DOCKET
09-AFC-3
DATE
RECD DEC 16 2010

MARIPOSA ENERGY PROJECT

Supplemental Staff Assessment

CALIFORNIA
ENERGY COMMISSION
Arnold Schwarzenegger, Governor

DECEMBER 2010
CEC 700-2010-017 - SUP

DOCKET NUMBER 09-AFC-3

PROOF OF SERVICE (REVISED 10/20/10) FILED WITH
ORIGINAL MAILED FROM SACRAMENTO ON 12/16/10
HA

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MARIPOSA ENERGY PROJECT (MEP)
(09-AFC-3)
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EXECUTIVE SUMMARY

Revised Testimony of Craig Hoffman

This section is revised testimony from the Staff Assessment published on November 8, 2010.

Energy Commission staff published a Staff Assessment (SA) for the Mariposa Energy Project (MEP) on November 8, 2010. This document included staff's analysis, conclusions, and recommendations for the project. Staff publically noticed the Staff Assessment for a 30-day comment period that lasted from November 9, 2010 through December 9, 2010.

During this comment period, a public workshop was held on Monday, November 29, 2010, at the Byron Bethany Irrigation District to discuss staff's findings, proposed mitigation, and proposed compliance-monitoring requirements. Based on the workshops and written comments, staff has refined its analysis, corrected any errors, and finalized conditions of certification.

This Supplemental Staff Assessment (SSA) has been prepared based upon discussions at the SA workshops and written comments provided by the applicant, agencies, other parties and public. This SSA is a limited document representing revisions and additions to various technical sections that were commented upon and therefore does not include each technical section. For a complete project description and all the technical sections, please see the original SA document with the complete engineering, environmental, public health and safety analysis of the MEP.

The MEP SSA contains the Energy Commission staff's engineering and environmental evaluation of the project in the following technical sections: Air Quality/Green House Gases, Alternatives, Biological Resources, Hazardous Materials, Land Use, Noise and Vibration, Project Description, Public Health, Socioeconomics, Soil and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Transmission System Engineering, Visual Resources and Worker Safety and Fire Protection and will serve as staff's testimony during evidentiary hearings.

Staff's testimony that will be provided at the Energy Commission's Evidentiary Hearings on the MEP project will encompass the SA and revisions to sections included in the SSA.

For purposes of the Table of Contents, the sections have the same numbering as in the previous SA. Sections that are not included in this SSA have strikethrough.

INTRODUCTION

This Supplemental Staff Assessment (SSA) contains the California Energy Commission staff's independent evaluation of the Mariposa Energy Project (MEP) Application for Certification (09-AFC-3). The SSA examines engineering, environmental, public health and safety aspects of the MEP project, based on the information provided by the applicant, Mariposa Energy, LLC and other sources available at the time the SSA was

prepared. The SSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment, the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and proposes conditions of certification for construction, operation and eventual closure of the project, if approved by the Energy Commission.

On November 8, 2010 the Energy Commission published the MEP Staff Assessment (SA). The SA presents for the committee, applicant, interveners, agencies, other interested parties, and members of the public, the staff's final analysis, conclusions, and recommendations except for biological resources and transmission system engineering where additional information and analysis is needed. The SA examined engineering, environmental and public health and safety aspects of the MEP project. Based on the information provided by the applicant and other sources available at the time the SA was prepared. The SA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). This document was publically noticed for comments from November 9, 2010 to December 9, 2010.

During the comment period that followed the publication of the SA, staff held a public workshop on Monday, November 29, 2010, at the Byron Bethany Irrigation District to discuss its findings, proposed mitigation, and proposed compliance monitoring requirements. Staff provides a comment period to resolve issues between the parties and to narrow the scope of disputed issues presented at evidentiary hearings. Based on the workshop and written comments, staff has refined its analysis, corrected errors, and finalized conditions of certification to reflect areas where agreements have been reached with the parties.. The SSA is a limited document representing revisions and additions rather than a document including each technical section.

The SA, and superseded sections within the SSA, will serve as staff's formal testimony in evidentiary hearings to be held by the Committee of two Commissioners who are hearing this case. After evidentiary hearings, the Committee will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The full Energy Commission will make the final decision, including findings, after the Committee's publication of its proposed decision.

PROJECT LOCATION AND DESCRIPTION

The Mariposa Energy Project (MEP) would be a natural gas-fired, simple cycle peaking facility with a generating capacity of 200-megawatts (MW). The proposed project site is in northeastern Alameda County, in an unincorporated area designated for Large Parcel Agriculture by the East County Area Plan. The facility would be located southeast of the

intersection of Bruns Road and Kelso Road on a 10-acre portion of a 158-acre parcel (known as the Lee Property) immediately south of the Pacific Gas and Electric Company (PG&E) Bethany Compressor Station and 230-kilovolt (kV) Kelso Substation. The proposed power plant site is located in the southern portion of the Lee Property.

The site is located approximately 7 miles northwest of Tracy, 7 miles east of Livermore, 6 miles south of Byron, and approximately 2.5 miles west of the community of Mountain House in San Joaquin County. The existing, unrelated 6.5 MW Byron Power Cogen Plant occupies 2 acres of the 158-acre parcel northeast of the MEP site. The remainder of the parcel is non-irrigated grazing land.

Primary equipment for the generating facility would include four General Electric (GE) LM6000 PC-Sprint natural gas-fired combustion turbine generators (CTG) and associated equipment. Power would be transmitted to the grid at 230-kV through a new 0.7-mile long transmission line that would connect to the existing Kelso Substation. A new 580-foot long natural gas pipeline would connect the project site to PG&E's Line 2, which is an existing high-pressure natural gas pipeline located northeast of the project site. Service water would be provided from a new connection to the Byron Bethany Irrigation District (BBID) via a new pump station and 1.8-mile long pipeline. All domestic wastewater would be routed to an onsite septic system and either discharged to an onsite leach filed or removed via truck for offsite disposal. Stormwater runoff would be detained onsite in an extended detention basin and released according to regulatory standards for stormwater quality control. Air emissions control systems would include a selective catalytic reduction (SCR) system for nitrogen oxides (NOx) control using 19 percent aqueous ammonia and an oxidation catalyst for carbon monoxide (CO) control.

Temporary construction facilities would include a 9.2-acre worker parking and laydown area immediately east of the project site, a 1-acre water supply pipeline parking and laydown area located at the BBID headquarters facility, and a 0.6-acre laydown area along the transmission line route.

The MEP has a 20-year power purchase agreement with PG&E. If approved, project construction would begin in April 2011, with commercial operation commencing in July 2012.

AGENCY COORDINATION

The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Commission seeks comments from and works 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, California Department of Fish and Game, and the California Air Resources Board. On July 2, 2009, Energy Commission staff sent the MEP AFC to all local, state, and federal agencies that might be affected by the proposed project. On September 28, 2009, staff followed up and sent the MEP Supplemental AFC to all local, state, and

federal agencies that might be affected by the proposed project. The MEP SA Notice of Availability and a Compact Disk copy of the SA was provided to all local, state, and federal agencies that might be affected by the proposed project on November 9, 2010.

The MEP SSA Notice of Availability and a Compact Disk copy of the SSA were provided to all local, state, and federal agencies that might be affected by the proposed project on December 17, 2010.

OUTREACH EFFORTS

Energy Commission regulations require staff to send notices regarding receipt of an AFC and Commission events and reports related to proposed projects, at a minimum, to property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines) and publish a notice in a local newspaper. The Energy Commission's outreach efforts are an ongoing process that, to date, has involved the following efforts; on July 2, 2009, a notice of receipt of MEP AFC was mailed out, and on September 28, 2009, a notice of receipt the MEP Supplemental AFC was mailed out. Notice of the October 1, 2009 Informational Hearing and Site Visit to the proposed site of the MEP was sent by letter. A site visit and status conference was held on October 6, 2010 with a status and scheduling conference. 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 of Alameda and San Joaquin Counties were similarly notified of the hearing and site visit.

The MEP SA Notice of Availability and the The MEP SSA Notice of Availability were provided to the required mailing list and those individuals that have requested to be added to the mailing lists.

LIBRARIES

On July 2, 2009, the Energy Commission staff sent the MEP Application for Certification and on September 28, 2009 followed up with the MEP Supplement to the Application for Certification to various libraries within the project vicinity including; Mountain House Branch Library, Tracy Public Library, Livermore Public Library, San Joaquin County Library, Brentwood Library and Fremont Main Library. In addition, to these local libraries, copies of the AFC are also available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

A copy of the MEP SA and Notice of Availability and a copy of the SSA and Notice of Availability were provided to all these libraries.

DATA RESPONSE AND ISSUE RESOLUTION WORKSHOP

Energy Commission staff sent a public notice to appropriate parties on November 30, 2009 for a December 15, 2009 Data Response Workshop and onJune 17, 2010 for a June 30, 2010 Data Response Workshop. 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.

NOTIFICATION TO THE LOCAL NATIVE AMERICAN COMMUNITY

In addition to the July 2, 2009 and September 28, 2009 mail-outs which were sent to the Native American Heritage Commission, on April 19, 2010 the local Native American community were sent letters advising them of the proposed project and provided them with contact information. In addition, their names have been added to the MEP project mail-out list so they will receive a copy of all Commission notices for events and reports related to this project.

PUBLIC ADVISER'S OFFICE

The Public Adviser helps the public participate in the Energy Commissions hearings and meetings. The Public Adviser assists the public by advising them how they can participate in the Energy Commission process; however, they do not represent members of the public.

ISSUES RAISED BY THE PUBLIC

At various workshops, the public have identified concerns that staff have incorporated into their analysis. Project concerns have included; air quality impacts to the Mountain House Community, impacts to the San Joaquin Air Basin from a project in the Bay Area Air Quality District, potential for bird attraction to the project thermal plumes, land use compatibility with Alameda County and Measure D, land use compatibility with the Byron Airport Master Plan, water supply concerns, safety concerns for pilots, impacts to air plane overflights and air space restrictions, air quality impacts to pilots, fire protection and worker safety concerns. These comments were incorporated into the SA as necessary.

Comments provided on the SA to date include comments on the following technical sections: Air Quality/Green House Gases, Alternatives, Biological Resources, Hazardous Materials, Land Use, Noise and Vibration, Project Description, Public Health, Socioeconomics, Soil and Water Resources, Traffic and Transportation, Transmission Line Safety and Nuisance, Transmission System Engineering, Visual Resources and Worker Safety and Fire Protection.

These comments have been incorporated into the SSA as appropriate in the individual technical sections.

ENVIRONMENTAL JUSTICE

The steps recommended by the U.S. EPA's guidance documents to assure compliance with the Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of

impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis.

In considering environmental justice in energy facility siting cases, staff uses a demographic screening analysis to determine whether a low-income and/or minority population exists within the potentially affected area of the proposed site. The demographic screening 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 Environmental Justice screening process relies on Year 2000 U.S. Census data to determine the presence of minority and below-poverty level populations. Environmental Justice: Guidance Under the National Environmental Policy Act, defines minority individuals 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 is identified when the minority population or the below-poverty-level population of the potentially affected area is:

1. greater than 50%; or
2. present in one or more US Census blocks where a minority population of greater than 50% exists.

In addition to the demographic screening analysis, staff follows the steps recommended by the U.S. EPA's guidance documents in regard to outreach and involvement; and if warranted, a detailed examination of the distribution of impacts on segments of the population.

Staff has followed each of the above steps for the following eleven (11) sections in the SA: **Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Socioeconomics, Soils and Water Resources, Traffic and Transportation, Transmission Line Safety/Nuisance, Visual Resources,** and **Waste Management**. Over the course of the analysis for each of these eleven technical disciplines, staff considered potential impacts and mitigation measures, and whether there would be a significant impact on an environmental justice population. Staff determined that the remaining technical areas did not involve potential environmental impacts that could contribute to a disproportionate impact on an environmental justice population, and so did not necessitate further environmental justice analysis for those areas.

DETERMINING MINORITY POPULATION

Socioeconomics Figure 1 (located in the Socioeconomics section of this SA shows the minority population within the six-mile radius of the proposed MEP site. A minority population is identified when the minority population of the potentially affected area is greater than 50% or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis. For the

MEP project, the 2000 U.S. Census total population within the six-mile radius of the proposed site is 2,164 persons, with a minority population of 706 persons, or about 33% of the total population.

DETERMINING BELOW-POVERTY-LEVEL POPULATION

Below-poverty-level populations are identified based on Year 2000 census block group data. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below-poverty-level population within a six-mile radius of the MEP consists of approximately 14% of the total population in that area or approximately 277 people.

STAFF'S ASSESSMENT

Each technical area section of the SSA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and proposed conditions of certification. The SSA includes staff's preliminary assessment of:

- the environmental setting of the proposal;
- impacts on public health and safety, and measures proposed to mitigate these impacts;
- direct, indirect and cumulative environmental impacts, and measures proposed to mitigate these impacts;
- the engineering design of the proposed facility, and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;
- compliance of the project with all applicable laws, ordinances, regulations and standards (LORS) during construction and operation;
- environmental justice for minority and low income populations;
- conclusions and recommendations; and,
- proposed conditions of certification.

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the MEP would comply with all applicable laws, ordinances, regulations, and standards (LORS).

For a more detailed review of potential impacts and LORS conformance, see staff's technical analyses in the SSA. The status of each technical area is summarized in the table below and the subsequent text.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	Yes
Noise and Vibration	Yes	Yes
Public Health	Yes	Yes
Socioeconomic Resources	Yes	Yes
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

STAFF ASSESSMENT COMMENTS

The following persons and agencies commented on the Staff Assessment. Responses to comments are provided in the technical sections.

Andy Wilson / California Pilots Association (TN 59223): Has provided oral and written comments on air quality, hazardous materials, land use, public health and traffic and transportation.

Byron Bethany Irrigation District (TN 59069): Comments on Proposed Soil & Water Resources Testimony.

Byron Bethany Irrigation District (TN 59077): Comments on MEP Soils and Water Resources Staff Assessment.

CH2M Hill / D. Urry (TN 59083): Mariposa Energy Center (09-AFC-03) Applicant's Comments on the CEC Staff Assessment. The majority of the comments were minor clarifications and requested modifications. Comments were provided on air quality, biological resources, hazardous materials, land use, noise and vibration, public health, socioeconomics, soil and water resources, traffic and transportation, transmission line safety and nuisance and visual resources.

Dolores Kuhn (TN 59195): Has provided written comments about concerns to the local community and a lack of review by the Energy Commission.

Douglas and Sylvia Little (TN 59210): Comments and questions on land use, public health and traffic and transportation.

Darlene Roehl (TN 59156): Provided written comments on air quality concerns.

Jass Singh (TN 59205): Has provided oral and written comments on air quality and socioeconomics.

Joan Jess (TN 59204): Has provided written comments on socioeconomic concerns and a lack of protection for the existing Mountain House community.

Jon Rubin (TN 59174). Written comments and concerns about items not in the Staff Assessment including air quality and socioeconomics.

Kishor Bhatt (TN 59178): Written comments on Air Quality and Socioeconomics.

Lucas Davis (TN 58732): The Effect of Power Plants on Local Housing Values and Rents. (technical paper)

Morgan Groover:Has provided oral comments on air quality and public health.

Rajesh Dighe (TN 59044): Social Economic Effects of Mariposa Power Plant on Mountain House Community.

Rajesh Dighe (TN 59130): Comments on the Mariposa Staff Assessment: air quality, alternatives, public health, socioeconomics and traffic and transportation.

Robert Anderson (TN 59206): Response to letter from Chris Bazar regarding the East County Area Plan.

Robert Sarvey (TN 59213): Has provided oral and written comments on air quality, alternatives, biological resources, land use, soils and water resources and worker safety and fire protection.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received the following comments on aspects of the MEP related to overall comments not included in technical sections:

Joan Jess, local resident

Comment: Why wasn't there extensive research describing potential environmental impacts, i.e., health, noise, and safety to the existing and original Mt. House Farming and Ranching Community that is located within 2 miles of the project? This community consists of over 86 residents, who are senior citizens, children, Hispanic and other minorities.

> **Response:** The Staff Assessment is completed by staff and in an independent technical environmental review of the Mariposa Energy Project and provides an environmental review of the project. The analysis found the project to have a less than significant impact upon the original Mountain House Farming Community, the residents of the Mountain House Community in San Joaquin County and the surrounding areas.

Comment: Why wasn't my property listed on the section of "Property Owners Adjacent to Mr. Lee's Property?" The answer I received at the workshop that I was receiving the notices and that was all that mattered. If that was the case everyone within 6 miles should have been on the list! It was not listed as a "Mailing List" on the section.

The other answer I received was that I was not a resident on my property. When in fact I do have a residence within 2 miles of the project and I was the only person in the entire meeting that actually lived within 2 miles of the project and have lived here for 42 years! Additionally, there are 5 (five) parcels on my property and I am planning to build homes on this property.

> **Response:** The applicant's AFC includes a list of property owners and residents within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). The AFC may be incorrect, but the CEC mailing list includes your name and address to receive notices and mailings. Staff is more concerned with the CEC mailing list for the project to ensure local residents are notified for public events.
>
> The ability to build residential units on your property is governed by Alameda County. We do not permit or restrict your ability to build residential units on your property. The MEP project has been mitigated to less than significant impacts. Potential new residential units on surrounding properties would not be impacted.

Comment: The following question is in regard to the money that has been given to the adjoining communities and the Mountain House School. Can you tell me the reason for the following amounts of money to be given to these entities? And what each entity had to give Mariposa Energy Project in return? i.e., right of way, water, air, electricity, no objection to the plant being built, or any other concessions, or other mitigations? The amounts are as follows; Alameda County, approximately $2,000,000; San Joaquin County, approximately $750,000; Contra Costa County $800,000, and Mountain House School $10,000, in addition to a potential WISH LIST of a substantial amount in salaries and improvements to the school.

> **Response:** The project applicant may have entered into community benefit package agreements with various agencies or jurisdictions. These agreements are private between the applicant and the entity. Energy Commission staff is not a party to those agreements, nor have we seen them or know the specific details.
>
> The Energy Commission can require mitigation and conditions of certification where an impact has been identified and mitigation is needed to reduce that impact to less than a significant level under CEQA. The Energy Commission cannot require or prohibit the applicant from entering into agreements.

Dolores Kuhn, local resident

Comment: We feel that our community the proposed plant is posing to built upon has been overlooked. The surrounding counties and communities have been compensated and catered to at our expense.

1) What does the Mariposa plant acquire in return for their compensation to these entities?

2) What does the community of Mountain House (not the Mountain House Town) get in return for dealing with a plant that is 2/10ths and beyond, in our visual and sound range. The devaluation of property, depleting range land, ranching/farming community turned into industrial type property isn't what the community stands for.

Response: The Energy Commission staff completes a thorough independent analysis of a power plant on the surrounding environment. The MEP SA and SSA have analyzed the environmental impacts of the project on the surrounding areas including the original Mountain House community, the new town of Mountain House and surrounding areas. Impacts to farm land and agricultural resources have been analyzed in the land use section and social economic conditions have been analyzed in Socioeconomics. Staff has identified that all project impacts can be mitigated to less than significant.

Staff has heard second hand that the project applicant may have entered into community benefit package agreements with various agencies or jurisdictions. These agreements are private between the applicant and the entity. Energy Commission staff is not a party to those agreements, nor have we seen them or know the specific details.

The Energy Commission can require mitigation and conditions of certification where an impact has been identified and mitigation is needed to reduce that impact to less than a significant level. The Energy Commission cannot require the applicant to enter into agreements that are not warranted.

PROJECT DESCRIPTION

Craig Hoffman

This section is revised from the Staff Assessment published on November 8, 2010.

INTRODUCTION

Mariposa Energy, LLC (applicant), owned by Diamond Generating Corporation (DGC), a wholly owned subsidiary of Mitsubishi Corporation, filed an Application for Certification (AFC) with the California Energy Commission (Energy Commission) on June 15, 2009, to construct and operate a natural gas-fired, simple cycle peaking facility with a generating capacity of 200 megawatts (MW). The AFC was reviewed for data adequacy and on July 29, 2009, the Energy Commission found the AFC inadequate and adopted a list of deficiencies in eight technical areas. On July 31, 2009, the applicant provided additional information to supplement the AFC. At a business meeting held on August 26, 2009, the Energy Commission adopted the Executive Director's data adequacy recommendation, thereby deeming the AFC complete for filing purposes.

PROJECT LOCATION

The proposed project site is in northeastern Alameda County, in an unincorporated area designated for Large Parcel Agriculture by the East County Area Plan. The site is located approximately 7 miles northwest of Tracy, 7 miles east of Livermore, 6 miles south of Byron, and approximately 2.5 miles west of the community of Mountain House in San Joaquin County. **See Project Description Figure 1.**

The power plant site is approximately 2.7 miles south of the Byron Airport and approximately 1 mile west of the centerline of the main runway approach path.

The facility would be located southeast of the intersection of Bruns Road and Kelso Road on a 10-acre portion of a 158-acre parcel (known as the Lee Property) immediately south of the Pacific Gas and Electric Company (PG&E) Bethany Compressor Station and 230-kilovolt (kV) Kelso Substation. The proposed power plant site is located in the southern portion of the Lee Property. The existing, unrelated 6.5 MW Byron Power Cogeneration Plant occupies 2 acres of the 158-acre parcel northeast of the Mariposa Energy Project (MEP) site. The remainder of the parcel is non-irrigated grazing land.

