. Metropolitan's existing transmission system is part of the baseline condition and, as such, has been taken into account in the PA/FEIS.

2-003 The GSEP would not draw water from any of MWD's facilities, and would not compete with MWD for water supplies. As discussed in FEIS Section 4.19, proposed groundwater extraction in support of the GSEP could interfere with groundwater flows that would otherwise be tributary to the Colorado River. However, Mitigation Measures SOIL&WATER-3 and SOIL&WATER-17 require the Applicant to mitigate or completely offset these effects. Therefore, the proposed action would not interfere with any water right or MWD's ability to divert water from the Colorado River. Therefore, the BLM anticipates that the GSEP would not have any direct or indirect effect on water resources, including the Colorado River and local groundwater supplies. As discussed in PA/FEIS Section 4.19, proposed groundwater extraction in support of the GSEP could interfere with groundwater flows that would otherwise be tributary to the Colorado River. However, Mitigation Measures WATER-15 and WATER-19 require the Applicant to mitigate or completely offset these effects. Therefore, the proposed action would not interfere with any water right or MWD's ability to divert water from the Colorado River.

2-004 PA/FEIS Section 4.19 discusses potential direct, indirect and cumulative impacts on water resources, including surface waters, including the Colorado River, and groundwater. See, e.g., PA/FEIS Section 4.19.2 (Groundwater Levels). This section also sates, "water in the Colorado River is fully appropriated."

2-005 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

2-006 The Colorado River and local groundwater supplies are identified in FEIS Section 3.20, Water Resources. Direct, indirect and cumulative impacts on such resources are discussed in FEIS Section 4.19. Projects included in the cumulative scenario, including other pending renewable energy projects within the Colorado River Basin and the local groundwater regions, are identified in FEIS Section 4.1. Accordingly, the FEIS adequately addresses the Applicant's water supply needs and any potential direct, indirect or cumulative impact on existing supplies.

5.4.3.3 Letter 3 – Responses to Comments NextEra and SolarReserve

3-001 This comment does not appear applicable to the GSEP because the establishment of a North-South utility corridor through the Solar Millennium Project site, as requested in the comment, would not result in the accommodation of an additional double circuit 230kV line that would run in parallel to the proposed gen-tie to the SCE Colorado River Substation and also would not provide access by projects to the north of the GSEP via separate transmission line corridors around the proposed GSEP either to the west or to the east.

5.4.3.4 Letter 4 – Responses to Comments from Kaiser Eagle Mountain, LLC

4-001 The BLM has identified all reasonably foreseeable future projects based on Section 6.8.3.4 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008).

5.4.3.5 Letter 5 – Responses to Comments from Colorado River Board of California

5-001 PA/FEIS Section 4.19 discusses potential direct, indirect and cumulative impacts on water resources, including surface waters, including the Colorado River, and groundwater. See, e.g., PA/FEIS Section 4.19.2 (Groundwater Levels). This section also states, "water in the Colorado River is fully appropriated."

5-002 See Response to Comment 5-001.

5.4.3.6 Letter 6 – Responses to Comments from CURE

6-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

6-002 Cumulative impacts are addressed in the FEIS Chapter 4.01 with a detailed listing of cumulative projects in Tables 4.1-1 and 4.1-2, and a cumulative discussion by resource in Sections 4.02 through 4.21.

6-003 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

6-004 Impacts are identified in sections 4.17 and 4.21 and Appendix E.

6-005 See FEIS Section 4.19 (Water Resources) and Appendix G (conditions of certification - soil & water). Dry cooling is the Agency's Preferred Alternative.

6-006 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

6-007 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

6-008 Section 4.17 and Appendix E address direct, impact, and cumulative impacts to vegetation resources including special status plants. Mitigating measures BIO-19, BIO-8, and BIO-14, as well as others, avoid, reduce, or compensate for special status plants, including those not found on surveys to date, as pre-construction surveys are included as mitigation. Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010b) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

6-009 The GSEP Golden Eagle Survey reports were submitted in June, 2010 (WMI 2010a and TTEC 2010), and clarify and confirm prior assumptions and understandings. The information was used in preparation of PA/FEIS Sections 3.23 and 4.21. Mitigation Measure BIO-12 (desert tortoise compensation) would compensate with like habitat in the same area for the lost golden eagle foraging habitat which supports as good, or better prey populations than the GSEP habitat. Mitigation measure BIO-28 remains for monitoring to ensure construction or operations features can be managed if golden eagles appear later in the project.

6-010 See responses to comments 6-044 and 12-089. Efforts to identify places of traditional cultural importance to ethnic and cultural groups are described on pages 3.4-28 through 3.4-34 and in Appendix D of the FEIS. Mitigation measures for cultural resources affected by the GSEP are presented on pages 4.4-8 through 4.4-10 and in Appendix G of the FEIS. The BLM is complying with Section 106 of the National Historic Preservation Act (NHPA) through the completion of a Programmatic Agreement (PA) with the State Historic Preservation Officer (SHPO) and consulting parties such as Native American Tribes.

6-011 The “project setting”, that is, the affected environment is thoroughly described throughout FEIS Chapter 3; the description of the proposed action is presented in Chapter 2; the indentified impacts and mitigation measures are presented in Chapter 4 and Appendix G.

6-012 All connected ancillary actions are identified in FEIS Section 2.2 and are analyzed in FEIS Chapter 4.

6-013 An updated description of the affected environment for each resource is discussed in the FEIS Sections 3.2 through 3.23. Additional surveys/studies are anticipated to be required or completed as a result of other agencies’ statutory or regulatory obligations, or within specific areas of expertise. For example, the FWS Endangered Species Act Section 7 consultation, ACOE Jurisdictional Delineation, and the Section 106 Programmatic Agreement all are in progress. Each of these processes is independent of and separate from the NEPA process, and will be prepared in accordance with the schedule and procedures established in the relevant regulatory regimes. Studies required or completed in satisfaction of other agencies’ requirements that become available before the ROD is issued will be evaluated by the BLM. Other agencies and the public would have the opportunity to review such reports to the full extent of the relevant governing law.

6-014 Section 4.17 and Appendix E address direct, impact, and cumulative impacts to vegetation resources including special status plants. Mitigating measures BIO-19, BIO-8, and BIO-14, as well as others, avoid, reduce, or compensate for special status plants, including those not found on surveys to date, as pre-construction surveys are included as mitigation. Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

6-015 See response to comment 6-014.

6-016 The GSEP Golden Eagle Survey reports were submitted in June, 2010 (WMI 2010a and TTEC 2010), and clarify and confirm prior assumptions and understandings. The information was used in preparation of PA/FEIS Sections 3.23 and 4.21. Mitigation Measure BIO-12 (desert tortoise compensation) would compensate with like habitat in the same area for the lost golden eagle foraging habitat which supports as good, or better prey populations than the GSEP habitat. Mitigation measure BIO-28 remains for monitoring to ensure construction or operations features can be managed if golden eagles appear later in the project.

6-017 See response to comment 6-016.

6-018 Other surveys conducted for the GSEP found no wintering golden eagles (TTEC and Karl 2010). See discussion in section 4.21 on impacts to golden eagles.

6-019 See response to comment 6-016.

6-020 Surveyors found suitable breeding habitat for Couch's spadefoot toad (Scaphiopus couchi). All artificial or temporary water catchments that could serve as breeding pools for Couch's spadefoot toad were also mapped. Surveyors did detect suitable breeding habitat for this species in the borrow pit south of I-10 that crosses the Project's transmission line route near the Colorado River Substation. Habitat for this species consists of extremely xeric areas with sandy, well-drained soils, often associated with creosote bush and mesquite trees (Arizona-Sonora Desert Museum 2010). Temporary ponds created during seasonal rainstorms are important habitat for breeding. Couch's spadefoot toad breed primarily in response to summer storms, from May through September, so surveys have been scheduled for Summer or early Fall 2010 (TTEC and Karl 2010). Couch's spadefoot toad mitigation (BIO-27) limits noise and vibration requires preparing and implementing a protection and mitigation plan, and creating and protecting suitable breeding ponds. Habitat findings confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

6-021 See response to comment 6-020.

6-022 A great deal of current baseline information was acquired for the GSEP, including that presented in the SA/DEIS and referenced from various documents such as the Application For Certification (AFC), the Biological Resources Technical Report (TTEC and Karl 2009; TTEC and Karl 2010) and the CEC RSA. See PA/FEIS Sections 3.18, 3.22 and 3.23, which describe the affected environment for vegetation resources, wildland fire ecology, and wildlife resources, respectively. Most biological data relevant to the GSEP Study Area were collected in the last three years. Additionally, reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

6-023 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

6-024 The GSEP Golden Eagle Survey reports were submitted in June, 2010 (WMI 2010x and TTEC 2010), and clarify and confirm prior assumptions and understandings. The information was used in preparation of PA/FEIS Sections 3.23 and 4.21. Mitigation Measure BIO-12 (desert tortoise compensation) would compensate with like habitat in the same area for the lost golden eagle foraging habitat which supports as good, or better prey populations than the GSEP habitat. Mitigation measure BIO-28 remains for monitoring to ensure construction or operations features can be managed if golden eagles appear later in the project.

6-025 Section 4.17 and Appendix E address direct, impact, and cumulative impacts to vegetation resources including special status plants. Mitigating measures BIO-19, BIO-8, and BIO-14, as well as others, avoid, reduce, or compensate for special status plants, including those not found on surveys to date, as pre-construction surveys are included as mitigation. Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

6-026 The process of soil-mapping considers the interrelated factors of age, climate, vegetation, parent rock, and soil texture; and most pertinently assesses the soil for its relative susceptibility to wind erosion. Table 4.14-1 presents the results of an analysis of soil series on the site for their predicted wind erosion rates. This analysis shows that under the construction scenario, there is a negligible increase in wind erosion rates for the Arco Soil Series and an actual decrease in wind erosion rates for the Gunsight and Cipriano Series, relative to undisturbed conditions. This indicates that disturbance of the land surface during construction is unlikely to have substantial adverse effects on soil loss by wind. Further, implementation of Mitigation Measures AQ-SC3 and AQ-SC4 would control construction-related fugitive dust and address the commenter concern about possible contributions to PM-10 (see PA/FEIS Section 4.2.4 and Appendix G).

6-027 This is mostly a CEQA comment. Reducing impacts to “less than significant” levels is a requirement of CEQA, which also defines significance differently, but is not a requirement of NEPA. See response to comment 6-020.

6-028 Surveys were conducted to detect migratory birds and special status species in the GSEP study area. In addition, agency experts were contacted to determine survey needs and likely species that may occur in the GSEP study area (TTEC and Karl 2010). The Gila woodpecker is a migratory bird. Even though the Gila woodpecker was not detected and is not expected to occur in the GSEP, several mitigation measures appropriate for migratory birds would benefit the Gila woodpecker if it occurred at the GSEP (see FEIS Section 4.21).

6-029 Compensation is not proposed for cumulative impacts. Features available to bats for roosting and habitat that provides forage for bats occurs scattered throughout the lands that may be available for acquisition and conservation. The lands in the GSEP that may be valuable for bats are all suitable desert tortoise habitat and it is reasonable to assume that like habitat suitable for the tortoise in the same area will have similar value for bats.

6-030 Mitigation measure BIO-17 is found in Appendix G. Reducing impacts to “less than significant” levels is a requirement of CEQA, which also defines significance differently, but is not a requirement of NEPA. In NEPA the impacts to the human environment are disclosed and in this case, significance is a given since an Environmental Impact Statement is being prepared.

6-031 BLM stands by the conclusions in the FEIS sections 4.21 and 4.09. Additionally, mitigation measures BIO-8 and BIO-16 would avoid or reduce impacts through seasonal work windows and pre-construction surveys and avoidance measures.

6-032 The low level of impacts is not largely because of a lack of bighorns or their sign during surveys, but the best available knowledge that a corridor lies north of the GSEP. Additionally, the GSEP location conforms to guidelines by the Society for Conservation of Bighorn Sheep recommendation of a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat. Reducing impacts to “less than significant” levels is a requirement of CEQA, which also defines significance differently, but is not a requirement of NEPA. In NEPA the impacts to the human environment are disclosed and in this case, significance is a given since an Environmental Impact Statement is being prepared.

6-033 The applicant did not perform a detailed cumulative impact analysis. A detailed cumulative impact analysis which includes Nelson’s Bighorn Sheep is found in Appendix E. The low level of impacts is not largely because of a lack of bighorns or their sign during surveys, but the best available knowledge that a corridor lies north of the GSEP. Additionally, the GSEP location conforms to guidelines by the Society for Conservation of Bighorn Sheep recommendation of a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat.

6-034 Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

6-035 The Agency Preferred Alternative is Dry Cooling and impacts to the water table from the GSEP are not as expected as they would be in the proposed action. See section 4.19 for detailed discussion on impacts to the groundwater table and vegetation. Mitigation measures would remain in effect for water resources and biological resources.

6-036 The detailed cumulative effects analysis for wildlife and vegetation is found in Appendix E. Cumulative impact analysis is not an exercise in determining current conditions and trends, but requires considering effects of past, present, and reasonably foreseeable actions. The Appendix includes analyses Wildlife Habitat Management Areas and connectivity corridors. It also includes an analysis of cumulative effects to special status animals such as Mojave fringe-toed lizards and special status plants.

6-037 See response to comment 6-036.

6-038 Consultation under the federal ESA and CESA concerning GSEP effects to the desert tortoise is a separate process from NEPA and is ongoing. Coordination among the agencies has been close and mitigation measures are likely to be in synchrony with any terms and conditions that could arise from section 7 consultation. The ROD will incorporate terms and conditions from the Incidental Take Statement in the Biological Opinion, if any, and mitigation measures from the FEIS. The process is discussed in Section 5.2, consultation and coordination, of the FEIS

6-039 See response to comment 6-038.

6-040 See response to comment 6-038.

6-041 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, section 4.21 and appendix E discuss direct, indirect, and cumulative impacts to the desert tortoise.

6-042 Consultation under the federal ESA and CESA concerning GSEP effects to the desert tortoise is a separate process from NEPA and is ongoing. Coordination among the agencies has been close and mitigation measures are likely to be in synchrony with any terms and conditions that could arise from section 7 consultation. The ROD will incorporate terms and conditions from the Incidental Take Statement in the Biological Opinion, if any, and mitigation measures from the FEIS. The process is discussed in Section 5.2, consultation and coordination, of the FEIS

6-043 See response to comment 6-038.

6-044 BLM's Programmatic Agreement (PA) being formulated between the respective parties will address this issue. The PA will be available for public review and signed prior to issuance of the ROD. Additional mitigation measures are outlined in 4.4.4 (summary of mitigation measures) to the extent they are consistent with the PA.

6-045 See cumulative impacts discussion for cultural resources under Section 4.4.3 (discussion of cumulative impacts).

6-046 FEIS Chapter 4.11 address the health risks associated with Therminol VP-1 and other potentially hazardous materials and Section 4.11.2.4 summarizes the mitigation measures to reduce these risks. The mitigation measures are outlined in Appendix G (conditions of certification).

6-047 See Response to Comment 6-046.

6-048 See Response to Comment 6-046.

6-049 See Response to Comment 6-046.

6-050 The FEIS Section 4.11.4.4 identifies a mitigation measure that required implementation of a program for identifying UXO during construction.

6-051 BLM's policy is to use the best available information regardless of the source and will consider all other information supported by the scientific community (see FEIS Sections 3.2 and 3.22).

6-052 See Response to Comment 6-051.

6-053 The 400 AFY of outflow attributed to groundwater underflow to the Palo Verde Mesa Groundwater Basin is accounted for in the water balance of 2,608 AFY, see Section 4.19.

6-054 Groundwater analysis is discussed in FEIS Sections 3.20 (water resources) and 4.19 (impacts on water resources). BLM's policy is to use the best available information regardless of the source and will consider all other information supported by the scientific community.

6-055 See Response to Comment 6-054.

6-056 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

6-057 See Section 3.20 and 4.19 for discussion on Water Resources and Impacts to Water Resources along with Appendix G (conditions of certification – soil & water) for mitigation measures that address this issue.

6-058 See Response to Comment 6-005

6-059 See Response to Comment 6-005.

6-060 The Applicant's construction and operation of the GSEP is subject to myriad separate and independent legal requirements, including NEPA, FLPMA, CEQA and the Warren-Alquist Act, which created and gives statutory authority to the California Energy Commission. The alleged noncompliance with CEQA and the Warren-Alquist Act is inapposite to the BLM's consideration of the proposed action under NEPA and FLPMA. Nonetheless, the secondary access road ("spur road"), approximately one third of a mile in length, will be located along the same north/south corridor as the proposed gas line to allow emergency vehicles a secondary point of access. This corridor was previously surveyed to determine impacts from the proposed gas line.

6-061 In accordance with 40 CFR 1502.22, the FEIS Chapter 2 discloses that a Phase II interconnection study involving 2,200 MW is forthcoming. The Phase I interconnection study involving 9,690 MW of generation would not result in downstream transmission impacts. Any actions as a result of the studies are not considered connected actions.

6-062 See Response to Comment 6-002.

6-063 See FEIS Sections 4.22 and 4.23.

6-064 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

5.4.3.7 Letter 7 – Responses to Comments from Center for Biological Diversity

7-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment

7-002 The proposed action including all connected actions and alternatives are described in FEIS Chapter 2. Biological resources of the Colorado Desert are identified in FEIS Section 3.18 (vegetation) and FEIS Section 3.23 (wildlife). Direct, indirect and cumulative impacts of the GSEP and alternatives on these resources (including rare plants, desert tortoise, and Mojave fringe-toed lizard) are discussed in FEIS Sections 4.17 (vegetation) and 4.21 (wildlife), and FEIS Appendix E. The comment questions the adequacy of the FEIS's identification and analysis of impacts, including cumulative impacts and the reasonableness of the range of alternatives considered, but does not provide a basis for the statement or provide new information relevant to the analysis. Thus, the BLM has insufficient information to provide a more detailed response. The comment is correct that the proposed action includes a gen-tie line and would rely on the Colorado substation

7-003 The environmental consequences of the proposed GSEP are analyzed on an issue-by-issue basis throughout FEIS Chapter 4. See, e.g., FEIS Section 4.17 (vegetation), FEIS Section 4.21 (wildlife), FEIS Appendix E. Impacts to the CDCA plan are fully analyzed in FEIS Section 4.08.

7-004 NEPA directs the BLM to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources" (NEPA Section 102(2)(E)). A discussion of alternatives need not be exhaustive. What is required is information sufficient to permit the BLM to make a "reasoned choice" among alternative so far as environmental aspects are concerned (40 CFR 1502.14).

In order to establish the reasonable range of alternatives to be considered, the defined project purpose and need functions as the first and most important screening tool. Thereafter, the range of alternatives is based on the applicant's proposed action, alternatives that would reduce or avoid adverse impacts of the applicant's project, and appropriate No Action Alternatives. The full range of possible alternatives may be narrowed to a "reasonable number" that covers the full spectrum of alternatives. In determining the alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponents or others like or are capable of implementing the alternative. See BLM NEPA Handbook H-1790-1 (Jan. 30, 2008) §6.6.1.

The number and range of alternatives considered in the EIS is reasonable. In total, 24 alternatives to the proposed action were considered by the BLM. Five were carried forward, in addition to the proposed action, for more detailed review. Two of the five are action alternatives (the Reconfigured Alternative and the Dry Cooling Alternative); one is a "no action" alternative, under which no project and no CDCA Plan amendment would be approved (No Action Alternative A); and two are "no project" alternatives under which the CDCA Plan would be amended but the proposed project would not be approved (No Action Alternatives B and C). A comparison of impacts by alternative is provided in Table 2-1. The 19 alternatives that were considered but eliminated from detailed analysis, including the rationale for their elimination (40 C.F.R. 1502.14(a)), are presented in FEIS Table 2-1. This is a reasonable number of alternatives given the breadth of the BLM's statement of purpose and need. Further, the alternatives carried forward for more detailed consideration in the PA/FEIS sufficiently cover the full spectrum of alternatives because the scope of impacts assessed went from none (no action) to some (reduced acreage) to lessened in some respects (reconfigured).

7-005 See response to comments 7-004 and 13-009.

7-006 The BLM will not consider the proposed GSEP within the draft framework of the Solar PEIS. Although the BLM generally prefers to develop programmatic NEPA documentation and, thereafter, to use it as a basis for site-specific projects, the process of drafting, reviewing and considering the Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development (Solar PEIS) is not yet final.

A Notice of Intent to Prepare the Solar PEIS was published in the Federal Register on May 29, 2008. Secretarial Order No. 3285, issued March 11, 2009 by the Secretary of the Interior, announced a policy goal of identifying and prioritizing specific locations best-suited for large-scale production of solar energy. In light of this Order, the BLM and the DOE agreed to postpone completion of the Draft Solar PEIS, and, on June 30, 2009, published a Notice of Availability of maps that preliminarily identify 24 tracts of BLM-administered land for in-depth study. The scoping period was extended. The schedule to complete the Draft Solar PEIS remains "to be determined." (Solar PEIS, 2010). The schedule to complete the Final Solar PEIS or adopt the ROD also is not yet known (Id.).

The Center's comments on the PEIS and other utility-scale solar energy development proposals do not question, with reasonable basis, the accuracy of information in the EIS or the adequacy of, methodology for, or assumptions used for the environmental analysis for this project; they also do not don't pertain to the proposed action now under consideration. Nonetheless, the BLM is considering the proposed action as required under FLPMA, NEPA and other applicable requirements. Impacts of the GSEP and alternatives are analyzed on an issue-by-issue basis throughout FEIS Chapter 4. See, e.g., FEIS Sections 4.17 and 4.23 (vegetation and wildlife species and habitats, including connectivity).

Concerning sprawl development or sprawl-related impacts, the social and economic analysis in the FEIR (see Sections 3.14, 4.13) concludes that the proposed GSEP would not induce growth. The analysis estimates the amount of growth expected to occur based on the demand for housing from construction and operations workers by evaluating the supply of suitable housing to meet the temporary housing demand of project construction and operations workers. Given the region's relatively high unemployment rates it is expected that the majority of future construction and operations workers would live within the regional study area. Any workers attracted to work at any of the construction sites may be expected to seek temporary housing (i.e., for weekly commuting) and would maintain their existing primary residence in western Riverside County, San Bernardino or elsewhere. Based on the current housing vacancy rates and availability of local hotel/motel accommodations in the local and regional study area, there is considerable potential availability for suitable temporary housing or accommodations within the existing housing stock and motel/hotel facilities especially if workers are willing to share accommodations. Consequently, the BLM does not expect that any new housing or hotel/motel growth, much less sprawl, would occur as a result of the GSEP individually, or as part of the cumulative scenario.

7-007 The proposed action including all connected actions and alternatives considered for the proposed PA and ROW are described in FEIS Chapter 2 and are analyzed in Chapter 4.

7-008 The BLM agrees with this comment and has selected the Dry Cooling Alternative as the agency's Preferred Alternative.

7-009 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-010 The BLM and Energy Commission cooperatively prepared the draft environmental analysis for the GSEP in accordance with NEPA and CEQA; they agreed to prepare stand-alone final documents, one for NEPA (this PA/FEIS) and one for CEQA (the RSA). The BLM participated in the analysis contained in the RSA along with reviewing the RSA to be reviewed and relied on the RSA in the preparation of this PA/FEIS because the substantive analysis and conclusions of the Federal and State environmental review processes are substantially similar even though the format of the documentation is different. The BLM has incorporated all relevant studies and documents and materials provided by the CEC into the environmental analyses presented in this FEIS (see FEIS Chapter 4).