PROJECT PURPOSE AND OBJECTIVES

The main objective of the MEP would be to provide dispatchable generation to meet PG&E's need for new energy sources in Alameda County and the San Francisco Bay Area, to support and back up intermittent renewable resources (e.g., wind and solar), and to satisfy the terms of MEP's power purchase agreement with PG&E. PG&E has identified a near-term need for new power facilities that can be on line by or before 2015

and that can support easily dispatchable and flexible system operation. PG&E issued a Request for Offers on April 1, 2008, to obtain these energy resources from qualified bidders.

The applicant expects to operate MEP as a peaker unit, with some amount of load following and cycling. It is expected that the primary purpose of MEP will be to provide generation capacity during peak season (summer) high demand periods. The facility is expected to be operated during high demand times (typically afternoon hours) to supplement base-load and renewable generation capacity. A facility that provides peaking capacity must be able to be up and running at peak generation within 10 minutes of dispatch to meet California Independent System Operator (California ISO) requirements. As a peaking facility, MEP would not run continuously, but instead would start, run for as many hours as necessary, and then shut down. As described in the AFC, the applicant's specific project objectives are as follows:

- Safely construct and operate a 200-megawatt (MW), natural gas-fired, simple-cycle generating facility to meet PG&E's growing peak load and the growing energy demands of customers within PG&E's service territory.
- Site the project within the Altamont Wind Resource Area in order to supply back-up generation when the local wind turbines decrease output due to decreased wind. The quick start, peaking facility will be utilized to supplement the renewable wind generation during periods of low or variable wind resource in order to maintain grid stability.
- Site the project as near as possible to a PG&E substation with available transmission capacity.
- Site the project to minimize or eliminate the length of any project linears, including gas and water supply pipelines, as well as transmission interconnections.
- Assist Alameda County in meeting its electrical energy needs by providing additional local dispatchable generation, decreasing the amount of imported energy and providing system/grid support at critical times, such as periods of decreasing renewable generation and peak load conditions.
- Minimize environmental and air quality impacts.
- Assist the State of California in developing increased local generation projects, thus reducing dependence on imported power.

PROJECT FEATURES

The MEP would be a natural gas-fired, simple-cycle peaking facility with a generating capacity of 200 megawatts (MW). The project proposes to operate on average, 600 hours per year, but if licensed, can run up to 4,000 hours. Primary equipment for the generating facility would include four General Electric (GE) LM6000 PC-Sprint natural gas-fired combustion turbine generators (CTG) and associated equipment. Power would be transmitted to the grid at 230-kV through a new 0.7-mile transmission line that would connect to the existing Kelso Substation. A new 580-foot 8-inch diameter natural gas pipeline would connect the project site to PG&E's Line 2, which is an existing high-pressure natural gas pipeline located northeast of the project site. Service and process

water would be fresh irrigation water provided from a new connection to the Byron-Bethany Irrigation District (BBID) via a new pump station and 1.8-mile 10-inch diameter pipeline. **See Project Description Figures 2 and 3.**

The MEP is proposing to utilize on average 35 acre-feet of water per year. In the event of continuous and maximum permitted operation, the MEP would utilize 187 acre feet of water for 4,000 hours of operation. All domestic wastewater would be routed to an on-site septic system and either discharged to an on-site leach field or removed via truck for off-site disposal. Stormwater runoff would be detained on-site in an extended detention basin and released according to regulatory standards for stormwater quality control. Air emissions control systems would include a selective catalytic reduction (SCR) system for nitrogen oxides (NOx) control using 19 percent aqueous ammonia and an oxidation catalyst for carbon monoxide (CO) control.

Temporary construction facilities would include a 9.2-acre worker parking and laydown area immediately east of the project site, a 1-acre water supply pipeline parking and laydown area located at the BBID headquarters facility, to serve water pipeline construction needs, and a 0.6-acre laydown area along the transmission line route.

The project would have the following design features:

- Four General Electric (GE) LM6000 PC Sprint combustion turbine generators CTGs and associated support equipment.
- Air emissions control systems including selective catalytic reduction (SCR) systems for nitrogen oxides (NOx) control and oxidation catalyst for carbon monoxide (CO) control.
- A new, approximately 0.7-mile-long, 230-kV transmission line to deliver the plant output to the electrical grid via the existing 230-kV Kelso Substation located north of the project site.
- Approximately 580 feet of new 8-inch-diameter natural gas pipeline that will run directly northeast from the project site to interconnect with PG&E's existing high pressure natural gas pipeline.
- A new 10-inch-diameter, 1.8-mile water supply line from the Byron-Bethany Irrigation District (BBID) Canal 45.

AIR QUALITY

The CTGs selected for the project include demineralized water injection and selective catalytic reduction (SCR) to control emissions of NOx. The CTGs incorporate staged combustion of a pre-mixed fuel/air charge, resulting in high thermal efficiencies with reduced CO and volatile organic compound (VOC) emissions. CO and VOC emissions will be further controlled by means of CO oxidation catalysts. Criteria air pollutants will be mitigated by the purchase of emission reduction credits in the Bay Area Air Quality Management District.

Particulate emissions will be controlled by the use of best combustion practices; the use of natural gas, which is low in sulfur, as the sole fuel for the CTGs; and high efficiency air inlet filtration. For each CTG, a separate Continuous Emission Monitoring System

(CEMS) will sample, analyze, and record fuel gas flow rate, NOx and CO concentration levels, and percentage of oxygen in the exhaust gas from the stacks. The CEMS sensors will transmit data to a data acquisition system (DAS) that will store the data and generate emission reports in accordance with permit requirements.

NATURAL GAS SUPPLY

The combustion turbine generators would be designed to burn natural gas only. The natural gas requirement during base load operation at annual average ambient temperature is approximately 1,926 million British thermal units per hour (MMBtu/hr), or 44.9 million dry standard cubic feet. Seasonal temperature fluctuations do not significantly influence fuel demand.

Natural gas would be delivered to the site via a tap to an existing PG&E natural gas pipeline located approximately 580 feet east of MEP. The new gas supply piping would consist of an 8-inch-diameter pipeline. At the plant site, the natural gas would flow through an 8-inch turbine-meter set, gas scrubber/filtering equipment, a gas pressure control station, electric-driven booster compressors coalescing and final fuel filters, and a fuel gas heater prior to entering the combustion turbines.

WATER SUPPLY

The applicant has proposed using raw water that would be supplied by Byron-Bethany Irrigation District (BBID) via a new 1.8-mile 10-inch diameter pipeline along Bruns Road. Total water use is expected to average 34.8 acre-feet per year (equivalent to the usage of approximately 35 homes) based on the expected operating scenario of 600 hours per year and 200 start and stop cycles. The estimated annual usage associated with the maximum permitted operating scenario of 4,000 hours per year and 300 start and stop cycles is approximately 187 acre-feet per year, under annual average temperature design conditions.

Most of the water would be diverted to a mobile demineralization system. The demineralized water would be used for combustion turbine water injection for NOx control, online water wash of the combustion turbine compressor section, and the normal operating mode of the PC Sprint CTG. Additionally, some of the raw water would be used for miscellaneous on-site uses such as equipment washdown and landscape irrigation. A small amount of water would be diverted to a domestic water treatment system and used on-site for domestic uses (e.g., sinks, toilets).

As part of the proposed project, Mariposa Energy will commit to voluntarily funding an annual water conservation program designed to conserve a volume of raw water equal to the volume of water consumed by the Mariposa Energy Project annually (potable water for personnel consumption, eyewash stations, showers, and sanitary needs not included). As a result of this commitment to voluntarily fund water conservation, the Mariposa Energy Project will not result in a net increase in consumption of raw water within Byron Bethany Irrigation District.

WASTEWATER

The project would be a Zero Liquid Discharge (ZLD) facility. Process wastewater and stormwater runoff from plant equipment process areas would be treated on-site via an oil/water separator and activated carbon filtration system. The treated water then would be recycled to the raw water storage tank for plant process water usage.

STORMWATER DISCHARGE

The proposed facility would mitigate stormwater runoff with a series of inlets and storm drain pipes that would convey the runoff to a proposed on-site extended detention basin located at the north end of the site. The extended detention basin is designed to release site stormwater runoff from the design storm capture volume over a minimum 48-hour period. It is not designed to hold water for longer periods. The multi-stage discharge structure would discharge to one of two swales routing upgradient stormwater around the site. Areas of potential oily water contamination would be constructed within containment barriers to prevent oily water from mixing with stormwater flowing to the extended detention basin.

TRANSMISSION SYSTEM

MEP would be interconnected with the regional electrical grid by a new, approximately 0.7-mile-long, single-circuit, three-phase, 230-kV transmission line. The proposed 230-kV line will run generally north from the project site, staying east of the Byron Power Cogen Plant, crossing Kelso Road, and staying east of the PG&E Bethany Compressor Station. It will turn west just north of the Kelso Substation, then turn south to the final interconnect point at the Kelso Substation.

Construction of the MEP may require PG&E to reconductor two segments within their transmission system. The two segments are the Kelso–Tesla 230-kV line (Kelso–United States Wind Power Regional Linear Facility), which is approximately 3.3 miles long, and the Kelso–Tesla 230-kV line (United States Wind Power Regional Linear Facility – Tesla), which is approximately 4.7 miles long. The total length of the lines to be reconductored is approximately 8 miles. The lines would be reconductored with 1113 Aluminum Conductor Steel-Supported (ACSS) or equivalent. **See Project Description Figures 4 and 5.**

PROJECT CONSTRUCTION AND OPERATION

Construction of the generating facility, from site preparation and grading to commercial operation, is expected to take place from April 2011 to July 2012 (14 months total).

CONSTRUCTION PHASE

There will be an average and peak workforce of approximately 90 and 177, respectively. Typically, noisy construction would be scheduled to occur between 7 a.m. and 7 p.m. on weekdays and 8 a.m. and 5 p.m. on Saturdays. Additional hours may be necessary to make up schedule deficiencies, or to complete critical construction activities (e.g.,

pouring concrete at night during hot weather, working around time-critical shutdowns and constraints). During some construction periods and during the startup phase of the project, some activities will continue 24 hours per day, 7 days per week.

The cost of materials and supplies required for the construction of MEP is estimated at approximately $185 million. The estimated value of materials and supplies that will be purchased locally during construction is $12.3 million. MEP will provide about $16.3 million in construction payroll. Assuming that 90 percent of the construction workforce will reside in the Alameda County, Contra Costa County and San Joaquin County region, it is expected that approximately $14.7 million will stay in the local area during the 14-month construction period.

OPERATION PHASE

MEP will have an operations and maintenance manager, business supervisor, and instrument technician working during the standard 5-day, 8-hours per day work week. Additionally, the facility will be staffed by an operator on a 24-hour basis, using rotating 12-hour shifts.

MEP operation will generate approximately eight full-time employees, that will result in an approximate operation payroll of $830,000 per year. The annual operations and maintenance budget is approximately $1,640,000, all of which is estimated to be spent locally in the Alameda County, Contra Costa County and San Joaquin County region.

FACILITY CLOSURE

Facility closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, including closure for overhaul or replacement of the combustion turbines. Causes for temporary closure include a disruption in the supply of natural gas or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations owing to plant age, damage to the plant beyond repair, economic conditions, or other reasons.

For a temporary facility closure where there is no release of hazardous materials, Mariposa Energy would maintain security of the facilities on a 24-hour basis, and would notify the Energy Commission and other responsible agencies. Depending on the length of the shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. The contingency plan would be designed to ensure conformance with all applicable LORS and the protection of public health, safety, and the environment. The plan, depending on the expected duration of the shutdown, may include the draining of all chemicals from storage tanks and other equipment and the safe shutdown of all equipment.

The planned life of the generation facility is 40 years. The removal of the facility from service, or decommissioning, may range from “mothballing” to the removal of all equipment and appurtenant facilities, depending on conditions at the time. Because the

conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the Energy Commission when more information is available and the timing for decommissioning is more imminent.

REFERENCES

CH2M 2009c- CH2M HILL / D Urry (TN52651). Supplement A – Data Adequacy Responses dated July 2009 Submitted to CEC on 7/31/2009.

CH2M 2009f- CH2M Hill / D. Urry (TN 54287). Data response Sets 1A and 1B, dated 11/30/2009. Submitted to CEC on 11/30/2009.

CH2M 2010d - CH2M Hill / D. Urry (TN 55797). Applicant's Supplement B Additional Laydown Area Analysis, dated 3/5/2010 Submitted to CEC on 3/8/2010.

CH2M 2010g - CH2M Hill / D. Urry (TN 56125). Data Response Set 1D, Responses to CEC Staff Data Request 56 dated 3/31/2010 Submitted to CEC on 4/1/2010.

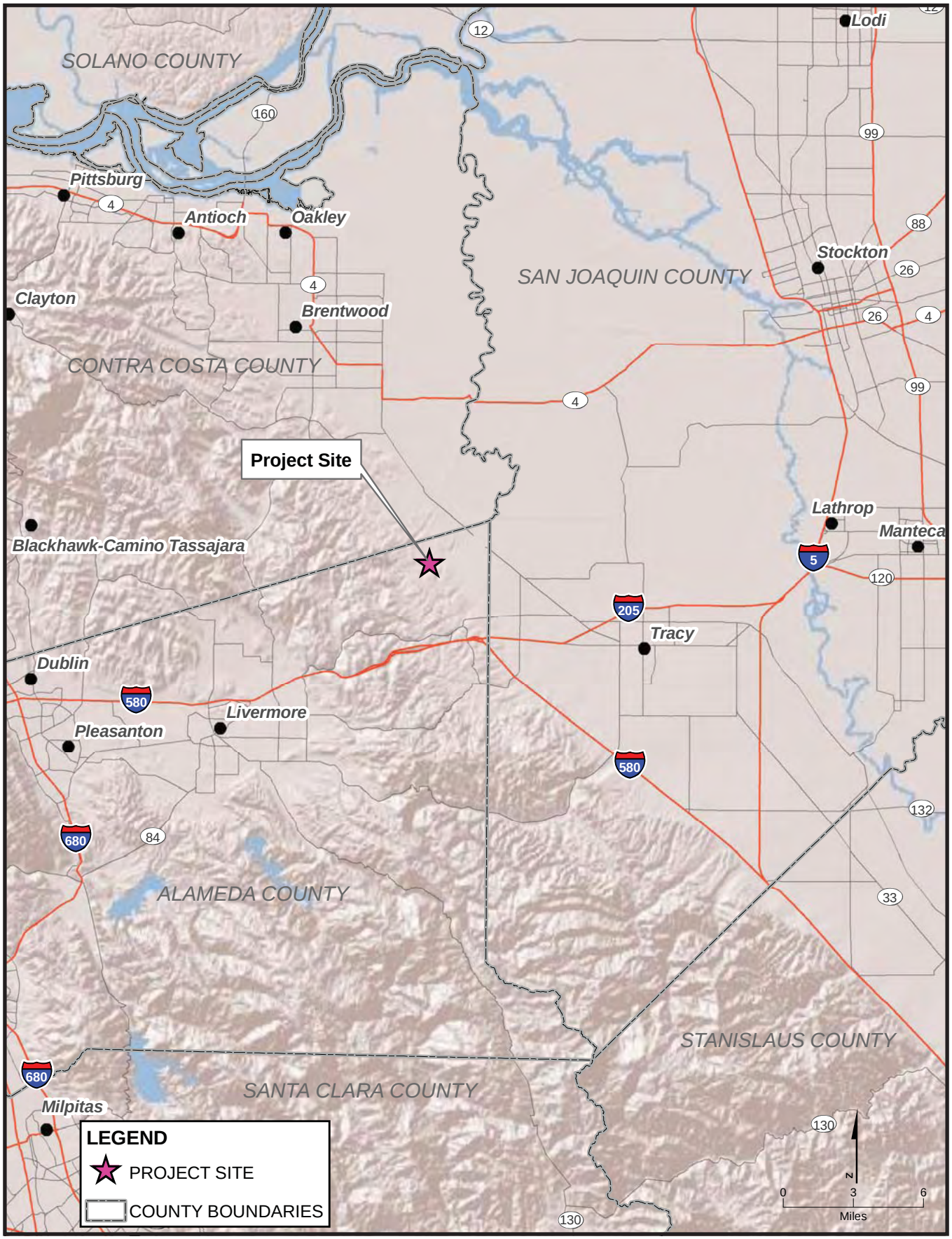
CH2M 2010ab - CH2M Hill / D. Urry (TN 59119). Project Description Update for Proposed Water Supply & Natural Gas Pipeline, dated 12/1/10. Submitted to CEC on 12/2/2010

CH2M 2010ae - CH2M Hill / D. Urry (TN 59197). MEP Voluntary Water Conservation Program, dated 12/9/10. Submitted to CEC on 12/10/2010.

MEP 2009a - Mariposa Energy LLC / B. Buchynsky (TN 51974). Application for Certification for Mariposa Energy Project, dated 6/15/2009. Submitted to CEC on 6/15/2009.

MEP 2009b - Mariposa Energy LLC / B. Buchynsky (TN 53543). Applicant Power Point presentation regarding informational site visit and hearing, dated 10/1/2009. Submitted to CEC on 10/5/2009.

PROJECT DESCRIPTION - FIGURE 1
Mariposa Energy Project - Project Vicinity



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC Figure 1.1-2

PROJECT DESCRIPTION - FIGURE 2

Mariposa Energy Project - Site Location

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 1.1-3R

PROJECT DESCRIPTION - FIGURE 3

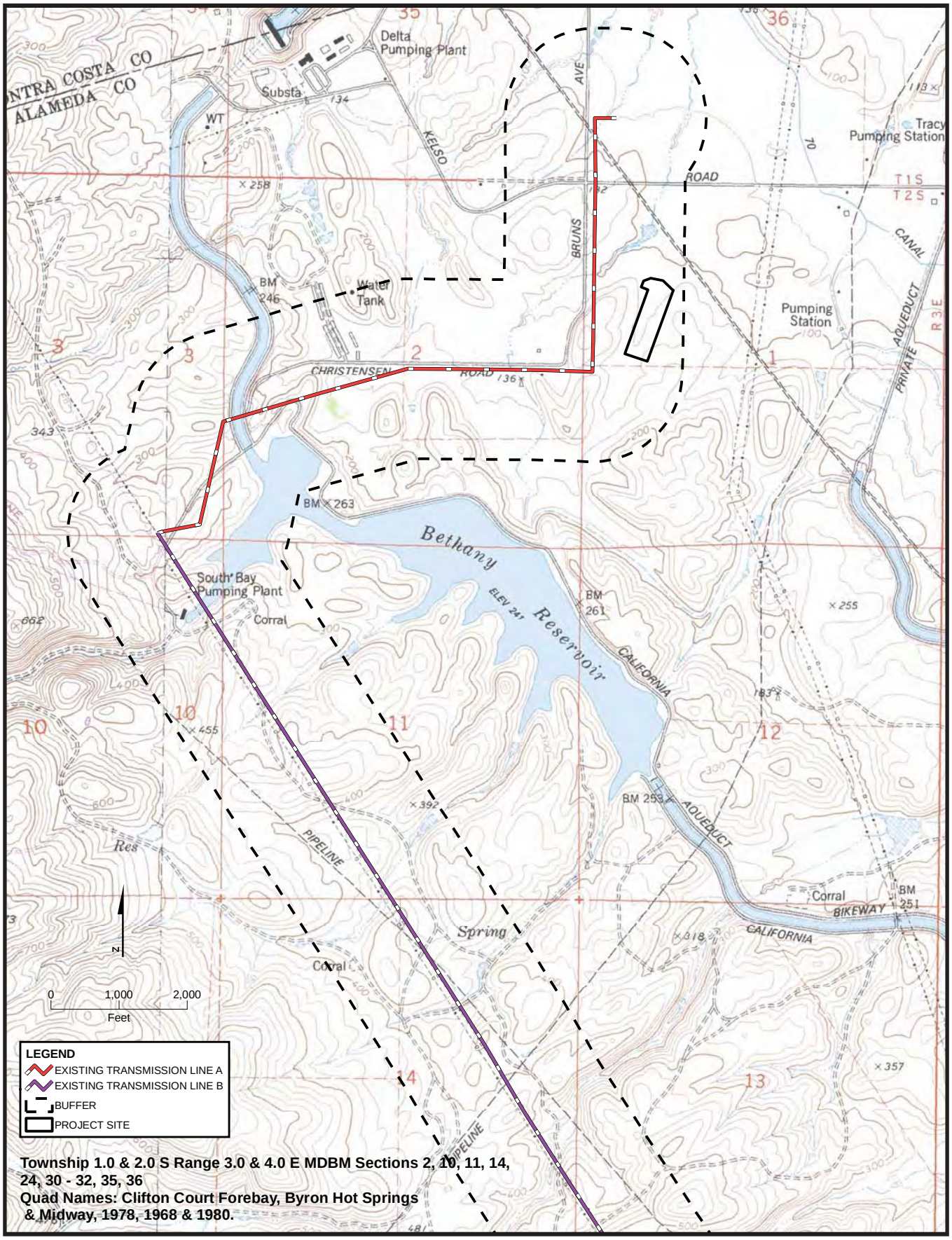
Mariposa Energy Project - Architectural Rendering