7-011 Section 4.08 of the FEIS provides an analysis of the GSEP's potential affects concerning CDCA Multiple Use Classes. The BLM has considered alternative CDCA plan amendments as described under No Action Alternatives B and C (see Chapter 2 for description). For additional information concerning the range of alternatives considered, see response to comment 7-006.

7-012 The use of exclusion areas for BLM would not be consistent with the stated purpose and need for the GSEP project. Any proposed plan amendments for exclusion areas in the BSPP and PSPP were not carried forward for inclusion in the FEIS. Other strategies have been used to protect relocation areas from future solar development and other measures, such as relocation areas in DWMA's have been used to achieve the same effect.

7-013 The CDCA Plan is a comprehensive, long-range plan that was adopted in 1980; it since has been amended many times. As described in PA/FEIS Table 1-1, the CDCA is a 25-million-acre area that contains over 12 million acres of BLM-administered public lands within the area known as the California Desert. As described by BLM's California State Director in his letter presenting the CDCA Plan:

> The California Desert Plan encompasses a tremendous area and many different resources and uses. The decisions in the Plan are major and important, but they are only general guides to site-specific actions. The job ahead of us now involves three tasks: 1) Site-specific plans, such as grazing allotment management plans or vehicle route designation; 2) On-the-ground actions, such as granting mineral leases, developing water sources for wildlife, building fences for livestock pastures or for protecting petroglyphs; and 3) Keeping people informed of and involved in putting the Plan to work on the ground, and in changing the Plan to meet future needs.

The CDCA Plan initially was prepared and continues to provide guidance concerning the use of the California desert public land holdings while balancing other public needs and protecting resources. More specifically, it establishes goals and specific actions for the management, use, development, and protection of the resources and public lands within the CDCA. It is based on the concepts of multiple use, sustained yield, and maintenance of environmental quality. The CDCA Plan's goals and actions for each resource are established in its 12 elements, each of which provides both a desert-wide perspective of the planning decisions for one major resource or issue of public concern and a more specific interpretation of multiple-use class guidelines for a given resource and its associated activities.

The Multiple Use Class (MUC) Guidelines in Table 1 of the CDCA Plan state that solar electrical generation facilities may be allowed in an MUC Moderate (M) area after NEPA requirements are met and the CDCA Plan is properly amended. The proposed action, if approved, would amend the CDCA Plan following the process anticipated in the CDCA Plan to identify the site as suitable for the proposed solar energy use. As stated in the PA/FEIS, the CDCA Plan amendment would only apply to the BLM-administered land being evaluated for the GSEP. Accordingly, the proposed CDCA Plan amendment and the overall amendment process would be consistent with the CDCA Plan.

The CDCA Plan anticipated that renewable energy generation facilities would be proposed in the California Desert. Accordingly, it made allowances for the review of such applications, including a provision that all proposed applications "associated with power generation or transmission not identified in the [CDCA] Plan will be considered through the Plan Amendment process." (See also, PA/FEIS Sections 1.4 and 4.6). The intention of this provision was to ensure that the BLM would take a planning view of all of the renewable energy applications proposed and that such projects would require an amendment to the CDCA to maintain consistency throughout the plan. Amendments to the CDCA Plan can be site-specific or global, depending on the nature of the amendment.

Concerns from the public regarding the multiple use mission of the BLM and the loss of this large section of public land to a single use are addressed in the strict enforcement of mitigation measures for habitat and other measures that ensure a one-to-one replacement of lands lost to a single use.

7-014 See Response to Comment 7-013.

7-015 See Response to Comment 7-013.

7-016 This comment is not considered substantive. A Land Use Plan is not a component of the Affected Environment (40 CFR 1502.15).

7-017 See Response to Comment 7-013.

7-018 OHV use in the NECO portion of the CDCA is limited to individually designated open routes only. There are no existing open routes in the GSEP site. However, the GSEP's proposed linear facilities would cross five routes. Unauthorized OHV travel is monitored by BLM law enforcement officers. For a full discussion concerning OHV impacts, refer to Section 4.16.

7-019 Concerning the relationship between the proposed action and the planning process for the Solar PEIS, see response to comment 7-006. Contrary to the suggestion in the comment, prior planning has occurred to set the stage and establish parameters for the BLM's consideration of the proposed action. Additional, site-specific and action-specific, planning in the form of this FEIS and the CDCA Plan amendment process will supplement prior planning efforts. At the site-specific and project-specific level, the direct, indirect and cumulative impacts of the GSEP and alternatives is discussed in FEIS Chapter 4. Additionally, inclusion of current projects is ongoing within the programmatic document. Current projects are being reviewed in context with the PEIS to help clarify the impacts of siting these project within the CDCA. Concerning worries about sprawl, see Response to Comment 7-006.

See Connected Action Descriptions in Chapter 2, as well as, new FEIS Tables 4.01-1 and 4.01-2 and cumulative impacts section for each resource.

7-020 All connected ancillary actions warranting analysis are identified in FEIS Section 2.2 and are analyzed in FEIS Chapter 4. Because the proposed action, if approved, would come before any of the development contemplated under the Solar PEIS, it is not appropriate to in this document to analyze how the PEIS could be affected by the approval of the GSEP and other projects in the cumulative scenario. To the contrary, the impacts of the proposed action, if approved, could be considered as part of the cumulative scenario for the Solar PEIS as a past action or, if the ROD has not been issued and PA and ROW has not yet been granted, impacts of the GSEP could be considered in the Solar PEIS's cumulative scenario as a present or reasonably foreseeable action.

7-021 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-022 The DEIS adequately analyzes impacts on biological resources, including vegetation and wildlife. The Applicant and consultants coordinated with BLM, USFWS, CDFG, and CEC on the requirements for species-surveys and survey protocols, if any. A great deal of current baseline information was acquired for this proposed action, including that presented in the SA/DEIS and referenced from various documents such as the Application For Certification (AFC), the Biological Resources Technical Report and the CEC RSA. See PA/FEIS Sections 3.18 and 3.23, which describe the affected environment for vegetation and wildlife, respectively. Most biological data relevant to the GSEP Study Area were collected in the last three years. Additionally, reports regarding Western Burrowing Owl surveys conducted in the spring of 2010 for special-status plants, golden eagles, Nelson's Bighorn sheep, and a revised Biological Resources Technical Report were recently submitted, confirm and refine prior assumptions and understandings, and were used in completing the PA/FEIS.

7-023 The FEIS identifies and analyzes impacts (direct, indirect and cumulative) of the GSEP and alternatives on an issue-by-issue basis throughout Chapter 4. See, e.g., FEIS Section 4.18 (vegetation), FEIS Section 4.21 (wildlife), FEIS Section 4.21(water resources), and FEIS Section 4.14 (soils).

7-024 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-025 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-026 See response to comment 7.004.

7-027 The proposed CDCA Plan amendment is described in FEIS Section 1.4.2. The construction and operation of a solar generating project on the proposed site would require the BLM to amend the CDCA Plan specifically to identify the site as suitable for such use; for the GSEP, the requisite amendment would identify the proposed site as suitable for the proposed project, i.e., the GSEP. The CDCA Plan amendment for this project would not result in changes to the Class M land use designation; instead, it would be site-specific, limited to the allowance of a solar energy use on the proposed site. Nonetheless, the PA/FEIS acknowledges an adverse cumulative impact on approximately one million acres of desert lands that are proposed for possible solar and wind energy development in the southern California Desert. Moreover, the proposed CDCA Plan amendment for the GSEP would be further limited by the accompanying right-of-way grant. The CDCA Plan amendment, if adopted, would not result in any changes in lands use designations or authorized lands uses anywhere else in the CDCA.

7-028 A review of the potential effects of climate change on the GSEP, including biological resources, is presented in FEIS Chapter 4.03, Impacts on Global Climate Change. The analysis assesses potential for climate change to affect various resources, as well as the extent to which the GSEP would influence these factors. As discussed in Chapter 4.03, the GSEP would result in a net reduction in GHG emissions, and the GHG emissions that would occur would be minor in comparison to amount of GHG emissions that would be offset by the GSEP. Therefore, additional mitigation of GHG emissions is not warranted.

Potential effects of the GSEP on wildlife resources are discussed in FEIS Chapter 3.23, Wildlife Resources and Chapter 4.21, Impacts on Wildlife Resources. Additionally, Chapter 4.03 contains a discussion of potential climate related effects on biological resources, as relevant to the GSEP. BLM concurs with the commenter regarding the importance of protecting intact wildlands and associated habitat corridors, in the face of potential climate change. The commenter suggests that the GSEP could interfere with climate change adaptation strategies, however, BLM is not aware of any existing or pending climate change adaptation planning or other strategies that are currently being implemented or proposed for implementation, that contain specific requirements or proposed management strategies or initiatives for the GSEP and its vicinity.

Unfortunately, the potential effects of future climate change on desert populations remains largely unknown, but could result in additional effects on desert wildlife, as discussed by the commenter. The potentially deleterious effects of climate change on wildlife would occur regardless of implementation of the GSEP. As discussed in Chapter 4.21, proposed mitigation would reduce the intensity of potential impacts on wildlife that would result from implementation of the GSEP, including desert tortoise and the Mojave fringe-toed lizard. Requirements for additional mitigation are not warranted.

In terms of groundwater use, the applicant has committed to moving forward with a dry cooling option (analyzed in this FEIS as the Dry Cooling Alternative). This action substantially mitigates potential water use and substantially reduces the volume of groundwater that would be required for GSEP implementation, and supports sustainable management of water resources in the Chuckwalla Valley Groundwater Basin, in order to help counter potential effects of climate change and other strain on water resources availability for human and environmental uses.

In regards to the amount of GHG emissions that would result from implementation of the GSEP, as discussed in Chapter 4.3, the GSEP would result in a net reduction in global GHG emissions. Therefore, the GSEP in and of itself serves as mitigation for global climate change. No additional analysis is warranted. Please see also response to Comment 7-071.

7-029 FEIS Chapter 2 provides a description of the Colorado River Substation expansion as well as the proposed secondary (spur) access road. These ancillary facilities are analyzed throughout FEIS Chapter 4.

7-030 Sections 3.18 on vegetation resources and 3.23 on wildlife resources characterize those resources that may be affected by the GSEP or its alternatives. A great deal of current baseline information was acquired for the GSEP, including that presented in the SA/DEIS and referenced from various documents such as the Application For Certification (AFC), the Biological Resources Technical Report (TTEC and Karl 2009; TTEC and Karl 2010) and the CEC RSA. See PA/FEIS Sections 3.18, 3.22 and 3.23, which describe the affected environment for vegetation resources, wildland fire ecology, and wildlife resources, respectively. Most biological data relevant to the GSEP Study Area were collected in the last three years. Additionally, reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

7-031 See response to comment 6-013.

7-032 See comment 7-030.

7-033 Mitigation is identified for the Mojave fringe-toed lizard, dunes, and sand drifts over playa habitats. These are elements of the Palen-Ford WHMA. Analysis of cumulative impacts to WHMAs and Mojave fringe-toed lizard are found in Appendix E.

7-034 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-035 FEIS section 4.21 and Appendix E discuss direct, indirect, and cumulative impacts to the desert tortoise and its critical habitat from the GSEP, including habitat fragmentation and movement barriers. Whether or not the recovery unit(s) is (are) in one configuration or another is beyond the scope of the EIS and cannot be resolved in the EIS process.

7-036 Energy Commission Conditions of Certification are incorporated into the FEIS as proposed Mitigation Measures. They are set forth in full in Appendix G and called out in the relevant issue sections of FEIS Chapter4. Mitigation measure BIO-10 requires the applicant to develop and implement a final Desert Tortoise Translocation Plan (Plan) that is consistent with current USFWS approved guidelines no later than 30 days before site mobilization. Further, the BLM agrees that disease testing should be a part of the Relocation/Translocation Plan. When the plan is prepared it will be made available.

7-037 See mitigation measure BIO-12 in Appendix G.

7-038 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-039 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-040 Section 4.21 and Appendix E of the FEIS discuss direct, indirect, and cumulative impacts to Nelson's bighorn sheep and burro deer. Additionally, the GSEP location conforms to guidelines by the Society for Conservation of Bighorn Sheep recommendation of a one mile buffer from the upper edge of any solar development to the base of the mountains to protect spring foraging habitat.

7-041 Mitigation ratios for indirect impacts are not mentioned in the NECO plan. The mitigation ratio for the GSEP indirect impacts cannot be compared to other referenced projects that discuss ratios for only direct impacts.

7-042 Section 4.21 discusses indirect impacts to Mojave fringe-toed lizards and residual impacts such as predators using fences at the edge of the developed area.

7-043 The DEIS adequately analyzes impacts on biological resources, including vegetation and wildlife. The Applicant and consultants coordinated with BLM, USFWS, CDFG, and CEC on the requirements for species-surveys and survey protocols, if any. A great deal of current baseline information was acquired for this proposed action, including that presented in the SA/DEIS and referenced from various documents such as the Application For Certification (AFC), the Biological Resources Technical Report and the CEC RSA. Section 4.17 and Appendix E address direct, impact, and cumulative impacts to vegetation resources including special status plants. Mitigating measures BIO-19, BIO-8, and BIO-14, as well as others, avoid, reduce, or compensate for special status plants, including those not found on surveys to date, as pre-construction surveys are included as mitigation. Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

7-044 Section 4.21 and Appendix E identifies potential and likely impacts from GSEP infrastructure, including fences, towers, mirrors, ponds, and powerlines. Surveys were conducted to detect migratory birds and special status species in the GSEP study area.

These studies helped identify birds in the area and a general idea of relative abundances. There is no practical way, however, to quantify hypothetical or real impacts from this project's infrastructure. Additionally, mitigation measures BIO-8 and BIO-16 would avoid or reduce impacts through seasonal work windows and pre-construction surveys and avoidance measures. Such measures can reduce impacts, but not eliminate them entirely over the life of the project.

7-045 The suggested relocation of the ponds would not decrease the impacts to wildlife. For applicable mitigation measures see Appendix G.

7-046 Section 4.21 and Appendix E identifies potential and likely impacts from GSEP infrastructure, including fences, towers, mirrors, ponds, and powerlines. Surveys were conducted to detect migratory birds and special status species in the GSEP study area. These studies helped identify birds in the area and a general idea of relative abundances. There is no practical way, however, to quantify hypothetical or real impacts from this project's infrastructure. Additionally, mitigation measures BIO-8 and BIO-16 would avoid or reduce impacts through seasonal work windows and pre-construction surveys and avoidance measures. Such measures can reduce impacts, but not eliminate them entirely over the life of the project.

7-047 Two burrowing owls cannot affect a regional distribution. A detailed cumulative impact analysis is found in Appendix E. Western burrowing owls are also discussed in FEIS Section 3.23 and impacts on them and their habitat are discussed in FEIS Section 4.21.

7-048 See Response to Comment 7-047. Concerning Energy Commission Conditions of Certification, including Bio-18, see Response to Comment 7-036. Concerning the adequacy of the data relied upon, in light of the Burrowing Owl mitigation plan, see Response to Comment 7-043. Mitigation measures have been modified slightly from those found in the DEIS to make them more clear, time-sensitive and verify their implementation. They are found in Appendix G. BIO-18 calls for a monitoring to be included in the plan. It is recognized that burrowing owl relocations are not always successful.

7-049 The FEIS discusses golden eagles in Sections 3.23 (affected environment) 4.21 (environmental consequences), and Appendix E. The GSEP Golden Eagle Survey reports were submitted in June, 2010 (WMI 2010x and TTEC 2010), and clarify and confirm prior assumptions and understandings. The information was used in preparation of PA/FEIS Sections 3.23 and 4.21. Mitigation Measure BIO-12 (desert tortoise compensation) would compensate with like habitat in the same area for the lost golden eagle foraging habitat which supports as good, or better prey populations than the GSEP habitat. Mitigation measure BIO-28 remains for monitoring to ensure construction or operations features can be managed if golden eagles appear later in the project.

7-050 The Applicant's construction and operation of the GSEP is subject to myriad separate and independent legal requirements, including NEPA, FLPMA, and the Bald Eagle and

Golden Eagle Protection Act (BEGEPA), which prohibits, except under certain specified conditions, the take, possession, and commerce of such birds. The analysis of environmental and other impacts in the FEIS is consistent with NEPA, which does not require that the EIS analyze impacts pursuant to BEGEPA. The GSEP Golden Eagle Survey reports were submitted in June, 2010 (WMI 2010x and TTEC 2010), and clarify and confirm prior assumptions and understandings. The information was used in preparation of PA/FEIS Sections 3.23 and 4.21. Mitigation Measure BIO-12 (desert tortoise compensation) would compensate with like habitat in the same area for the lost golden eagle foraging habitat which supports as good, or better prey populations than the GSEP habitat. Mitigation measure BIO-28 remains for monitoring to ensure construction or operations features can be managed if golden eagles appear.

7-051 The possibilities of collisions or electrocution are discussed in the FEIS in section 4.21.

7-052 Mitigation measure BIO-17 is found in Appendix G. Although suitable habitat occurs throughout the GSEP area, no statement was made that badgers and kit foxes occur throughout the GSEP. Any relocation/translocation effort is likely to entail risk to the translocated animal. It is recognized that translocation is an imperfect mitigation procedure.

7-053 The site's attainment status for PM-10 is acknowledged in PA/FEIS Section 3.2. While cryptobiotic soils are not specifically mentioned in the PA/FEIS, they are known to occur on older alluvial fan surfaces, along with desert pavement (see PA/FEIS Section 4.14). Both crypotbiotic soils and desert pavement are indicators of older desert soils that have not been recently flooded by desert washes, or overlain by wind-blown sands.

More specific information on the distribution and acreage of cryptobiotic soils within the GSEP is not necessary for an informed analysis of construction-related effects on wind erosion rates. This is because the process of soil-mapping considers the interrelated factors of age, climate, vegetation, parent rock, and soil texture; and most pertinently assesses the soil for its relative susceptibility to wind erosion. Table 4.14-1 presents the results of an analysis of soil series on the site for their predicted wind erosion rates. This analysis shows that under the construction scenario, there is an actual decrease in wind erosion rates relative to undisturbed conditions. This indicates that disturbance of the land surface during construction is unlikely to have substantial adverse effects on soil loss by wind. Further, implementation of Mitigation Measures AQ-SC3 and AQ-SC4 would control construction-related fugitive dust and address the commenter concern about possible contributions to PM-10 (see PA/FEIS Section 4.2.4 and Appendix G).

7-054 A discussion of desert pavement located on site is contained in FEIS Chapter 4.15, Impacts on Soils Resources. The commenter is correct that the air quality analysis does not specifically mention desert pavement. However, the analysis provided in FEIS Chapter 4.02, Impacts on Air Resources quantifies the total particulate matter emissions that would occur during construction and operation as a result of implementation of the GSEP. The emission rates shown in Tables 4.2-2 through 4.2-7 include dust emissions from soils sources on site, including desert pavement. Mitigation proposed by the applicant and referenced within Chapter 4.02 would minimize potential impacts associated with disturbance of desert pavement, including associated air emissions.

7-055 During scoping period no issues were raised relative to insects. The Applicant and consultants coordinated with BLM, USFWS, CDFG, and CEC on the requirements for species-surveys and survey protocols and checked with the California Natural Diversity Database for occurrences of special status species in or near the GSEP study area. No special status insects occur in the GSEP study area.

7-056 The Agency Preferred Alternative is Dry Cooling and impacts expected from large ponds are not as would be expected from the proposed action. Mitigation measure BIO-21 would remain in effect even for smaller ponds to protect wildlife and reduce incidence of subsidized predators.

7-057 The proposed action would be required to comply with the requirements detailed in the Decommissioning Plan. The plan would be finalized prior to the start of commercial operation and reviewed every five years thereafter. Concerning Energy Commission Conditions of Certification, including Bio-23, see Response to Comment 7-036. Residual impacts from the project and unavoidable adverse impacts are found at the end of sections 4.17 and 4.21 for vegetation and wildlife, respectively. Decommissioning and restoration would reduce recovery time somewhat; however recovery of the site would be measured in decades, not years. The 3809 regulations are inappropriate in this case as those relate to mining law. Reference to the 3809 regulations has been stricken from the mitigating measures and discussion of decommissioning.

7-058 Sections 3.22 and 4.20 of this FEIS discuss wildland fire ecology affected environment and impacts, respectively. In addition, section 4.11, impacts to public health and safety, discusses fire and the required Fire Protection and Prevention Program prior to start of operations, and a required Operation Fire Prevention Plan. Appendix G details Mitigation requirements in Worker Safety-1 and Worker Safety-9.

7-059 The comment suggests that the EIS fails to adequately identify and analyze impacts and that the mitigation measures are thereby flawed; however, the comment does not provide specific examples. Consequently, the BLM is not able to provide a more detailed response.

7-060 All required biological resource plans would be finalized and made publicly available prior to the initiation of construction activities.

7-061 Impacts concerning habitat associated with washes and ephemeral streams as well as soils and soil transport are thoroughly analyzed in FEIS Chapter 4.

7-062 The BLM agrees with stated concerns about wet cooling and has selected the Dry Cooling Alternative as the Agency's Preferred Alternative.

7-063 See FEIS Sections 3.20 and 4.19.

7-064 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-065 The GSEP would use only groundwater. The GSEP not require the use of surface water for construction or operation. Groundwater levels within the Chuckwalla Valley Groundwater Basin in areas potentially affected by or hydrologically downstream of the GSEP are sufficiently below the ground's surface, such that no change in surface water infiltration rates would occur as a result of any potential GSEP-related groundwater drawdown. Flood waters associated with desert washes in the vicinity of the GSEP would be routed around the GSEP site, and would not be captured or detained. Potential effects on the Colorado River would be mitigated as discussed in Chapter 4.19, Impacts on Water Resources. Therefore, the GSEP would not interfere with any existing water rights relevant to the California Desert Protection Act or any other water right holder.

7-066 As discussed for the wet cooling alternative under Chapter 4.21, Impacts on Wildlife Resources, based on the best available data and assuming implementation of wet cooling, implementation of the GSEP would have minor effects on the McCoy spring. This analysis is based on a detailed assessment of modeled groundwater level data, which are discussed in greater detail in Chapter 4.19, Impacts on Water Resources. Additionally, please note that the applicant has committed to carrying forward the Dry Cooling Alternative for GSEP implementation, in order to ensure that potential impacts to groundwater levels, including potential effects on springs, are minimized.

7-067 The GSEP would not affect surface water rights, as discussed for response to comment 7-065. Therefore, a cumulative analysis of potential effects on surface water rights, as proposed by the commenter, would neither be applicable to the GSEP nor required. No further discussion is warranted.

7-068 Potential impacts associated with groundwater use for the GSEP are discussed in FEIS Chapter 4.19, Impacts on Water Resources. Potential effects of groundwater use on the Colorado River are also discussed in Chapter 4.19. Potential effects of groundwater use on groundwater dependent vegetation and plant communities, as well as potential effects related to springs, are discussed in Chapter 4.17, Impacts on Vegetation Resources. Potential effects of groundwater use on wildlife resources are discussed in Chapter 4.21, Impacts on Wildlife Resources. No further potential impact categories related to the depletion of groundwater were identified. Therefore, no further analysis is warranted.

7-069 Chapter 4.19, Impacts on Water Resources addresses potential effects on water rights associated with the Colorado River system, and provides applicable mitigation to reduce the intensity of such effects. In terms of groundwater use, the groundwater basin in question is not adjudicated, or is it in process for or under serious consideration for adjudication. In the absence of adjudication, no groundwater rights or allocations would be established. Therefore, pumping of groundwater from the basin would not constitute an infringement upon another water user's right to pump groundwater, nor would it constitute a new groundwater right for the GSEP applicant. Providing additional, auxiliary analysis regarding a hypothetical and perhaps unlikely case in which the Chuckwalla Valley Groundwater Basin becomes subject to adjudication would require substantial speculation, and is not required under federal (or state) environmental law. For additional discussion of water rights, please refer to response to Comment 7-056.

Regarding the use of water off site: the environmental review process documented here only includes use of water on site. If the applicant were to use water from the GSEP off site, this use would be required, under Federal and California law, to undergo additional environmental review. To circumvent such review would be in direct violation of federal and state law. The present environmental review and associated permitting do not include off site use of pumped groundwater. Therefore, no off site of groundwater would be permitted, without further environmental review.

7-070 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-071 Chapter 3.03, Global Climate Change, provides an up-to-date overview of the required level of impact analysis regarding global climate change. BLM concurs with the commenter that NEPA requires a review of potential GHG emission sources and emission rates, including operations and construction. However, an assessment of life cycle emissions from materials used in the manufacture of GSEP components is not warranted, and is not provided for in existing documentation, case law, or reporting requirements. (Additionally, life cycle assessments for power generation facilities typically indicate that GHG emissions from the manufacture of materials and associated use of energy are very minor [1-2% or less] in comparison to emissions during project construction and operation.) As discussed in Chapter 4.03, Impacts on Global Climate Change, the GSEP would result in emission of approximately 53,974 MTCO2E during construction, and an additional 4,133 MTCO2E per year during operations. As discussed in the Mitigation Potential of the GSEP on Climate Change subsection of Chapter 4.03, the GSEP would offset significantly greater amounts of GHG emissions, as compared to construction and annual GSEP operation GHG emissions. Therefore, the GSEP would function to reduce GHG emissions overall, and no additional mitigation is warranted.

Heat transfer fluid would be contained within a closed-loop cycle, which would circulate the HTF from the power block out to the solar array. Leakage of HTF is expected to be minor, and HTF has not been identified as a potential contributor to GHG emissions. Note that the auxiliary boilers discussed in the FEIS would be used to heat the HTF during cold periods, and the GHG emissions from these boilers are quantified. There is no additional heating system for the HTF beyond the boilers.

For additional discussion, please refer to response to Comment 7-072.

7-072 FEIS Chapter 4.03, Impacts on Global Climate Change, quantifies SF6 emissions in terms of their global warming potential. As shown in Table 4.3-2, SF6 emissions for the entire GSEP would amount to approximately 3.4 MTCO2E over the lifetime of the GSEP. As a comparison point, emissions of other GHGs over the lifetime of the GSEP amount to 4,133 MTCO2E per year over the lifetime of the GSEP. The SF6 emissions considered within this analysis are associated with leakage from high voltage equipment (in particular, circuit breakers). Because SF6 emissions contribute to only a very minor fraction (approximately 0.08%) of the total GSEP GHG emissions, these emissions were not considered for additional mitigation.

7-073 Response: As discussed in Chapter 4.03, Impacts on Global Climate Change, implementation of the GSEP in and of itself serves as mitigation for GHG emissions. Specifically, the GSEP has an estimated GHG emission rate of 0.007 MT CO2E/MWh. This is well below the relevant GHG Emission Performance Standard of 0.500 MT CO2E/MWh, and far below typical CO2 emissions for the fossil power generation (0.35 to 1.0 MT CO2E/MWh) that the GSEP would offset. During the initial design phase, substantial effort has been made to minimize construction and operation CO2 emissions to the maximum extent practicable. Residual emissions are below applicable thresholds, and do not warrant additional, potentially costly mitigation.

7-074 The extent of PM10 emission during GSEP construction and operation is addressed in Chapter 4.02, Impacts on Air Quality. Specifically, Tables 4.2-2 through 4.2-5 summarize existing background PM10 and ozone concentrations, and also estimate the amount of PM10 and ozone that would be emitted during GSEP construction and operation. The mitigation measures provided in Chapter 4.02 would thereby provide specific and enforceable reductions in the intensity of PM10 and ozone impacts, in order to mitigate the potential for air quality impacts in accordance with NEPA.

7-075 FEIS Chapter 4.03, Impacts on Global Climate Change quantifies GHG emissions during construction and operation of the GSEP. The commenter specifically raises the issue of potential loss or destruction of existing sinks of carbon. These include losses of soil carbon from desert soils, loss of existing vegetation on site, and loss of carbon sequestration that would have occurred on site over the life of the project, if the proposed action never were to be installed/implemented. Potential carbon related effects related to land use change have been a subject of scientific, government, and interest group interest and research for the last several years, and many researchers have provided estimates of the amount of carbon contained in desert soils and vegetation, and the amount of carbon taken up annually by ecosystems in the Mojave Desert and similar climates. Estimates vary substantially based on the specific location of interest.

Campbell et al (2009) compiled several recent peer reviewed studies and other available data to assess the adequacy of a 500 MW solar thermal power plant installed in the Mojave Desert, when accounting for GHG emissions from land use change, as described above. The study compares the emissions of the solar thermal plant with a coal-fired Integrated Gasification Combined Cycle (IGCC) plant, assuming a 90% carbon capture sequestration rate for the IGCC plant. Results from the study indicate that, over the lifetime of the solar thermal plant, the solar thermal plant would save a total of 27,916,997 metric tons (30,773,222 short tons) of carbon emissions as compared to the IGCC with 90% carbon capture. This is likely a substantial underestimate of the carbon emission savings that would occur under the proposed action for two reasons: (1) the assessment of carbon emissions for the IGCC plant does not include emissions associated with land use change at the IGCC plant or the coal mine, which would supply the IGCC plant, and (2) the IGCC assessment includes carbon capture sequestration (CCS) at a 90% capture rate. There has been much discussion regarding CCS and its potential to reduce carbon emissions from fossil power plants. However, to date, only pilot scale CCS projects have been implemented in the U.S. Therefore, the fossil power that the proposed action would displace would not include CCS. Almost all of California's fossil-based electricity is supplied from natural gas without carbon capture, and carbon emissions California's existing grid mix of power would be many times higher than the IGCC with CCS case that is considered under the proposed action. Therefore, while we acknowledge that the proposed action would result in increased carbon emissions due to land use changes on site, the total mass of carbon emitted due to these land use changes would be significantly less than the net carbon emission savings of the power plant, based on displacement of existing fossil power production.

7-076 Please refer to response to comment 12-070.

7-077 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. The comment does not provide sufficient specificity to allow for a substantive response.

7-078 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. The comment does not provide sufficient specificity to allow for a substantive response.

7-079 Cumulative impacts on desert tortoise, Mojave fringe-toed lizard, golden eagles, and sand dunes ecosystems are analyzed in FEIS Section 4.21 (wildlife resources) and FEIS Appendix E. Cumulative impacts on water resources are analyzed in FEIS Section 4.21.

7-080 As explained in Section 6.2.1 of the BLM's NEPA Handbook, the statement of purpose and need dictates the range of alternatives analyzed, because action alternatives are not "reasonable" if they do not respond to the purpose and need for the action. The narrower the purpose and need statement, the narrower the range of alternatives that must be analyzed; the converse also is true. BLM has discretion in defining the purpose and need of the proposed action (40 CFR 1502.13).

BLM's purpose and need for the proposed action, as stated in Section 1.1 of the PA/FEIS, is based on two key considerations: (i) the potential action the BLM could or would take on the specific proposed action; and (ii) the response of the BLM in meeting specific directives regarding the implementation of renewable energy projects on federally-managed lands. The primary action that BLM is considering is a response to a specific ROW grant application from the Applicant to construct and operate a specific solar project on a specific site managed by the BLM. As a result, the BLM determined that a key purpose of this project was to determine whether to approve, approve with conditions, or deny that ROW application for a parabolic trough solar thermal electric generating facility, i.e., the GSEP.

7-081 Concerning the second access road, see response to Comment 7-029.

7-082 See response to comment 7-080.

7-083 See response to comment 7-080.

7-084 See response to comment 7-080.

7-085 See response to comment 7-080.

7-086 See response to comment 7-080.

7-087 See response to comment 7-080.

7-088 This comment is outside the scope of BLM's decision making authority.

7-089 See response to comment 7-080.

7-090 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

7-091 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

5.4.3.8 Letter 8 – Responses to Comments from California/Nevada Desert Energy Committee of the Sierra Club (Sierra Club)

8-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

8-002 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

8-003 Because the comment does not identify what technical flaws the SA/DEIS contained or what essential information was omitted, the BLM is unable to provide a detailed response. The analysis of impacts on groundwater supplies (PA/FEIS Section 4.19) concludes that mitigation measures would ensure that potential reductions in groundwater levels are minimized, but that some residual groundwater level reduction would occur as a result of GSEP implementation. PA/FEIS Section 4.4 finds that residual impacts on cultural resources would remain because cultural resources damaged or destroyed by construction of the GSEP, even if subjected to mitigation, would be permanently lost from the archaeological record. Impacts on biological resources are analyzed in PA/FEIS Section 4.17, which concludes that the project would have substantial residual impacts to vegetation resources, and PA/FEIS Section 4.21, which concludes that, even with Mitigation Measures, GSEP implementation would cause residual impacts to wildlife resources such that losses would occur to habitat for, or individuals of, the desert tortoise, American badger, desert kit fox, golden eagle, migratory birds, burrowing owl and Mojave fringe-toed lizard. No indication is given in the comment concerning what alleged defect affects the analysis of cumulative impacts, which are analyzed on an issue-by-issue basis throughout Chapter 4. The BLM agrees that dry cooling is the preferred alternative.

8-004 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

8-005 NEPA procedures ensure that “high quality” environmental information is available before actions are taken (40 CFR 1500.1). A “hard look” under NEPA consists of a reasoned analysis containing quantitative or detailed qualitative information. See, BLM NEPA Handbook H-1790-1 (Jan. 30, 2008). Further, the data and analyses provided in the PA/FEIS about the affected environment should be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced (40 CFR 1502.15). The PA/FEIS relies on quantitative data where possible, and detailed qualitative data under other circumstances. The BLM may rely on the best available information if it is sufficient to allow a reasoned analysis of particular impacts, and the BLM need not necessarily postpone its consideration of a proposal while additional data is being developed –the endless loop of analysis that might otherwise result surely would lead to significant regulatory delays. Data and other information relied upon in preparing the PA/FEIS are identified in the References section.

All studies or reports that were not available prior to the SA/DEIS that subsequently have become available were analyzed in the preparation of the PA/FEIS. Each of the studies and reports clarified or complimented earlier understandings or assumptions; none has caused a substantial change in a proposed action, and none is “significant” for purposes of NEPA.

Additional surveys are anticipated to be required or completed as a result of other agencies’ statutory or regulatory obligations, or within specific areas of expertise. For example, the FWS Endangered Species Act Section 7 consultation, ACOE Jurisdictional Delineation, and the Section 106 Programmatic Agreement all are in progress. Each of these processes is independent of and separate from the NEPA process, and will be prepared in accordance with the schedule and procedures established in the relevant regulatory regimes. Studies required or completed in satisfaction of other agencies’ requirements that become available before the ROD is issued will be evaluated by the BLM. BLM is making every effort to complete these processes in coordination with NEPA, and to finalize these other processes before the issuance of the ROD. Other agencies and the public would have the opportunity to review such reports to the full extent of the relevant governing law.

8-006 See response to comment 8-005.

8-007 Concerning the adequacy of the data relied upon, see response to comment 8-005. Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

8-008 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nevertheless, concerning the adequacy of the data relied upon, see response to comment 8-005.

8-009 Concerning the adequacy of the data relied upon, see response to comment 8-005. Information appended to the SA/DEIS was available to and accessible by members of the public. Mitigation measure BIO-10 requires the applicant to develop and implement a final Desert Tortoise Translocation Plan (Plan) that is consistent with current USFWS approved guidelines no later than 30 days before site mobilization. It will be made available when developed.

8-010 During scoping period no issues were raised relative to invertebrates. The Applicant and consultants coordinated with BLM, USFWS, CDFG, and CEC on the requirements for species-surveys and survey protocols and checked with the California Natural Diversity Database for occurrences of special status species in or near the GSEP study area. No special status invertebrates occur in the GSEP study area.

8-011 See response to comment 8-005.

8-012 See response to comment 8-005.

8-013 The BLM agrees with stated concerns about wet cooling and has selected the Dry Cooling Alternative as the Agency’s Preferred Alternative.

8-014 FEIS Chapters 3.20, Water Resources and 4.19, Impacts on Water Resources provide a review of available data and information regarding water balance within the Chuckwalla Valley Groundwater Basin(CVGB), including an estimate of total basin storage. Table 3.20-6 provides an overview of aquifer characteristics, including storativity, for alluvial, Bouse, and fanglomerate formations. The 15 million acre-feet figure is based on modeling completed by WorleyParsons and AECOM (see CEC Revised Staff Assessment and associated documentation for additional details). Hypothetically speaking, even if the total recoverable storage in the CVGB were only half of that indicated in Chapter 4.19 (e.g., 7.5 million acre-feet), the cumulative effect of the GSEP, in combination with all other reasonably forseeable projects, would still be a net reduction of only (approximately) 0.77%. This would still be only a minor proportion of total basin storage.

Also, the commenter should note that not all aquifer drawdown should be considered an environmental impact, in and of itself. It is the effect of that drawdown that can result in a potential impact. For the GSEP, aquifer drawdown would require implementation of various mitigation measures, in order to protect existing wells, ensure no reduction in flows to the Colorado River, and mitigate other potential impacts as discussed in Chapter 4.19.

8-015 The cumulative scenario is discussed in PA/FEIS Section 4.1, and includes Palen, Blythe, and Desert Sunlight in addition to other utility-scale energy projects. The Eagle Mountain Landfill project is analyzed as part of the cumulative scenario and so are various residential developments. Increased workforce-related issues and impacts are discussed and analyzed in PA/FEIS Sections 3.14 and 4.13. Contrary to the commenter's suggestion, the PA/FEIS presents the most conservative analysis reasonable under the circumstances.

8-016 The BLM agrees with stated concerns about wet cooling the Dry Cooling Alternative as the Agency's Preferred Alternative.

8-017 See response to comment 8-005.

8-018 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, consistent with BLM's Solar Energy Development Policy, ongoing monitoring of the groundwater basins will be a stipulation of the ROW grant and will be monitored by the BLM's Soil, Air and Water resources staff. The Compliance and Monitoring Program Manager will review the reports through the construction process, but will turn over long term monitoring to the Resources staff. The monitoring itself is not mitigation, but the if the results of the monitoring indicate an impact to groundwater, the applicant will be required to compensate in some form (see FEIS sections 4.14 and 4.19.

8-019 PA/FEIS Section 3.20 identifies ground subsidence as an issue of concern and analyzes related consequences in Section 4.19. Concerning the adequacy of mitigation measures that require action based on information current just prior to construction, see response to comment 8-005.

8-020 The PA/FEIS analyzes impacts of groundwater draw-down to biological resources, including vegetation, in Section 4.17, Considering the requirement that the analysis be quantified and the timing of information-gathering to inform mitigation measures, see response to comment 8-005. The BLM agrees with stated concerns about wet cooling and has selected the Dry Cooling Alternative as the Agency's Preferred Alternative.

8-021 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, the BLM agrees with stated concerns about wet cooling and has selected the Dry Cooling Alternative as the Agency's Preferred Alternative.

8-022 PA/FEIS identifies baseline conditions at McCoy Spring in Section 3.20. Concerning the adequacy of the information relied upon, see response to comment 8-005.

8-023 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

8-024 The BLM agrees with stated concerns about wet cooling and has selected the Dry Cooling Alternative as the Agency's Preferred Alternative.

8-025 In accordance with prevailing professional standards, the Class III cultural resource inventory conducted for the GSEP identified all cultural properties locatable from surface and exposed profile indications. This is considered a reasonable effort to identify historic properties that might be affected by the proposed undertaking. The geoarchaeological studies point to sediments within the project footprint that have the potential to contain archaeological materials because of their relatively recent age, stability, and proximity to topographic features (e.g. lake shoreline) used by indigenous peoples. Areas having high potential to contain buried archaeological deposits will be targeted for monitoring during construction. Any significant cultural resources discovered during construction will be treated in accordance with the Historic Properties Treatment Plan developed pursuant to the Programmatic Agreement for the GSEP.

8-026 See responses to comments 6-044 and 8-027.

8-027 The regulations implementing the National Historic Preservation Act (NHPA), found at 36 CFR Part 800, provide for the use of a Programmatic Agreement (PA) when effects on historic properties cannot be fully determined prior to approval of an undertaking. PAs commonly are used to comply with NHPA Section 106 on large projects like the GSEP. The PA for the GSEP would govern a process for completing the identification and evaluation of cultural resources that would be affected, and for determining mitigation consistent with their values, prior to construction or other activities that could affect them. The PA will be completed and signed prior to approval of the ROD. Consulting parties and stakeholders, including the State Historic Preservation Officer, the Advisory Council on Historic Preservation, and Indian tribes, will have an opportunity to participate in consultations on the terms and provisions of the PA before it is approved.

8-028 See Response to Comment 8-027.

8-029 Reducing impacts to "less than significant" levels is a requirement of CEQA, which also defines significance differently, but is not a requirement of NEPA. In NEPA the impacts to the human environment are disclosed and in this case, significance is a given since an

Environmental Impact Statement is being prepared. Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

8-030 Not all mitigation is in the form of compensation and there is no outright requirement for compensation of both direct and indirect impacts. Avoidance and minimization measures are also provided and discussed in Appendix G. Mitigation measures BIO-9, 10, 11, 12, and 13 directly relate to desert tortoise impact avoidance, minimization, and compensation. Other mitigation measures have at least an indirect relationship to avoidance and minimization of impacts to tortoises also, particularly BIO-1 through BIO-8 and BIO-14.

8-031 Even though the large majority of the GSEP is "outside the boundaries of "existing tortoise conservation areas," the NECO plan also recognized the value of conserving the desert tortoise in the planning area. A great deal of mitigation for the desert tortoise is proposed due to the impacts of the GSEP. Avoidance, minimization, and compensation measures are provided and discussed in Appendix G. Mitigation measures BIO-9, 10, 11, 12, and 13 directly relate to desert tortoise impact avoidance, minimization, and compensation. Other mitigation measures have at least an indirect relationship to avoidance and minimization of impacts to tortoises also, particularly BIO-1 through BIO-8 and BIO-14.

8-032 Mitigation measure BIO-10 requires the applicant to develop and implement a final Desert Tortoise Translocation Plan (Plan) that is consistent with current USFWS approved guidelines no later than 30 days before site mobilization. Further, the BLM agrees that disease testing should be a part of the Relocation/Translocation Plan.

8-033 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

8-034 Impacts to the Mojave fringe-toed lizard are found in section 4.21 and a detailed cumulative effects analysis is found in Appendix E. Additional discussion of impacts to sand transport is found in section 4.17, impacts to vegetation and 4.14, impacts to soils. Section 4.03 discusses impacts relative to global climate change. Biological resources could be affected as a result of climate change. Distribution patterns of species generally are expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species also may be altered. It would be extraordinarily difficult, if possible at all, to provide a broad-based climate analysis to a particular special-status species or habitat. Distribution patterns of species are generally expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species may also be altered. GSEP impacts on habitat fragmentation, habitat linkages, and cumulative impacts of multiple projects on corridors and connectivity are analyzed in the PA/FEIS and are only heightened in their importance by the effects of global climate change. As discussed in Section 4.3, adverse impacts of global climate change are expected to continue; however, international, national, and regional efforts, as well as the proposed action, are expected to reduce the rate at which such change occurs, and, thereby, to benefit the environment by minimizing the environmental impacts of climate change. Appropriate climate data would be collected while groundwater monitoring and special-status species monitoring occurs. Analysis of monitoring resource and project effects would consider available climate data when evaluating trends. In addition, evaluating the importance of this population to genetic diversity and climate adaptation of the species is beyond the scope of this EIS.

8-035 NEPA directs the BLM to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources” (NEPA Section 102(2)(E)). A discussion of alternatives need not be exhaustive. What is required is information sufficient to permit the BLM to make a “reasoned choice” among alternative so far as environmental aspects are concerned (40 CFR 1502.14). The full range of possible alternatives may be narrowed to a “reasonable number” that covers the full spectrum of alternatives. In determining the alternatives to be considered, the emphasis is on what is “reasonable” rather than on whether the proponents or others like or are capable of implementing the alternative. The BLM “can only define whether an alternative is ‘reasonable’ in reference to the purpose and need for the action. See BLM NEPA Handbook H-1790-1 (Jan. 30, 2008) §6.6.1.

For the proposed action, the BLM’s purpose for the project is to specifically respond to the applicant’s application for a right-of-way grant to construct, operate, maintain, and decommission a solar energy generation facility on public lands in compliance with Title V of FLPMA, BLM right-of-way regulations, and other applicable Federal laws. Thus, for BLM, the range of alternatives is based on the applicant’s proposed action, alternatives that would reduce or avoid adverse impacts of the applicant’s project, and appropriate No Action Alternatives. The alternatives considered by the BLM must involve an action on the part of the BLM. Here, those actions are to approve or disapprove a ROW grant for the use of the GSEP site for the proposed action and to amend or not amend the CDCA Plan to allow or not allow solar on the site.

The number and range of alternatives considered in the EIS is reasonable. In total, 30 alternatives to the proposed action were considered by the BLM. Five were carried forward, in addition to the proposed action, for more detailed review. Two of the five are action alternatives: The Dry Cooling Alternative and the Reduced Acreage Alternative. The remaining three are variations of a No Action Alternative. A comparison of impacts by alternative is provided in Table 2-2. The 30 alternatives that were considered but eliminated from detailed analysis, including the rationale for their elimination (40 C.F.R. 1502.14(a)), are presented in FEIS Table 2-3.

8-036 Section 4.21 of the FEIS discusses the effects of fences on other wildlife, including the subsection on residual impacts.

8-037 See response to comment 8-035

8-038 See response to comment 6-013.

8-039 Primary constituent elements are characteristics of critical habitat and are not required to be on all lands acquired for desert tortoise compensation. Primary constituent elements do not apply to Mojave fringe-toed lizard, desert kit fox, or American badger as they are not federally listed species with designated critical habitat.

8-040 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, The DEIS and PA/FEIS identify special-status species and sensitive plant communities and analyze direct, indirect, and cumulative impacts to desert tortoise, Mojave fringe-toed lizard, special-status plants, Desert Dry Wash Woodland, Nelson's bighorn sheep, and burro deer among many others. See PA/FEIS sections 3.18 and 4.17 (vegetation), PA/FEIS sections 3.23 and 4.21 (wildlife), and the detailed cumulative impacts analysis in Appendix E.

8-041 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, the detailed cumulative effects analysis for wildlife and vegetation is found in Appendix E. Cumulative impact analysis is not an exercise in determining current conditions and trends, but requires considering effects of past, present, and reasonably foreseeable actions. The Appendix includes analyses of Wildlife Habitat Management Areas and connectivity corridors. It also includes an analysis of cumulative effects to special status animals and plants. Both the DEIS and the PA/FEIS discuss cumulative impacts to wildlife movement and connectivity.