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 1.1-1

PROJECT DESCRIPTION - FIGURE 4

Mariposa Energy Project - Project Area Map, 1 of 2

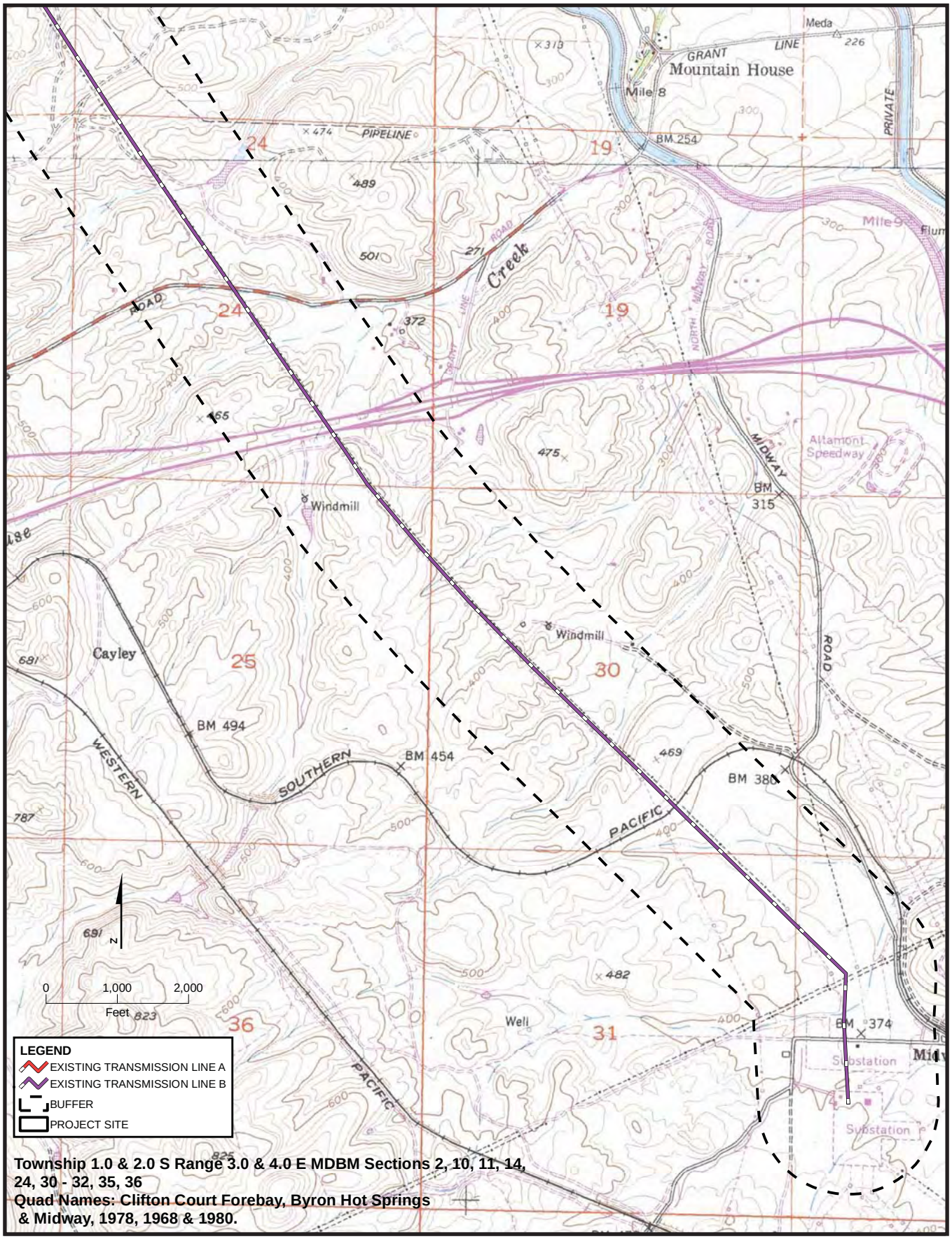


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Data Response, Set 1D, March 2010 - **CH2M**Hill

PROJECT DESCRIPTION - FIGURE 5

Mariposa Energy Project - Project Area Map, 2 of 2



Township 1.0 & 2.0 S Range 3.0 & 4.0 E MDBM Sections 2, 10, 11, 14, 24, 30 - 32, 35, 36
Quad Names: Clifton Court Forebay, Byron Hot Springs & Midway, 1978, 1968 & 1980.

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Data Response, Set 1D, March 2010 - **CH2M**Hill

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Revised Testimony of Brewster Birdsall, P.E., QEP, Jacquelyn Leyva, and Wenjun Qian, PhD

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification, the proposed Mariposa Energy Project (MEP) would likely conform with applicable federal, state and Bay Area Air Quality Management District (BAAQMD) air quality laws, ordinances, regulations and standards (LORS), and that the proposed MEP project would not result in significant air quality-related impacts.

The MEP would be located in northeastern Alameda County, approximately 0.6 miles from the nearest residence, to the northeast along Kelso Road, and approximately 2.5 miles from the community of Mountain House located within the San Joaquin Valley Air Pollution Control District (SJVAPCD) and San Joaquin County to the east. Maximum ambient air quality impacts would generally occur in elevated terrain west of MEP in the BAAQMD because the high exhaust temperature and velocity would tend to carry air pollutants high above ground-levels. This analysis shows that the air quality impacts from MEP at the location of maximum impact, and for residences within Mountain House, would not be significant.

Separate from the Energy Commission review of MEP, the applicant has independently agreed to fund an additional air quality improvement program that will be paid to and administered by the SJVAPCD (executed by SJVAPCD Governing Board December 17, 2009; Attachment DR8-2 of CH2M 2010b). Staff does not formally recommend or oppose the Air Quality Mitigation Settlement Agreement. However, staff does consider it as part of the project analyzed in the California Environmental Quality Act (CEQA) process implemented by the Energy Commission, because the need for some CEQA mitigation can be avoided with the Mitigation Settlement Agreement.

In summary, staff finds that:

- The project would comply with New Source Review and Best Available Control Technology (BACT) requirements.
- In conjunction with offsets required by BAAQMD and local emission reductions enabled through an Air Quality Mitigation Settlement Agreement between MEP and SJVAPCD the project would fully mitigate all reasonably foreseeable ozone and particulate matter impacts under CEQA.

Global climate change and greenhouse gas emissions from the project are discussed and analyzed in **AIR QUALITY APPENDIX AIR-1**. The MEP would emit approximately 0.54 metric tonnes of carbon dioxide per megawatt hour (MTCO2/MWh). The project would not be subject to the emission limits established by SB 1368 (Perata, Chapter 598, Statutes of 2006), known as the greenhouse gas Emission Performance Standard, because MEP is not designed or intended for base load generation [Cal. Code Regs.,

tit. 20, section 2901 (b)]. The permitted annual capacity factor would be approximately 46% while SB 1368 requirements only apply to facilities planned to be operated at a 60% capacity factor or greater. Mandatory reporting of the GHG emissions would occur while the Air Resources Board develops greenhouse gas regulations and/or trading markets. The project may be subject to GHG reduction or trading requirements as the GHG regulations become more fully developed and implemented.

INTRODUCTION

The Mariposa Energy Project is located within the jurisdiction of the San Francisco Bay Area Air Quality Management District (BAAQMD) but is on the edge of the San Joaquin Valley Air Basin. Because some project-related activities would occur in San Joaquin County and project emissions would occur on the edge of the San Joaquin Valley Air Basin the environmental setting of the San Joaquin Valley (or Central Valley) is considered in this analysis. However, no regulations from the San Joaquin Valley Air Pollution Control District (SJVAPCD) are applicable.

Criteria air pollutants are defined as air contaminants for which the state and/or federal government has established an ambient air quality standard to protect public health. The criteria pollutants analyzed are nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), ozone (O_3), inhalable particulate matter less than 10 microns in diameter (PM10), and fine particulate matter less than 2.5 microns in diameter (PM2.5). In addition, nitrogen oxides (NOx, consisting primarily of nitric oxide [NO] and nitrogen dioxide [NO_2]), sulfur oxides (SOx), and volatile organic compounds (VOCs), also known as precursor organic compounds (POC), are also analyzed. NOx and VOCs readily react in the atmosphere as precursors to ozone. NOx and SOx readily react in the atmosphere to form particular matter and are major contributors to acid rain. Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in the context of cumulative impacts (**AIR QUALITY APPENDIX AIR-1**).

In carrying out this analysis, the Energy Commission staff evaluated the following major points:

- Whether MEP is likely to conform with applicable federal, state, and Bay Area Air Quality Management District (BAAQMD or District) air quality laws, ordinances, regulations and standards (Title 20, California Code of Regulations, section 1744 (b));
- Whether MEP is likely to cause significant air quality impacts, including new violations of ambient air quality standards or substantial contributions to existing violations of those standards (Title 20, California Code of Regulations, section 1743); and
- Whether the mitigation measures proposed to the project are adequate to lessen the potential impacts to a level of insignificance (Title 20, California Code of Regulations, section 1742 (b)).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws, ordinances, regulations, and standards (LORS) and policies pertain to the control of criteria pollutant emissions and the mitigation of air quality impacts. Staff's analysis examines the project's compliance with these requirements, shown in **Air Quality Table 1**.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	**U.S. Environmental Protection Agency**
Federal Clean Air Act Amendments of 1990 (CAAA), Title 40 Code of Federal Regulations (CFR) Part 50	National Ambient Air Quality Standards (NAAQS).
Clean Air Act (CAA) § 160-169A and implementing regulations, Title 42 United State Code (USC) §7470-7491, 40 CFR 51 & 52 (Prevention of Significant Deterioration Program)	Requires prevention of significant deterioration (PSD) review and facility permitting for construction of new or modified major stationary sources of pollutants that occur at ambient concentrations attaining the NAAQS. A PSD permit would not be required for the proposed MEP project because it would be neither a new major source nor a major modification to an existing major source. The BAAQMD implements the PSD program for U.S. EPA within the San Francisco Bay Area.
CAA §171-193, 42 USC §7501 et seq., 40 CFR 51 Appendix S (New Source Review)	Requires new source review (NSR) facility permitting for construction or modification of specified stationary sources. Federal NSR applies to sources of designated nonattainment pollutants. This requirement is addressed through compliance with BAAQMD Regulation 2, Rule 1.
40 CFR 60, Subpart KKKK	New Source Performance Standard (NSPS) for Stationary Combustion Turbines. Requires each proposed simple-cycle combustion turbine to achieve 25 parts per million (ppm) NOx or 1.2 pounds NOx per megawatt-hour (lb/MWh), achieve fuel sulfur standards, and provide reporting.
40 CFR 60, Subpart IIII	New Source Performance Standard (NSPS) for Stationary Compression Ignition Internal Combustion Engines. Requires the diesel fire water pump engine to achieve U.S. EPA Tier 3 emission standards.
CAA §401 (Title IV), 42 USC §7651, 40 CFR 72 (Acid Rain Program)	Requires reductions in NOx and SO_2 emissions for electrical generating units greater than 25 MW, implemented through the Federal Operating Permits (Title V) program. This program is within the jurisdiction of the BAAQMD with U.S. EPA oversight [BAAQMD Regulation 2, Rule 7].
CAA §501 (Title V), 42 USC §7661, 40 CFR 70 (Federal Operating Permits Program)	Establishes comprehensive federal operating permit program for major stationary sources. Title V permit application required within one year following start of operation. This program is within the jurisdiction of the BAAQMD with U.S. EPA oversight [BAAQMD Regulation 2, Rule 6]
State	**California Air Resources Board and Energy Commission**
California Health & Safety Code (H&SC) §41700 (Nuisance Regulation)	Prohibits discharge of such quantities of air contaminants that cause injury, detriment, nuisance, or annoyance.
H&SC §40910-40930	Permitting of source needs to be consistent with approved clean air plan. The BAAQMD New Source Review program is consistent with regional air quality management plans.

Applicable Law	Description
California Public Resources Code §25523(a); 20 CCR §1752, 2300-2309 (Memorandum of Understanding)	Requires that Energy Commission decision on AFC include requirements to assure protection of environmental quality consistent with Air Resources Board (ARB) programs.
California Code of Regulations for Off-Road Diesel-Fueled Fleets (13 CCR §2449, et seq.)	General Requirements for In-Use Off-Road Diesel-Fueled Fleets – Requires owners and operators of in-use (existing) off-road diesel equipment and vehicles to report fleet characteristics to ARB and meet fleet emissions targets for diesel particulate matter and NOx.
Airborne Toxic Control Measure for Idling (ATCM, 13 CCR §2485)	ATCM to Limit Diesel-Fueled Commercial Motor Vehicle Idling – Generally prohibits idling longer than five minutes for diesel-fueled commercial motor vehicles.
Airborne Toxic Control Measure for Stationary Compression Ignition Engines (ATCM, 17 CCR §93115.6)	ATCM for Stationary Compression Ignition (CI) Engines. Establishes operating requirements and emission standards for emergency standby diesel-fueled CI engines [17 CCR 93115.6]. The emission standard is 0.15 g/bhp-hr diesel particulate matter for emergency engines used fewer than 50 hours per year for maintenance and engine testing.
Local	**Bay Area Air Quality Management District (BAAQMD)**
BAAQMD Regulation 1 – General	Limits releases of air contaminants to not "cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public." Prohibits contaminants that may endanger "the comfort, repose, health or safety of any such persons or the public, or cause injury or damage to business or property."
BAAQMD Regulation 2, Rule 1 – Permits	General Requirements – Specifies requirements for issuance or denial of permits, exemptions, and appeals against BAAQMD decisions. An Authority to Construct (ATC) is required for any non-exempt source. Natural gas-fired heaters with a heat input rate of less than 10 million Btu per hour are exempt, and stationary internal combustion engines and gas-fired combustion turbines with an output rating of less than 50 horsepower (hp) are exempt.
BAAQMD Regulation 2, Rule 2	New Source Review – Requires preconstruction review including Best Available Control Technology (BACT) for sources with the potential to emit more than 10 pounds per day (NOx, POC, PM10, CO, or SO_2). Requires surrendering offsets for facilities with the potential to emit more than 35 tons per year of NOx or POC, or 100 tons per year of PM10 or SOx.
BAAQMD Regulation 2, Rule 3	Permits – Power Plants – Requires Preliminary Determination of Compliance (PDOC) and Final Determination of Compliance (FDOC) by the BAAQMD Air Pollution Control Officer with public notice and public comment prior to issuing an Authority to Construct (ATC). The BAAQMD would issue the ATC after the Energy Commission certifies the MEP project.
BAAQMD Regulation 2, Rule 5	NSR of Toxic Air Contaminants – Requires preconstruction review for new and modified sources of toxic air contaminants. Contains project health risk limits and requirements for Toxics BACT. See **Public Health**.
BAAQMD Regulation 2, Rule 6	Major Facility Review – Requires an application be submitted for the federal operating permit within 12 months after commencing operation, as specified by Title V federal Clean Air Act.
BAAQMD Regulation 2, Rule 7	Acid Rain – Requires monitoring, recordkeeping, and holding of allowances for pollutants that contribute to the formation of acid rain, as specified by Title IV of the federal Clean Air Act.

Applicable Law	Description
BAAQMD Regulation 6, Rule 1	Particulate Matter – Limits particulate matter and visible emissions to less than 1 opacity. Prohibits emissions from any activity for more than 3 minutes in any one hour that result in visible emissions as dark or darker than Number 1 on the Ringlemann Chart.
BAAQMD Regulation 7	Odorous Substances – Prohibits the discharge of any odorous substances which remain odorous at the property line after dilution with four parts of odor-free air. Limits the emissions of ammonia to no more than 5,000 parts per million (ppm).
BAAQMD Regulation 8	Organic Compounds – Requires use of architectural coatings and solvents meeting POC limits and compliant coatings. Emissions from solvent use must not exceed 5 tons annually.
BAAQMD Regulation 9, Rule 1	Sulfur Dioxide – Prohibits emissions causing SO2 ground level concentrations exceeding 0.5 ppm averaged continuously for three minutes or 0.25 ppm over 60 minutes, consistent with the California Ambient Air Quality Standard.
BAAQMD Regulation 9, Rule 9	Stationary Gas Turbines – Specifies emission limits of 9 ppmvd NOx or 0.43 pounds NOx per megawatt-hour (lb/MWh), applicable to the proposed combustion turbines.

SETTING

METEOROLOGICAL CONDITIONS

The general climate of California is typically dominated by the eastern Pacific high pressure system centered off the coast of California. In the summer, this system results in low inversion layers and clear skies inland and typically early morning fog by the coast. In winter, this system promotes wind and rainstorms originating in the Gulf of Alaska and striking Northern California.

The climate of the northern San Joaquin Valley is characterized by hot dry summers and mild winters. Very little precipitation occurs during the summer months because the strong high pressure blocks migrating storm systems. Beginning in the fall and continuing through the winter, the storm belt and zone of strong westerly winds begins to greatly influence California. Temperature, winds, and rainfall are variable during these months, and stagnant conditions occur more frequently than during summer.

The proposed project site is in northeastern Alameda County, approximately 7 miles northwest of Tracy. The annual rainfall in Tracy is only about 12 inches and most precipitation (90%) occurs during October through April. Summers are usually quite warm, with average daily maximum temperatures between 90 and 95°F for the months of July and August. During December and January, average daily minimum temperatures are between 35 and 40°F (WRCC 2010).

At the Mariposa project site, winds are predominantly directional. This site is located near the intersection of the Altamont Pass and the northern San Joaquin Valley where wind is channeled through the Altamont Pass as it makes its way to the Central Valley from the Livermore Valley. This wind is strongest and most persistent in the summer, but occurs with regularity all year. In the winter, wind directions are more variable as storms cause occasional reversal of the summertime patterns.

The application shows four seasonal wind roses from meteorological data collected at the Patterson Pass station near Tracy (AFC Appendix 5.1C, MEP 2009a). Wind speeds are generally higher in summer than in winter. During the spring, summer, and fall, the stronger winds and predominately westerly winds are caused by a combination of offshore and thermal low pressure resulting from high temperatures in the Central Valley. During the winter months, winds are more variable with stronger northwesterly and southeasterly components. Calm conditions occur more during winter, but are relatively infrequent throughout the year. Valley fog often occurs during these calm, stagnant atmospheric conditions, when temperature inversions trap a layer of cool, moist air near the surface. It is also during these calm stagnant conditions that the highest particulate matter readings can occur in the area. Nearly 70% of particulate matter emissions in the San Joaquin Valley are from area-wide sources, primarily fugitive dust from vehicle travel on unpaved and paved roads, dust from farming operations, waste burning, and residential fuel combustion (including wood). (ARB 2009).

Along with the wind flow, atmospheric stability and mixing heights are important factors in the determination of pollutant dispersion. Atmospheric stability is an indicator of the air turbulence and mixing. During the daylight hours of the summer when the earth is heated and air rises, there is more turbulence, more mixing, and thus less stability. During these conditions there is more air pollutant dispersion and therefore usually reduced air quality impacts near any single air pollution source. During the winter months between storms, however, very stable atmospheric conditions can occur, resulting in very little mixing. Under these conditions, minimal air pollutant dispersion occurs, and consequently higher air quality impacts may result near sources. Because lower mixing heights generally occur during the winter, along with lower mean wind speeds and less vertical mixing, dispersion occurs less rapidly.

AMBIENT AIR QUALITY STANDARDS

The United States Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (ARB) have both established allowable maximum ambient concentrations of criteria air pollutants. These ambient air quality standards are set to avoid potential public health impacts. These are based upon public health impacts and are called ambient air quality standards. The California Ambient Air Quality Standards (CAAQS), established by ARB, are typically lower (more stringent) than the federally established National Ambient Air Quality Standards (NAAQS).

The primary health effects of the criteria air pollutants are as follows:

- Ozone (O_3): aggravation of respiratory and cardiovascular diseases; impairment of cardiopulmonary function; and eye irritation. Ozone can also affect sensitive plant species by interfering with photosynthesis, and is therefore a threat to California agriculture and native vegetation.
- Particulate matter (PM10 and PM2.5): increased risk of chronic respiratory disease such as bronchitis, emphysema, and asthma; reduced lung function; increased cough and chest discomfort; and particulates may lodge in and/or irritate the lungs.
- Carbon monoxide (CO): impairment of oxygen transport in the bloodstream; aggravation of cardio-vascular disease; impairment of central nervous system

function; fatigue, headache, confusion, dizziness; death at high levels of exposure; and aggravation of some heart diseases (angina).

- Nitrogen dioxide (NO_2): risk of acute and chronic respiratory disease.
- Sulfur dioxide (SO_2): aggravation of respiratory diseases (asthma, emphysema); reduced lung function; and irritation of eyes.

Ambient air quality standards are designed to protect people who are most susceptible to respiratory distress such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and people engaged in strenuous work or exercise. The ambient air quality standards are also set to protect public welfare, including protection against decreased visibility, and damage to animals, crops, vegetation, and buildings.

Current state and federal air quality standards are listed in **Air Quality Table 2**. The averaging times for the various ambient air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year. The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (mg or 10^{-3} g) or micrograms (µg or 10^{-6} g) of pollutant in a cubic meter (m^3) of ambient air, drawn over the applicable averaging period.

Air Quality Table 2
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	None
	8 Hour	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)[a]
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	150 µg/m^3
	Annual	20 µg/m^3	None
Fine Particulate Matter (PM2.5)	24 Hour	None	35 µg/m^3
	Annual	12 µg/m^3	15 µg/m^3
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm [b]
	Annual	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm [b]
	3 Hour	None	0.5 ppm (1300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	0.14 ppm (365 µg/m^3)
	Annual	None	0.03 ppm (80 µg/m^3)

Source: ARB (http://www.arb.ca.gov/research/aaqs/aaqs2.pdf), July 2010.
Notes:
a. On January 6, 2010, the U.S. EPA proposed to reduce the federal 8-hour ozone standard to 0.06 to 0.07 ppm, but the standard change has not yet been implemented.
b. The U.S. EPA and BAAQMD are in the process of implementing the new federal 1-hour NO_2 standard, which became effective April 12, 2010, and the new SO_2 standard became effective August 23, 2010. The NO_2 NAAQS is based on the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations. The SO_2 NAAQS is based on the 3-year average of the 99th percentile of the yearly distribution of 1-hour daily maximum concentrations..