8-042 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

8-043 The detailed cumulative effects analysis for wildlife and vegetation is found in Appendix E. Cumulative impact analysis is not an exercise in determining current conditions and trends, but requires considering effects of past, present, and reasonably foreseeable actions. The Appendix includes analyses of Wildlife Habitat Management Areas and connectivity corridors. It also includes an analysis of cumulative effects to special status animals and plants. Both the DEIS and the PA/FEIS discuss cumulative impacts to wildlife movement and connectivity.

8-044 The detailed cumulative effects analysis for wildlife and vegetation is found in Appendix E. Cumulative impact analysis is not an exercise in determining current conditions and trends, but requires considering effects of past, present, and reasonably foreseeable actions. The Appendix includes analyses of Wildlife Habitat Management Areas and connectivity corridors. It also includes an analysis of cumulative effects to special status animals and plants. Both the DEIS and the PA/FEIS discuss cumulative impacts to wildlife movement and connectivity.

Section 4.03 discusses impacts relative to global climate change. Biological resources could be affected as a result of climate change. Distribution patterns of species generally are expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species also may be altered. It would be extraordinarily difficult, if possible at all, to provide a broad-based climate analysis to a particular special-status species or habitat. Distribution patterns of species are generally expected to shift according to regional changes in temperature and precipitation, while the location of wildlife migration corridors and the extent of invasive species may also be altered. GSEP impacts on habitat fragmentation, habitat linkages, and cumulative impacts of multiple projects on corridors and connectivity are analyzed in the PA/FEIS and are only heightened in their importance by the effects of global climate change. As discussed in Section 4.3, adverse impacts of global climate change are expected to continue; however, international, national, and regional efforts, as well as the proposed action, are expected to reduce the rate at which such change occurs, and, thereby, to benefit the environment by minimizing the environmental impacts of climate change. Appropriate climate data would be collected while groundwater monitoring and special-status species monitoring occurs. Analysis of monitoring resource and project effects would consider available climate data when evaluating trends. In addition, evaluating the importance of this population to genetic diversity and climate adaptation of the species is beyond the scope of this EIS.

8-045 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. The comment does not provide sufficient specificity to allow for a substantive response.

8-046 The cumulative scenario is described in PA/FEIS Section 4.1 (see, e.g., Tables 4.01-1 and 4.01-2) and analyzed on an issue-by-issue basis throughout Chapter 4.

8-047 See response to comment 8-035

8-048 See response to comment 8-035

8-049 See Response to Comment 8-045.

8-050 This comment states that the proposed action was not adequately analyzed under the requirements of the CDCA and FLPMA. FEIS Section 3.09 and 4.08 analyze and assess the impacts associated with the CDCA Plan. The FEIS analyzes impacts from “desert-wide” perspective in the cumulative impacts discussion presented throughout Chapter 4.

FLPMA

As indicated in PA/FEIS Sections 1.1.1 and 1.3.1, Table 1-1 and elsewhere, the BLM processes applications for commercial solar energy facilities as right-of-way authorizations under Title V of FLPMA and Title 43, Part 2804 of the CFR. FLPMA establishes public land policy; guidelines for administration; and provides for the management, protection, development, and enhancement of public lands. In particular, the FLPMA's relevance to the proposed project is that Title V, Section 501, establishes BLM's authority to grant rights-of-way for generation, transmission, and distribution of electrical energy. The BLM is processing the Applicant's application within the FLPMA framework.

CDCA Plan

The Multiple Use Class (MUC) Guidelines in Table 1 of the CDCA Plan state that solar electrical generation facilities may be allowed in an MUC Moderate(M) area after NEPA requirements are met and the CDCA Plan is properly amended. The proposed action, if approved, would amend the CDCA Plan following the process anticipated in the CDCA Plan to identify the site as suitable for the proposed solar energy use. As stated in the PA/FEIS, the CDCA Plan amendment would only apply to the BLM-administered land being evaluated for the GSEP. Accordingly, the proposed CDCA Plan amendment and the overall amendment process would be consistent with the CDCA Plan.

The CDCA Plan anticipated that renewable power generation facilities would be proposed in the California Desert. Accordingly, it made allowances for the review of such applications, including a provision that all proposed applications "associated with power generation or transmission not identified in the [CDCA] Plan will be considered through the Plan Amendment process." (See also, PA/FEIS Sections 1.4 and 4.6). The intention of this provision was to ensure that the BLM would take a planning view of all of the renewable energy applications proposed and that such projects would require an amendment to the CDCA to maintain consistency throughout the plan. Amendments to the CDCA Plan can be site-specific or global, depending on the nature of the amendment.

Concerns from the public regarding the multiple use mission of the BLM and the loss of this large section of public land to a single use are addressed in the strict enforcement of mitigation measures for habitat and other measures that ensure a one-to-one replacement of lands lost to a single use.

NECO Plan

The NECO Plan amended the CDCA plan in 2002 to make it compatible with desert tortoise conservation and recovery efforts. As described in FEIS Table 1-1, the BLM's NECO Plan is a landscape-scale planning effort that covers most of the California portion of the Sonoran Desert ecosystem, including over five million acres and two desert tortoise recovery units. No NECO Plan amendment is proposed as part of this action. However, through the California Desert Renewable Energy Conservation Plan (DRECP) process now underway, amendments to the NECO Plan are being considered.

8-051 The GSEP is proposed for development on lands designated Multiple-Use Class M. Nonetheless, the proposed BLM-initiated amendment of the CDCA Plan. Impacts of the

GSEP are analyzed on an issue-by-issue basis throughout Chapter 4. The comment provides insufficient detail concerning the alleged failure of the SA/DEIS to identify impacts to allow the BLM to provide a substantive response.

8-052 Impacts of the CDCA Plan Amendment described in FEIS Chapter 2 are analyzed on an issue by issue basis throughout Chapter 4. See, e.g., PA/FEIS Section 4.17 concerning vegetation and Section 4.21 concerning wildlife.

8-053 Sections 3.18 on vegetation resources and 3.23 on wildlife resources characterize those resources that may be affected by the GSEP or its alternatives. Specifically, the desert tortoise and Mojave fringe-toed lizard and their habitats are discussed. A great deal of current baseline information was acquired for the GSEP, including that presented in the SA/DEIS and referenced from various documents such as the Application For Certification (AFC), the Biological Resources Technical Report (TTEC and Karl 2009; TTEC and Karl 2010) and the CEC RSA. See PA/FEIS Sections 3.18, 3.22 and 3.23, which describe the affected environment for vegetation resources, wildland fire ecology, and wildlife resources, respectively. Most biological data relevant to the GSEP Study Area were collected in the last three years. Additionally, reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

8-054 Concerning consistency with FLPMA, see response to comment 8-050. The requisite "integrated consideration of physical, biological, economic, and other sciences," including consideration of cumulative effects on an issue-by-issue basis is provided throughout PA/FEIS Chapter 4. Concerning the adequacy of the data and information relied upon, see response to comment 8-005.

8-055 Concerning the alternatives examined, see response to comment 8-035. Cumulative impacts are addressed on an issue-by-issue basis throughout Chapter 4. The comment provides insufficient specificity for the BLM to provide a more detailed response.

8-056 Concerning consistency with FLPMA and the CDCA Plan, see response to comment 8-050. Concerning the geographic scope of analysis, which includes the CDCA.

8-057 Concerning consistency with NEPA, FLPMA and the CDCA and NECO Plans, see response to comment 8-050. CEQA consistency is beyond the scope of the PA/FEIS.

8-058 Concerning the range of alternatives considered, including the Dry Cooling Project Alternative, which is BLM's preferred alternative, see response to comment 8-005.

8-059 The Class III cultural resource inventory for the GSEP identified observable cultural resources within the GSEP Area of Potential Effects, including those along the ancient shoreline of Ford Dry Lake. These cultural resources are described in section 3.41 of the FEIS. The analysis of impacts for the resources identified is presented in section 4.4 of the FEIS. Mitigation measures for cultural resources affected by the GSEP are presented on pages 4.4-8 through 4.4-10 and in Appendix G of the FEIS. Mitigation will include monitoring to identify any buried cultural resources along the ancient shoreline that may be discovered during construction. Specific treatment measures for cultural resources that will be affected by the GSEP, including any buried cultural resources that are discovered during construction, will be implemented as part of a Historic Properties Treatment Plan pursuant to a Programmatic Agreement being developed for the project.

5.4.3.9 Letter 9 – Responses to Comments from Western Watersheds Project

9-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

9-002 See FEIS Table 2 -1 Comparison of Impacts by Alternative. In total, 25 Alternatives were considered by BLM, see revised Table 2-1 in the FEIS, Alternatives Considered But Eliminated.

9-003 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, impacts to the desert tortoise and its critical habitat are discussed in FEIS section 4.21 and Appendix E.

9-004 FEIS Section 4.21 and Appendix E discuss impacts to the desert tortoise and its critical habitat from the GSEP, including fragmentation and movement. Whether or not the recovery unit(s) is (are) in one configuration or another is beyond the scope of the EIS and cannot be resolved in the EIS process.

9-005 Potential impacts to wildlife species are assessed in Chapter 4.21, Impacts on Wildlife Resources, which includes mitigation to minimize potential wildlife impacts. The BLM acknowledges that future climate change could result in effects on migration patterns for wildlife, including the desert tortoise, including shifts northward and/or to higher elevations. Potential reductions in the viability of lands identified as “refuges” for desert tortoise are an unfortunate effect of climate change. However, beyond those impacts discussed in Chapter 4.21, the GSEP is not anticipated to intensify warming or other effects of climate change on area wildlife. Therefore, no additional discussion, analysis, or mitigation is warranted. Please see also response to Comment 7-028.

9-006 FEIS Section 4.21 and Appendix E discuss direct, indirect, and cumulative impacts to the desert tortoise and its critical habitat from the GSEP and its alternatives. These analyses were based on detailed surveys as reported in TTEC and Karl 2010 and other sources. Impacts of open ponds as hazards to wildlife and also as predator-subsidizing attractants are discussed in section 4.21 also. There are no designated open routes in the GSEP area. Ford Dry Lake is not an open recreation area.

9-007 Impacts to the Mojave fringe-toed lizard are found in section 4.21 and Appendix E. Additional discussion of impacts to sand transport is found in section 4.17, impacts to vegetation and 4.14, impacts to soils.

Reducing impacts to “less than significant” levels is a requirement of CEQA, which also defines significance differently, but is not a requirement of NEPA. In NEPA the impacts to the human environment are disclosed and in this case, significance is a given since an Environmental Impact Statement is being prepared.

9-008 Reports regarding fall 2009 and spring 2010 surveys for rare plants and wildlife (TTEC 2010p), golden eagles (WRI 2010; TTEC 2010), a revised Biological Resources Technical Report (TTEC and Karl 2010) and the Revised Staff Assessment Supplement (CEC 2010x) were recently submitted (June, 2010 and July, 2010, respectively) and confirm or refine prior assumptions and understandings, and were used in completing the PA/FEIS.

9-009 Section 4.17, impacts to vegetation resources discusses GSEP impacts to the spread or proliferation of weeds. A weed management plan will be developed under mitigation measure BIO-14. Control options under the plan will conform to the NECO plan and BLM’s 2007 Record Of Decision for the Programmatic EIS for Vegetation Treatments using Herbicides on Bureau of Land Management lands in 17 western states.

9-010 McCoy Spring National Register District will not be directly impacted by the GSEP. Possible indirect impacts to this National Register District are discussed on page 4.4-4 of the FEIS. Evaluations and consultations carried out with Indian tribes pursuant to the Programmatic Agreement being developed for the GSEP will determine whether any Native American traditional values ascribed to the McCoy Springs site will be affected by the GSEP. With respect to other cultural resources, all cultural resource surveys have been completed, and the results of those surveys are described on pages 3.4-28 through 3.4-39 of the FEIS. Analysis of impacts for the cultural resources affected by the GSEP is presented in 4.4 of the FEIS.

9-011 See FEIS Section 3.21 Water Resources, and Section 4.19 Impacts on Water Resources.

5.4.3.10 Letter 10 – Responses to Comments from National Park Service – Joshua Tree National Park

10-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

10-002 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

10-003 Your request for BLM to amend the CDCA/NECO plans to expand the two DWMAs is outside the scope of this FEIS.

10-004 See FEIS Section 4.21 Wildlife Resources.

10-005 See FEIS Section 3.21 Water Resources, and Section 4.19 Impacts on Water Resources, and FEIS Table 4.01-1 and Table 4.01-2 describing the cumulative approach and list of cumulative projects BLM considers reasonably foreseeable.

10-006 The GSEP is not located west of the Palen Mountains, therefore this comment does not appear to apply to the GSEP. However, the DEIS has analyzed both the project-specific and cumulative impacts to wilderness users due to visual disturbance caused by the GSEP. The impact of the proposed action and alternatives is discussed in Section 4.18-2, and the impact in combination with past present and foreseeable future projects is discussed in Section 4.18-3.

10-007 CEQA requirements, including a determination of impact significance, are not applicable in the NEPA context

10-008 CEQA requirements, including a determination of impact significance, are not applicable in the NEPA context.

10-009 The commenter proposes to use a basin storage value of 9.1 million acre-feet, as compared to 15 million acre-feet, citing that the 9.1 million acre-feet storage value is a more conservative estimate and is consistent with documentation from a pumped hydrologic storage project in the vicinity of the GSEP. The studies completed by WorleyParsons in support of the GSEP were completed as recently as 2009. These studies were completed with the most recent and up-to-date data available, and represent the most up-to-date information that is available that is directly relevant and applicable to the GSEP. Utilizing documentation prepared in support of a separate project, which likely includes significantly different study and boundary assumptions, is not anticipated to result in greater accuracy in terms of basin storage estimates, as relevant to the GSEP, and would not be consistent with other BLM documentation for regional solar power projects. Therefore, no further analysis is warranted.

10-010 The BLM recognizes a need for consistency among groundwater storage parameters, water balance parameters, and other relevant hydrologic resources information. In coordination with the CEC and the GSEP applicant, BLM has made a substantial effort to ensure consistency among projects. However, by the simple nature of the various projects, some variation among groundwater and surface water analysis parameters is warranted. For instance, projects located within one groundwater basin or subbasin would be subject to very different conditions, as compared to those located in a separate basin or subbasin. Additionally, the documentation and analysis provided in support of the GSEP and other projects represents significant contributions by many different agencies, contractors, consultants, engineers, and BLM staff. Typically, staff, agency, and engineering/contractor personnel are not entirely consistent among the many projects that BLM is reviewing. Therefore, while BLM, the CEC, and the GSEP applicant have endeavored to maintain as much consistency among documents as possible, some discrepancies will no doubt remain.

10-011 CEQA requirements, including a determination of impact significance, are not applicable in the NEPA context

10-012 As discussed in Chapter 3.20, Water Resources, and 4.19, Impacts on Water Resources, groundwater levels in the vicinity of the GSEP remained relatively stable up until the 1980s, when agricultural pumping reduced groundwater levels in some areas. These reductions are reflected in some of the groundwater level data collected immediately north of Desert Center (FEIS Figure 3.20-8). Unfortunately, groundwater levels were not consistently measured, and none of the well data available provide a complete dataset of well levels from before increased agricultural pumping in the 1980s through present. However, taken together, the well level data shown in Figure 3.20-8 are consistent with increased pumping during the 1980s, followed by a reduction in pumping by the early 1990s, followed by a period of groundwater level recovery. This scenario, of recently recovering groundwater levels, is consistent with the basin balance information presented in the FEIS, which indicates that net inflow to the basin exceeds net outflow. The commenter posits a lack of recent increases in groundwater levels as a means for support of an existing groundwater balance deficit. However, there is no evidence that groundwater levels are decreasing at present. Additionally, the groundwater basin balance analysis presented in the FEIS is more recent, and is considered more applicable to the GSEP, than the older Eagle Crest Energy assessment cited by the commenter. Please see also response to Comment 10-009. No additional updates were made.

10-013 The referenced figure has been incorporated into the FEIS as Figure 3.20-8. The groundwater level graphics included in this figure serve dual purposes: to compare groundwater levels among wells and also to provide a visual overview of long-term groundwater level trends in the basin. Unfortunately, none of the datasets available provides a complete review of historic groundwater level trends at a single well. That level of detail is not easy to visually assess based on available data, without the use of sophisticated models and analysis. The commenter mentions that the existing scale is not conducive to detecting changes in water level on the order of several feet. Unfortunately, the data available are not conducive to detecting changes in water level at this resolution, no matter how they are displayed, without substantial additional modeling and analysis (discussed elsewhere in the text of Chapter 3.20 and Chapter 4.19). In our opinion, these graphic representations of groundwater level data are more useful, especially for the lay reader, to compare the relative depth to groundwater occurring at various points in the basin. Therefore, no updates to the vertical scale of the graphs were made. For additional information regarding historic trends in groundwater levels, the commenter is referred to the text of Chapter 3.20 and Chapter 4.19.

10-014 Based on the design criteria provided by the applicant for the technology being employed at the GSEP site, the construction water use estimates provided in the FEIS represent reasonable and the most current and accurate calculations available for the GSEP. Although all of the projects mentioned by the commenter would be installed within relatively close proximity to each other, soil, grading, earthwork, topography, and technology characteristics vary substantially based on both the technology that would be implemented and the specific conditions at each project site. The construction water use calculations represent the most reasonable and accurate estimates available. However, only the amount of water required for construction and associated activities will be pumped during the construction period. If a smaller volume of water is required than initially anticipated, that additional water will not be removed from the aquifer.

10-015 FEIS Section 3.21 Water Resources and Section 4.19 Impacts on Water Resources present the correct data.

10-016 See FEIS Section 3.21 Water Resources, and Section 4.19 Impacts on Water Resources. Also See FEIS Table 4.01-1 and Table 4.01-2 describing the cumulative approach and list of cumulative projects BLM considers reasonably foreseeable.

10-017 The model used by AECOM is based on the USGS model referenced by the commenter, but was modified slightly to account for GSEP-specific properties. Additional documentation on the properties of this model can be found in the CEC's Revised Staff Assessment and supporting documentation for the GSEP. This second modeling effort was used to assess potential for impacts to the Colorado River system. This second modeling effort was not included in the applicant's initial analysis, because the applicant was not at that time aware that there was potential for the GSEP to affect the Colorado River. Only through the CEC's separate environmental assessment process did potential effects on the Colorado River come to light. Therefore, these effects were modeled subsequent to the initial groundwater modeling effort completed by WorleyParsons.

10-018 Potential cumulative impacts to groundwater levels that would result from implementation of the GSEP, in combination with other reasonably foreseeable projects (as discussed in FEIS Chapter 4.1, Introduction), are discussed in Chapter 4.19, Impacts on Water Resources. Mitigation measures, which would reduce or minimize the potential cumulative contributions of the GSEP on groundwater levels, are included. These measures include regional monitoring of groundwater levels. Additionally, the applicant has recently committed to implementation of the Dry Cooling Alternative as its new preferred alternative, which would substantially reduce the potential groundwater withdrawal requirements of the GSEP during operations. Requiring oversight of the groundwater level monitoring program by an outside agency such as the USGS or California Department of Water Resources would be inefficient in terms of agency coordination and cost, and the proposed mitigation monitoring plan is expected to be sufficient to meet such needs. Therefore, additional mitigation is not warranted.

10-019 FEIS Chapter 4.02, Impacts on Air Quality, assesses potential construction and operation period fugitive dust emissions, including dust emissions from disturbed soils, and provides mitigation to reduce the intensity of these effects. For additional discussion, please refer to FEIS Chapter 4.02, and to response to Comments 7-074 and 7-054.

10-020 Emissions of fugitive dust, including PM10 and PM2.5, are discussed in FEIS Chapters 3.02, Air Resources, and 4.02, Impacts on Air Resources. The discussion provided includes a review of the potential release of PM10 and PM2.5 from the GSEP, wherein emissions were modeled as area sources. Total construction period emissions are shown in Table 4.2-4, while operation period emissions are shown in Table 4.2-5. Substantial mitigation has been incorporated into the GSEP in order to offset these potential fugitive dust emissions. Chapter C.1, Air Quality of the Revised Staff Assessment provides a complete review of these measures, which include revegetation, covering with gravel or dust suppressant, installation of wind breaks, use of chemical dust suppressants, and other measures. These are also included as Mitigation Measures AQ-SC1 through AQ-SC5 in Appendix G of the FEIS.

10-021 FEIS Chapter 4.02, Impacts on Air Quality, assesses potential construction and operation period fugitive dust emissions, including dust emissions from disturbed soils, and provides mitigation to reduce the intensity of these effects. Also, see response to comment 10-22 below.

10-022 The boundary of Joshua Tree National Park is shown in Figure 3.19-3 (West of Highway 177), which provides a viewshed map of the proposed project. The closest distance between the boundaries of Joshua Tree National Park and the GSEP footprint is over 15 miles, placing the park in the “seldom seen” distance zone (as defined in BLM Manual H-8410-1). From this location, and from most viewing locations within the Park, views of the GSEP would be screened by intervening mountains in the Palen-McCoy Wilderness. While some locations in the far southern portion of the national park could have an unobstructed line of sight, these places are located over 25 miles away from the GSEP footprint. For these reasons, a description of the current view from prominent overlooks in the park is not necessary. Even during optimum atmospheric conditions, the GSEP area would be indistinguishable from other elements in far background views, if visible at all.

10-023 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment

10-024 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment

10-025 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, Impacts to and mitigation for, the Mojave fringe-toed lizard is discussed in FEIS section 4.21 and Appendices E and G, respectively.

10-026 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. However, these lands were use for livestock grazing until the NECO plan eliminated that use, and none of the fastrack projects are located in critical habitat.

5.4.3.11 Letter 11 – Responses to Comments from Brendan Hughes

11-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

11-002 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, environmental consequences of the proposed action on wildlife resources are discussed in FEIS Section 4.21, which acknowledges unavoidable, adverse impacts and that "the GSEP and the proposed alternative would result in substantial impacts to sensitive wildlife resources, and would permanently diminish the extent and value of native animal communities in the region." The FEIS further acknowledges specific impacts to the Desert Tortoise.

11-003 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, environmental consequences of the proposed action and alternatives on vegetation are discussed in FEIS Section 4.17, which acknowledges unavoidable, adverse impacts and that "the GSEP and other action alternatives would result in substantial impacts to sensitive vegetation resources, and would permanently diminish the extent and value of native plant and animal communities in the region."

11-004 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, environmental consequences of the proposed action and alternatives on cultural resources are discussed in FEIS Section 4.4. Furthermore, Section 4.4 acknowledges unavoidable, adverse impacts and that "the ground disturbance that would occur from the GSEP would result in unavoidable adverse impacts on cultural resources through damage and displacement of artifacts, loss of integrity of cultural resources, and changes in the settings of cultural resources inconsistent with their historic or traditional cultural values."

11-005 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, environmental consequences of the proposed action and alternatives on visual resources are discussed in FEIS Section 4.18, which acknowledges unavoidable, adverse impacts and that "the GSEP would cause one substantial adverse impact that cannot be mitigated: adverse cumulative impacts for travelers along I-10 and dispersed recreational users in the Palen-McCoy Wilderness and other surrounding mountains."