The California Air Resources Board and the U.S. EPA designate regions where ambient air quality standards are not met as “nonattainment areas.” Where a pollutant exceeds standards, the federal and state Clean Air Acts both require air quality management

plans that demonstrate how the standards will be achieved. These laws also provide the basis for implementing agencies to develop mobile and stationary source performance standards.

EXISTING AMBIENT AIR QUALITY

The federal and state attainment status of criteria pollutants in the San Francisco Bay Area are summarized in **Air Quality Table 3**. Overall air quality in the San Francisco Bay Area Air Basin is better than other areas such as the South Coast, San Joaquin Valley, and Sacramento regions. This is due to a more favorable climate, with cooler temperatures and better ventilation. Although air quality improvements have occurred, violations and exceedances of the State ozone and PM standards continue to persist in the San Francisco Bay Area Air Basin, and still pose challenges to State and local air pollution control agencies (ARB 2009).

Air Quality Table 3
Attainment Status of Bay Area Air Quality Management District

Pollutants	State Classification	Federal Classification
Ozone (1-hr)	Nonattainment	No Federal Standard
Ozone (8-hr)	Nonattainment	Nonattainment (Marginal)
PM10	Nonattainment	Unclassified
PM2.5	Nonattainment	Nonattainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment [a]
SO_2	Attainment	Attainment

Source: http://hank.baaqmd.gov/pln/air_quality/ambient_air_quality.htm. Accessed July 2010.
Notes:
a. Attainment status relative to the new federal short-term NO_2 standard is scheduled to be determined by January 2012; Air Quality Table 7 shows that the area is likely to comply with this new standard.

Ozone transport studies have shown that emissions sources from the Bay Area impact downwind areas, including western San Joaquin County and Stanislaus County. Studies conducted by the Air Resources Board identified the Carquinez Strait, the Livermore Valley, and the Santa Clara Valley as pathways transporting air pollution from the Bay Area into the San Joaquin Valley Air Basin (ARB 1996 and 2001).

Nonattainment Criteria Pollutants

This section summarizes the existing ambient monitoring data for nonattainment criteria pollutants (ozone and particulate matter) collected by ARB and BAAQMD from monitoring stations closest to the project site. Data marked in **bold** indicates that the most-stringent current standard was exceeded. Note that an exceedance is not necessarily a violation of the standard, and that only persistent exceedances lead to designation of an area as nonattainment.

The MEP project site is in northeastern Alameda County near the Contra Costa County and San Joaquin County boundaries. The monitoring stations closest to the proposed site with long-term records of ozone, NO_2, CO, SO_2, PM10 include Pittsburg-10th Street, Concord-2975 Treat Blvd, and Bethel Island Road. The only monitoring station in Contra Costa County that monitors PM2.5 is the Concord station.

Ozone

Ozone is not directly emitted from stationary or mobile sources, but the contaminant is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NOx and VOC (also known as POC), which interact in the presence of sunlight and warm air temperatures to form ozone. Ozone formation is highest in the summer and fall, when abundant sunshine and high temperatures trigger the necessary photochemical reactions, and lowest in the winter.

The days with the highest ozone concentrations tend to occur between June and August, and the region's ozone management season (and the BAAQMD "Spare the Air" program) normally runs from June 1 to October 12.

Air Quality Table 4 summarizes the ambient ozone data collected from three different monitoring stations near the project site.

Air Quality Table 4
MEP, Background Ozone Air Quality Data (ppm)

Location, Year	Maximum 1-hour Ozone Concentration	Days Above CAAQS	Maximum 8-hour Ozone Concentration	Days Above NAAQS	Days Above CAAQS
Tracy- 5749 S. Tracy Blvd.*					
2001	**0.114**	4	**0.087**	6	11
2002	**0.102**	11	**0.096**	14	23
2003	**0.103**	5	**0.090**	15	23
2004	**0.109**	4	**0.098**	6	8
2005	-	-	-	-	-
2006	**0.121**	14	**0.104**	22	29
2007	**0.097**	1	**0.084**	6	11
2008	**0.123**	11	**0.104**	16	26
2009	**0.104**	2	**0.087**	8	20
Stockton- Hazelton Street					
2001	**0.103**	5	**0.088**	6	8
2002	**0.102**	2	**0.082**	3	7
2003	**0.104**	3	**0.089**	2	9
2004	**0.096**	1	**0.080**	2	5
2005	**0.099**	3	**0.086**	1	10
2006	**0.109**	6	**0.092**	13	21
2007	0.093	0	**0.082**	3	4
2008	**0.105**	2	**0.091**	4	7
2009	**0.116**	2	**0.096**	2	4
Bethel Island Road					

2001	**0.130**	3	**0.102**	8	13
2002	**0.111**	5	**0.096**	9	12
2003	0.092	0	**0.082**	6	9
2004	**0.103**	1	**0.081**	2	5
2005	0.089	0	**0.077**	1	2
2006	**0.116**	9	**0.090**	13	14
2007	0.093	0	**0.078**	1	4
2008	**0.109**	4	**0.090**	4	10
2009	**0.109**	2	**0.094**	3	6

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed September 2010.
*note: 2001 to 2004 from 24371 Patterson Pass, Tracy

Respirable Particulate Matter (PM10)

PM10 is a mixture of particles and droplets that vary in size and chemical composition, depending upon the origin of the pollution. An extremely wide range of sources, including natural causes, most mobile sources, and many stationary sources, causes emissions that directly and indirectly lead to increased ambient particulate matter. This makes it an extremely difficult pollutant to manage. Particulate matter caused by any combustion process can be generated directly by burning the fuel, but it can also be formed downwind when various precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulate matter since the contaminants are not directly emitted, but are rather indirectly formed as a result of precursor emissions. Gaseous contaminants such as NOx, SOx, organic compounds, and ammonia (NH_3) from natural or man-made sources can form secondary particulate nitrates, sulfates, and organic solids. Secondary particulate matter is mostly smaller-diameter (finer) PM10, whereas particles directly emitted from dust sources tend to be the coarser fraction of PM10. **Air Quality Table 5** shows that PM10 is primarily a winter problem, but that high regional PM10 levels can occur at other times of the year as well. This is because ammonium nitrate and ammonium sulfate particles tend to form most readily in colder weather and times of low wind speeds, high humidity, and stable conditions, whereas high levels of summertime PM10 tend to be caused by direct sources, including wildfires.

Air Quality Table 5
MEP, Background PM10 Air Quality Data (µg/m^3)

Location, Year	Maximum 24-hr PM10 Concentration	Month of Maximum 24-hr Concentration	Days Above CAAQS	Days Above NAAQS	Annual Average PM10 Concentration
Tracy Airport - 5749 S. Tracy Blvd.					
2006	**94.2**	OCT	-	-	**20.4**
2007	**75.0**	AUG	-	0	19.5
2008	**126.8**	JUN	-	0	**24.8**
2009	**55.3**	SEP	-	0	-
Stockton – Hazelton Street					
2001	**140.0**	JAN	64.1	0	**35.9**
2002	**87.0**	NOV	58.4	0	**35.5**
2003	**88.0**	OCT	17.2	0	**28.1**

2004	**60.0**	OCT	18.0	0	**28.6**
2005	**79.0**	DEC	46.5	0	**28.9**
2006	**82.0**	OCT	62.9	0	**32.6**
2007	**58.7**	FEB	23.5	0	**26.6**
2008	**104.5**	JUN	48.6	0	**29.9**
2009	**71.0**	SEP	18.2	0	-
Bethel Island Road					
2001	**86.8**	JAN	25.1	0	**22.7**
2002	**58.4**	NOV	18.4	0	**23.7**
2003	49.9	OCT	6.1	0	18.9
2004	40.0	DEC	0.0	0	18.9
2005	**61.8**	OCT	5.8	0	17.9
2006	**82.1**	OCT	6.1	0	18.8
2007	46.7	NOV	0.0	0	18.3
2008	**78.2**	JUN	18.3	0	**23.6**
2009	36.9	JAN	0	0	-

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed September 2010.
Note: Concentrations shown in **Air Quality Table 5** are based upon federal reference methods. The number of days above the CAAQS (50 µg/m^3) is calculated by ARB. Because PM10 is monitored approximately once every six days, the potential number of violation days is calculated by multiplying the actual number of days of violations by six.

Fine Particulate Matter (PM2.5)

Particles and droplets with an aerodynamic diameter less than or equal to 2.5 microns (PM2.5) penetrate more deeply into the lungs than PM10, so can therefore be much more damaging to public health than larger particles.

PM2.5 is mainly a product of combustion and includes nitrates, sulfates, organic carbon (ultra-fine dust), and elemental carbon (ultra-fine soot). Almost all combustion-related particles, including those from wood smoke and cooking, are smaller than 2.5 microns. Nitrate and sulfate particles are formed through complex chemical reactions in the atmosphere. Particulate nitrate (mainly ammonium nitrate) is formed in the atmosphere from the reaction of nitric acid and ammonia. Nitric acid in turn originates from NOx emissions from combustion sources. The nitrate ion concentrations during the winter make up a large portion of the total PM2.5. Ammonium sulfate is also a concern when there is ready availability of ammonia in the atmosphere, such as can occur in the San Joaquin Valley. On an annual average basis, approximately 50% of the ambient PM2.5 in the San Joaquin Valley Air Basin is from direct emissions, the remainder being from secondary formation of particles from precursors (ARB 2009).

Air Quality Table 6 summarizes the ambient PM2.5 data collected from the most representative nearby PM2.5 monitoring station.

Air Quality Table 6
MEP, Background PM2.5 Air Quality Data (μg/m^3)

Location, Year	Maximum 24-hr PM2.5 Concentration	Month of Maximum 24-hr PM2.5 Concentration	Days Above NAAQS	Annual Average PM2.5 Concentration
Stockton - Hazelton Street				
2001	**76.0**	JAN	17.5	**13.8**
2002	**64.0**	NOV	37.9	**16.6**
2003	**45.0**	NOV	14.4	**13.5**
2004	**41.0**	NOV	9.2	**13.2**
2005	**63.0**	DEC	14.8	**12.4**
2006	**47.0**	DEC	20.8	**13.0**
2007	**52.0**	JAN	34.1	**12.9**
2008	**81.2**	JUN	27.7	**14.3**
2009	**48.4**	FEB	15.9	11.3

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed September 2010.
Note: Concentrations shown are based upon federal reference methods.

Air Quality Table 6 shows that PM2.5 concentrations tend to exceed the standard in winter months, but not exclusively. During winter high particulate matter episodes, the contribution of ground level releases to ambient particulate matter concentrations is disproportionately high because of low wind speeds and relatively stable meteorology. The BAAQMD sponsors particulate matter management programs (including the "Winter Spare the Air" program) from November 1 to February 28 annually for managing the contribution of wood smoke particles, which make up a substantial fraction of ground level PM2.5 concentrations (ARB 2009). The SJVAPCD sponsors the "Burn Cleaner" program and other programs to facilitate replacement of wood-burning devices and to reduce wood burning during critical periods.

Other Criteria Pollutants

Air Quality Table 7 shows the maximum concentrations for the criteria pollutants that occur in the vicinity of the project at concentrations that attain all ambient air quality standards.

Air Quality Table 7
MEP, Background Data for Criteria Pollutants in Attainment (ppm)

Location, Year	Maximum 8-hr CO Concentration	Maximum 1-hr NO_2 Concentration	Annual Average NO_2 Concentration	Maximum 24-hr SO_2 Concentration	Annual Average SO_2 Concentration
Tracy Airport - 5749 S. Tracy Blvd.					
2006	-	0.056	0.010	-	-
2007	-	0.045	0.009	-	-
2008	-	0.048	0.009	-	-
2009	-	0.043	0.008	-	-
Stockton- Hazelton Street					
2001	6.03	0.084	0.019	-	-

2002	3.21	0.076	0.021	-	-
2003	3.14	0.088	0.018	-	-
2004	2.51	0.079	0.017	-	-
2005	2.86	0.087	0.017	-	-
2006	2.25	0.072	0.018	-	-
2007	2.31	0.070	0.016	-	-
2008	1.86	0.076	0.017	-	-
2009	2.29	0.068	0.015	-	-
Bethel Island Road					
2001	1.50	0.044	0.010	0.008	0.002
2002	1.30	0.043	0.010	0.010	0.003
2003	0.89	0.045	0.009	0.008	0.002
2004	0.91	0.034	0.008	0.006	0.002
2005	0.91	0.038	0.007	0.006	0.002
2006	1.04	0.044	0.008	0.007	0.002
2007	0.84	0.048	0.008	0.005	0.001
2008	1.11	0.041	0.007	0.004	0.001
2009	0.94	0.033	0.006	0.003	0.000
Livermore-793 Rincon Ave.					
2001	3.19	0.070	0.017	-	-
2002	2.50	0.079	0.017	-	-
2003	1.94	0.065	0.016	-	-
2004	1.81	0.063	0.014	-	-
2005	1.79	0.072	0.014	-	-
2006	1.79	0.064	0.014	-	-
2007	1.83	0.052	0.013	-	-
2008	1.43	0.058	0.013	-	-
2009	1.31	0.052	0.012	-	-

Source: ARB, Air Quality Data Statistics (http://www.arb.ca.gov/adam/welcome.html). Accessed September 2010.

Carbon Monoxide

Carbon monoxide (CO) is a by-product of incomplete combustion common to any carbon-bearing fuel-burning source. Mobile sources are the main sources of CO emissions. Ambient concentrations of CO are highly dependent on motor vehicle activity, with highest concentrations usually found near traffic congested roadways and intersections. Ambient CO concentrations attain the air quality standards due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phase I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to reduced CO emissions and long-term maintenance of the CO ambient air quality standards.

Nitrogen Dioxide

Approximately 90% of the NOx emitted from combustion sources is in the form of nitric oxide, while the balance is NO_2. Nitric oxide (NO) is oxidized in the presence of ozone to form NO_2, but some level of photochemical activity is needed for this conversion. High concentrations of NO_2 occur during the fall (not in the winter) when atmospheric conditions tend to trap ground-level releases but lack significant photochemical activity

(less sunlight) to form ozone and nitric oxide. In the summer, the conversion rates of NO to NO_2 are high, but the relatively high temperatures and windy conditions (atmospheric unstable conditions) tend to engage the NO in reactions with VOC and POC to create ozone and also disperse the NO_2. The formation of NO_2 in the summer, with the help of the ozone, is according to the following reaction:

$$NO + O_3 \leftrightarrow NO_2 + O_2$$

Urban areas typically have high daytime ozone concentrations that drop substantially at night as the above reaction takes place, and ozone scavenges the available NO. If ozone is unavailable to oxidize the NO, less NO_2 will form because the reaction is "ozone-limited." This reaction explains why, in urban areas, ground-level ozone concentrations drop at night, while aloft and in downwind rural areas (without sources of fresh NO emissions), ozone concentrations can remain relatively high.

The current CAAQS for NO_2 became effective in early 2008, and the U.S. EPA adopted a new 1-hour standard of 0.100 ppm (188 $\mu g/m^3$) in early 2010. Although the attainment designations have not yet been established for the new, more stringent standards, the San Francisco Bay Area air basin appears likely to remain attainment for NO_2 under the new federal standard. The new federal 1-hour standard became effective in April 2010, but areas will not be given attainment designations until 2012. All recent data shows that the areas near the project site would attain all current state and federal NO_2 standards (ARB 2010). For the Tracy Airport station, the nearest NO_2 monitor, current SJVAPCD data reflects a background of 0.039 ppm NO_2 (73 $\mu g/m^3$) for the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentration at Tracy Airport.[1] See **Air Quality Table 7** for maximum 1-hour and annual NO_2 concentrations at the closest monitoring stations.

Sulfur Dioxide

Sulfur dioxide is typically emitted as a result of the combustion of fuels containing sulfur. When high levels are present in ambient air, SO_2 leads to sulfite particulate formation and acid rain. Natural gas contains very little sulfur and therefore results in low SO_2 emissions when burned. By contrast, high sulfur fuels like coal emit large amounts of SO_2 when burned. Sources of SO_2 emissions come from every economic sector and include a wide variety of gaseous, liquid, and solid fuels. The entire state is designated attainment for all SO_2 ambient air quality standards. A new federal 1-hour standard became effective in August 2010, but areas will not be given attainment designations until 2012. Current ambient data indicates that the area would be likely to attain this new standard.

Summary of Existing Ambient Air Quality

The recent and local ambient air quality data show existing violations of ambient air quality standards for ozone, PM10, and PM2.5. Staff uses the highest local background ambient air concentrations from the last three years collected at the monitoring stations

[1] The SJVAPCD processed its 1-hour NO_2 data following federal guidance (Accessed October 11, 2010. Available at: http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm). However, this data is preliminary and does not reflect the higher concentrations that might be expected with the new near-roadway NO_2 monitoring requirements. As a result, the values are subject to change.

close to the project. Attainment with certain short-term standards is based on a statistical form and multi-year averaging, which reveals lower concentrations than the absolute highest data. Staff recommends using the background concentrations in **Air Quality Table 8** as the baseline for analyzing ambient air quality impacts. Concentrations in excess of their ambient air quality standard are shown in **bold**.

The project impact modeling analysis was limited to the pollutants listed in **Air Quality Table 8**. Therefore, establishing background concentrations is not necessary for other criteria pollutants (ozone and lead).

Air Quality Table 8
Staff-Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Background	Limiting Standard	Percent of Standard
PM10	24 hour	**126.8**	50	**254**
	Annual	**24.8**	20	**124**
PM2.5	24 hour	**81.2**	35	**232**
	Annual	**14.3**	12	**119**
CO	1 hour	5,029	23,000	22
	8 hour	2,640	10,000	26
NO_2	1 hour	105.7	339	31
	1 hour Federal	73.0	188	39
	Annual	18.9	57	33
SO_2	1 hour	46.9	655	7
	1 hour Federal	46.9	196	24
	24 hour	18.3	105	17
	Annual	5.2	80	7

Source: AFC Table 5.1-21 (MEP 2009a); updated with ARB 2010.
Note that an exceedance is not necessarily a violation of the standard, and that only persistent exceedances lead to designation of an area as nonattainment.

PROJECT DESCRIPTION AND PROPOSED EMISSIONS

The proposed MEP would include the following new stationary sources of emissions (AFC Section 5.1.4.1.4, MEP 2009a):

- Four General Electric (GE) LM6000 PC-Sprint natural gas-fired combustion turbine generators (CTG) with a nominal capacity of 50 MW and a heat input capacity of up to 481 MMBtu/hr (high heating value) for each gas turbine, in a simple-cycle configuration; and
- One fire water pump to be driven by a 220 bhp diesel engine certified to achieve ARB Tier 3 emission standards.

The proposed MEP is designed to provide peaking power. Each of the four CTGs would be capable of starting up and reaching full load in approximately 10 minutes with emissions stabilized at permitted levels within 30 minutes (AFC Section 2.3.2, MEP 2009a). MEP proposed to limit fire water pump operation to no more than 20 minutes for

non-emergency use or testing in any hour (CH2M 2009f); however, staff expects each test to occur for 30 minutes, per recommendations from the National Fire Protection Association in NFPA 25.

The MEP facility would be permitted to operate up to 4,000 hours per year plus 300 startup and shutdown cycles (equivalent to an annual capacity factor of about 46%). However, the applicant expects the proposed MEP combustion turbines to actually run only approximately 600 hours per year with 200 startup and shutdown events annually, based on MEP's review of data from 2004 on California simple-cycle power plants greater than 50 MW (AFC Table 2.3-1 and Table 5.1-18, MEP 2009a).

The CTGs would each be equipped with an inlet air chilling system with a modular, multistage filtration system. The chilled inlet air would be drawn into the turbine combustion chamber to increase power output and efficiency. The proposed MEP would also include other equipment causing exempt levels of emissions. These include heating for a control room building, one aqueous ammonia storage tank, and electrical circuit breakers and transformers.

Separate emissions estimates for the proposed project during the construction phase, initial commissioning, and operation are each described next.

PROPOSED CONSTRUCTION EMISSIONS

Construction of the MEP is expected to take about 14 months (MEP 2009a). Onsite construction activities include site preparation, grading, excavating, and erection of facility structures, including administration structures. During the construction period, air emissions would be generated from the exhaust of off-road/non-road heavy construction equipment and on-road vehicles and fugitive dust from activity in areas disturbed by grading and from material handling. Construction would take place within approximately 20 acres of the MEP site, which includes approximately 9.2 acres for laydown and parking. (MEP 2009a). Activities would generally be confined to a 10 hour work day, 22 days per month. The maximum annual construction emissions would occur from month 1 through month 12.

Fugitive dust emissions would result from:

- Dust released during site preparation, grading, and excavation at the construction site;
- Dust entrained during on-site travel on paved and unpaved surfaces;
- Dust entrained during aggregate material and soil loading and unloading operations; and
- Wind erosion of soil at areas disturbed during construction activities.