11-006 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, environmental consequences of the proposed action and alternatives on water resources are discussed in FEIS Section 4.19. Furthermore, the BLM has selected the Dry Cooling Alternative as the agency's Preferred Alternative, which would significantly reduce groundwater use.

5.4.3.12 Letter 12 – Responses to Comments from U.S. EPA, Region IX

12-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-002 Alternatives, including alternative technologies, sites and footprints, are identified in PA/FEIS Sections 2.2 through 2.6.

12-003 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, the BLM will continue to exercise its land management authority consistent with all of the statutes, regulations and policies that govern this authority.

12-004 BLM acknowledges this comment; however, the comment provides an opinion about the overall adequacy of the EIS and does not provide comment or concerns regarding a specific issue. Therefore, pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-005 The BLM agrees with stated concerns about wet cooling. Direct dry cooling involves fans blowing air over a radiator system, known as the air-cooled condenser (ACC) to remove heat from the system via convective heat transfer. Steam from the steam turbine exhausts directly to a manifold radiator system that rejects heat to the atmosphere, condensing the steam inside the radiator. On extremely hot days, a wet-surface air cooler (WSAC) system will be used to provide auxiliary cooling. These systems are described in chapter two and analyzed in chapter four. The BLM has selected the Dry Cooling Alternative as the agency's Preferred Alternative because the Dry Cooling Alternative would reasonably accomplish the purpose and need for the Proposed Action while fulfilling BLM's statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors.

Many comments expressed opposition to wet cooling and the associated impacts. The BLM agrees that wet cooling is not an appropriate technology for a desert environment due to associated environmental impacts. Accordingly, because the BLM would not approve a wet cooling option, no further response is necessary.

12-006 The number and range of alternatives considered in the EIS is reasonable. In total, 26 alternatives to the proposed action were considered by the BLM. Five were carried forward, in addition to the proposed action, for more detailed review. Two of the five are action alternatives (the Reduced Acreage Alternative and the Dry Cooling Alternative); one is a "no action" alternative, under which no project and no CDCA Plan amendment would be approved (No Action Alternative A); and two are "no project" alternatives under which the CDCA Plan would be amended but the proposed project would not be approved (No Action Alternatives B and C). A comparison of impacts by alternative is provided in Table 2-5. The 21 alternatives that were considered but eliminated from detailed analysis, including the rationale for their elimination (40 C.F.R. 1502.14(a)), are presented in FEIS Table 2-6. This is a reasonable number of alternatives given the breadth of the BLM's statement of purpose and need. Further, the alternatives carried forward for more detailed consideration in the PA/FEIS sufficiently cover the full spectrum of alternatives because the scope of impacts assessed went from none (no action) to some (reduced acreage) to lessened in some respects (reconfigured).

In addition, the BLM will implement mitigation measures (Mitigation Measures BIO-9 through BIO-13), which have been developed in coordination with the USFWS and CDFG and meet the requirements under Section 2081 of the California Fish and Game Code, to reduce impacts to desert tortoises. Accordingly, no further response is necessary.

12-007 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, impacts on groundwater and ephemeral washes are analyzed in PA/FEIS Section 4.19, mitigation for impacts to biological resources and special status species are identified in PA/FEIS Sections 4.17 and 4.21, cumulative impacts to air quality are addressed in PA/FEIS Section 4.2, and the range of alternatives is addressed in the response to comment 12-006. Impacts to cultural resources are analyzed in PA/FEIS Section 4.4.

Regarding purpose and need, as explained in Section 6.2.1 of the BLM's NEPA Handbook, the statement of purpose and need dictates the range of alternatives analyzed, because action alternatives are not "reasonable" if they do not respond to the purpose and need for the action. The narrower the purpose and need statement, the narrower the range of alternatives that must be analyzed; the converse also is true. BLM has discretion in defining the purpose and need of the proposed action (40 CFR 1502.13).

BLM's purpose and need for the proposed action, as stated in Section 1.1 of the PA/FEIS, is based on two key considerations: (i) the potential action the BLM could or would take on the specific proposed action; and (ii) the response of the BLM in meeting specific directives regarding the implementation of renewable energy projects on federally-managed lands. The primary action that BLM is considering is a response to a specific ROW grant application from the Applicant to construct and operate a specific solar project on a specific site managed by the BLM. As a result, the BLM determined that a key purpose of this project was to determine whether to approve, approve with conditions, or deny that ROW application for a parabolic trough solar thermal electric generating facility, i.e., the GSEP.

12-008 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, the BLM appreciates the EPA's input concerning its special expertise.

12-009 The BLM agrees with stated concerns about wet cooling. See response to comment 12-005, above.

12-010 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see response to comment 12-005 concerning wet cooling and dry cooling (the BLM's Preferred Alternative).

12-011 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see response to comment 12-005 concerning wet cooling and dry cooling (the BLM's Preferred Alternative).

12-012 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see response to comment 12-005 concerning wet cooling and dry cooling (the BLM's Preferred Alternative).

12-013 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see response to comment 12-005 concerning wet cooling and dry cooling (the BLM's Preferred Alternative).

12-014 Mitigation includes specific means, measures or practices that would reduce or eliminate effects of the proposed action or alternatives. Mitigation may be used to reduce or avoid adverse impacts, whether or not they are significant in nature. Reasonable, relevant mitigation measures that could improve the project are identified in Appendix G and are called out on an issue-by-issue basis in Chapter 4, regardless of agency jurisdiction. BLM-specific mitigation measures, developed consistent with CEQ guidance, also are identified and generally work in coordination with the Energy Commission's conditions of certification. Mitigation measures are identified to reduce or eliminate adverse effects to biological, physical, or socioeconomic resources even in instances where the precise extent of impacts is somewhat uncertain because of the complexity of the issues or variability, such as is the case with mitigation measures WATER-5 through WATER-7.

In this context, mitigation measures that predicate future actions and obligations on data, analysis and results of future studies do not improperly defer mitigation or deprive the public of a meaningful opportunity to comment on the adequacy of the mitigation measures. To the contrary, the mitigation measures proposed in the PA/FEIS provide performance standards that are sufficiently detailed to allow for meaningful agency and public review. In addition, Section 4.19, under the subheading, Residual Impacts After Mitigation Measures Are Implemented, provides a discussion regarding the residual impacts of mitigation measures after they are implemented.

12-015 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. However, the Agency Preferred Alternative is Dry Cooling and impacts to the water table from the GSEP are not expected as they would be in the proposed action.

12-016 The Agency Preferred Alternative is Dry Cooling and impacts to the water table from the GSEP are not expected as they would be in the proposed action. See Section 4.19 for detailed discussion on impacts to the groundwater table and vegetation. Mitigation measures would remain in effect for water resources and biological resources.

12-017 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, groundwater basin balance is addressed in PA/FEIS Section 4.19. In addition, NEPA procedures ensure that "high quality" environmental information is available before actions are taken (40 CFR 1500.1). A "hard look" under NEPA consists of a reasoned analysis containing quantitative or detailed qualitative information. See, BLM NEPA Handbook H-1790-1 (Jan. 30, 2008). Further, the data and analyses provided in the PA/FEIS about the affected environment should be commensurate with the importance of the impact, with less important material summarized, consolidated, or simply referenced (40 CFR 1502.15). The PA/FEIS relies on quantitative data where possible, and detailed qualitative data under other circumstances. The BLM may rely on the best available information if it is sufficient to allow a reasoned analysis of particular impacts, and the BLM need not necessarily postpone its consideration of a proposal while additional data is being developed –the endless loop of analysis that might otherwise result surely would lead to significant regulatory delays. Data and other information relied upon in preparing the PA/FEIS are identified in the References section.

12-018 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. However, as noted above, the Agency Preferred Alternative is Dry Cooling and impacts to the water table from the GSEP are not expected as they would be in the proposed action. Mitigation measures would remain in effect for water resources.

12-019 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see response to comment 12-014.

12-020 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see responses to comments 12-014 and 12-017.

12-021 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see responses to comments 12-014 and 12-017.

12-022 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see Section 4.1, which identifies energy projects, projects along the I-10 corridor and others as within the cumulative scenario, and Chapter 4, which addresses cumulative impacts on an issue-by-issue basis.

12-023 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, groundwater basin balance is addressed in PA/FEIS Section 4.19. See response to comment 12-017.

12-024 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, impacts (including cumulative impacts) on the groundwater basin are analyzed in PA/FEIS Section 4.19, and Mitigation Measures are recommended that would require monitoring and further action as appropriate (see mitigation measures WATER-5 through WATER-7).

12-025 The potential growth-inducing impacts of the GSEP are analyzed in PA/FEIS Section 4.13.

12-026 Alternatives, including those eliminated from further consideration, are addressed in response to comment 12-006. The requested evaluation of potential sources of reclaimed water from all wastewater treatment plants within a 40-mile radius is beyond the scope of this PA/FEIS.

12-027 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-028 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-029 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-030 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-031 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, impacts on downstream flows are analyzed in PA/FEIS Section 4.19.

12-032 Drainage features are discussed and analyzed in PA/FEIS Sections 3.20 and 4.19. NEPA requires the consideration of alternatives to the proposed action, not to specific elements of the proposed action; thus, questions of the feasibility of various drainage options are beyond the scope of this PA/FEIS.

12-033 The final drainage plan would not change the analysis of impacts, but only clarify those impacts. Inclusion of the final drainage plans in the Final POD will solidify the design, but not change the impacts.

12-034 Stormwater flows and impacts area identified and analyzed in PA/FEIS Sections 3.20 and 4.19. The comment does not provide a basis for any need to clarify the related information that was provided in the SA/DEIS; consequently, clarification has not been made.

12-035 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, mitigation measures for impacts to desert washes are identified in FEIS Section 4.19and Appendix G.

12-036 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-037 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-038 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, surface water-related impacts are analyzed and related mitigation measures identified in PA/FEIS Section 4.20.

12-039 See Response to Comment 12-038.

12-040 Consistency with the identified policies is considered in the Energy Commission's CEQA process for the GSEP. Analyzing consistency with these State law policies is beyond the scope of analysis for the BLM.

12-041 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-042 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see Response to Comment 12-040.

12-043 See Response to Comment 12-040.

12-044 Proposed fencing is unlike the fencing described in the cited study, which is situated such that monsoonal desert flood flows must pass through the fence. Identified effects included floodwater pooling and backup behind the fence, and significant debris collection along the fence. The fencing that would be installed at the GSEP site would be very different compared to purpose and design, as compared to the fencing in the referenced study. The fencing proposed for the GSEP would provide a barrier to human crossing onto the site, and would be located along the proposed flood control berms and other features that would protect the GSEP from flooding. The proposed fence is not anticipated to intersect significant or substantial flood flows, and therefore would not have effects similar to the referenced National Parks study. However, the BLM and the Applicant acknowledge that the proposed fencing could affect drainage on a smaller scale – if improperly managed or installed, fencing could potentially exacerbate erosion or sedimentation conditions on site and adjacent to the site, for instance resulting in undercutting of the fence, buildup of small amounts of debris along the fence line, and other related issues. Implementation of Mitigation Measure WATER-10 of the PA/FEIS Section 4.19 would provide for adherence to the recommendations of a drainage plan, which would include fencing-related drainage and erosion/sedimentation considerations.

Implementation of this mitigation measure would reduce potential impacts to less than significant levels.

12-045 The ACOE Jurisdictional Delineation process is independent of and separate from the NEPA process, and will be completed in accordance with the relevant statutory and regulatory requirements. If the final determination becomes available before the ROD is issued, it will be evaluated by the BLM. BLM is making every effort to ensure that the parties finalize the process before BLM issues a ROD for the GSEP.

12-046 Decommissioning and restoration would reduce recovery time somewhat, however recovery of the site would be measured in decades, not years.

Consultation under the federal ESA and CESA concerning GSEP effects to the desert tortoise is a separate process from NEPA and is ongoing. Coordination among the agencies has been close and mitigation measures are likely to be in synchrony with any terms and conditions that could arise from section 7 consultation. The ROD will incorporate terms and conditions from the Incidental Take Statement in the Biological Opinion, if any, and mitigation measures from the FEIS. The process is discussed in Section 5.2, consultation and coordination, of the FEIS.

12-047 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, sections 4.17 and 4.21 of the FEIS have refined acreage figures for the various alternatives.

12-048 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-049 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, see response to comment 12-006 concerning alternatives.

12-050 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Nonetheless, mitigating measures, including those that avoid or minimize impacts are included in BIO-1 through BIO-29 and are found in Appendix G.

12-051 Consultation under the federal ESA and CESA concerning GSEP effects to the desert tortoise is a separate process from NEPA and is ongoing. Coordination among the agencies has been close and mitigation measures are likely to be in synchrony with any terms and conditions that could arise from section 7 consultation. The ROD will incorporate terms and conditions from the Incidental Take Statement in the Biological Opinion, if any, and mitigation measures from the FEIS.

12-052 The requested information is provide in PA/FEIS Tables ES-1 and ES-2 and Table 2-1, which compares the environmental impacts of the proposed action to those of each of the alternatives.

12-053 The Biological Opinion (BO) process is independent of and separate from the NEPA process; the BO will be prepared in accordance with the schedule and procedures established in the Endangered Species Act and implementing regulations. The BLM is making every effort to complete this process in coordination with NEPA, and to finalize it before the issuance of the ROD.

12-054 Consultation under the federal ESA and CESA concerning GSEP effects to the desert tortoise is a separate process from NEPA and is ongoing. Coordination among the agencies has been close and mitigation measures are likely to be in synchrony with any terms and conditions that could arise from section 7 consultation. The ROD will incorporate terms and conditions from the Incidental Take Statement in the Biological Opinion, if any, and mitigation measures from the FEIS. The process is discussed in Section 5.2, consultation and coordination, of the FEIS.

12-055 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-056 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-057 The requested analysis is provided in Table ES-2.

12-058 Tables 4.17.4 and 4.17.5 detail the ratios and acreages for compensatory mitigation of impacts to biological resources. Acreages are slightly different from the SA/DEIS due to refinements in the GSEP description and impact calculations. Appendix G details the mitigation measures BIO-1 through 29 and mechanisms that would be used to achieve them, including use of the REAT Account.

12-059 Appendix G details the mitigation measures BIO-1 through 29 and mechanisms that would be used to achieve them, including use of the REAT Account.

12-060 Best Management Practices are included in Chapter 2 for the proposed action and alternatives. In addition, sections 4.17 and 4.21 of the FEIS cover 29 mitigation measures for vegetation and wildlife, respectively. Appendix G discusses the mitigation measures in detail. Mitigation measures have been refined since the SA/DEIS.

12-061 The requested analysis is beyond the scope of NEPA. Nonetheless, concerning the alternatives considered and reasons for eliminating some from further consideration, see response to comment 12-006.

12-062 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-062 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-063 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

12-064 The comment provides insufficient information concerning the suggested underestimations in air dispersion modeling for the BLM to provide a more detailed response; nonetheless, see PA/FEIS Section 4.1 concerning the cumulative scenario and Section 4.2, Impacts on Air Resources, concerning the analysis of cumulative impacts on air resources and mitigation measures recommend. There is insufficient basis to require the implementation of the additional mitigation measures proposed; however, the BLM will consider whether to require them as part of the ROD

12-065 A thorough discussion of the methodology used to assess potential cumulative air quality impacts is provided in FEIS Chapter 4.01, Introduction, in Tables 4.01-1 and 4.01-2. The commenter is correct in that these tables do not include every solar project that is currently being proposed. However, the projects listed in these tables represent the projects that BLM considers reasonably foreseeable. Other potential projects were determined by BLM to have a comparatively lower probability of implementation, and therefore were not considered in the cumulative analysis.

In regards to parameters included in the cumulative analysis and the reasoning behind the use of such parameters, the parameters are summarized in Tables 4.01-1 ("Elements to Consider" column), and are discussed in greater detail, including reasoning behind the selection of each parameter, as relevant, in each of the subject area chapters. This level of analysis is consistent with NEPA and BLM/US Department of the Interior standards regarding cumulative analysis. No additional discussion is warranted.

12-066 Please see response to Comment 12-065.

12-067 Please see response to Comment 12-065.

12-068 Please see response to Comment 1-02.

12-069 Please refer to the response to Comment 12-070.

12-070 Substantial additional analysis of potential climate changes impacts has been added to FEIS Chapter 4.03, Global Climate Change. The updated analysis includes discussion of the direct and indirect impacts of the GSEP on climate change, including GHG emissions during construction and operation. This chapter also includes an assessment of the direct and indirect impacts of climate change on the GSEP, including the following specific potential impact categories: sea level rise; snowpack and snowmelt period; dilution; water temperature; flooding, drainage, and erosion; water resources availability; biological resources; fisheries; habitat values of mitigation lands; hazards; wildfire risks; heat waves; changes in soil moisture; and fugitive dust emissions. This chapter assesses the comparative climate change effects for the GSEP and GSEP alternatives, including the Reduced Acreage Alternative, the Dry Cooling Alternative, and three No Action

Alternatives. A review of applicable mitigation measures that would reduce the intensity of potential climate change related impacts is also included. This updated and expanded analysis is consistent with the statutory requirements of NEPA, and is in compliance with Department of Interior requirements for the assessment of climate change for major projects and initiatives, as relevant to the GSEP.

12-071 An assessment of the specific mitigation measures that would be needed to required to protect the Project from the effects of climate change is presented in FEIS Chapter 4.03, Global Climate Change. An assessment and list of specific measures that would reduce adverse air quality effects to minimal levels, or to the maximum extent practicable, is presented in FEIS Chapter 4.2, Impacts on Air Resources. Reviews and lists of specific mitigation measures that would support pollution prevention and environmental stewardship are contained throughout Chapter 4 of the FEIS, including potential impacts to cultural resources, aesthetics, soils resources, water resources, vegetation resources, and several other resource areas. Please refer to these chapters for additional analysis.

12-072 Please refer to response to Comment 12-070.

12-073 A discussion of the potential climate change benefits of the GSEP is contained in Chapter 4.03, Global Climate Change. Please also refer to response to comment 12-070.

12-074 As explained in Section 6.2.1 of the BLM's NEPA Handbook, a carefully crafted purpose and need statement can "increase efficiencies by eliminating unnecessary analysis and reducing delays in the process." The statement of purpose and need dictates the range of alternatives, because action alternatives are not "reasonable" if they do not respond to the purpose and need for the action. As correctly noted in several comments on the GSEP, the narrower the purpose and need statement, the narrower the range of alternatives that must be analyzed; the converse also is true. BLM has discretion in defining the purpose and need of the proposed action (40 CFR 1502.13). Several comments requested that the BLM substantially expand its statement to address more broad (and less specific) purposes in order to allow for consideration of a broader range of alternatives.

As discussed under response to comment 12-007, BLM's purpose and need for the proposed action, as stated in Section 1.1 of the PA/FEIS, is based on two key considerations: (i) the potential action the BLM could or would take on the specific proposed action; and (ii) the response of the BLM in meeting specific directives regarding the implementation of renewable energy projects on federally-managed lands. The primary action that BLM is considering is a response to a specific ROW grant application from the Applicant to construct and operate a specific solar project on a specific site managed by the BLM. As a result, the BLM determined that a key purpose of this project was to determine whether to approve, approve with conditions, or deny that ROW application for the Proposed Action. A statement of this breadth led the BLM to consider two additional "build" or "action" alternatives on the same site, one no action alternative (No Action Alternative A) and two no project alternatives pursuant to which the CDCA Plan would be amended but the GSEP would not be approved (No Action Alternative B and No Action Alternative C) (see PA/FEIS Chapter 2).

The need for increased energy from renewable sources is not the responsibility of the BLM. However, the BLM can respond, within the context of specific directives under which it operates, to those needs by considering ROW grant applications for projects that would produce renewable energy on federally managed lands. As a result, the BLM purpose for the GSEP responds in part to the specific directives related to renewable energy production that are summarized in PA/FEIS Section 1.1. As noted above, these directives authorize the BLM to act expediently in increasing the production of nonrenewable energy within the bounds of its other authorities regarding the management of federal lands. The BLM is not in the business of developing and operating energy production facilities; its responsibilities are to consider and to approve, approve with modification, or deny issuance of a ROW grant to any qualified individual, business, or government entity and to direct and control the use of rights-of-way on public land in a manner that:

1. Protects the natural resources associated with public lands and adjacent lands, whether private or administered by a government entity.

2. Prevents unnecessary or undue degradation to public lands;

3. Promotes the use of rights-of-way in common considering engineering and technological compatibility, national security, and land use plans; and

4. Coordinate, to the fullest extent possible, all BLM actions under the regulations in this part with state and local governments, interested individuals and appropriate quasi-public entities.

As directed by Secretarial Order 3285, the BLM has identified renewable energy projects on federally managed lands as a priority throughout the lands it manages. As a result, the BLM is considering ROW grants for various renewable energy projects throughout California and other western states. Each of these projects is considered by the BLM on its own merits and with consideration of the impacts of the specific project on a specific site. Therefore, the statement of purpose and need for each project, including the proposed GSEP, is specific to each project within the broader scope of the directives prioritizing renewable energy development on federally managed lands. (The PA/FEIS considers other applications for energy projects in the cumulative impacts analyses provided in PA/FEIS Chapter 4.)

The BLM believes that the purpose and need for the GSEP, as discussed in PA/FEIS Chapter 1, is consistent with the directives described above and the requirements of Title V of FLPMA, and satisfies the requirements of NEPA. Therefore, the purpose and need for this project was neither revised in response to these comments nor replaced wholesale in favor of replacement statements proposed in comments.

12-075 The PA/FEIS provides information about the alternatives considered, including the rational for why alternatives were eliminated from further consideration in Section 2.6. See also, response to comment 12-074, concerning the purpose and need, and response to comment 12-006, concerning alternatives.

12-076 The PA/FEIS provides information about the alternatives considered, including the rationale for why alternatives were eliminated from further consideration in Section 2.6. See also, response to comment 12-074 concerning the purpose and need, and 12-006, concerning alternatives.

12-077 The question requests a description of BLM's authority to adopt a "modified" project design or alternate site on BLM land, to deny an application, or to select another ROW application submitted by the same applicant or its corporate owner. A Right-of-Way (ROW) grant is an authorization to use a specific piece of public land for a certain project, such as a transmission line, road, pipeline, or communication site. A ROW grant authorizes rights and privileges for a specific use of the land for a specific period of time. Generally, a BLM ROW is granted for a term appropriate for the life of the project. As indicated in PA/FEIS Table 1 1, ROWs granted are authorized by Title V of the Federal Land Policy and Management Act (FLPMA) (43 U.S.C. 1761-1771) and the implementing regulations set forth at 43 CFR part 1600. Pursuant to 43USC 1764(j), "The Secretary. . . shall grant, issue, or renew a right-of-way under this subchapter only when he is satisfied that the applicant has the technical and financial capability to construct the project for which the right-of-way is requested, and in accord with the requirements of this subchapter."

BLM's authority includes the power to modify a project design subject to a ROW application, or to deny the application, to the extent that the application does not reflect certain statutorily-required terms and conditions. For example, terms and conditions are imposed to carry out the purposes of FLPMA; minimize damage to scenic and aesthetic values and fish and wildlife habitat, and otherwise protect the environment; require compliance with applicable air and water quality standards; and require compliance with State standards for public health and safety, environmental protection, and siting, construction, operation and maintenance if such standards are more stringent than applicable Federal standards. 43 USC 1765. BLM also may impose terms and conditions to the extent that it deems them necessary to protect Federal property and economic interests; manage efficiently the lands that would be subject to the ROW and protect the other lawful users of the lands adjacent to or traversed by the ROW; protect lives and property; protect the interests of individuals living in the general area traversed by the ROW who rely on the fish, wildlife, and other biotic resources of the area for subsistence purposes; require location of the ROW along a route that will cause least damage to the environment, taking into consideration feasibility and other relevant factors; and otherwise protect the public interest in the lands traversed by the right-of-way or adjacent thereto. 43 USC 1765.

Individual ROW applications are considered separately; thus, two applications submitted by the same applicant or its corporate owner would be considered independently based on the independent merit of each. A decision whether to grant one of the applications would be made independently of whether to grant the other.

12-078 For further rationale for eliminating alternatives from consideration, see PA/FEIS Section 2.6.

12-079 Concerning the purpose and need for the project, see response to comment 12-074.

12-080 The DRECP is a Natural Community Conservation Plan that will help provide for effective protection and conservation of desert ecosystems while allowing for the appropriate development of renewable energy projects. The DRECP will provide long-term endangered species permit assurances, facilitate the California Renewables Portfolio Standard, and provide a process for conservation funding to implement the DRECP. It is anticipated that the DRECP also would serve as the basis for one or more habitat conservation plans (HCPs) under FESA and provide biological information necessary for consultation under FESA Section 7. This Planning Agreement is intended to explain generally the DRECP process and its purpose, and identify the responsibilities of the Parties in the DRECP process. The Parties intend that the DRECP will encompass development of solar, solar PV, wind, and other forms of renewable energy within the Mojave and Colorado Desert regions.

The DRECP is intended to advance federal and state conservation goals in the California desert region while facilitating the timely permitting of renewable energy projects under applicable federal and state laws. The federal government, State of California and others are committed to developing compatible renewable energy generation facilities and related transmission infrastructure to achieve requirements and goals established in the federal Energy Security Policy Act of 2005, the American Recovery and Reinvestment Act of 2009, the State Renewables Portfolio Standard (Pub. Util. Code Section 399.11, et seq.), and Executive Order S-14-08. They are equally committed to conserving biological and natural resources, including the desert regions of California, which support extraordinary biological and other natural resources of great value, including numerous threatened and endangered plant and animal species.

A joint Federal and State Renewable Energy Action Team (REAT) was established in 2008 by Executive Order S-14-08 and associated Memoranda of Understanding by and among several federal and state agencies. BLM is a voluntary participant in the REAT. See Secretary of the Interior's Secretarial Order 3285 (March 2009), which directs all Department of the Interior agencies (including the BLM) to encourage the timely and responsible development of renewable energy, while protecting and enhancing the nation's water, wildlife, and other natural resources. Other REAT members include representatives of the Fish and Wildlife Service, California Department of Fish and Game and the California Energy Commission. The REAT's primary mission is to streamline and expedite the permitting processes for renewable energy projects, while conserving endangered species and natural communities at the ecosystem scale. Executive Order S-14-08 directs the REAT to achieve these twin goals in the Mojave and Colorado Desert regions through the DRECP.

On May 19, 2010, the REAT announced the signing of an agreement to enable renewable energy projects proposed in the California Desert to address mitigation requirements through the use of a deposit account rather than having to individually undertake mitigation for each project. The necessary amount of funds to mitigate a project's impacts to wildlife and habitat will be determined on a project by project basis. It is expected that this process will expedite projects and ensure that a wider range of mitigation measures are available to address environmental impacts. This newly-established deposit account is one tool among several that renewable energy project proponents can use to mitigate impacts. The availability of this mechanism to address impacts in no way restricts the availability of other possible avenues to mitigate impacts. The Energy Commission's conditions of certification (PA/FEIS Appendix G) identify the deposit account as one possible avenue; other avenues remain available.

Solar PEIS

The BLM will not consider the proposed GSEP within the draft framework of the Solar PEIS. Although the BLM generally prefers to develop programmatic NEPA documentation and, thereafter, to use it as a basis for site-specific projects, the process of drafting, reviewing and considering the Programmatic Environmental Impact Statement to Develop and Implement Agency-Specific Programs for Solar Energy Development (Solar PEIS) is not yet final.

In response to direction from Congress under Title II, Section 211 of the Energy Policy Act of 2005, as well as Executive Order 13212, Actions to Expedite Energy-Related Projects, the BLM and the DOE are collaborating to prepare the Solar PEIS pursuant to NEPA and CEQ regulations. The Solar PEIS will evaluate utility-scale solar energy development in a six-state area, including that portion of the CDCA that is open to solar energy development in accordance with the provisions of the CDCA Plan. The planning area will not include lands within the CDCA that have special designations, such as National Monuments, Wilderness Areas, Wilderness Study Areas, Wild and Scenic Rivers, National Historic and Scenic Trails, Areas of Critical Environmental Concern, or other special management areas that are inappropriate for or inconsistent with extensive, surface-disturbing uses. The planning area for the Solar PEIS also will not include lands within the National Landscape Conservation System.

A Notice of Intent to Prepare the Solar PEIS was published in the Federal Register on May 29, 2008. Secretarial Order No. 3285, issued March 11, 2009 by the Secretary of the Interior, announced a policy goal of identifying and prioritizing specific locations best-suited for large-scale production of solar energy. In light of this Order, the BLM and the DOE agreed to postpone completion of the Draft Solar PEIS, and, on June 30, 2009, published a Notice of Availability of maps that preliminarily identify 24 tracts of BLM-administered land for in-depth study. The scoping period was extended. The schedule to complete the Draft Solar PEIS remains “to be determined.” (Solar PEIS, 2010). The schedule to complete the Final Solar PEIS or adopt the ROD also is not yet known (Id.).

Because the Solar PEIS is under development, it, and any decisions the BLM’s makes based on its analysis, will not govern BLM’s decision-making efforts for the GSEP. The BLM has a responsibility to perform a timely environmental review in response to individual applications. For this reason, the BLM will consider the proposed GSEP pursuant to FLPMA, NEPA, and applicable planning documents, in accordance with the BLM's existing Solar Energy Development Policy.

12-081 The purpose and need are addressed in PA/FEIS Sections 1.1.1 (BLM’s Purpose and Need) and 1.1.2 (DOE’s Purpose and Need), and in response to comment 12-074.

12-082 Concerning the joint Department of Energy (DOE)/BLM Programmatic Solar DEIS and the Desert Renewable Energy Conservation Plan, see response to comment 12-081.

12-083 The information requested in this comment is beyond the scope of the PA/FEIS.

12-084 The comment recommends that renewable energy projects be sited on previously disturbed or contaminated lands, e.g., pursuant to the Environmental Protection Agency’s RE-Powering America’s Land program, which has identified a number of contaminated lands and abandoned mine sites nationwide with potential for renewable energy development. While several of these sites are on BLM-managed land in California, none comes close to the acreage necessary for a utility-scale solar facility of the proposed project’s size. Applicants are responsible for identifying possible sites for proposed projects. The Applicant for the GSEP project did not propose its development on a disturbed, degraded or contaminated site. The BLM is responsible for identifying possible project alternatives, potentially including alternative locations, and did so here (see, FEIS Chapter 2). Suggestions about prospective siting decisions that do not pertain to the decisions, methodology, or analysis in the FEIS; and that do not recommend or cause changes or revisions in one or more of the alternatives considered do not raise a NEPA issue. See, BLM NEPA Handbook H-1790-1 (Jan. 30, 2008) § 6.9.2.1, Substantive Comments.

Concerning the recommendation that the BLM consider each proposed renewable energy project in comparison with others proposed in the Desert Southwest region, the BLM refers the commenter to Chapter 4, in which the direct, indirect and cumulative impacts of the GSEP and alternatives are discussed. See, e.g., FEIS Section 4.02 (Air Resources), FEIS Section 4.19 (Water Resources), FEIS Section 4.17(Vegetation), FEIS Section 4.21 (Wildlife Resources), FEIS Section 4.18 (Visual Resources), and FEIS Section 4.04 (Cultural Resources).

12-085 Concerning the siting of renewable energy projects on previously disturbed or contaminated lands, see Response to Comment 12-084. Concerning siting decisions, the BLM’s role in managing public lands includes facilitating land uses on lands under the

BLM's jurisdiction while appropriately balancing and responding to multiple interests concerning federal mandates, collaborating agencies' directives, and BLM's own interests. As a result, the sites considered in the SA/DEIS and the FEIS focus on actions by the BLM that would respond to the specific application for a ROW grant received by the BLM for the GSEP project. The location of a project is determined by the applicant and must meet a number of requirements in order to be considered a viable location. BLM's role is to ensure that each proposal is reviewed with the utmost scrutiny. Accordingly, since renewable power generation facilities were expected in the California Desert, the CDCA plan made allowances for the review of such applications and in fact created a provision that all proposed applications, "…associated with power generation or transmission not identified in the Plan (CDCA) will be considered through the Plan Amendment process." The intention of this provision was to ensure that the BLM would take a planning view of all of the renewable energy applications proposed and that such projects would require an amendment to the CDCA Plan to maintain consistency throughout the planning area. Here, the Applicant's proposal to construct, operate, and ultimately to decommission, the GSEP on the proposed site is evaluated, and alternatives proposed, consistent with the BLM's role in managing the public lands subject to its authority.

12-086 Concerning the adequacy of the range of alternatives considered, see response to comment 12-006. The rationale for eliminating the Gabrych Alternative and a "Resource Avoidance" alternative is provided in PA/FEIS Section 2.6.

12-087 NEPA does not require the completion of a quantified lifecycle analysis in order to evaluate relative impacts and, because no such analysis was provided for this project, Chapter 4 has not been revised to include one.

12-088 Concerning the Desert Renewable Energy Conservation Plan, see response to comment 12-080).

12-089 The BLM has been consulting with Indian tribes since the early stages of project planning and will continue this consultation throughout the Section 106 compliance process. BLM's tribal consultation efforts are discussed on pages 3.4-32 through 3.4-34 and in Appendix D, Cultural Resources Tables 3 and 4. Tribes have been invited to identify properties of traditional cultural and religious importance that might be affected by the project. Tribes have also been invited to participate in consultations to develop a Programmatic Agreement for the project that will seek to resolve adverse effects on any properties of traditional cultural and religious importance that may be identified. Development of the Programmatic Agreement, with tribal participation, is ongoing. The Programmatic Agreement will be completed and signed prior to approval of the ROD.

12-090 Impacts on cultural resources are analyzed in PA/FEIS Section 4.4. As indicated in PA/FEIS Section 3.4, 4.4 and Appendix D, the BLM recognizes the distinction between Executive Order 13007 and NHPA Section 106.

12-091 The requested analysis is included in PA/FEIS Sections 3.14 and 4.13. Cumulative impacts on biological and other environmental resources are analyzed on an issue-by-issue basis throughout Chapter 4.

5.4.3.13 Letter 13 – Responses to Comments from Tom Budlong

13-001 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-002 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-003 There is no requirement in NEPA to mitigate all impacts below a threshold as required under CEQA.

13-004 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-005 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-006 According to Section 6.2 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), the purpose and need statement for an externally generated action must describe the BLM purpose and need, not an applicant's or external proponent's purpose and need. The applicant's purpose and need may provide useful background information, but this description must not be confused with the BLM purpose and need for action. The BLM action triggers the NEPA analysis.

13-007 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-008 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. With regard to the commenter's statement concerning immitigable significant impacts, there is no requirement in NEPA to mitigate all impacts below a threshold as required under CEQA.

13-009 As explained in Section 6.2.1 of the BLM's NEPA Handbook, the statement of purpose and need dictates the range of alternatives analyzed, because action alternatives are not "reasonable" if they do not respond to the purpose and need for the action. The narrower the purpose and need statement, the narrower the range of alternatives that must be analyzed; the converse also is true. BLM has discretion in defining the purpose and need of the proposed action (40 CFR 1502.13).

BLM's purpose and need for the proposed action, as stated in Section 1.1 of the PA/FEIS, is based on two key considerations: (i) the potential action the BLM could or would take on the specific proposed action; and (ii) the response of the BLM in meeting specific directives regarding the implementation of renewable energy projects on federally-managed lands. The primary action that BLM is considering is a response to a specific ROW grant application from the Applicant to construct and operate a specific solar project on a specific site managed by the BLM. As a result, the BLM determined that a key purpose of this project was to determine whether to approve, approve with conditions, or deny that ROW application for a parabolic trough solar thermal electric generating facility, i.e., the GSEP.

13-010 See Response to Comment 13-009.

13-011 See Response to Comment 13-009.

13-012 See Response to Comment 13-009.

13-013 The Applicant has applied to the Department of Energy (DOE) for a loan guarantee under 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, P.L. 111-5 (the “Recovery Act”). The purpose and need for action by DOE is to comply with its mandate under EPAct by selecting eligible projects that meet the goals of the Act.

EPAct 05 established a Federal loan guarantee program for eligible energy projects, and was amended by the Recovery Act to create Section 1705 authorizing a new program for rapid deployment of renewable energy projects and related manufacturing facilities, electric power transmission projects, and leading edge biofuels projects.

13-014 The BLM does not require the preparation of a cost benefit analysis or a fiscal impact statement. These are more typically done by the applicants prior to considering the use of public lands for projects. Additionally, reviewing such information would not affect the size and scope of the project, or its impacts, nor would it improve the analysis of the alternatives in such a manner as to make one more feasible than another. Prior to initiating the NEPA environmental review process, the BLM required the applicant provide a power purchase agreement to ensure that the proposed action would be economically viable. The GSEP has received approval for a 25-year power purchase agreement with PG&E. Additionally, reclamation bonds will be required for the removal of the project facilities and rehabilitation and revegetation of the environment.

13-015 See Response to Comment 13-014.

13-016 This comment suggests that the energy delivered to the customer, after it has gone through the transmission lines should be analyzed. However, this is not a substantive comment based on the guidance provided in Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008) because the comment does not pertain to the area of the proposed action or the proposed action itself. The energy required for proposed operations and construction including fuel combustion associated with equipment and worker trips has been quantified and is analyzed with regard to impacts to climate change (See PA/FEIS section 4.03, Impacts to Climate Change). See also Response to Comment 13-014.

13-017 See Response to Comment 13-014.

13-018 The proposed MW capacity refers to the maximum amount of power that can be generated at the proposed facility. The project description is correct in that the GSEP would have a capacity of 250 MW, that is, if the GSEP is operating at 100 percent efficiency, it would be capable of generating 250 MW. The capacity of parabolic through solar energy projects affects the amount of acreage required for the installation of the solar troughs. The more MWs produced the more acreage required. Thus, the proposed 250 MW capacity explains why the proposed area of disturbance totals roughly 1,800 acres. The fact that the GSEP would operate at an efficiency lower than 100 percent is expected and does not affect the environmental analysis presented in this FEIS. From an economic standpoint, the applicant would receive revenue based on the amount of power sold. However, the BLM does not require the preparation of a cost benefit analysis or a fiscal impact statement, and therefore no such analysis is presented in this FEIS.

13-019 See Response to Comment 13-018.

13-020 The environmental consequences of the proposed action are discussed in PA/FEIS Chapter 4. CEQA requirements, including a determination of impact significance, are not applicable in the NEPA context.

13-021 This comment suggests that the Conditions of Certification uses subjective terminology. However, pursuant to 40 CFR 1505.2(c), a monitoring and enforcement program shall be adopted and implemented to ensure compliance with NEPA decisions. Therefore, the BLM will ensure that the mitigation is carried out as described in the decision document. With regard to comments made concerning impact significance, CEQA requirements, including a determination of impact significance, are not applicable in the NEPA context.

13-022 See Response to Comment 13-021.

13-023 See Response to Comment 13-021.

13-024 See Response to Comment 13-021.

13-025 See Response to Comment 13-021.

13-026 CEQ regulations demand information of ‘‘high quality’’ and professional integrity (40 CFR 1500.1, 1502.24). The use of “available data” does not indicate the analysis has relied on incomplete data. NEPA itself does not require the use of ‘‘best available data.’’ However, the BLM’s obligations under other authorities, such as the Information Quality Act Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106–554), do require bureaus to use the best available data. There is, however, no official definition of best available data; this is principally a byproduct of experience. This does not imply, however, that there may not be a better way of acquiring or analyzing necessary information, but through years of experience, EIS preparers and the BLM have become familiar with certain data sets and have grown accustomed to their application for various assessments. With regard to the commenter's implication that the terminology used is too subjective, see Response to Comment 13-021.

13-027 See Response to Comments 13-021 and 13-026.

13-028 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-029 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-006.

13-030 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-006.

13-031 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-032 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-033 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-034 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-035 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-036 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. CEQA requirements, including a determination of impact significance, are not applicable in the NEPA context. BLM does not require the preparation of a cost benefit analysis or a fiscal impact statement, and therefore no such analysis is presented in this FEIS. Also see Response to Comment 13-009.

13-037 See Response to Comment 13-009.

13-038 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

13-039 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-040 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-041 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-042 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-043 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-044 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-045 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-046 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

13-047 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment. Also see Response to Comment 13-009.

5.4.3.14 Letter 14 – Responses to Comments from Galati-Blek, LLP, for Genesis Solar

14-001 Tank you for your input. BLM has considered the testimony in preparing this PA/FEIS.

14-002 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-003 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-004 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-005 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-006 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-007 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-008 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-009 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-010 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-011 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

14-012 Pursuant to Section 6.9.2.1 of the BLM NEPA Handbook H-1790-1 (Jan. 30, 2008), this is not a substantive comment.

5.5 Administrative Remedies

BLM and EPA's Office of Federal Activities will publish separate NOAs for the PA/FEIS in the *Federal Register* when the document is ready to be released to the public. The NOA (to be published by the EPA in the *Federal Register*) will initiate a 30-day protest period on the Proposed PA to the Director of the BLM in accordance with 43 CFR 1610.5-2. Additionally, the BLM will be accepting additional public comment during this period. All substantive comments will be reviewed and responded to in the Record of Decision.

Following resolution of any protests, BLM may publish an Approved Plan Amendment and a Record of Decision (ROD) on the Project Application. Publication and release of the ROD would serve as public notice of BLM's decision on the Project Application which is appealable in accordance with 43 CFR Part 4.

5.6 List of Preparers

Though individuals have primary responsibility for preparing sections of the Proposed PA/FEIS, the document is an interdisciplinary team effort. In addition, internal review of the document occurs throughout preparation. Specialists at the BLM's Field Office, State Office, and Washington Office review the analysis and supply information, as well as provide document preparation oversight. Contributions by individual preparers may be subject to revision by other BLM specialists and by management during internal review.

TABLE 5-2
LIST OF PREPARERS

Name	Job Title	Primary Responsibility
BLM – Palm Spring-South Coast Field Office		
Cook, Stewart	GIS Specialist	Mapping
Hill, Greg	NEPA Coordinator	OHV/Recreation/VRM
Kline, George	Archaeologist	Cultural and Paleontological Resources
Maser, Mark	Biologist	Wildlife and Vegetation
Roberts, Holly	Associate Field Manager	Land Use Planning and NEPA Compliance
Shaffer, Allison	Realty Specialist	Lands and Transmission
BLM – California Desert District Office		
Childers, Jeff	Planning and Environmental Coordinator	Land Use Planning and NEPA Compliance
Godfrey, Peter	Hydrologist	Water Resources
LaPre, Larry	District Wildlife Biologist	Wildlife and Vegetation
Ludwig, Noel	Hydrologist	Water Resources
Marsden	Wildlife Biologist	Wildlife and Vegetation
Queen, Rolla	District Archaeologist	Cultural Resources
Roholt, Chris	Wilderness/NLCS Coordinator	Wilderness; Special Designations
Stein, Alan	Deputy District Manager, Resources	Planning; Review
BLM – California State Office		
Brink, Dianna	Rangeland Management Specialist	Rangeland, Grazing, Invasive Species/Weeds
Conley, Mark	Wilderness Coordinator	Special Land Use Designations, NLCS
Conrad-Saydah, Ashley	Renewable Energy Program Manager	Climate Change, Environmental Justice, (transmission)
Dreyfuss, Erin	Planning and Environmental Coordinator	Planning, NEPA Compliance
Fesnock, Amy	State Wildlife and Threatened and Endangered Species Lead	Wildlife, Special Status Species, Biology
Hunter, Charlotte	State Archeologist	Cultural and Paleontological Resources
Keeler, Jim	Off-highway vehicle coordinator	Recreation
Lund, Christina	State Botanist	Botany
McGinnis, Sandra	Planning and Environmental Coordinator	Planning, NEPA Compliance
Quinn, Sarah	Renewable Energy Program and Environmental Coordinator	Consistency Review, NEPA Compliance
Sintetos, Mike	Project Manager	Public Comment Review; Consistency Review
Wick, Bob	Natural Resource Specialist - Wilderness	Wilderness Characteristics Inventory
Environmental Science Associates		
Bautista, Lisa	Document Manager	Word Processing
Carlson, Nik	Senior Technical Associate	Environmental Justice, Social and Economics
Cordery, Ted	Biologist	Vegetation and Wildlife Resources, Wildland and Fire Ecology
Duverge, Dylan	Associate	Visual Resources
Eckard, Robert	Senior Associate	Global Climate Change, Water Resources
Holst, Julie	Associate	References
Hooper, Ron	Hydrologist	Livestock and Grazing, Water Resources, Wild Horse and Burro, Air Quality, Noise

TABLE 5-2 (Continued)
LIST OF PREPARERS

Name	Job Title	Primary Responsibility
Environmental Science Associates (cont.)		
Kershaw, Byard	Hazardous Materials Specialist	Mineral Resources, Public Health and Safety
Kershaw, Carol	Lands and Realty Specialist	Lands and Realty
McCullough, Wes	GIS Analyst	Figures
Nielsen, Jason	Graphic Artist	Figures
Noddings, Chris	Associate	Figures, Appendices, References
Piraino, Cristina	Senior Associate	Recreation, Special Designations, Transportation and Public Access – OHV, and Consultation, Coordination and Public Involvement
Prohaska, Robert	Energy Group Director	Purpose and Need, Proposed Action and Alternatives, Public Health and Safety
Scott, Janna	Managing Associate	Cumulative Projects, Consultation, Coordination and Public Involvement
Simmons, Gregg	NEPA Compliance Specialist	Proposed Action and Alternatives, Cumulative Projects, Multiple Use Classes, Special Designations, Consultation, Coordination and Public Involvement
Stumpf, Gary	Cultural Resources Specialist	Cultural and Paleontological Resources
Teitel, Ron	Senior Graphic Artist	Figures

ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
°F	degrees Fahrenheit
A	ampere (amp)
AAQS	ambient air quality standards
AB	Assembly Bill
AB 32	California Global Warming Solutions Act of 2006
ac	acres
ACC	air-cooled condenser
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
ADT	Average Daily Traffic
AERMOD	AMS/EPA Regulatory Model
af or ac-ft	acre-feet
AFC	Application for Certification
afy or ac-ft/yr	acre-feet per year
AIChE	American Institute of Chemical Engineers
AIM	Aeronautical Information Manual
ALUC	Airport Land Use Commission
AM	Amplitude Modulated
AML	appropriate management level
AML	abandoned mined lands
AMPs	Allotment Management Plans
AMS	American Meteorological Society
amsl	above mean sea level
AMT	alternative minimum tax
ANSI	American National Standards Institute
AO	Authorized Officer
APCDs	Air Pollution Control Districts
APCO	Air Pollution Control Officer
APE	Area of Potential Effects
API	American Petroleum Institute
APLIC	Avian Power Line Interaction Committee