Combustion-related emissions would be the result of:

- Exhaust from the gasoline and diesel construction equipment used (off-road) for site preparation, grading, excavation, and erection, fabrication, and installation of onsite structures;
- Exhaust from water trucks used to control construction dust emissions;

- Exhaust from portable welding machines, compressors, and portable lighting;
- Exhaust from gasoline and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel and construction supplies to and from the construction site; and
- Exhaust from automobiles used by workers commuting to the construction site.

Estimates for the highest daily emissions and total annual emissions over the 14-month construction period are shown in **Air Quality Table 9**.

Air Quality Table 9
MEP, Estimated Maximum Construction Emissions

Construction Activity (lb/day)	NOx	VOC	PM10	PM2.5	CO	SOx
Construction Equipment (onsite)	59.2	7.4	2.25	2.0	50.1	0.074
Fugitive Dust (onsite)	--	--	4.5	0.9	--	--
Motor Vehicles (onsite)	0.836	0.281	0.0565	0.0029	0.86	0.00088
Motor Vehicles Fugitive (onsite)	--	--	9.9	0.99	--	--
ONSITE CONSTRUCTION TOTAL	**60.04**	**7.68**	**16.71**	**3.89**	**50.96**	**0.07**
Construction Equipment(offsite)	12.3	1.5	0.48	0.43	8.3	0.015
Motor Vehicles (offsite)	47.33	2.20	23.12	2.80	12.69	0.06
OFFSITE CONSTRUCTION TOTAL	59.63	3.70	23.60	3.23	20.99	0.08
Maximum Daily Construction Emissions Onsite + Offsite (lb/day)	**119.67**	**11.38**	**40.31**	**7.12**	**71.95**	**0.15**
On-site Construction Emissions (tpy)	5.0	0.6	1.02	0.3	4.0	0.146
Off-site Vehicle Emissions (tpy)	3.7	0.2	1.8	0.2	1.0	0.005
Off-site Construction Emissions (tpy)	0.7	0.09	0.03	0.009	0.5	0.0009
Peak Annual Construction Emissions (tpy)	**9.5**	**0.9**	**2.9**	**0.5**	**5.5**	**0.012**

Source: AFC Table 5.1-9 and Appendix 5.1A 3 to 5.1A17 and 5.1A 27 to 5.1A 36 (MEP 2009a);
Notes: Average daily emissions based on 22 days / month. Different activities have maximum emissions at different time during the construction period; therefore, total maximum daily, monthly, and annual emissions might be different from the summation of emissions from individual activities.

PROPOSED INITIAL COMMISSIONING EMISSIONS

New electrical generation facilities must go through initial commissioning phases to demonstrate compliance with vendor performance guarantees before becoming commercially available to generate electricity. During this period, initial firing causes greater emissions than those that occur during normal operations because of the need to tune the combustor, conduct numerous startups and shutdowns, operate under low loads, and conduct testing before emission control systems are functioning or fine-tuned for optimum performance.

The applicant expects about 26 days of operation of each CTG, or 200 hours of each turbine operating, would be needed to accomplish the various following commissioning activities (AFC Section 5.1.4.1.2, Table 5.1-11, MEP 2009a; **AQ-7**, BAAQMD 2010c):

- **Initial load testing and checkout of power-train** – consisting of one day of unsynchronized operation for approximately 2 to 4 hours per day, followed by 1 day for approximately 2 to 4 hours per power-train of low-load check. The approximate load should be from 5 to 10 percent load.

- **Initial tuning** – several days (approximately 9 days) of tuning the CTG combustor and loads up to full load per turbine for no more than 8 hours per day, averaging 75 percent load. Upon completion of initial tuning, the selective catalytic reduction (SCR) equipment and CO oxidation catalyst will be loaded. The second tuning phase will be done with the SCR and CO catalyst operation and may include up to 120 hours.
- **Final tuning** – consisting of approximately 9 days of SCR and oxidation catalyst tuning and testing performance verification between 12 to 16 hours per day. The average operating load is expected to be 75 percent load.

Air Quality Table 10 presents the applicant's anticipated maximum hourly and daily short-term commissioning period emissions of criteria pollutants. Maximum hourly emissions for NOx, VOC, and CO would occur with the gas turbine undergoing initial load tests before emission control systems are installed and operational. Emission rates for PM10, PM2.5, and SOx during initial commissioning are not expected to be higher than normal operating emissions. This is because PM10 and SOx emissions are proportional to fuel use. The total initial commissioning emissions would be subject to all annual emission limitations applicable to normal operations, and commissioning period emissions would accrue towards the annual emission limits (**AQ-8**, BAAQMD 2010c).

Air Quality Table 10
MEP, Maximum Initial Commissioning Emissions (hourly and daily)

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG Maximum Commissioning (lb/hr)	51	4.48	2.5	45	1.35
Each CTG Maximum Commissioning (lb/day)	408	36	17.6 (avg.)	360	10.8
Each CTG Total Commissioning (ton)	16.3	1.0	0.91	8.7	0.54

Source: Response to DR set 1C Table 5.1-11R (CH2M 2010b); FDOC Table 5 and Table 7 (BAAQMD 2010c).

PROPOSED OPERATION EMISSION CONTROLS

NOx Controls

Each combustion turbine would use dry low-NOx (DLN) combustors to maintain low levels of NOx formation while ensuring complete combustion of the fuel and a Selective Catalytic Reduction (SCR) system for post-combustion NOx control. Exhaust from each turbine would enter the SCR system before being released into the atmosphere. SCR refers to a process that chemically reduces NOx to nitrogen (N_2) and water vapor (H_2O) by injecting ammonia (NH_3) into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NOx rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires the uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

VOC and CO Controls

Emissions of CO and unburned hydrocarbons, including VOC and POC, would be controlled with an oxidation catalyst installed in conjunction with the SCR catalyst. An oxidation catalyst system chemically reacts with organic compounds and CO with excess oxygen to form carbon dioxide (CO_2) and water. Unlike the SCR system for reducing NOx, an oxidation catalyst does not require any additional chemicals.

PM10/PM2.5 and SOx Controls

The exclusive use of pipeline-quality natural gas, a clean-burning fuel that contains very little sulfur or noncombustible solid residue, will limit the formation of SOx and particulate matter. Natural gas does contain small amounts of a sulfur-based scenting compound known as mercaptan, which results in some SOx emissions when burned. However, in comparison with other fossil fuels used in thermal power plants, such as coal and oil, SOx emissions from natural gas are very low. Particulate matter emissions from natural gas combustion are also very low compared with other fossil fuels. The sulfur content of pipeline-quality natural gas is normally less than 1 grain of sulfur per 100 cubic feet at standard temperature and pressure (gr/100 scf). Inlet air filtration also helps to control particulate emissions.

Ammonia Emissions Resulting from NOx Controls

Ammonia is injected into the flue gas stream as part of the SCR system that controls NOx emissions. In the presence of the catalyst, the ammonia and NOx react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NOx; a portion of the ammonia passes through the SCR system and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip. The applicant proposes to limit ammonia slip (NH_3) emissions from each CTG emission control system to 5 ppmvd.

PROPOSED OPERATION EMISSIONS

Air Quality Table 11 through **Air Quality Table 15** summarize the maximum (worst-case) criteria pollutant emissions associated with the MEP project's normal and routine operation. Emissions for the simple-cycle power plant are based upon:

- NOx emissions controlled to 2.5 parts per million by volume, dry basis (ppmvd) corrected to 15% oxygen, averaged over any 1-hour period except transient hours;
- VOC, also known as POC, emissions controlled to 1.0 ppmvd at 15% O_2;
- CO emissions controlled to 2.0 ppmvd at 15% O_2 for any 3-hour period;
- PM10 emissions at 2.5 lb/hr based on exclusive use of pipeline-quality natural gas fuel with no provisions for an alternative or backup fuel;
- SOx emissions based on hourly or daily levels of fuel sulfur content of up to 0.66 gr/100 scf in the short-term (1.347 lb/hr) and annually averaging 0.25 gr/100 scf or 0.337 lb/hr (BAAQMD 2010c);
- Each CTG firing up to 4,000 hours at full turbine capacity with air inlet chiller operation and 300 startup and shutdown events per turbine (MEP 2009a) or 4,225 hours per turbine annually (**AQ-15b**, BAAQMD 2010c).

Air Quality Table 11 lists the maximum hourly emissions from the proposed equipment. Emissions for NOx, CO, and VOC during startup and shutdown events would have higher emissions than during normal operation. Allowable emissions during startups are also shown. The proposed permit conditions would not allow any excess emissions during transient hours or due to a fast-changing load.

Air Quality Table 11
MEP, Maximum Hourly Emissions (pounds per hour [lb/hr])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG (routine steady state)	4.4	0.61	2.5	2.14	1.35
Each CTG (steady state average)	---	---	2.2	---	0.34
Each CTG (during hour with startup)	18.5	1.4	2.5	17.3	1.35
Diesel Fire Water Pump Engine	1.27	0.07	0.06	0.58	0.003

Source: Response to DR set 1C Table 5.1-12R (CH2M 2010b); FDOC Table 2a, Table 2b, and Table 3 and **AQ-17**, **AQ-18** (BAAQMD 2010c).

Air Quality Table 12 lists the worst-case emissions during any given day of operation of the proposed MEP. Daily combustion turbine emissions are based on an unlikely worst-case of twelve startup/shutdown events per turbine in a day and approximately 12 hours of turbine operation at 100 percent load with inlet chillers operating (MEP 2009a).

Air Quality Table 12
MEP, Maximum Daily Emissions (pounds per day [lb/day])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Each CTG (steady state)	105.6	14.7	53	51.4	32.4
Total Four CTGs (steady state)	422.4	58.8	212	205.4	129.6
Total Four CTGs (startups)	835.2	62.4	90	807	48.6
Diesel Fire Water Pump Engine	30.5	1.7	1.4	13.9	0.06
MEP Facility Total	**1,129.7**	**120.8**	**213**	**1,026**	**178.3**

Source: FDOC Table 11 and Table 12 and **AQ-19** (BAAQMD 2010c).

Air Quality Table 13 lists maximum potential annual emissions from the proposed project, based on applicant and District calculations reviewed by staff. The operating assumptions include each CTG firing up to 4,225 hours annually, which allows for about 300 startup events. The applicant expects the project to provide peaking power at a relatively low capacity factor, with actual operation averaging less than 600 hours annually for each CTG (MEP 2009a).

Air Quality Table 13
MEP, Maximum Annual Emissions (tons per year [tpy])

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Total Four CTGs Maximum Annual	45.6	5.60	18.6	27.2	2.87
Diesel Fire Water Pump Engine [a]	0.3	0.02	0.02	0.1	< 0.01
Total Maximum Annual Emissions	**46.0**	**5.62**	**18.6**	**30.1**	**2.9**

Source: FDOC Table 10 and **AQ-20** (BAAQMD 2010c).
Note:
a. Based on 500 hours of emergency use per year, although no more than 50 hours per year would be allowed for testing (**AQ-39**).

Air Quality Table 14 shows the worst-case expected annual emissions for MEP as a peaking power plant. Although MEP would be permitted to operate with an annual capacity factor of about 46 percent, based on experience with other similar power plants in California, MEP and Energy Commission staff agree that its actual capacity factor would be much less. Staff set out to determine the expected annual emissions based on a conservatively-high reasonably foreseeable annual capacity factor and number of startups. Comparatively, another recently-approved power plant project in the Bay Area Air Quality Management District (Marsh Landing Generating Station) is permitted to operate at a capacity factor of up to 20 percent, equivalent to 1,752 hours annually, which is closer to the expected capacity factor for this type of power plant.

Air Quality Table 14
MEP, Expected Annual Emissions (tons per year [tpy])

Source	**NOx**	**VOC**	**PM10/ PM2.5**	**CO**	**SOx**
Total Four CTGs Expected (1,400 hours)	12.32	1.71	7.00	5.99	0.94
Total Four CTGs Expected (startups)	10.4	0.8	1.1	10.2	0.15
Diesel Fire Water Pump Engine	0.002	<0.001	<0.001	0.001	<0.001
Total Expected Annual Emissions	**22.72**	**2.51**	**8.13**	**16.19**	**1.10**

Source: Staff calculation for CTGs at 300 startups with a capacity factor of 16% or 1,400 hours annually, with PM10 at 2.5 lb/hr and SOx at annual average 0.337 lb/hr.

Expected annual emissions in **Air Quality Table 14** are based on the reasonable worst-case of annual capacity factors (the 98th percentile) for existing peaking power plants in California. The applicant expects the proposed MEP combustion turbines to run approximately 600 hours per year with 200 startup and shutdown events annually, based on MEP's review of data from 2004 on California simple-cycle power plants greater than 50 MW (AFC Table 2.3-1 and Table 5.1-18, MEP 2009a). Energy Commission staff conducted a more comprehensive search including smaller peaking facilities and data from 2001 to 2008 and found that in the average year, the average peaking unit operated about 300 hours. Energy Commission data (from the Quarterly Fuel and Energy Reporting or QFER records) indicates that 98 percent of all comparable peaking facilities operate with an annual capacity factor of less than 16 percent or 1,400 hours annually. Expected annual emissions (**Air Quality Table 14**) derived by staff rely on these historic capacity factors. Along with 1,400 hours of steady state operation, staff expects MEP could require up to its proposed 300 startup events annually, especially if called upon to integrate renewable resources. These levels apply to staff's analysis for determining CEQA mitigation requirements for this project. This is conservatively somewhat higher than the 600 hours and 200 startups expected by the applicant.

Worker trips and material deliveries cause additional emissions of criteria pollutants from mobile sources operating offsite. These are shown in **Air Quality Table 15** were estimated using emission factors from EMFAC2007 (version 2.3) (MEP 2009a).

Air Quality Table 15
MEP, Annual Offsite Emissions (tpy)

Source	NOx	VOC	PM10	PM2.5	CO	SOx
Worker Commutes (Offsite)	0.039	0.01	0.005	0.003	0.37	0.0006
Material Deliveries (Offsite)	0.087	0.004	0.003	0.0025	0.025	0.0001
Total Annual Emissions (tpy)	**0.126**	**0.014**	**0.008**	**0.0055**	**0.395**	**0.0007**

Source: AFC Table 5.1-17 (MEP 2009a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff characterizes air quality impacts as follows: All project emissions of nonattainment criteria pollutants and their precursors (NOx, VOC, PM10, PM2.5, SOx, and NH_3) are considered significant and must be mitigated. For short-term construction activities that essentially cease before operation of the power plant, our assessment is qualitative and mitigation consists of controlling construction equipment tailpipe emissions and fugitive dust emissions to the maximum extent feasible. For operating emissions, the mitigation includes both the Best Available Control Technology (BACT) and emission reduction credits (ERC) or other valid emission reductions to offset emissions of both nonattainment criteria pollutants and their precursors.

The ambient air quality standards used by staff as the basis for characterizing project impacts are health-based standards established by the ARB and U.S. EPA. They are set at levels that contain a margin of safety to adequately protect the health of all people, including those most sensitive to adverse air quality impacts such as the elderly, persons with existing illnesses, children, and infants.

PROPOSED PROJECT IMPACTS AND MITIGATION

Ambient air quality impacts occur when project emissions cause the ambient concentration of a pollutant to increase. Project-related emissions are the actual mass of emitted pollutants, which are diluted in the atmosphere before reaching the ground. Analysis begins with quantifying the emissions, then uses an atmospheric dispersion model to determine the probable change in ground-level concentrations caused by those emissions.

Dispersion models complete the complex, repeated calculations that analyze the emissions in the context of various ambient meteorological conditions, local terrain, and nearby structures that affect air flow. For the MEP, the surface meteorological data used as an input to the dispersion model included four years of meteorological data from the San Joaquin Valley Air Pollution Control District (SJVAPCD) Patterson Pass monitoring station, the Stockton Airport, and the Oakland upper air sounding station were used for the dispersion modeling analysis (MEP 2009a).

The applicant conducted the air dispersion modeling based on guidance presented in the Guideline on Air Quality Models (EPA, 2005) and the American Meteorological Society/Environmental Protection Agency Regulatory Model, known as AERMOD (version 09292). The U.S. EPA designates AERMOD as a “preferred” model for refined modeling in all types of terrain. For determining impacts during inversion breakup fumigation conditions, the U.S. EPA SCREEN3 model was used.

The impact assessment for NOx emissions is refined by using the Ozone Limiting Method (OLM), which determines NO_2 impacts from short-term emissions (1-hour averaging period) and concurrent hourly ozone data from the area, in this case the Tracy Airport monitoring station. Because project NOx emissions would be approximately 90% NO that could oxidize into NO_2 with sufficient time, sunlight, and availability of organic compounds or ozone, use of OLM is appropriate. All 1-hour NO_2 results shown here are the maximum concentration for any one year, except as follows. The highest 1-hour results are not comparable to the new standard promulgated in 2010 by U.S. EPA, which is expressed as a 3-year average of the 98th percentile value of the daily maximum 1-hour NO_2 concentrations. This federal standard was promulgated after the MEP application filing date. For comparison with the federal 1-hour standard, staff shows the highest of the eighth highest 1-hour NO_2 project impact in each year and adds the background in the form of the 3-year average of the 98th percentile of the yearly distribution of 1-hour daily maximum concentrations, which would be comparable to the form of the federal standard; guidance on conducting a more-refined analysis is being developed by air management agencies.[2] For this assessment, the modeled 1-hour NO_2 concentration has not been paired with the concurrent hourly monitored background concentration. However, this staff assessment shows conservatively higher concentrations because pairing each hour of NO_2 impact concentrations with hourly concurrent background values would result in totals less than those shown in this assessment.

This impact assessment has a purpose that is similar to but not identical to that required for compliance of a major source with the federal Prevention of Significant Deterioration (PSD) program; because the MEP would be a minor source under PSD, this impact assessment is not subject to U.S. EPA review.

Project-related modeled concentrations for all pollutants are added to highest monitored background concentrations to arrive at the total project impact. The total impact is then compared with the ambient air quality standards for each pollutant to determine whether the project's emissions would either cause a new violation of the ambient air quality standards or contribute to an existing violation.

Construction Impacts and Mitigation

This section discusses the project's short-term direct construction ambient air quality impacts assessed by the applicant and, as necessary, independently assessed by Energy Commission staff. The ambient air quality impacts are modeled using AERMOD, and the impacts for NO_2 are modeled using the ozone limiting method (OLM).

Air Quality Table 16 summarizes the results of the modeling analysis for the 14 months of construction activities. The total impact is the sum of the existing background condition plus the maximum impact predicted by the modeling analysis for project

[2] Relevant NO_2 modeling guidelines include options from SJVAPCD in draft guidelines for use of AERMOD and OLM, dated 9/16/2010. Energy Commission staff and MEP modeling differs from these draft guidelines and regulatory recommendations for major sources because MEP uses three years of locally-available meteorological data where major source modeling requires five years (nearest station: Stockton) and because MEP uses the 3-year average of the eighth highest concentration rather than the form of the standard which is the 98th percentile of the annual distribution of daily highest 1-hour concentrations. Energy Commission staff may use some variation of this approach in future cases if U.S. EPA releases a prevailing recommendation, suitable for federal non-major sources, as part the Guideline on Air Quality Models in Appendix W of Title 40, Code of Federal Regulations (CFR) Part 51.

activity. The values in **bold** in the Impact and Background columns represent the values that either equal or exceed the relevant ambient air quality standard.

Air Quality Table 16
MEP, Construction-Phase Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	**67.5**	**126.8**	**194.3**	50	**389**
	Annual	6.0	**24.8**	**30.8**	20	**154**
PM2.5	24 hour	17.9	**81.2**	**99.1**	35	**283**
	Annual	1.2	**14.3**	**15.5**	12	**129**
CO	1 hour	957	5,029	5,986	23,000	26
	8 hour	416	2,640	3,056	10,000	31
NO_2 [a]	1 hour	226.0	105.7	331.7	339	98
	Annual	19.5	18.9	38.4	57	67
SO_2	1 hour	1.2	46.9	48.1	655	7
	24 hour	0.19	18.3	18.4	105	18
	Annual	0.03	5.2	5.2	80	7

Source: AFC Table 5.1-24 (MEP 2009a), with independent staff assessment to partially reconfigure area sources to volume type.
Note: a. The maximum 1-hour NO2 concentration is based on AERMOD OLM output, and the ambient ratio method (ARM) is applied for annual NO_2, using national default 0.75 ratio.

The maximum modeled project construction impacts would occur at the eastern property boundary for the 1-hour NO_2 and western property boundary for the 24-hour PM10 construction impacts. The highest diesel exhaust combustion-related impact would be about 6 µg/m^3 (24-hour PM10/PM2.5) at the western property boundary. Modeling shows that 24-hour PM10 concentrations could result in a potential new violation, during the 14 months of construction. Staff considers this to be a significant impact that can be mitigated. This impact would only occur for receptors within 425 feet (130 meters) of the construction site, inside the 158 acre parcel that would be used for grazing, and the impact would cease at the conclusion of construction. For each pollutant, the concentrations would decrease rapidly with distance.

The highest diesel exhaust combustion-related impact would be about 2 µg/m^3 (24-hour PM10/PM2.5) at the western property boundary. For each pollutant, the concentrations would decrease rapidly with distance. At the closest residence, which is approximately 0.6 miles away, to the northeast of MEP along Kelso Road, the 24-hour PM10 impact caused by project construction would be about 15 µg/m^3, about one quarter of the maximum impact as shown in **Air Quality Table 16**.

Construction activities are short-term and do not need to be compared to the new federal 1-hour NO_2 and SO_2 standards. The MEP construction phase impacts would occur over a proposed schedule lasting about 14 months. Construction impacts would be zero during the almost all of the second and third years in a compliance assessment with the new federal NO_2 and SO_2 standards. Because the new federal 1-hour NO_2 standard depends on multi-year averaging of impacts and backgrounds over three years, the NO_2 impacts during the 14 months of construction would not be likely to cause a new violation of the federal 1-hour NO_2 or SO_2 standard.

Staff believes that particulate matter emissions from construction would cause a significant impact because they will contribute to existing violations of PM10 and PM2.5

ambient air quality standards, and additionally that those emissions can and should be mitigated to a level of insignificance. Significant secondary impacts would also occur for PM10, PM2.5, and ozone because construction-phase emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and VOC) would contribute to existing violations of these standards. The direct impacts of NO_2, in conjunction with worst-case background conditions, would not create a new violation of the California 1-hour or annual NO_2 ambient air quality standard. The direct impacts of CO and SO_2 would not be significant because construction of the project would neither cause nor contribute to a violation of these standards. Mitigation should be provided for construction emissions of PM10, PM2.5, SOx, NOx, and VOC to reduce PM10, PM2.5, NO_2, and ozone impacts.

Construction Mitigation

The applicant proposes to reduce construction-related emissions of particulate matter, particulate matter precursors, and ozone precursors by implementing measures consistent with local air district requirements limiting visible emissions and nuisances. The applicant expects to implement controls for construction activities requiring the use of water or chemical dust suppressants to minimize PM10 emissions and prevent visible particulate emissions, consistent with measures adopted in previous similar Energy Commission licensing cases and will include the following construction mitigation measures (AFC p. 5.1-30, MEP 2009a):

- Watering unpaved roads and disturbed areas
- Limiting onsite vehicle speeds to 10 mph and post the speed limit
- Frequent watering during period of high winds when excavation/grading is occurring
- Sweeping onsite paved roads and entrance roads on an as-needed basis
- Replacing ground cover in disturbed areas as soon as practical
- Covering truck loads when hauling material that could be entrained during transit
- Applying dust suppressants or covers to soil stockpiles and disturbed areas when inactive for more than 2 weeks
- Using ultra-low sulfur diesel fuel (15 ppm sulfur) in all diesel-fueled equipment
- Maintaining all diesel-fueled equipment per manufacturer’s recommendations to reduce tailpipe emissions
- Limiting diesel heavy equipment idling to less than 5 minutes, to the extent practical
- Using electric motors for construction equipment to the extent feasible

Staff recommends specific construction mitigation measures to ensure enforceable reductions of the potential impacts. Measures recommended by staff would reduce construction-phase impacts to a less than significant level by reducing construction emissions of particulate matter and combustion contaminants. The short-term and variable nature of construction activities warrants a qualitative approach to mitigation. Construction emissions and the effectiveness of mitigation vary widely depending on variable levels of activity, the specific work taking place, the specific equipment, soil conditions, weather conditions, and other factors, making precise quantification difficult.

Despite this variability, there are a number of feasible control measures that can be implemented to significantly reduce construction emissions. Staff has determined that the use of oxidizing soot filters is a viable emissions control technology for all heavy diesel-powered construction equipment that does not use an ARB-certified low emission diesel engine. In addition, staff proposes that, prior to beginning construction the applicant should provide an Air Quality Construction Mitigation Plan (AQCMP) that specifically identifies mitigation measures to limit air quality impacts during construction. Staff includes proposed staff Conditions of Certification **AQ-SC1** through **AQ-SC5** to implement these requirements. These conditions are consistent with both the applicant's proposed strategy and the conditions of certification adopted in similar prior licensing cases. Compliance with these conditions would substantially eliminate the potential for significant air quality impacts during construction of the MEP project.

Operation Impacts and Mitigation

The following section discusses ambient air quality impacts that were estimated by MEP and subsequently evaluated by Energy Commission staff. The applicant performed a number of direct impact modeling analyses, including both fumigation modeling and modeling for impacts during commissioning.

Routine Operation Impacts

A refined dispersion modeling analysis was performed by the applicant to identify off-site criteria pollutant impacts that would occur from routine operational emissions throughout the life of the project. The worst case one-hour impacts reflect the highest emissions, during startups, and all other impacts reflect the impacts during normal steady-state operation. The modeled impacts are extremely conservative, since the maximum impacts are evaluated under a combination of highest allowable emission rates and the most extreme meteorological conditions, which are unlikely to occur simultaneously. Emissions rates are shown in **Air Quality Table 11** to **Air Quality Table 13**. The predicted maximum concentrations are summarized in **Air Quality Table 17**. PM10 and PM2.5 values are shown in **bold** because they exceed ambient air quality standards due to high background levels.

Air Quality Table 17
MEP, Routine Operation Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	3.0	**126.8**	**129.8**	50	**260**
	Annual	0.1	**24.8**	**24.9**	20	**124**
PM2.5	24 hour	3.0	**81.2**	**84.2**	35	**240**
	Annual	0.1	**14.3**	**14.4**	12	**120**
CO	1 hour	144.0	5,029	5,173	23,000	22
	8 hour	23.0	2,640	2,663	10,000	27
NO_2 [a, b]	1 hour	129.2	105.7	234.9	339	69
	1 hr Federal	104.1	73.0	177.1	188	94
	Annual	0.2	18.9	19.0	57	33
SO_2	1 hour	10.7	46.9	57.7	655	9
	1 hr Federal	10.7	46.9	57.7	196	29
	24 hour	1.59	18.3	19.8	105	19
	Annual	0.04	5.2	5.3	80	7

Source: Independent Staff Assessment for all pollutants based on MEP stack parameters (CH2M 2010b).
Notes:
a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output, and the ambient ratio method (ARM) is applied for annual NO_2, using national default 0.75 ratio.
b. The proposed MEP emergency-use fire water pump engine would cause a highest 1-hour NO_2 modeled impact of 265 µg/m^3, if run continuously. Staff recommends restrictions on non-emergency use of the MEP fire water pump engine to demonstrate compliance with 1-hour NO_2 standards (**AQ-SC9** and **AQ-SC10**).

The maximum 24-hour PM10 and 1-hour NO_2 impact due to the CTGs at MEP occurs in the undeveloped and elevated terrain about 1.9 miles (3.0 kilometers) southwest of the project site. Because of the high exhaust temperature and velocity, impacts would be substantially lower at the closest residence, which is approximately 0.6 miles away, to the northeast of MEP along Kelso Road. Although PM10 and PM2.5 concentrations presently exceed the limiting standards, the addition of MEP would cause no more than a 4 percent contribution at the location experiencing highest impact, which is in the hills.

The proposed MEP fire water pump engine, when operating, would dominate the 1-hour NO_2 impact with the highest concentration of about 265 µg/m^3 adjacent to the engine if it were tested every hour, which is not proposed. If testing of the fire pump engine coincides with the highest background NO_2 conditions, then the total concentration could exceed the California ambient air quality standard of 339 µg/m^3 for locations within about 100 meters of the engine. Fire pump engine use would be infrequent, and staff considers the possibility of emergency use engine emissions coinciding with the highest background conditions to be a remote likelihood and not reasonably foreseeable for this analysis. Nevertheless, causing a new violation would be a potentially significant impact. Staff recommends mitigating this impact in two ways: first, by limiting reliability testing of the engine to no more than 30 minutes per test, which would match the recommendations from the National Fire Protection Association in NFPA 25 for testing water-based fire protection systems; and second by limiting testing of the engine to only certain hours of the day when background concentrations of NO_2 are known to be low (between 8 a.m. and 11 a.m.). With these limitations the resulting concentrations would be reduced to a level that would not be likely to cause a new violation of the federal 1-hour NO_2 standard (see **AQ-SC10**). Additional restrictions of simultaneous non-emergency use of the engine with the remainder of the power plant are recommended in **AQ-SC10**.

Staff believes that particulate matter emissions from routine operation would cause a significant impact because they will contribute to existing violations of PM10 and PM2.5 ambient air quality standards. Significant secondary impacts would also occur for PM10, PM2.5, and ozone because operational emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and VOC) would contribute to existing violations of these standards.

The direct impacts of NO_2 after implementing **AQ-SC10** in conjunction with worst-case background conditions would not create a new violation of the NO_2 ambient air quality standards. The direct impacts of CO and SO_2 would not be significant because routine operation of the project would neither cause nor contribute to a violation of these standards. Mitigation should be provided for emissions of PM10, PM2.5, SOx, NOx, and VOC to reduce PM10, PM2.5, and ozone impacts.

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SOx, VOC, and ammonia are precursor pollutants that can contribute to the formation of secondary pollutants, including ozone, PM10, and PM2.5. Gas-to-particulate conversion in ambient air involves complex chemical and physical processes that depend on many factors, including local humidity, pollutant travel time, and the presence of other compounds. Currently, there are no agency-recommended models or procedures for estimating ozone or particulate nitrate or sulfate formation from a single project or source. However, because of the known relationships of NOx and VOC to ozone and of NOx, SOx, and ammonia emissions to secondary PM10 and PM2.5 formation, unmitigated emissions of these pollutants would likely contribute to higher ozone and PM10/PM2.5 levels in the region. Significant impacts of ozone and PM10/PM2.5 precursors would be mitigated with BAAQMD offsets and local SJVAPCD emission reductions that would be provided under a recommended condition of certification (**AQ-SC7**).

Ammonia (NH_3) is a particulate precursor but not a criteria pollutant. Reactive with sulfur and nitrogen compounds, ammonia is abundant in the Bay Area and San Joaquin Valley due to natural sources, agricultural activities, and as a byproduct of tailpipe controls on motor vehicles. Studies ongoing by the BAAQMD are exploring the relationship of the ammonia emission inventory to ambient particulate levels, with a preliminary indication that restricting ammonia emissions could be a useful part of a regional strategy to reduce particulate matter formation (see discussion of BAAQMD **2010 Clean Air Plan** below). Restricting ammonia emissions from new sources would also be likely to reduce potential deposition of nitrogen-containing compounds on nearby soils and vegetation (discussed in **Biological Resources**). With sulfuric and nitric acid availability being a key component of particulate matter formation, minimizing and offsetting SOx and NOx emissions would avoid PM10/PM2.5 impacts and reduce secondary pollutant impacts to a less than significant level.

Energy Commission staff recommends limiting ammonia slip emissions to the extent feasible. Ammonia emissions are not restricted by the Bay Area Air Quality Management District except for avoiding excessive health risks. The applicant in this case proposes to achieve levels of 5 ppmvd during steady operations, and staff considers this to be the achievable performance standard to avoid unnecessarily high

levels of ammonia emissions. Accordingly, staff recommends that this limit be adopted as it is reflected in the Bay Area Air Quality Management District's determination of compliance (**AQ-17**, BAAQMD 2010c).

Fumigation Impacts

There is the potential that higher short-term concentrations of pollutants may occur during fumigation conditions. Fumigation conditions are generally short-term in nature and only compared to standards of 24 hours or shorter. Thermal inversion breakup fumigation occurs when a stable layer of air lies a short distance above the release point of a plume and unstable air lies below. Under these conditions, an exhaust plume may be drawn to the ground, causing high ground-level pollutant concentrations.

The analysis of fumigation impacts considers the maximum allowable hourly emissions from the combination of the four CTGs simultaneously under any mode of operation using the SCREEN3 Model (version 96043) (AFC Table 5.1-27, MEP 2009a). The maximum impacts under inversion breakup fumigation conditions would occur more than 10 km from MEP. Including startup emissions, the short-term project impacts during fumigation would not exceed the impacts for routine operation shown in **Air Quality Table 17**, above. Therefore, no additional mitigation is required for fumigation impacts.

Commissioning-Phase Impacts

Commissioning of all four turbines would be completed within a period of 180 days, and about 30 days would be needed completing commissioning on each of the four combustion turbines (MEP 2009a). As such, commissioning impacts are compared with ambient air quality standards having hourly or other short-term averaging times, and standards with annual or multi-year averaging are not applicable. The commissioning emissions estimates are based on partial load operations before the emission control systems become operational, as in **Air Quality Table 10**. Impacts due to PM10, PM2.5, and SO_2 during commissioning would occur under similar exhaust conditions as those for startup while in routine operation because these emissions are proportional to fuel use.

MEP indicates that it would agree to a condition of certification specifying that no more than three combustion turbines would operate simultaneously in commissioning and that the fire water pump engine would not be tested while commissioning any turbine (AFC Table 5.1-25, MEP 2009a; Response to DR5, CH2M 2010b). Staff finds that the air quality impact of NO_2 during commissioning of three combustion turbines would approach the California ambient air quality standard. To be protective of the NO_2 standard, staff and BAAQMD recommend that none of the four CTGs undergo commissioning simultaneously (see also **AQ-9** and **AQ-9a**; BAAQMD 2010c). The prohibition of simultaneous commissioning is in **AQ-SC9**, and the limitation on planned use of the fire pump engine is in **AQ-SC10**.

Air Quality Table 19 shows that under this condition the commissioning-phase impacts of CO and NO_2 would be somewhat higher than those during routine operations. However, these impacts would not create any new violation of the limiting standards, and they would be limited to a 90-day window before commercial operation of each

CTG (**AQ-10**). Commissioning-phase impacts to particulate matter and ozone concentrations would be addressed with the mitigation identified above for routine operations.

Air Quality Table 19
MEP, Commissioning-Phase Maximum Impacts (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
CO	1 hour	205.0	5,029	5,234	23,000	23
	8 hour	69.0	2,640	2,709	10,000	27
NO_2 [a, b]	1 hour	226.5	105.7	332.2	339	98

Source: AFC Table 5.1-25 (MEP 2009a) with Independent Staff Assessment for NO_2.
Note:
a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.
b. Impacts shown for three CTGs in simultaneous commissioning. Staff and BAAQMD conditions would prohibit commissioning of any CTGs simultaneously as in **AQ-SC9** and **AQ-9** and **AQ-9a**.

Visibility Impacts

A visibility analysis of the project's gaseous emissions would not be required because the MEP project would not qualify as a new major stationary source under the federal Prevention of Significant Deterioration (PSD) permitting program. For projects subject to PSD review by the U.S. EPA, a visibility analysis would address the nearest federally-protected Class I area, which is Point Reyes National Seashore, about 95 kilometers (59 miles) away. Due to its distance from Class I areas being nearly 100 kilometers, and due to the potential emissions of the project being less than the PSD applicability thresholds, Energy Commission staff anticipates that the project's impacts to visibility in Class I areas would be insignificant.

Mitigation for Routine Operation

Applicant's Proposed Mitigation

The proposed MEP would mitigate air quality impacts by limiting emissions to the maximum extent feasible with the Best Available Control Technology and by providing emission reduction credits to offset emissions. The equipment description, equipment operation, and proposed emission control devices are provided in **Air Quality Project Description**.

Emission Controls

The combustion turbine generators at MEP would include two catalyst systems: the SCR and water injection system to reduce NOx; and the oxidation catalyst system to reduce CO and VOC. Operating exclusively with pipeline quality natural gas limits SOx and particulate matter emissions. Additionally, inlet air filters would be used to minimize particulate emissions.

Emission Offsets

In addition to emission control strategies included in the project design, MEP proposes to provide offsets in the form of emission reduction credits (ERCs). BAAQMD Rule 2-2-302 requires MEP to provide emission reduction credits to offset the new emissions of

NOx. The FDOC would limit the emissions of MEP to a level that allows MEP to be exempt from BAAQMD requirements to offset new emissions of VOC (also known as precursor organic compounds or POC).

The AFC (Section 5.1.6.2.1) describes a strategy of providing emission reduction credits to offset operational emissions, and MEP has sufficient holdings of ERCs to offset NOx and VOC emissions, at the levels originally proposed in the AFC. The FDOC would require MEP to achieve emission levels lower than those originally proposed in the AFC.. However, according to public records, MEP owns or controls offsets at levels that exceed the BAAQMD requirements. Any surplus ERCs held by MEP can be used to reduce impacts remaining after meeting BAAQMD requirements. MEP is not volunteering to surrender ERCs for the proposed increases of SO_2 and PM10/PM2.5. Instead, MEP entered into a Air Quality Mitigation Settlement Agreement with SJVAPCD (discussed below).

Air Quality Table 20 summarizes the BAAQMD Rule 2-2-302 offset requirements for the MEP (at the mandatory NOx offset ratio of 1.15-to-1) and the offsets held by MEP (as Diamond Generating Corporation).

Air Quality Table 20
MEP, BAAQMD Offset Requirements and Offset Holdings (tpy)

Source	NOx	VOC	PM10/ PM2.5	CO	SOx
Total Four CTGs Maximum Annual	45.6	5.60	18.6	29.98	1.10
Diesel Fire Water Pump Engine	0.3	0.02	0.02	0.1	< 0.01
MEP Potential to Emit	**46.0**	**5.62**	**18.6**	**30.1**	**1.10**
Offset Requirements					
BAAQMD Offset Requirements	52.44 [a]	0 [b]	0 [c]	0 [d]	0 [e]
Effectiveness of BAAQMD Offset in San Joaquin Valley (1.5-to-1)	34.96	0	0	0	0
MEP Offset Holdings Certificate, Site of Reduction					
#1182 Owens Corning, Santa Clara	55.90	---	---	---	---
#1184 Quebecor World, San Jose	---	11.10	---	---	---
Additional Mitigation					
SJVAPCD Air Quality Mitigation Settlement Agreement, December 17, 2009	---	---	11.03	---	See PM10
MEP Mitigation Total	**34.96**	**---**	**11.03**	**---**	**---**
Reasonably-Foreseeable Emissions					
Expected Annual Emissions (from Table 14)	**22.72**	**2.51**	**8.13**	**---**	**1.10**
Fully Offset?	**Yes**	**Yes**	**Yes**	**---**	**Yes**

Source: Independent Staff Assessment; Condition **AQ-20** (BAAQMD 2010c); and BAAQMD website accessed September 2010: http://hank.baaqmd.gov/pmt/emissions_banking/banking.htm.
Notes:
a. BAAQMD offset requirements for NOx for MEP include an offset ratio of 1.15-to-1. In BAAQMD, VOC (or precursor organic compounds) offsets may be used to offset emission increases of NOx.
b. Offsets are not required by BAAQMD for VOC (POC) since MEP would not exceed 10 tons per year.
c. Offsets are not required by BAAQMD for PM10 or PM2.5 since MEP would not exceed 100 tons per year.
d. Offset are not required by BAAQMD for CO since the area is designated as an area that attains the CO ambient air quality standards and MEP would not be subject to PSD review for CO. This Staff Assessment demonstrates that MEP would not cause or contribute to a violation of the CO ambient air quality standards.
e. Offsets are not required by BAAQMD for SO_2 since MEP would not exceed 100 tons per year.

SJVAPCD Air Quality Mitigation Settlement Agreement

MEP is participating in a separate agreement to provide certain emission reductions in addition to the emission offsets identified above. The Air Quality Mitigation Settlement Agreement entered into by MEP and approved by the SJVAPCD Governing Board on December 17, 2009 (Attachment DR8-2, CH2M 2010b) includes the following features:

- SJVAPCD expressed that it: "*is concerned about the general migration of air pollutants from the BAAQMD region and the migration's effect on the ability of the District to meet its air quality attainment goals*" and that: "*due to the proximity of the [Mariposa] Project to the District, the emissions from the Project will mostly impact the District without corresponding benefits from offsets provided from sources within the BAAQMD.*"
- SJVAPCD and MEP determined that payment of an air quality mitigation fee of $644,503 for local air quality benefit programs is the appropriate method for MEP to address SJVAPCD concerns and ensure localized benefits within SJVAPCD.
- The actual emission reductions provided by the mitigation fee are unknown because the SJVAPCD has only provided a range of measures to be implemented, at the discretion of the SJVAPCD. Final measures implemented by the SJVAPCD can include: "*the SJVAPCD's Burn Cleaner woodstove retrofit and fireplace replacement program, the Carl Moyer Program, heavy duty engine retrofit/replacement program, agricultural engine replacement program, and/or other similar programs approved by the SJVAPCD.*"
- The SJVAPCD commits to giving preference to: "*cost-effective programs in or near the Mountain House Community Service District, City of Tracy, San Joaquin County, and the Northern Region of the San Joaquin Valley Air Basin, in that order*."

The timing of the reductions achieved by the fee is a concern. Emission reductions created by SJVAPCD using the fee may occur slowly. The SJVAPCD must first identify mitigation projects, either by advertising availability of funds or by contacting operators of sources that are normally outside of SJVAPCD jurisdiction. The owner of the source then must apply for the funds, then order and receive the replacement equipment, and retire the original source. Staff expects the SJVAPCD to use the fee quickly and in the most effective manner, but how quickly the reductions might occur is speculative. The SJVAPCD would make the primary decisions on when and where reductions would occur, depending somewhat on market demand for the funds. No party can guarantee the timing of the reductions.

The cost-effectiveness of the fee depends on what programs are finally selected, ranging from a low cost of $16,800 per ton of NOx or VOC reductions for the Carl Moyer Program to approximately $55,500 per ton of PM10 reductions for the woodstove retrofit and fireplace replacement program (Part A-2 of the Settlement Agreement). Energy Commission staff assumes that a reasonable worst-case scenario (lowest air quality benefits) is for a 5% administration fee and then the remainder of $644,503 being applied to the woodstove and fireplace program. This would result in the Settlement Agreement providing a minimum of 11.03 tons of PM10 reductions (shown in **Air Quality Table 20**).