APN	Assessor's Parcel Number
APP	Avian Protection Plan
Applicant	Palo Verde Solar I
AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
AQMD	Air Quality Management District
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
ARPA	Archaeological Resources Protection Act of 1979
ASME	American Society for Material Engineering
AST	aboveground storage tank
ASTM	American Society for Testing Materials Standards
ATC	Authority to Construct
ATCC	Area of Traditional Cultural Concern
ATCM	Airborne Toxic Control Measure
ATV	all-terrain vehicle
AWEA	American Wind Energy Association
BA	Biological Assessment
BAAB	Blythe Army Air Base
BAAQMD	Bay Area Air Quality Management District
BACM	Best Available Control Measures
BACT	Best Available Control Technology
BCC	birds or conservation concern
bgs	below ground surface
bhp	brake-horsepower
BIL	basic impulse level
BIS	Department of Business Innovation & Skills
BLM	United States Bureau of Land Management
BMPs	best management practices
BO	Biological Opinion
BOR	Bureau of Reclamation
BRMIMP	Biological Resources Mitigation Implementation and Monitoring Plan
BSPP	Blythe Solar Power Plant
CAA	Clean Air Act
CAISO	California Independent System Operator
CAL FIRE	California Department of Forestry and Fire Protection
CalARP	California Accidental Release Program
CalEPA	California Environmental Protection Agency
Cal-IPC	California Invasive Plant Council
Cal-OSHA	California - Occupational Safety and Health Administration

CalPIF	California Partners in Flight
Caltrans	California State Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CAS	Chemical Abstracts Service
CATEF II	California Air Toxics Emission Factors
CBC	California Building Code
CBEA	California Biomass Energy Alliance
CBO	Conference of Building Officials
CBOC	California Burrowing Owl Consortium
CBSC	California Building Standards Code
CC	City Council
CCAA	California Clean Air Act
CCR	California Code of Regulations
CCS	cryptocrystalline silicate
CCTV	closed circuit television
CDCA	California Desert Conservation Area
CDCA Plan	California Desert Conservation Area Plan
CDD	California Desert District
CDE	California Department of Education
CDF	California Department of Forestry and Fire Protection
CDFA	California Department of Food and Agriculture
CDFG	California Department of Fish and Game
CDMG	California Division of Mines and Geology
CDPA	California Desert Protection Act of 1994
CEC	California Energy Commission
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	California Endangered Species Act
CFATS	Chemical Facility Anti-Terrorism Standard
CFR	Code of Federal Regulations
cfs	cubic feet per second
CGS	California Geological Survey
CH_4	methane
Chamber of Commerce	Blythe Area Chamber of Commerce
CHP	California Highway Patrol
CHRIS	California Historical Resources Information System
CIWMA	California Integrated Waste Management Act of 1989
CIWMB	California Integrated Waste Management Board
CMUP	Comprehensive Management and Use Plan

CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNF	Cleveland National Forest
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	carbon monoxide
CO_2	carbon dioxide
COC	Conditions of Certification
col	colonies
CPM	Compliance Project Manager
CPUC	California Public Utilities Commission
CRAM	California Rapid Assessment Method
CRBRWQCB	Colorado River Basin Regional Water Quality Control Board
CRHR	California Register of Historical Resources
CRS	Congressional Research Service
CSC	California Species of Special Concern
CSP	California State Parks
CTG	Combustion Turbine Generator
CTI	Cooling Technology Institute
CTTM	Comprehensive Travel and Transportation Management
CUPA	Certified Unified Program Authority
CURE	California Unions for Reliable Energy
CVBG	Chuckwalla Valley Groundwater Basin
CWA	Clean Water Act
cy	cubic yards
D	dynamic volt amp reactive
D	Delisted
dB	Decibel
dBA	A-weighted decibels
DCS	data (or distributed) control system
DDT	Dichloro-diphenyl-trichloroethane
DESCP	Drainage, Erosion, and Sedimentation Control Plan
DHS	Department of Homeland Security
DMG	Division of Mines and Geology (now called California Geological Survey)
DNA	Determination of NEPA Adequacy
DOC	California Department of Conservation
DOE	United States Department of Energy
DOI	United States Department of Interior
DOJ	United States Department of Justice
DOT	Department of Transportation

DPM	diesel particulate matter
DPR	Department of Parks and Recreation
DPR	Department of Pesticide Regulation
DPS	Distinct Population Segment
DPV1	Devers-Palo Verde No. 1 Transmission Line
DPV2	Devers-Palos Verde 2 Transmission Line
DRECP	California Desert Renewable Energy Conservation Plan
DRMP-A/DEIS	Draft Resource Management Plan-Amendment/Draft Environmental Impact Statement
DTC	Desert Training Center
DTC/C-AMA	George S. Patton's World War II Desert Training Center/California-Arizona Maneuver Area
DTCCL	Desert Training Center California-Arizona Area Cultural Landscape
DTRO	Desert Tortoise Recovery Office
DTSC	Department of Toxic Substances Control
DWMA	Desert Wildlife Management Area
DWR	California Department of Water Resources
E3	Energy and Environmental Economics, Inc.
EA/FONSI	Environmental Assessment/Finding of No Significant Impact
EB	eastbound
EEC	Eastshore Energy Center
EEMP	Equipment Emissions Mitigation Plan
EERE	Energy Efficiency and Renewable Energy
EFD	El Centro Fire Department
EFZ	Earthquake Fault Zone
EIC	Eastern Information Center
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMF	Electric and Magnetic Field
EMS	Emergency Medical Services
EO	Executive Order
EPA	United States Environmental Protection Agency
EPAct 05	Energy Policy Act of 2005
EPRI	Electric Power Research Institute
EPS	Emission Performance Standard
ERC	Emission Reduction Credit
ESA	Endangered Species Act
ET	evapotranspiration
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDOC	Final Determination of Compliance

FE	Federally listed as endangered
FEIR	Final Environmental Impact Report
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FESA	Federal Endangered Species Act
FHWA or FHA	Federal Highway Administration
FLPMA	Federal Land Policy and Management Act
FM	Frequency Modulated
FMAP	Fire Management Activity Plan
FMMP	Farmland Mapping and Monitoring Program
FPPA	Farmland Protection Policy Act
fps	feet per second
FR	Federal Register
FSC	Field Supervisor Controller
ft	feet
ft^2/d	feet squared per day
FT	Federally listed as threatened
FTA	Federal Transit Administration
FTE	full time equivalent
FTHL	flat-tailed horned lizard
g	gravity
gal	gallon
GCC	Global Climate Change
GEA	Geothermal Energy Association
gen-tie	power transmission line
GHG	greenhouse gas
GIS	geographic information system
gpd	gallons per day
gpd/ft	gallons per day per foot
gpd/ft^2	gallons per day per square foot
gpm	gallons per minute
GSEP	Genesis Solar Energy Project
GSU	generator set-up transformer
GWh	gigawatt-hour
GWR	groundwater recharge
H_2S	hydrogen sulfide
HABS	Historic American Building Survey
HAER	Historic American Engineering Record
HALS	Historic American Landscape Survey

HAP	Hazardous Air Pollutant
HARP	Hotspots Analysis Reporting Program
HAs	Herd Areas
HCE	heat collection element
HCM	Highway Capacity Manual
HDPE	high-density polyethylene
HEC-RAS	Hydrologic Engineering Center River Analysis System
HERO	high efficiency reverse osmosis
HFCs	hydrofluorocarbons
HI	Hazards Index or Chronic Hazards Index
HMAs	Herd Management Areas
HMBP	Hazardous Materials Business Plan
hp	horsepower
HP	high pressure
HPTP	Historic Properties Treatment Plan
HRA	Health Risk Assessment
HRP	Habitat Restoration Plan
HSC	Health and Safety Code
HTF	Heat Transfer Fluid
HUC	hydrologic unit code
HWSRMRA	Hazardous Waste Source Reduction and Management Review Act of 1989
Hz	Hertz
I-10	Interstate-10
ICAPCD	Imperial County Air Pollution Control District
ICC	Interagency Coordinating Committee
ICDTSC	Imperial County Department of Toxic Substances Control
IEEE	Institute of Electrical and Electronics Engineers
IEPR	Integrated Energy Policy Report
IID	Imperial Irrigation District
ILPP	Injury and Illness Prevention Program
in	inches
in/sec	inches per second
IND	Industrial Service Supply
INT	international
IP	intermediate pressure
ISCST	Industrial Source Complex Short Term
ISO	Independent System Operator
ITC	investment tax credit
IUSD	Imperial Unified School District
IVEDC	Imperial Valley Economic Development Corporation

IVRM	Interim Visual Resource Management
IVS	Imperial Valley Solar
K	erosion factor
kA	kilo-amps
KOPs	key observation points
kV	kilovolt
kVA	kilovolt-amperes
kVAR	kilovolt-ampere reactive
kW	kilowatt
kWe	kilowatt-electric
L_{90}	The A-weighted noise level that is exceeded 90 percent of the time during the measurement period.
LADWP	Los Angeles Department of Water and Power
lbs	pounds
lb/yr	pounds per year
L_{dn}	day-night average noise level
LDS	leachate detection system
LE	Land Evaluation
LEDPA	Least Environmentally Damaging Practicable Alternative
L_{eq}	equivalent continuous sound level
LESA	Land Evaluation and Site Assessment
LESA Model	Land Evaluation and Site Assessment Model
LID	Low Impact Development
LLC	Limited Liability Corporation
LORS	laws, ordinances, regulations, and standards
LOS	level of service
LP	low pressure
LRAs	Local Reliability Areas
LTU	Land Treatment Unit
LTVA	Long-Term Visitor Area
LUP	Land Use Plan
M6.0	earthquake of magnitude 6.0 or greater
Ma	million years ago
MA	management area
MACT	Maximum Available Control Technology
MBTA	Migratory Bird Treaty Act
MCE	Maximum Credible Earthquake
MCL	Maximum Contaminant Level
MCR	Monthly Compliance Report
MDAB	Mojave Desert Air Basin
MDAQMD	Mojave Desert Air Quality Management District

MEIR	maximum exposed individual resident
MEIW	maximum exposed individual worker
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mi	miles
ml	milliliters
ML	Measuring Location
mm	millimeters
MM	Modified Mercalli
MMBtu	1 million british thermal units
MND	Mitigated Negative Declaration
MOU	Memorandum of Understanding
mph	miles per hour
MPP	Mirror Positioning Plan
MRZ	Mineral Resource Zone
MSA	Metropolitan Statistical Area
msl	mean sea level
MT	metric ton
MTBF	mean time between failure
$MTCO_2e$	metric tons of carbon dioxide equivalent
MTPs	Master Title Plats
MTS	Metropolitan Transit System
MUC	Multiple-Use Class
MUC C	Multiple-Use Class Controlled
MUC I	Multiple-Use Class Intensive
MUC L	Multiple-Use Class Limited
MUC M	Multiple-Use Class Moderate
MUC U	Multiple-Use Class Unclassified
MUN	Municipal and Domestic Water Supply
MVA	megavolt-amperes
MVAR	megavolt-ampere reactive
MW	megawatts
Mw	Maximum Earthquake Magnitude
MWh	megawatt-hour
N/A	Not Applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAHC	Native American Heritage Commission
NECO	Northern and Eastern Colorado Desert Coordinated Management Plan

NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electrical Safety Code
NFP	National Fire Plan
NFPA	National Fire Protection Association
NFWF	National Fish and Wildlife Foundation
NHPA	National Historic Preservation Act
NIOSH	National Institute of Safety and Health
NLCS	National Landscape Conservation System
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
NRHP or National Register	National Register of Historic Places
NO	nitric oxide
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NO_X	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPS	United States National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRDC	Natural Resources Defense Council
NSPS	New Source Performance Standard
NSR	New Source Review
NTP	Notice to Proceed
NWIS	National Water Information System
O&M	operations and maintenance
O_2	oxygen
O_3	ozone
OCA	Off-site Consequence Analysis
OCWGB	Ocotillo/Coyote Wells Groundwater Basin
OEHHA	Office of Environmental Health Hazard Assessment
OFA	Offer of Financial Assistance
OHV	off-highway vehicle
OII	Order Initiating an Informational
OLM	Ozone Limiting Method
OSHA	United States Occupational Safety and Health Administration
OTC	once-through cooling
PA	Programmatic Agreement
PA	Plan Amendment

PA/FEIS	Resource Management Plan-Amendment/Final Environmental Impact Statement
PSSCFO	Palm Springs / South Coast Field Office
PALS	pre-acquisition liability survey
PBS	Peninsular bighorn sheep
PCA	Pest Control Advisor
PCU	power conversion unit
PDF	Portable Document Format
PDOC	Preliminary Determination of Compliance
PEIS	Programmatic Environmental Impact Statement
PFCs	perfluorocarbons
PGA	peak ground acceleration
PG&E	Pacific Gas and Electric Company
PL	Public Law
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PMI	Point of Maximum Impact
POD	Plan of Development
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
ppm	parts per million
ppmv	parts per million by volume
ppmvd	parts per million by volume, dry
PQAD	Prehistoric Quarries Archaelogical District
PRC	Public Resources Code
PRIA	Public Rangelands Improvement Act of 1978
PRM	Paleontological Resource Monitors
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
PRPA	Paleontologic Resources Preservation Act
PRS	Paleontological Resources Supervisor
PSA	Preliminary Staff Assessment
PSD	Prevention of Significant Deterioration
psi	pounds per square inch
PSSCFO	Palm Springs South Coast Field Office
PTNCL	Prehistoric Trails Network Cultural Landscape
PTO	Permit to Operate
PTZ	pan, tilt, and zoom
PV	photovoltaic
PVC	polyvinyl chloride
PVID	Palo Verde Irrigation District

PVMGB	Palo Verde Mesa Groundwater Basin
PVVGB	Palo Verde Valley Groundwater Basin
PVVTA	Palo Verde Valley Transit Agency
PYFC	Potential Fossil Yield Classification
QFER	Quarterly Fuel and Energy Report
R	Rare
RACM	Reasonably Available Control Measures
RACT	Reasonably Available Control Technology
RCALUC	Riverside County Airport Land Use Commission
RCFD	Riverside County Fire Department
RCRA	Resource Conservation and Recovery Act
REAT	Renewable Energy Action Team
REC I	Water Contact Recreation
REC II	Non-contact Water Recreation
Recovery Act	American Recovery and Reinvestment Act of 2009, P.L. 111-5
RECs	Recognized Environmental Conditions
REF	Renewable Electricity Future
RELs	Reference Exposure Levels
RETI	Renewable Energy Transmission Initiative
RFI	radio frequency interference
RMP	Resource Management Plan
RMPA	Resource Management Plan Amendment
RO	reverse osmosis
ROD	Record of Decision
ROG	reactive organic gases
ROW	right-of-way
ROWD	Report of Waste Discharge
RPS	Renewables Portfolio Standard
RQ	reportable quantity
RSA	Revised Staff Assessment
RTP	Regional Transportation Plan
RUSLE2	Revised Universal Soil Loss Equation
RV	recreational vehicle
RWQCB	Regional Water Quality Control Board
S	Sensitive
SAC	Science Advisory Committee
SA/DEIS	Staff Assessment/Draft Environmental Impact Statement
SAP	Sampling and Analysis Plan
SARA Title III	Superfund Amendments and Reauthorization Act of 1986
SC	sediment control

SCA	Solar Collector Assembly
SCADA	supervisory control and data acquisition
SCAG	Southern California Association of Governments
SCCWRP	Southern California Coastal Water Research Project
SCE	Southern California Edison
SCEC	Southern California Earthquake Center
scf	standard cubic feet
scfh	standard cubic feet of hydrogen per hour
SCG	Southern California Gas Company
SCPBRG	Santa Cruz Predatory Bird Research Group
SCWD	Seeley County Water District
SDAR	San Diego and Arizona Railroad
SDG&E	San Diego Gas and Electric Company
SE	State listed as endangered
SES	Stirling Energy Systems
SESA	Solar Energy Study Area
sf	square feet
SF_6	sulfur hexafluoride
SFP	State fully protected
SHPO	State Historic Preservation Officer
SIC	Southeastern Information Center
SIP	State Implementation Plan
SLF	Sacred Lands File
SLRU	Sensitivity Level Rating Units
SO_2	sulfur dioxide
SO_4	sulfate
SOPs	standard operating procedures
SO_X	sulfur oxides
SPCC	Spill Prevention Control and Countermeasures
SPRR	Southern Pacific Railroad
sq mi	square miles
SQRUs	Scenic Quality Rating Units
SR-111	State Route 111
SR-98	State Route 98
SRA	Safety Risk Assessment
SRA	State Responsibility Area
SRP	Scientific Review Panel
SS	soil stabilization
SSAB	Salton Sea Air Basin
SSAB	Salton Sea Air Basin

ST	State listed as threatened
STG	steam turbine-generator
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
SWWTP	Seeley Wastewater Treatment Plant
TAC	Toxic Air Contaminants
T-BACT	Best Available Control Technology for Toxics
TC	tracking control
TDS	Total Dissolved Solids
TGA	Taylor Grazing Act
TMDLs	Total Maximum Daily Loads
TNW	traditional navigable water
tpy	tons per year
UBC	Uniform Building Code
UDI	undocumented immigrants
µg/L	micrograms per Liter
$\mu g/m^3$	micrograms per cubic meter
URS	URS Corporation
US	United States
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USC	United States Code
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USLE	Universal Soil Loss Equation
UXO	unexploded ordnance
UV	ultraviolet
V	volts
VAC	volts alternating current
VAR	volt-ampere reactive
VdB	velocity decibel
VDE	Visible Dust Emission
VHA	Lavic Lake volcanic hazard area
VMT	vehicle miles traveled
VOCs	volatile organic compounds

VRI	Visual Resource Inventory
VRM	Visual Resource Management
W	watts
WAs	Wilderness Areas
WAPA	Western Area Power Administration
WB	westbound
WDR	Waste Discharge Requirement
WE	wind erosion
WEAP	Worker Environmental Awareness Program
WEC	World Energy Council
WECC	Western Electricity Coordinating Council
WECO	Western Colorado Desert Routes of Travel Designations
WEPS	Wind Erosion Prediction System
WHMA	Wildlife Habitat Management Area
WILD	Wildlife Habitat
WIU	Wilderness Inventory Unit
WL	Watch List
WRCC	Western Regional Climate Center
WSA	Wilderness Study Area
WSAC	Wet Surface Air Cooler
WSS	Web Soil Survey
WTE	Wave & Tidal Energy
ybp	years before present
YDMP	Yuha Desert Management Plan
yr	year
ZOI	zone of influence

GLOSSARY OF TERMS

A

Adjacent: Defined by ASTM E1527-00 as any real property the border of which is contiguous or partially contiguous with that of the Site or would be contiguous or partially contiguous with that of the Site but for a street, road, or other public thoroughfare separating them.

Air Basin: A regional area defined for state air quality management purposes based on considerations that include topographic features that influence meteorology and pollutant transport patterns, and political jurisdiction boundaries that influence the design and implementation of air quality management programs.

Air Quality Control Region: A regional area defined for federal air quality management purposes based on considerations that include topographic features that influence meteorology and pollutant transport patterns, and political jurisdiction boundaries that influence the design and implementation of air quality management programs.

Alluvium: a fine-grained fertile soil consisting of mud, silt, and sand deposited by flowing water on flood plains, in river beds, and in estuaries.

Alluvial Fan: Fan shaped material of water deposited sediments.

Ambient Air Quality Standards: A combination of air pollutant concentrations, exposure durations, and exposure frequencies that are established as thresholds above which adverse impacts to public health and welfare may be expected. Ambient air quality standards are set on a national level by the U.S. Environmental Protection Agency. Ambient air quality standards are set on a state level by public health or environmental protection agencies as authorized by state law.

Ambient Air: Outdoor air in locations accessible to the general public.

Archaeological district: A significant concentration, linkage, or continuity of sites, buildings, or features important in history or prehistory. There can be discontiguous districts composed of resources that are not in close proximity to one another

Area of Critical Environmental Concern (ACEC): A designated area on public lands where special management attention is required: (1) to protect and prevent irreparable damage to fish and wildlife; (2) to protect important historic, cultural, or scenic values, or other natural systems or processes; or (3) to protect life and safety from natural hazards.

Attainment Area: An area that has air quality as good as or better than a national or state ambient air quality standard. A single geographic area may be an attainment area for one pollutant and a non-attainment area for others.

B

Basic Elements: The four design elements (form, line, color, and texture), which determine how the character of a landscape is perceived.

Bioremediation: The use of biological agents, such as bacteria or plants, to remove or neutralize contaminants, as in polluted soil or water.

C

Calcareous Substrates: Substances, often cemented and of a chalky appearance, containing calcium carbonate.

Cancer: A class of diseases characterized by uncontrolled growth of somatic cells. Cancers are typically caused by one of three mechanisms: chemically induced mutations or other changes to cellular DNA; radiation induced damage to cellular chromosomes; or viral infections that introduce new DNA into cells.

Carbon Monoxide (CO): A colorless, odorless gas that is toxic because it reduces the oxygen-carrying capacity of the blood.

Characteristic: A distinguishing trait, feature, or quality.

Characteristic Landscape: The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Climate: A statistical description of daily, seasonal, or annual weather conditions based on recent or long-term weather data. Climate descriptions typically emphasize average, maximum, and minimum conditions for temperature, precipitation, humidity, wind, cloud cover, and sunlight intensity patterns; statistics on the frequency and intensity of tornado, hurricane, or other severe storm events may also be included.

Community Noise Equivalent Level (CNEL): A 24-hour average noise level rating with a 5 dB penalty factor applied to evening noise levels and a 10 dB penalty factor applied to nighttime noise levels. The CNEL value is very similar to the Day-Night Average Sound Level (Ldn) value, but includes an additional weighting factor for noise during evening hours.

Contrast: Opposition or unlikeness of different forms, lines, colors, or textures in a landscape.

Contrast Rating: A method of analyzing the potential visual impacts of proposed management activities.

Cretaceous: In geologic history the third and final period of the Mesozoic era, from 144 million to 65 million years ago, during which extensive marine chalk beds formed.

Criteria Pollutant: An air pollutant for which there is a national ambient air quality standard (carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, inhalable particulate matter, fine particulate matter, or airborne lead particles).

Critical Habitat: Habitat designated by the US Fish and Wildlife Service under Section 4 of the Endangered Species Act and under the following criteria: 1) specific areas within the geographical area occupied by the species at the time it is listed, on which are found those physical or biological features essential to the conservation of the species and that may require special management of protection; or 2) specific areas outside the geographical area by the species at the time it is listed but that are considered essential to the conservation of the species.

Cultural Modification: Any man-caused change in the land form, water form, vegetation, or the addition of a structure which creates a visual contrast in the basic elements (form, line, color, texture) of the naturalistic character of a landscape.

Cultural Resource: A location of human activity, occupation, or use identifiable through field inventory, historical documentation, or oral evidence. Cultural resources include archaeological and historical sites, structures, buildings, objects, artifacts, works of art, architecture, and natural features that were important in past human events. They may consist of physical remains or areas where significant human events occurred, even though evidence of the events no longer remains. And they may include definite locations of traditional, cultural, or religious importance to specified social or cultural groups.

Cultural Resource Data: Cultural resource information embodied in material remains such as artifacts, features, organic materials, and other remnants of past activities. An important aspect of data is context, a concept that refers to the relationships among these types of materials and the situations in which they are found.