Summary of Mitigation for Ozone Impact

Air Quality Table 20 summarizes offset requirements established by the BAAQMD and identifies the offsets offered by MEP. By satisfying the local air district offset requirements, which apply only for NOx for this project, MEP would surrender more than 52 tons per year of NOx offsets.

The offsets originate from sources shut down in the Santa Clara Valley, which is a location that the Air Resources Board has found to be a source of transported pollutants to the San Joaquin Valley (ARB 1996 and 2001). Staff accepts the ERCs as partially effective mitigation for the project area because they reflect reductions from an area that is upwind but distant from the project site. To determine the effectiveness of the BAAQMD offsets locally, staff looked to the rules and regulations established by the SJVAPCD, which is responsible for protecting air quality in the San Joaquin Valley. According to SJVAPCD Rule 2201 (Sec 4.8.3 and 4.13.2) and the Air Quality Mitigation Settlement, emission reductions from a neighboring air district at a distance of less than 50 miles would be effective at a ratio of 1.5-to-1. Dividing the BAAQMD-required offsets of 52.44 tons per year by 1.5 for the distance ratio results in an effective mitigation in the SJVAPCD of 34.96 tons per year NOx.

Both NOx and VOC emissions are recognized precursors to the formation of ambient ozone, and NOx is also a recognized precursor to the formation of the nitrate fraction of fine particulate matter. MEP would comply with BAAQMD's offset requirements and would provide overall total ERCs for the proposed ozone precursor emissions at an offset ratio of at least one-to-one. This would satisfy the CEQA mitigation requirements for ozone impacts as established by Energy Commission staff in recent fossil fuel-fired power plant cases, such as Avenal Energy (08-AFC-1).

Summary of Mitigation for Particulate Matter Impact

Air Quality Table 20 shows that the BAAQMD would not require offsets for particulate matter or SOx, which is a recognized precursor to the formation of the sulfate fraction of fine particulate matter. Additionally, the AFC does not identify any offsets for mitigating the particulate matter impacts. There are no separate offset requirements for the proposed PM2.5 emissions from MEP.

Although MEP would satisfy the BAAQMD requirements without surrendering any PM10 or SO_2 offsets, the SJVAPCD sought and obtained a $644,503 mitigation fee to achieve emission reductions in the San Joaquin Valley, partially to address particulate matter impacts. Staff expects at least 11.03 tons of PM10 reductions to be achievable through SJVAPCD using the fee. Additional mitigation may be needed to ensure that implementing the fee results in sufficient local SJVAPCD emission reductions of particulate matter and its precursors. Providing overall total PM10 and SO_2 ERCs for the proposed PM10/PM2.5 plus SOx emissions at an offset ratio of at least one-to-one would satisfy the CEQA mitigation requirements for particulate matter impacts.

Adequacy of Proposed Mitigation

Energy Commission staff have long held that emission reductions need to be provided for all nonattainment pollutants and their precursors at a minimum overall one-to-one ratio of annual operating emissions. For this project, the BAAQMD's offset requirements

for ozone would meet or exceed that minimum offsetting goal, while staff recommended mitigation for particulate matter impacts would exceed the BAAQMD's requirements (**Air Quality Table 20**). Staff proposes additional mitigation (**AQ-SC7**) to ensure that all reasonably foreseeable nonattainment pollutant and precursor emissions are offset by at least one-to-one.

Staff's review of the offset package was conducted solely based on the merits of this case, including the local air district offset requirements, the project's emission limits, the specific ERCs proposed, and ambient air quality considerations of the region, and does not in any way provide a precedence or obligation for the acceptance of offset proposals for any other current or future licensing cases.

Staff Proposed Mitigation

Staff proposes Condition of Certification **AQ-SC6** to ensure that, if needed, the license would be amended as necessary to incorporate future changes to the air quality permits. Staff recommends a Condition of Certification (**AQ-SC7**) to ensure that significant impacts of ozone and PM10/PM2.5 precursors would be mitigated with BAAQMD offsets and local SJVAPCD emission reductions in a sufficient quantity and timeline as specified by staff to ensure the worst-case expected annual emissions are offset by at least one-to-one (**Air Quality Table 14**).

Staff also proposes mitigation to ensure ongoing compliance during routine operation through quarterly reports (**AQ-SC8**).

CUMULATIVE IMPACTS AND MITIGATION

"Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines, §15355). Such impacts can be relatively minor and incremental yet still be significant because of the existing environmental background, particularly when considering other closely related past, present, and reasonably foreseeable future projects.

Criteria pollutants have impacts that are usually (though not always) cumulative by their nature. Rarely will a project itself cause a violation of a federal or state criteria pollutant standard. However, many new sources contribute to violations of criteria pollutant standards because of elevated background conditions. Air districts attempt to reduce background criteria pollutant levels by adopting attainment plans, which are multi-faceted programmatic approaches to attainment. Attainment plans typically include new source review requirements that provide offsets and use Best Available Control Technology, combined with more stringent emissions controls on existing sources.

The discussion of cumulative air quality impacts includes the following three analyses:

- a summary of projections for criteria pollutants by the local air quality management district and the programmatic efforts to abate such pollution;
- an analysis of the project's "localized cumulative impacts" caused by direct emissions when combined with other local major emission sources; and

- a discussion of greenhouse gas impacts (in **AIR QUALITY APPENDIX AIR-1**).

SUMMARY OF PROJECTIONS

The federal and California Clean Air Acts direct local air quality management agencies, in this case, ARB and BAAQMD, to implement plans and programs that lead to attainment and maintenance of the ambient air quality standards. New Source Review programs for permitting new and modified stationary sources, and other programs for reducing emissions from mobile sources or area-wide sources, are part of the regional air quality management plans.

Ozone

- **2010 Clean Air Plan.** The BAAQMD works with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG) to assess population, employment, and transportation trends in the region when developing its air pollution control strategies. The California Clean Air Act requires periodically updating Clean Air Plan. This plan updates the Bay Area 2005 Ozone Strategy in accordance with the requirements of the California Clean Air Act to implement "all feasible measures" to reduce ozone and to reduce transport of ozone precursors to neighboring air basins. The 2010 Clean Air Plan expands the ozone management effort and provides a control strategy to reduce ozone, particulate matter, air toxics, and greenhouse gases in a single, integrated plan. Studies ongoing by the BAAQMD are exploring the relationship of the ammonia emission inventory to ambient particulate levels, with a preliminary indication that restricting ammonia emissions could be a useful part of a regional strategy to reduce particulate matter formation. The California Clean Air Act does not require a plan to address nonattainment of the state's PM10 or PM2.5 standards, but many of the measures to reduce ozone precursors will also reduce precursors to ambient particulate matter.
- **2001 Ozone Attainment Plan.** This plan was a regional strategy to achieve the federal one-hour ozone standard. Because the federal one-hour ozone standard was subsequently replaced with an eight-hour standard, this plan included measures that became components of the 2005 Ozone Strategy.

BAAQMD rules and regulations specify performance standards, offset requirements, and emission control requirements for all sources. The regulations also include requirements for obtaining Authority to Construct (ATC) permits and subsequent operating permits. These regulations apply to MEP and all projects; they ensure that all projects will be consistent with steps taken to bring the region into attainment. Routinely updating the attainment plans ensure that population, employment, and transportation trends in the region are taken into account. Compliance with BAAQMD rules and regulations ensures that projects will be consistent with the regional air quality management plans.

Particulate Matter

The BAAQMD is currently designated as an attainment area for the federal PM10 standard and was recently designated nonattainment for the federal PM2.5 standard. The California Clean Air Act does not require any local air district to provide a plan for

attaining the state PM10 or PM2.5 standards, so there is no adopted implementation plan for particulate matter. The 2010 Clean Air Plan provides an outline of achieving reductions in particulate matter, but it is not a formal plan for meeting federal Clean Air Act Requirements regarding PM2.5 planning. The BAAQMD must prepare and submit to the ARB and U.S. EPA by December 2012 a separate plan demonstrating how the region will comply with the federal PM2.5 standard no later than 2019.

Direct emissions of PM10 and PM2.5 have been gradually increasing and are projected to increase in the air district, but ambient concentrations have not increased over recent years. Because many of the same sources contribute to both ozone and particulate matter, future ozone precursor emission controls should help ensure continued particulate matter improvements (ARB 2009).

In response to state legislation (SB 656), the BAAQMD identified the most readily available, feasible, and cost-effective control measures that could be employed to reduce PM10 and PM2.5. On November 9, 2005, the District issued a final staff report called the Particulate Matter Implementation Schedule. The proposed measures included reducing NOx and POC emissions from internal combustion engines and providing additional outreach and educational resources. Compliance with BAAQMD rules and regulations and implementing mitigation recommended by staff for offsetting PM10/PM2.5 and SOx emissions (**AQ-SC7**) ensures that project PM10/PM2.5 and precursor impacts will be mitigated and consistent with the forecasted BAAQMD trends.

LOCALIZED CUMULATIVE IMPACTS

The combined air quality impacts of the proposed project, neighboring electric generating facilities, and other reasonably foreseeable local projects are presented here. The analysis for localized cumulative impacts depends upon identifying which present and future projects are not included in the background conditions.

Reasonably foreseeable future projects in the area are those that are either currently under construction or in the process of being approved by a local air district or municipality. Projects that have not yet entered the approval process do not normally qualify as “foreseeable” since the detailed information needed to conduct this analysis is not available. Sources that are presently operational are included in the background concentrations. Stationary source projects located up to six miles from the proposed project site usually need to be included in the analysis. Background conditions take into account the effects of non-stationary (mobile and area) sources.

The applicant with assistance from BAAQMD and SJVAPCD staff identified the following reasonably foreseeable future sources (Response to DR11, CH2M 2009f) for the analysis of localized cumulative impacts:

- Waste Management of Alameda County (BAAQMD Facility 2066), includes one landfill gas fired flare and four portable diesel engines for waste tippers.
- East Altamont Energy Center (EAEC, 01-AFC-4, BAAQMD Facility 13050), is an approved 1,100 MW power plant, granted a license by the Energy Commission in August 2003, for a site 1.9 miles (3.0 kilometers) northeast of MEP, bordered by Byron Bethany Road to the north, Kelso Road to the south, and Mountain House Road to the west. If built, EAEC would include three stationary combustion turbines

generators and auxiliary sources. This facility is included in the cumulative model, although some equipment, namely the EAEC emergency-use generator and pump engines, would no longer be allowed to emit at the originally-approved and modeled levels. The fate of the EAEC is uncertain because although the Energy Commission extended the license to allow construction by 2011, the BAAQMD review of EAEC is out of date, and the licensed version of EAEC may no longer be able to demonstrate compliance with current air quality requirements, such as Best Available Control Technology.

- Byron Power Company (Byron Co-gen), Ridgewood Power at 4901 Bruns Road (Facility 10437), is an existing facility that staff has included in the cumulative model for NO_2 specifically at the request of public comments on the Staff Assessment. This facility consists of five natural gas fired internal combustion engine-generator sets rated at approximately 1.1 MW (1,470 hp) each, and historically, it operates very few hours per year.

The following existing sources are either included as background sources or not included as follows:

- The Mountain House Community Services District anticipates 14,915 residential units and a population over 40,000 at build-out (2022), eventually within a mixed-use use development that is existing and under construction (MHCSD 2008). Increased urbanization of western San Joaquin County introduces mobile sources and area sources (e.g., natural gas combustion for residential hot water heaters) that contribute to local air pollution today and in the future. Development at Mountain House is generally subject to environmental review by San Joaquin County, which determined in 1994 that Mountain House Master Plan would cause an increase in regional emissions due to new vehicle travel and area sources that would have a significant and unavoidable impact on air quality within the San Joaquin Valley and adjacent San Francisco Bay Air Basin. Planning and development are ongoing. Air quality management agencies address this growth through regional air quality management plans, noted above.
- The 1994 Final Environmental Impact Report (EIR) for development of Mountain House Specific Plan I identified the following forecast for mobile source and residential emissions in year 2000: 1,852 lb/day (338 tpy) NOx; 1,145 lb/day (209 tpy) VOC; 192 lb/day (35 tpy) PM10; and 217 lb/day (40 tpy) SOx (SJC 1994). These emissions would be attributable to the Mountain House Community Services District in its existing and/or planned form. Baseline emissions are reflected in background conditions, and forecasted emissions are addressed in regional air quality management plans.
- The 2005 Draft EIR for development of Mountain House Specific Plan III identified the following forecast for mobile and area source emissions for the College Park Project at Mountain House in year 2025: 37.9 tpy NOx; 57.6 tpy VOC; and 112.4 tpy PM10 (SJC 2005). These emissions would be attributable to the Mountain House Community Services District in its existing and/or planned form. Baseline emissions are reflected in background conditions, and forecasted emissions are addressed in regional air quality management plans.

- Pacific Gas & Electric (PG&E) Company, Bethany Compressor Station at 14750 Kelso Road (Facility 14218), existing facility impacts are included as part of the background concentrations.
- Tesla Power Project, approved by the Energy Commission in 2004 (01-AFC-21, BAAQMD Facility 13424) for a site in Alameda County approximately five miles south of MEP, but construction never started. The staff's analysis did not include this project because the Energy Commission terminated the certification for this power plant on October 16, 2009.

The MEP applicant's analysis of cumulative impacts assumes lower PM2.5 than PM10 impacts due to the proposed cooling tower at EAEC (Response to DR13, CH2M 2009f; CH2M 2010x). To compensate for this, staff shows the PM2.5 impact level equivalent to PM10.

The maximum modeled cumulative impacts of MEP and nearby sources are presented below in **Air Quality Table 21**. The total impact is conservatively estimated by the maximum modeled impact plus existing maximum background pollutant levels, except for comparison with the 1-hour federal NO_2 standard, which is conducted as described for under the heading for "**Proposed Project Impacts and Mitigation**".

Air Quality Table 21
MEP, Ambient Air Quality Impacts from Cumulative Sources (µg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
PM10	24 hour	8.7	**126.8**	**135.5**	50	**271**
	Annual	2.4	**24.8**	**27.2**	20	**136**
PM2.5	24 hour	8.7	**81.2**	**89.9**	35	**257**
	Annual	2.4	**14.3**	**16.7**	12	**139**
CO	1 hour	504.0	5,029	5,533	23,000	24
	8 hour	133.0	2,640	2,773	10,000	28
NO_2 [a, b]	1 hour	152.6	105.7	258.3	339	76
	1 hr Federal	104.1	73.0	177.1	188	94
	Annual	1.2	18.9	20.1	57	35
SO_2	1 hour	129.0	46.9	175.9	655	27
	1 hr Federal	129.0	46.9	175.9	196	90
	24 hour	20.0	18.3	38.3	105	36
	Annual	1.0	5.2	6.2	80	8

Source: Response to DR13 Table DR13-3 (CH2M 2009f; CH2M 2010aa), with Independent Staff Assessment for PM2.5 and NO_2.
Notes:
a. The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.
b. The proposed emergency use engines at all cumulative facilities would dominate the highest 1-hour NO_2 modeled impacts.

Compared with the impacts from the proposed MEP project alone, maximum cumulative impacts caused by the sources in this assessment would be relatively higher for all criteria pollutants. Modeled concentrations of 1-hour NO_2 are highest adjacent to EAEC, where two internal combustion engines are proposed for emergency use. In the immediate vicinity of 330 feet (100 meters) of the EAEC fence-line, maximum 1-hour NO_2 concentrations could potentially exceed the newly-established federal 1-hour NO_2 standard. However, compliance with this new standard is not based upon maximum 1-

hour concentrations, but rather it relies on multi-year data. When viewed over a multi-year period, the modeled concentrations of NO_2 impacts from emergency-use sources become especially conservatively high because the standby sources are modeled with operation recurring each hour although they would emit only sporadically during testing events that would rarely occur simultaneously with worst-case meteorological conditions.

Cumulative sources would not create any new violation of the limiting standards, except for the federal 1-hour NO_2 standard, where modeling reveals concentrations that could result in a potential new violation adjacent to the proposed emergency-use-only sources at EAEC. Adjacent to EAEC, the proposed MEP would contribute less than 7 $\mu g/m^3$, which is an interim Significant Impact Level (4 ppb as in U.S. EPA memo dated 6/28/2010) that staff considers to be a suitable level for determining whether the contribution by MEP would be cumulatively considerable. The potential new violation caused by EAEC would only occur for receptors within about 330 feet (100 meters) of that power plant site. With MEP's contribution to modeled concentrations below 7 $\mu g/m^3$ in the area of the new potential exceedance, the contribution made by MEP to the potential new violation would not be cumulatively considerable.

Staff believes that particulate matter emissions from MEP would be cumulatively considerable because they would contribute to existing violations of the PM10 and PM2.5 ambient air quality standards. Secondary impacts would also be cumulatively considerable for PM10, PM2.5, and ozone because emissions of particulate matter precursors (including SOx) and ozone precursors (NOx and VOC) would contribute to existing violations of the PM10, PM2.5, and ozone standards. To address the contribution caused by MEP to cumulative particulate matter and ozone impacts, mitigation would offset all nonattainment pollutants and their precursors at a minimum ratio of one-to-one.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The Preliminary Determination of Compliance (PDOC) for MEP was dated August 18, 2010 (BAAQMD 2010b), and the Final Determination of Compliance (FDOC) was dated November 24, 2010 (BAAQMD 2010c). Compliance with all District Rules and Regulations was demonstrated to the BAAQMD's satisfaction in the FDOC, and the FDOC conditions are presented in the proposed Conditions of Certification of this Staff Assessment.

FEDERAL

40 CFR 51, Nonattainment New Source Review. The FDOC includes conditions that would implement the federal nonattainment New Source Review (NSR) permit for MEP. Nonattainment NSR rules and regulations for PM2.5 are not yet in place at the local level. Because the applicable interim federal program of 40 CFR 51, Appendix S, applies to new sources of PM2.5 emitting greater than 100 tons per year, MEP is not subject to federal nonattainment NSR for PM2.5 (BAAQMD 2010c).

40 CFR 52.21, Prevention of Significant Deterioration (PSD). A PSD permit would not be required for the proposed MEP project because it would be neither a new major source nor a major modification to an existing major source.

If, in the future, the project owner changes the project, staff proposes Condition of Certification **AQ-SC6** to ensure that the owner promptly notifies the Energy Commission to incorporate changes in permit conditions, if any.

40 CFR 60, NSPS Subpart KKKK. The four CTGs proposed for MEP would be likely to comply with the applicable emission limits by achieving a NOx emission rate of 2.5 ppmvd over any one-hour period except during startup or shutdown. The NSPS Subpart KKKK requires reporting any excess emissions including startup and shutdown emissions, if they exceed a 4-hour rolling average limit of 25 ppm NOx, applicable only to simple cycle units; however, the post-combustion control systems for MEP would ensure that this limit would not be exceeded during any conditions.

40 CFR 60, NSPS Subpart IIII. The fire water pump engine proposed for MEP would comply with the applicable emission limits of this federal program because its emissions would be certified by ARB as Tier 3 compliant (MEP 2009a).

STATE

MEP has demonstrated that the project would comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury. Compliance with the FDOC (BAAQMD 2010c) and the Energy Commission staff's Conditions of Certification enable staff's affirmative finding.

LOCAL

The Final Determination of Compliance (BAAQMD 2010c) summarizes how the proposed MEP project would comply with BAAQMD requirements.

FACILITY CLOSURE

Eventually the MEP project will close, and all sources of air emissions will cease. Impacts associated with those emissions would also cease. The only other expected emissions would be construction/demolition emissions from dismantling activities. Staff recommends that a facility closure plan be submitted to the Energy Commission Compliance Project Manager to demonstrate compliance with all local, state and federal rules and regulations during both closure and demolition.

RESPONSE TO AGENCY COMMENTS

Staff received no comments on the Air Quality portion of the Staff Assessment for MEP from any public agency. The applicant provided comments dated November 24, 2010 (CH2M 2010x), and appropriate revisions are reflected throughout this revised Staff Assessment.

RESPONSES TO PUBLIC COMMENTS, DIGHE, INTERVENOR

Comment: Staff's Assessment and dispersion modeling should be based on meteorological data that is not from the Tracy Airport and that is more representative of the foothill location of the project (RD 2010g; Little, 12/9/10; Singh, 12/9/10).

> **Response:** The workshop presentation on November 29, 2010 misidentified the source of the meteorological data as Tracy Airport. All meteorological data used in the Staff Assessment is from a tower formerly located along Patterson Pass Road, about 0.5 miles south of the Mountain House Community Services District. Background concentrations of key pollutants, namely ozone and NO_2, are from an air quality monitoring site at Tracy Airport. The Patterson Pass tower provides appropriate and representative meteorological (weather) inputs for staff's modeling because of the similarity of the surrounding topography and land uses. Four years of individual hours make up the Patterson Pass data, and this is a robust set covering the range of conditions foreseeable for dispersion. A different set of meteorological data would not be necessary. The input wind directions and speeds are shown graphically by wind roses in the original AFC (AFC Appendix 5.1C, MEP 2009a). Modeling files were re-submitted by MEP to dockets on November 30 (CH2M 2009f; CH2M 2010aa). Additionally, MEP provided a detailed explanation of the representativeness of the Patterson Pass data in a December 7, 2010 filing at staff's request (CH2M 2010ad).

Comment: Staff's Assessment should consider the potential for high concentrations in the Mountain House Community Service District (Bhatt, 12/6/10; Roehl, 12/6/2010).