Cultural Resource Data Recovery: The professional application of scientific techniques of controlled observation, collection, excavation, and/or removal of physical remains, including analysis, interpretation, explanation, and preservation of recovered remains and associated records in an appropriate curatorial facility used as a means of protection. Data recovery may sometimes employ professional collection of such data as oral histories, genealogies, folklore, and related information to portray the social significance of the affected resources. Such data recovery is sometimes used as a measure to mitigate the adverse impacts of a ground-disturbing project or activity.

Cultural Resource Integrity: The condition of a cultural property, its capacity to yield scientific data, and its ability to convey its historical significance. Integrity may reflect the authenticity of a property's historic identity, evidenced by the survival or physical characteristics that existed during its historic or prehistoric period, or its expression of the aesthetic or historic sense of a particular period of time.

Cultural Resource Inventory (Survey): A descriptive listing and documentation, including photographs and maps of cultural resources. Included in an inventory are the processes of locating, identifying, and recording sites, structures, buildings, objects, and districts through library and archival research, information from persons knowledgeable about cultural resources, and on-the-ground surveys of varying intensity.

Class I: A professionally prepared study that compiles, analyzes, and synthesizes all available data on an area's cultural resources. Information sources for this study include published and unpublished documents, BLM inventory records, institutional site files, and state and National Register files. Class I inventories may have prehistoric, historic, and ethnological and sociological elements. These inventories are periodically updated to include new data from other studies and Class II and III inventories.

Class II: A professionally conducted, statistically based sample survey designed to describe the probable density, diversity, and distribution of cultural properties in a large area. This survey is achieved by projecting the results of an intensive survey carried out over limited parts of the target area. Within individual sample units, survey aims, methods, and intensities are the same as those applied in Class III inventories. To improve statistical reliability, Class II inventories may be conducted in several phases with different sample designs.

Class III: A professionally conducted intensive survey of an entire target area aimed at locating and recording all visible cultural properties. In a Class III survey, trained observers commonly conduct systematic inspections by walking a series of close interval parallel transects until they have thoroughly examined an area.

Cultural Resource Values: The irreplaceable qualities that are embodied in cultural resources, such as scientific information about prehistory and history, cultural significance to Native Americans and other groups, and the potential to enhance public education and enjoyment of the Nation's rich cultural heritage.

Cultural Site: A physical location of past human activities or events, more commonly referred to as an archaeological site or a historic property. Such sites vary greatly in size and range from the location of a single cultural resource object to a cluster of cultural resource structures with associated objects and features.

D

Day/Night Average Sound Level (Ldn): A 24-hour average noise level rating with a 10 dB penalty factor applied to nighttime noise levels. The Ldn value is very similar to the CNEL value, but does not include any weighting factor for noise during evening hours.

Decibel (dB): A generic term for measurement units based on the logarithm of the ratio between a measured value and a reference value. Decibel scales are most commonly associated with acoustics (using air pressure fluctuation data); but decibel scales sometimes are used for ground-borne vibrations or various electronic signal measurements.

Desert Pavement: A surface covering developed over time, of closely packed rock fragments of pebble or cobble size found on desert soils.

Desert Wildlife Management Area (DWMA): areas established in the NECO Plan to address the recovery of the desert tortoise. They are intended to be areas where viable desert tortoise populations can be maintained (Category I habitat).

Distance Zones: A subdivision of the landscape as viewed from an observer position. The subdivision (zones) includes foreground-middleground, background, and seldom seen.

Drought condition: A hydrologic condition during a defined period when rainfall and runoff are much less than average.

E

Enhancement: A management action designed to improve visual quality.
Equivalent Average Sound Pressure Level (Leq): The decibel level of a constant noise source that would have the same total acoustical energy over the same time interval as the actual time-varying noise condition being measured or estimated. Leq values must be associated with an explicit or implicit averaging time in order to have practical meaning.

Ethnohistoric Resources: Areas used by Native Americans following exploration and settlement by non-Native Americans. Sites or artifacts of particular significance to modern Native Americans are often kept secret by those groups to protect the sites from disturbance, looting, overuse, or other defamations.

Excavation: The scientific examination of an archaeological site through layer-by-layer removal and study of the contents within prescribed surface units, e.g. square meters.

F

Fluvial: Of, relating to, or occurring in a river.

Form: The mass or shape of an object or objects which appear unified, such as a vegetative opening in a forest, a cliff formation, or a water tank.

G

Geomorphic Province: Naturally defined geologic regions that display a distinct landscape or landform.

Greenhouse Gas: A gaseous compound that absorbs infrared radiation and re-radiates a portion of hat back toward the earth’s surface, thus trapping heat and warming the earth’s atmosphere.

Groundwater Overdraft: The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions (CDWR, 1998).

H

Habitat: A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and living space.

Hazardous Air Pollutant (HAP): Air pollutants which have been specifically designated by relevant federal or state authorities as being hazardous to human health. Most HAP compounds are designated due to concerns related to: carcinogenic, mutagenic, or teratogenic properties; severe acute toxic effects; or ionizing radiation released during radioactive decay processes.

Hertz (Hz): A standard unit for describing acoustical frequencies measured as the number of air pressure fluctuation cycles per second. For most people, the audible range of acoustical frequencies is from 20 Hz to 20,000 Hz.

Historical Site: A location that was used or occupied after the arrival of Europeans in North America (ca. A.D. 1492). Such sites may consist of physical remains at archaeological sites or areas where significant human events occurred, even though evidence of the events no longer remains. They may have been used by people of either European or Native American descent.

Holocene: Of, denoting, or formed in the second and most recent epoch of the Quaternary period, which began 10,000 years ago at the end of the Pleistocene.

Hydrocarbons: Any organic compound containing primarily carbon and hydrogen, such as the alkanes, alkenes, alkynes, terpenes, and arenes.

I

Igneous: Rock, such as granite and basalt that has solidified from a molten or partially molten state.

Indian Tribe: Any American Indian group in the United States that the Secretary of the Interior recognizes as possessing tribal status (listed periodically in the Federal Register).

Indigenous: Being of native origin (such as indigenous peoples or indigenous cultural features).

Interdisciplinary Team: A group of individuals with different training, representing the physical sciences, social sciences, and environmental design arts, assembled to solve a problem or perform a task. The members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions.

Invasive Species: An exotic species whose introduction does or is likely to cause economic or environmental harm or harm to human health (Executive Order 13122, 2/3/99).

Isolate: Non-linear, isolated archaeological features without associated artifacts.

K

Key Observation Point (KOP): One or a series of points on a travel route or at a use area or a potential use area, where the view of a management activity would be most revealing.

L

Landscape Character: The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, color, and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.

Landscape Features: The land and water form, vegetation, and structures which compose the characteristic landscape.

Leasable Minerals: Minerals whose extraction from federally managed land requires a lease and the payment of royalties. Leasable minerals include coal, oil and gas, oil shale and tar sands potash, phosphate, sodium, and geothermal steam.

Line: The path, real or imagined, that the eye follows when perceiving abrupt differences in form, color, or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types, or individual trees and branches.

Locatable Minerals: Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

M

Maintenance Area: An area that currently meets federal ambient air quality standards but which was previously designated as a nonattainment area. Federal agency actions occurring in a maintenance area are still subject to Clean Air Act conformity review requirements.

Management Activity: A surface disturbing activity undertaken on the landscape for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Memorandum of Understanding (MOU): A written but noncontractual agreement between two or more agencies or other parties to take a certain course of action.

Mineral Material Disposal: The sale of sand, gravel, decorative rock, or other materials defined in 43 CFR 3600.

Mining Claim: A mining claim is a selected parcel of Federal Land, valuable for a specific mineral deposit or deposits, for which a right of possession has been asserted under the General Mining Law. This right is restricted to the development and extraction of a mineral deposit. The rights granted by a mining claim protect against a challenge by the United States and other claimants only after the discovery of a valuable mineral deposit. The two types of mining claims are lode and placer. In addition, mill sites and tunnel sites may be located to provide support facilities for lode and placer mining.

Mitigation: Mitigation includes: (a) Avoiding the impacts altogether by not taking an action or parts of an action, (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, (c) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment, (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, (e) Compensating for the impact by replacing or providing substitute resources or environments (40 CFR 1508.20).

N

National Pollutant Discharge Elimination System (NPDES): The NPDES permit program has been delegated in California to the State Water Resources Control Board. These sections of the CWA require that an applicant for a federal license or permit that allows activities resulting in a discharge to waters of the United States must obtain a State certification that the discharge complies with other provisions of the Clean Water Act.

National Register District: A group of significant archaeological, historical, or architectural sites, within a defined geographic area, that is listed on the National Register of Historic Places. See National Register of Historic Places.

National Register of Historic Places: The official list, established by the National Historic Preservation Act, of the Nation’s cultural resources worthy of preservation. The National Register lists archeological, historic, and architectural properties (i.e. districts, sites, buildings, structures, and objects) nominated for their local, state, or national significance by state and federal agencies and approved by the National Register Staff. The National Park Service maintains the National Register. Also see National Historic Preservation Act.

National Scenic Trail: One of the three categories of national trails defined in the National Trails System Act of 1968 that can only be established by act of Congress and are administered by federal agencies, although part or all of their land base may be owned and managed by others. National Scenic Trails are existing regional and local trails recognized by either the Secretary of Agriculture or the Secretary of the Interior upon application.

Native American: Indigenous peoples of the western hemisphere.

Nitric Oxide (NO): A colorless toxic gas formed primarily by combustion processes that oxidize atmospheric nitrogen gas or nitrogen compounds found in the fuel. A precursor of ozone, nitrogen dioxide, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere over a period that may range from several hours to a few days.

Nitrogen Dioxide (NO2): A toxic reddish gas formed by oxidation of nitric oxide. Nitrogen dioxide is a strong respiratory and eye irritant. Most nitric oxide formed by combustion processes is converted into nitrogen dioxide by subsequent oxidation in the atmosphere. Nitrogen dioxide is a criteria pollutant in its own right, and is a precursor of ozone, numerous types of photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Nitrogen Oxides (NOx): A group term meaning the combination of nitric oxide and nitrogen dioxide; other trace oxides of nitrogen may also be included in instrument-based NOx measurements. A precursor of ozone, photochemically generated nitrate particles (including PAN), and atmospheric nitrous and nitric acids.

Non-native Species: See Invasive Species and Noxious Weed.

Noxious Weed: According to the Federal Noxious Weed Act (PL 93-629), a weed that causes disease or has other adverse effects on man or his environment and therefore is detrimental to the agricultural and commerce of the United States and to the public health.

Nonattainment Area: An area that does not meet a federal or state ambient air quality standard. Federal agency actions occurring in a federal nonattainment area are subject to Clean Air Act conformity review requirements.

O

Off-Highway Vehicle (OHV): Any vehicle capable of or designed for travel on or immediately over land, water, or other natural terrain, deriving motive power from any source other than muscle. OHVs exclude: 1) any non-amphibious registered motorboat; 2), any fire, emergency, or law enforcement vehicle while being used for official or emergency purposes; 3) any vehicle whose use is expressly authorized by a permit, lease, license, agreement, or contract issued by an authorized officer or otherwise approved; 4) vehicles in official use; and 5) any combat or combat support vehicle when used in times of national defense emergencies.

Organic Compounds: Compounds of carbon containing hydrogen and possibly other elements (such as oxygen, sulfur, or nitrogen). Major subgroups of organic compounds include hydrocarbons, alcohols, aldehydes, carboxylic acids, esters, ethers, and ketones. Organic compounds do not include crystalline or amorphous forms of elemental carbon (graphite, diamond, carbon black, etc.), the simple oxides of carbon (carbon monoxide and carbon dioxide), metallic carbides, or metallic carbonates.

Overdraft condition: A condition in which the total volume of water being extracted from the groundwater basin would be greater than the total recharge provided to the basin.

Ozone (O3): A compound consisting of three oxygen atoms. Ozone is a major constituent of photochemical smog that is formed primarily through chemical reactions in the atmosphere involving reactive organic compounds, nitrogen oxides, and ultraviolet light. Ozone is a toxic chemical that damages various types of plant and animal tissues and which causes chemical oxidation damage to various materials. Ozone is a respiratory irritant, and appears to increase susceptibility to respiratory infections. A natural layer of ozone in the upper atmosphere absorbs high energy ultraviolet radiation, reducing the intensity and spectrum of ultraviolet light that reaches the earth’s surface.

P

Paleontological Resources (Fossils): The physical remains of plants and animals preserved in soils and sedimentary rock formations. Paleontological resources are for understanding past environments, environmental change, and the evolution of life.

Paleontology: A science dealing with the life forms of past geological periods as known from fossil remains.

Paleozoic Era: An era of geologic time (600 million to 280 million years ago) between the Late Precambrian and the Mesozoic eras and comprising the Cambrian, Ordovician, Silurian, Devonian, Missippian, Pennsylvanian, and Permian periods.

Particulate Matter: Solid or liquid material having size, shape, and density characteristics that allow the material to remain suspended in the atmosphere for more than a few minutes. Particulate matter can be characterized by chemical characteristics, physical form, or aerodynamic properties. Categories based on aerodynamic properties are commonly described as being size categories, although physical size is not used to define the categories. Many components of suspended particulate matter are respiratory irritants. Some components (such as crystalline or fibrous minerals) are primarily physical irritants. Other components are chemical irritants (such as sulfates, nitrates, and various organic chemicals). Suspended particulate matter also can contain compounds (such as heavy metals and various organic compounds) that are systemic toxins or necrotic agents. Suspended particulate matter or compounds adsorbed on the surface of particles can also be carcinogenic or mutagenic chemicals.

Peak Particle Velocity: A measure of ground-borne vibrations. Physical movement distances are typically measured in thousandths of an inch, and occur over a tiny fraction of a second. But the normal convention for presenting that data is to convert it into units of inches per second.

Perennial Yield: The maximum quantity of water that can be annually withdrawn from a groundwater basin over a long period of time [during which water supply conditions approximate average conditions] without developing an overdraft condition.- CDWR, 1998).

Petroglyph: Pictures, symbols, or other art work pecked, carved, or incised on natural rock surfaces.

pH (parts hydrogen): The logarithm of the reciprocal of hydrogen-ion concentration in gram atoms per liter.

Physiographic Province: An extensive portion of the landscape normally encompassing many hundreds of square miles, which portrays similar qualities of soil, rock, slope, and vegetation of the same geomorphic origin (Fenneman 1946; Sahrhaftig 1975).

Pleistocene (Ice Age): An epoch in the Quarternary period of geologic history lasting from 1.8 million to 10,000 years ago. The Pleistocene was an epoch of multiple glaciation, during which continental glaciers covered nearly one fifth of the earth’s land.

Pliocene: The Pliocene Epoch is the period in the geologic timescale that extends from 5.332 million to 2.588 million years before present.

PM_{10} (inhalable particulate matter): A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 50 microns penetrate to the lower respiratory tract (tracheo-bronchial airways and alveoli in the lungs). In a regulatory context, PM_{10} is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 9.5-10.5 microns and an maximum aerodynamic diameter collection limit less than 50 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 10 microns and less than 50 percent for particles with aerodynamic diameters larger than 10 microns.

$PM_{2.5}$ (fine particulate matter): A fractional sampling of suspended particulate matter that approximates the extent to which suspended particles with aerodynamic equivalent diameters smaller than 6 microns penetrate into the alveoli in the lungs. In a regulatory context, $PM_{2.5}$ is any suspended particulate matter collected by a certified sampling device having a 50 percent collection efficiency for particles with aerodynamic equivalent diameters of 2.0-2.5 microns and an maximum aerodynamic diameter collection limit less than 6 microns. Collection efficiencies are greater than 50 percent for particles with aerodynamic diameters smaller than 2.5 microns and less than 50 percent for particles with aerodynamic diameters larger than 2.5 microns.

Precursor: A compound or category of pollutant that undergoes chemical reactions in the atmosphere to produce or catalyze the production of another type of air pollutant.

Prehistoric: Refers to the period wherein American Indian cultural activities took place before written records and not yet influenced by contact with nonnative culture(s).

Programmatic Agreement (PA): A document that details the terms of a formal, legally binding agreement between one party and other state and/or federal agencies. A PA establishes a process for consultation, review, and compliance with one or more federal laws, most often with those federal laws concerning historic preservation.

Protocol Agreement (Protocol): A modified version of the NPA, adapted to the unique requirements of managing cultural resources on public lands in California, and is used as the primary management guidance for BLM offices in the state.

Q

Quaternary Age: The most recent of the three periods of the Cenozoic Era in the geologic time scale of the ICS. It follows the Tertiary Period, spanning 2.588 ± 0.005 million years ago to the present. The Quaternary includes two geologic epochs: the Pleistocene and the Holocene Epochs.

R

Rehabilitation: A management alternative and/or practice which restores landscapes to a desired scenic quality.

Restoration (Cultural Resource): The process of accurately reestablishing the form and details of a property or portion of a property together with its setting, as it appeared in a particular period of time. Restoration may involve removing later work that is not in itself significant and replacing missing original work. Also see Stabilization (Cultural Resource).

Riparian: Situated on or pertaining to the bank of a river, stream, or other body of water. Normally describes plants of all types that grow rooted in the water table or sub-irrigation zone of streams, ponds, and springs.

Road: A linear route declared a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use.

Route: “Routes” represents a group or set of roads, trails, and primitive roads that represents less than 100% of the BLM transportation system. Generically, components of the transportation system are described as routes.

S

Saleable Minerals: Common variety minerals on the public lands, such as sand and gravel, which are used mainly for construction and are disposed by sales or special permits to local governments. See also Mineral Materials.

Scale: The proportionate size relationship between an object and the surroundings in which the object is placed.

Scenery: The aggregate of features that give character to a landscape.

Scenic Area: An area whose landscape character exhibits a high degree of variety and harmony among the basic elements which results in a pleasant landscape to view.

Scenic Quality: The relative worth of a landscape from a visual perception point of view.

Scenic Quality Evaluation Key Factors: The seven factors (land form, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications) used to evaluate the scenic quality of a landscape.

Scenic Quality Ratings: The relative scenic quality (A, B, or C) assigned a landscape by applying the scenic quality evaluation key factors; scenic quality A being the highest rating, B a moderate rating, and C the lowest rating.

Scenic Values: See Scenic Quality and Scenic Quality Ratings.

Secretary of the Interior: The U.S. Department of the Interior is in charge of the nation’s internal affairs. The Secretary serves on the President’s cabinet and appoints citizens to the National Park Foundation board.

Sedimentary Rocks: Rocks, such as sandstone, limestone, and shale, that are formed from sediments or transported fragments.

Sensitivity Levels: Measures (e.g., high, medium, and low) of public concern for scenic quality.

Shaft: See Mine Shaft.

Special Status Species: Federal- or state-listed species, candidate or proposed species for listing, or species otherwise considered sensitive or threatened by state and federal agencies.

State Historic Preservation Office (SHPO): The official within and authorized by each state at the request of the Secretary of the Interior to act as liaison for the National Historic Preservation Act. Also see National Historic Preservation Act.

State Implementation Plan (SIP): Legally enforceable plans adopted by states and submitted to EPA for approval, which identify the actions and programs to be undertaken by the State and its subdivisions to achieve and maintain national ambient air quality standards in a time frame mandated by the Clean Air Act.

State Water Resources Control Board (SWRCB): Created in 1967, joint authority of water allocation and water quality protection enables the State Water Board to provide comprehensive protection for California's waters. The mission of the nine Regional Boards is to develop and enforce water quality objectives and implementation plans that will best protect the State's waters, recognizing local differences in climate, topography, geology and hydrology.

Subsurface: Of or pertaining to rock or mineral deposits which generally are found below the ground surface.

Sulfur Dioxide (SO2): A pungent, colorless, and toxic oxide of sulfur formed primarily by the combustion of fossil fuels. It is a respiratory irritant, especially for asthmatics. A criteria pollutant in its own right, and a precursor of sulfate particles and atmospheric sulfuric acid.

T

Taphonomy: The study of the processes by which animal bones and shells and plant and other fossil remains are transformed after deposition.

Tertiary: The Tertiary Period marks the beginning of the Cenozoic Era. It began 65 million years ago and lasted more than 63 million years, until 1.8 million years ago. The Tertiary is made up of 5 epochs: the Paleocene Epoch, the Eocene Epoch, the Oligocene Epoch, the Miocene Epoch, and the Pliocene Epoch.

Texture: The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.

Toxic: Poisonous. Exerting an adverse physiological effect on the normal functioning of an organism's tissues or organs through chemical or biochemical mechanisms following physical contact or absorption.

Traditional Cultural Properties: Areas associated with the cultural practices or beliefs of a living community. These sites are rooted in the community’s history and are important in maintaining cultural identity.

Trail: A linear route managed for human-powered, stock, or off-highway vehicle forms of transportation or for historical or heritage values. Trails are not generally managed for use by four-wheel drive or high-clearance vehicles.

V

Vandalism (Cultural Resource): Malicious damage or the unauthorized collecting, excavating, or defacing of cultural resources. Section 6 of the Archaeological Resources Protection Act states that "no person may excavate, remove, damage, or otherwise alter or deface any archaeological resource located on public lands or Indian lands…unless such activity is pursuant to a permit issued under section 4 of this Act."

Variables: Factors influencing visual perception including distance, angle of observation, time, size or scale, season of the year, light, and atmospheric conditions.

Variety: The state or quality of being varied and having the absence of monotony or sameness.

Vehicle Miles Traveled (VMT): The cumulative amount of vehicle travel within a specified or implied geographical area over a given period of time.

Viewshed: The landscape that can be directly seen under favorable atmospheric conditions, from a viewpoint or along a transportation corridor. Protection, rehabilitation, or enhancement is desirable and possible.

Visual Contrast: See Contrast.

Visual Quality: See Scenic Quality.

Visual Resources: The visible physical features on a landscape (e.g., land, water, vegetation, animals, structures, and other features).

Visual Resource Management Classes: Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective which prescribes the amount of change allowed in the characteristic landscape.

Visual Resource Management (VRM): The inventory and planning actions taken to identify visual values and to establish objectives for managing those values; and the management actions taken to achieve the visual management objectives.

Visual Values: See Scenic Quality.

W

Wetlands: Permanently wet or intermittently water-covered areas, such as swamps, marshes, bogs, potholes, swales, and glades.

Wilderness Area: An area formally designated by Congress as part of the National Wilderness Preservation System as defined in the Wilderness Act of 1964 (78 Stat.891), Section 2(c).

Wilderness Study Area: A roadless area or island that has been inventoried and found to have wilderness characteristics as described in section 603 of FLPMA and section 2(c) of the Wilderness Act of 1964 (78 Stat. 891). Source for both of these is BLM’s IMP and Guidelines for Lands Under Wilderness Review (December 1979).

REFERENCES

Organization of the References

A number of document available through the California Energy Commission's permitting process were used as primary references in preparing this PA/FEIS. These include the Staff Assessment/Draft Environmental Impact Statement, the Revised Staff Assessment, and the Revised Staff Assessment Supplement. The SA/DEIS is incorporated by reference in this FEIS. Other references used in the preparation of this FEIS for the GSEP are organized in this section as follows:

References from the CEC Permitting Process

The references listed here are provide the complete listing of references that were used in the PA/FEIS that were obtained from the Genesis Application for Certification or by the CEC permitting process.

Additional References

These are additional references that were used by the PA/FEIS authors as primary sources of information for the analyses provided in the PA/FEIS.

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