> **Response:** The dispersion modeling domain used in the Staff Assessment includes the entire Mountain House Community Services District, as well as the generally rural terrain of the remaining surroundings and the original Mountain House community. This vast modeling domain allows staff to identify the locations of highest concentrations due to MEP. Generally, the highest concentrations do not occur in the vicinity of Mountain House or in San Joaquin County. All peak impacts of MEP would occur in higher terrain that intercepts the airborne plumes, or at the immediate fenceline of MEP, within the first 100 to 200 meters. At all residences, schools, and other developed areas, concentrations due to the MEP would be lower than shown in **Air Quality Table 16** and **Table 17**.

Comment: Staff's Assessment should include the cumulative air quality effects of the Byron Power Company (Byron Co-gen).

> **Response:** This revised Staff Assessment includes the NO2 impacts due to the existing 5.5 MW Byron Co-gen (**Air Quality Table 21**). However, the maximum impacts tend to be dominated by sources at the proposed 1,100 MW EAEC.

RESPONSES TO PUBLIC COMMENTS, SARVEY, INTERVENOR

Comment: Staff's Assessment should limit the project's hourly PM2.5 emission rate to no more than 2.2 lb/hr to match the annual average limitation of the FDOC.

Response: This revised Staff Assessment incorporates the permit limits established by the BAAQMD in the FDOC, and staff requires additional mitigation in the form of offsets or emission reductions credits based on a worst-case hourly PM10/PM2.5 emission rate of 2.5 lb/hr (see **Air Quality Table 20** and **AQ-SC7**). This approach is over-protective because the lower annual average equivalent emission rate (2.2 lb/hr) is made enforceable through the BAAQMD conditions (**AQ-20**) while the level of staff mitigation is based on the potential of a worst-case hour occurring at the higher level (2.5 lb/hr). If staff were to lower its expectation of the worst-case hour to 2.2 lb/hr, then a lower level of mitigation would be specified in **AQ-SC7**. By requiring the higher level of offsets, staff's approach is conservatively protective.

Comment: Staff's condition **AQ-SC9** should be revised to limit the commissioning of the turbines to one at a time.

Response: Condition **AQ-SC9** includes the suggested revision.

Comment: Staff's Assessment relies on a mitigation agreement that is ill defined, and there is no way to quantify the emission reductions achieved through the agreement.

Response: The mitigation agreement specifies how emission reductions shall be achieved. The feature of the agreement is fully disclosed under the heading "**SJVAPCD Air Quality Mitigation Settlement Agreement**" and in the item approved by the SJVAPCD Governing Board on December 17, 2009 (Attachment DR8-2, CH2M 2010b). MEP would be required by condition **AQ-SC7** to report on the timing of the reductions and the use of the fee, and MEP must show that the reductions are likely to occur prior to operation. Cost effectiveness data in the Staff Assessment and in the agreement itself indicates a sufficient quantity of reductions is feasible.

Comment: Staff's Assessment determines that the project will violate the California and the new Federal 1-hour NO_2 ambient air quality standards.

Response: The Staff Assessment concluded that the MEP would neither cause new violations of the NO_2 standards nor contribute to existing violations of the NO_2 standards. Staff recommends Condition of Certification **AQ-SC10** to demonstrate that the emergency-use-only fire water pump engine does not cause or contribute to an NO_2 violation, as shown in **Air Quality Table 17** and **Table 21**.

Comment: Staff's Assessment should be revised to follow a method for weighting ERCs that was used in previous siting cases (Tesla and EAEC) because it relies on an incorrect interpretation of SJVAPCD rules and regulations.

Response: This Staff Assessment uses a distance ratio of 1.5-to-1 to figure the effectiveness of ERCs from distant sources. Credits from the neighboring BAAQMD are considered effective at a ratio of 1.5-to-1, meaning that ERC values are

multiplied by 1/1.5, or 0.67, so long as the emission reductions originate within 50 miles. This ratio is found in SJVAPCD Rule 2201 as adopted for the SJVAPCD New Source Review program, which is a key component of region-wide attainment planning, and it is found in the Air Quality Mitigation Settlement Agreement approved by the SJVAPCD Governing Board on December 17, 2009 for MEP (Attachment DR8-2, CH2M 2010b). Previous cases (namely Tesla and EAEC) used a factor ranging from 0.27 to 0.70 to estimate the effectiveness of ERCs from distant sources (p.119 of EAEC Final Commission Decision, August 2003, Docket 01-AFC-4), but those factors were not derived from SJVAPCD attainment planning efforts or adopted by SJVAPCD in any form. Staff's Assessment for MEP appropriately relies upon the factor of 0.67 because it is supported by current SJVAPCD rules and the agreement established specifically for MEP.

Comment: Staff's Assessment only mitigates a scenario of operating 1,400 hours per year.

Response: The MEP would be permitted to operate each CTG up to 4,225 hours annually (annual capacity factor of about 46 percent). However, MEP is designed as a peaking power plant, and it would only operate as needed. Additionally, when operating, it would be likely to emit at levels well below the maximum permitted emission levels considered in this Staff Assessment. CEQA requires public agencies to consider the reasonably foreseeable environmental effects of agency actions. Accordingly, Staff's Assessment for MEP examines the operating history of roughly 100 similar existing peaking power plant units in California to find that MEP's reasonably foreseeable annual capacity factor would be less than 16 precent corresponding or 1,400 hours annually. Staff then recommends mitigation based on this operating scenario (as in **Air Quality Table 20** and **AQ-SC7**).

Comment: Staff's Assessment fails to quantify or provide mitigation for ammonia emissions.

Response: This revised Staff Assessment includes text to clarify that the ammonia emissions would be mitigated by the applicant's proposal to achieve 5 ppmvd (see **AQ-17**).

Comment: Staff's Assessment should consider a variation on the inlet air chilling system that uses an ammonia-based heat recovery system to provide inlet air conditioning.

Response: The Staff Assessment considers the project's air quality impacts with the proposed CTGs, which would include inlet air chillers to improve power output, and the Staff Assessment identifies no potential air quality impact associated with the chillers as they were proposed by MEP. With no potentially significant impact, no additional analysis would be necessary. Note that MEP characterizes the ammonia-based heat recovery system as being undemonstrated in practice (CH2M 2010w).

RESPONSES TO OTHER PUBLIC COMMENTS

Comment: Staff's Assessment should identify the effects of MEP air pollution at the closest residence (Little, 12/9/10).

> **Response:** The Revised Staff Assessment (RSA) text describes the impact caused by MEP following the RSA tables showing the maximum changes in pollutant concentrations due to the project (**Air Quality Table 16** and **Table 17**). For all residential locations, the impacts would be lower than the maximum concentrations shown in the tables.

Comment: Staff's Assessment should take into account frequent inversion layers and how pollution may be trapped (Rubin, 12/6/2010).

> **Response:** The Staff Assessment includes the separate discussion of fumigation conditions (see **Fumigation Impacts**), which occur when a thermal inversion breaks up and draws elevated emission plumes to the ground. Thermal inversions are also considered in the assessment of MEP's construction and routine operations (**Air Quality Table 16**, **Table 17** and **Table 21**) because inversions force stable and calm conditions near the ground surface, and these stable and calm conditions are accounted for in the Patterson Pass meteorological data used for dispersion modeling.

Comment: The BAAQMD ignores pilots and aircraft passengers as sensitive receptors (A.Wilson, 12/9/10).

> **Response:** Ambient air quality standards that are protective of public health apply to all ground level locations, with averaging times of 1-hour or greater. Pilots and aircraft occupants are not exposed to ground level concentrations nor are they likely to be exposed to concentrations at any static airborne location for a period exceeding one hour. The project's contributions to existing violations of the standards experienced in the airspace occupied by pilots and aircraft would be mitigated by project mitigation, which would offset the overall air pollution burden.

CONCLUSIONS

- Construction impacts would contribute to violations of the ozone, PM10, and PM2.5 ambient air quality standards. Staff recommends Conditions of Certification **AQ-SC1** to **AQ-SC5** to mitigate the project construction-phase impacts to a less than significant level.
- Operation of the project would comply with applicable BAAQMD rules and regulations, including New Source Review, Best Available Control Technology (BACT) requirements, and requirements to offset emission increases.
- This Staff Assessment reflects the BAAQMD Preliminary Determination of Compliance conditions, from August 2010. These conditions may be modified further when the Final Determination of Compliance is released, expected in November 2010.

- The project would neither cause new violations of any NO_2, CO, or SO_2 ambient air quality standards nor contribute to existing violations for these pollutants. Therefore, the project's direct NO_2, CO, and SO_2 impacts are less than significant.
- The project NOx and VOC emissions would contribute to existing violations of state and federal ozone ambient air quality standards. The ozone precursor offsets required by BAAQMD and shown in Condition of Certification **AQ-SC7** would mitigate the foreseeable ozone impact to a less than significant level.
- The project PM10 and PM2.5 emissions and the PM10/PM2.5 precursor emissions of SOx would contribute to the existing violations of state PM10 and state and federal PM2.5 ambient air quality standards. The local emission reductions resulting from the SJVAPCD Air Quality Mitigation Settlement would mitigate the foreseeable PM10/PM2.5 impacts to a less than significant level. Staff recommends Condition of Certification **AQ-SC7** to ensure that, in conjunction with the offsets required by BAAQMD, sufficient quantities of local SJVAPCD emission reductions would occur to satisfy Energy Commission staff's longstanding position that all nonattainment pollutant and precursor emissions be offset at least one-to-one.
- Staff recommends Condition of Certification **AQ-SC9** to ensure that the applicant would not conduct initial commissioning on any of the CTGs simultaneously.
- Staff recommends Condition of Certification **AQ-SC10** to ensure that the fire pump engine is limited to no more than 30 minutes per test, that testing occurs only during certain hours when background concentrations are known to be low (between 8 a.m. and 11 a.m.), and so that engine testing does not occur simultaneously with commissioning.
- Global climate change and greenhouse gas (GHG) emissions from the project are discussed and analyzed in **AIR QUALITY APPENDIX AIR-1**. The MEP would exceed the Emission Performance Standard established by SB 1368 for base load generation. However, as a simple-cycle power plant, MEP is not designed or intended for base load generation and is therefore not subject to the Emission Performance Standard. The project would be subject to GHG reporting requirements for eventual implementation of GHG reduction or cap-and-trade regulations under development by the ARB.

PROPOSED CONDITIONS OF CERTIFICATION

STAFF-RECOMMENDED CONDITIONS OF CERTIFICATION

Staff proposes the following conditions of certification (identified as the **AQ-SCx** series of conditions) to provide CEQA mitigation for the project.

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with conditions **AQ-SC3, AQ-SC4** and **AQ-SC5** for the entire project site and linear facility construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM delegates. The AQCMM and AQCMM delegates shall have full access to all areas of construction on the project site and linear facilities, and shall have the

authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM delegates may have other responsibilities in addition to those described in this condition. The AQCMM shall not be terminated without written consent of the compliance project manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the CPM for approval the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM delegates. The AQCMM and all delegates must be approved by the CPM before the start of ground disturbance.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide, for approval, an AQCMP that details the steps to be taken and the reporting requirements necessary to ensure compliance with conditions of certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5**.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each monthly compliance report (MCR) that demonstrates compliance with the following mitigation measures for purposes of preventing all fugitive dust plumes from leaving the project site and linear facility routes. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

a. All unpaved roads and disturbed areas in the project and linear construction sites shall be watered as frequently as necessary to comply with the dust mitigation objectives of **AQ-SC4**. The frequency of watering may be either reduced or eliminated during periods of precipitation.

b. No vehicle shall exceed 15 miles per hour within the construction site.

c. The construction site entrances shall be posted with visible speed limit signs.

d. All construction equipment vehicle tires shall be inspected and washed as necessary to be free of dirt prior to entering paved roadways.

e. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

f. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

g. All construction vehicles shall enter the construction site through the treated entrance roadways unless an alternative route has been submitted to and approved by the CPM.

h. Construction areas adjacent to any paved roadway shall be provided with sandbags or other measures as specified in the Storm Water Pollution

Prevention Plan (SWPPP) to prevent run-off to roadways.

i. All paved roads within the construction site shall be swept at least twice daily (or less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

j. At least the first 500 feet of any public roadway exiting from the construction site shall be swept as needed on days when construction activity occurs or on any other day when dirt or run-off from the construction site is visible on the public roadways.

k. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered or treated with appropriate dust suppressant compounds.

l. All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and loaded onto the trucks to provide at least two feet of freeboard.

m. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

Verification: The project owner shall include in the MCR: (1) a summary of all actions taken to maintain compliance with this condition; (2) copies of any complaints filed with the air district in relation to project construction; and (3) any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion, as approved by the CPM.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes with the potential to be transported off the project site, 200 feet beyond the centerline of the construction of linear facilities, or within 100 feet upwind of any regularly occupied structures not owned by the project owner indicate that existing mitigation measures are not providing effective mitigation. The AQCMM or delegate shall then implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed.

Step 1: Within 15 minutes of making such a determination, the AQCMM or delegate shall direct more intensive application of the existing mitigation methods.

Step 2: If Step 1 specified above fails to result in adequate mitigation within 30 minutes of the original determination, the AQCMM or delegate shall direct implementation of additional methods of dust suppression.

Step 3: If Step 2 specified above fails to result in effective mitigation within one hour of the original determination, the AQCMM or delegate shall direct a temporary shutdown of the activity causing the emissions. The activity shall not restart until the AQCMM or delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The project owner may appeal to the CPM any directive from the AQCMM or delegate to shut down an activity, provided that the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

Verification: The AQCMP shall include a section detailing how additional mitigation measures will be accomplished within the specified time limits.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the MCR, a construction mitigation report that demonstrates compliance with the following mitigation measures for purposes of controlling diesel construction-related emissions. Any deviation from the following mitigation measures shall require prior CPM notification and approval.

a. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags, issued by the on-site AQCMM, showing that the engine meets the conditions set forth herein.

b. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless certified by the on-site AQCMM that such engine is not available for a particular item of equipment. This good faith effort shall be documented with signed written correspondence by the appropriate construction contractors, along with documented correspondence with at least two construction equipment rental firms. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier 2 engine or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels, unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is “not practical” for the following, as well as other, reasons:

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and either a Tier 1 engine or the highest level of available control is being used; or

2. The construction equipment is intended to be on site for five days or less.

3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and

that compliance is not possible.

4. Equipment owned by specialty subcontractors may be granted an exemption, for single equipment items on a case-by-case basis, if it can be demonstrated that extreme financial hardship would occur if the specialty subcontractor had to rent replacement equipment, or if it can be demonstrated that a specialized equipment item is not available by rental.

c. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and the AQCMM demonstrates that one of the following conditions exists:

1. The use of the control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.
2. The control device is causing or is reasonably expected to cause significant engine damage.
3. The control device is causing or is reasonably expected to cause a significant risk to workers or the public.
4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

d. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (b) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

e. All diesel heavy construction equipment shall not idle for more than five minutes, to the extent practical.

f. Construction equipment will employ electric motors when feasible.

Verification: The project owner shall include in the MCR: (1) a summary of all actions taken to maintain compliance with this condition; (2) a list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that the equipment has been properly maintained; and (3) any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion, as approved by the CPM.

AQ-SC6 The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. EPA, and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any proposed air permit modification to the CPM within five working days of either: 1) submittal by the project owner to an

agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC7 The project owner shall provide emission reductions in the form of offsets or emission reduction credits (ERCs) in the quantities of at least 22.72 tons per year (tpy) NOx, 2.51 tpy VOC, 8.13 tpy PM10, and 1.10 tpy SOx emissions.

The project owner shall surrender the NOx and/or VOC ERCs from among Bay Area Air Quality Management District Certificate Numbers 1182 and/or 1184, or an alternate certificate, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit an identification of the additional ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions to the listed credits.

The project owner shall demonstrate that a sufficient quantity of local emission reductions of PM10 and/or SOx occur by providing a report that identifies the feasible timing of the reductions and the ultimate use and cost-effectiveness of the $644,503 fee in the Air Quality Mitigation Settlement Agreement executed by the San Joaquin Valley Air Pollution Control District Governing Board, December 17, 2009 (Attachment DR8-2 of CH2M 2010b). If insufficient emission reductions would result from the use of the fee, then the project owner shall expand the scope of the Settlement Agreement and fee or surrender sufficient PM10 and/or SOx ERCs from the northern region of the San Joaquin Valley Air Pollution Control District in the amount corresponding with the shortfall.

The CPM, in consultation with the District, may approve any such change to the ERC list provided that the project remains in compliance with all applicable laws, ordinances, regulations, and standards, and that the requested change(s) will not cause the project to result in a significant environmental impact. The District must also confirm that each requested change is consistent with applicable federal and state laws and regulations.

Verification: The project owner shall submit to the CPM records showing that the project's BAAQMD offset requirements have been met prior to initiating construction and that the local emission reductions achieved by using the SJVAPCD fee are likely to occur prior to initiating operation. If the CPM approves a substitution or modification to the list of ERCs, the CPM shall file a statement of the approval with the project owner and the Energy Commission docket. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 The project owner shall submit to the CPM quarterly operation reports that include operational and emissions information as necessary to demonstrate compliance with the conditions of certification. The quarterly operation report shall specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit quarterly operation reports to the CPM and APCO no later than 30 days following the end of each calendar quarter. This information shall be maintained on site for a minimum of five years and shall be provided to the CPM and District personnel upon request.

AQ-SC9 The facility shall be operated such that simultaneous commissioning of the combustion turbines will not occur without abatement of nitrogen oxide and CO emissions by its SCR system and oxidation catalyst system. Operation of a combustion turbine during commissioning without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or Oxidation Catalyst Systems fully operational.

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period demonstrating compliance with this condition.

AQ-SC10 The diesel fire water pump engine (proposed rating: 220 horsepower) shall be certified as meeting ARB Tier 3 or better standards. Scheduled testing of the fire pump engine shall not occur during operation of any combustion turbine in commissioning mode. Any planned test of the fire pump engine shall last no more than 30 minutes and shall be completed only between 8 a.m. and 11 a.m. standard time.

Verification: The project owner shall submit a monthly compliance report to the CPM during the commissioning period, and subsequent quarterly operation reports (**AQ-SC8**), demonstrating compliance with this condition.

BAAQMD PROPOSED PERMIT CONDITIONS

The following conditions would be applicable to the combustion equipment and the abatement devices that are subject to permitting requirements (BAAQMD 2010c). This Staff Assessment reflects the BAAQMD Final Determination of Compliance conditions, from November 2010.

Conditions **AQ-1** through **AQ-10** shall only apply during the commissioning period. Unless otherwise indicated, **AQ-11** through **AQ-38** shall apply after the commissioning period has ended. Conditions **AQ-39** through **AQ-43** shall apply to the diesel fire pump engine.

Conditions for the Commissioning Period for GE LM 6000 PC Sprint Gas Turbines

AQ-1 The project owner of the MEP shall minimize emissions of carbon monoxide and nitrogen oxides from S-1, S-2, S-3 and S-4 Gas Turbines to the maximum extent possible during the commissioning period. (Basis: BACT, Regulation 2, Rule 2, Section 409)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-2 At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the project owner shall tune the S-1, S-2, S-3 and S-4 Gas Turbines combustors to minimize the emissions of carbon monoxide and nitrogen oxides. (Basis: BACT, Regulation 2, Rule 2, Section 409)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-3 At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the project owner shall install, adjust, and operate the A-1, A-3, A-5 and A-7 Oxidation Catalysts and A-2, A-4, A-6 and A-8 SCR Systems to minimize the emissions of carbon monoxide and nitrogen oxides from S-1, S-2, S-3, and S-4 Gas Turbines. (Basis: BACT, Regulation 2, Rule 2, Section 409)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-4 The project owner of the MEP shall submit a plan to the District Engineering Division and the CEC CPM at least four weeks prior to first firing of S-1, S-2, S-3, and S-4 Gas Turbines describing the procedures to be followed during the commissioning of the gas turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the initial tuning of the combustors, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1, S-2, S-3 & S-4) without abatement by their respective oxidation catalysts and/or SCR Systems. The project owner shall not fire any of the Gas Turbines (S-1, S-2, S-3 or S-4) sooner than 28 days after the District receives the commissioning plan. (Basis: Regulation 2, Rule 2, Section 419)

Verification: The project owner shall submit a commissioning plan to the CPM and APCO for approval at least four weeks prior to first firing of the gas turbine describing the procedures to be followed during the commissioning period and the anticipated duration of each commissioning activity.

AQ-5 During the commissioning period, the project owner of the MEP shall demonstrate compliance with **AQ-7**, **AQ-8**, **AQ-9**, and **AQ-10** through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters and emission concentrations:

- firing hours
- fuel flow rates
- stack gas nitrogen oxide emission concentrations,
- stack gas carbon monoxide emission concentrations
- stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the Gas Turbines (S-1, S-2, S-3, and S-4). The project owner

shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. The project owner shall retain records on site for at least 5 years from the date of entry and make such records available to District personnel upon request. (Basis: Regulation 2, Rule 2, Section 419)

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-4**.

AQ-6 The project owner shall install, calibrate, and operate the District-approved continuous monitors specified in **AQ-5** prior to first firing of the Gas Turbines (S-1, S-2, S-3 and S-4). After first firing of the turbines, the project owner shall adjust the detection range of these continuous emission monitors as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The instruments shall operate at all times of operation of S-1, S-2, S-3, and S-4 including start-up, shutdown, upset, and malfunction, except as allowed by BAAQMD Regulation 1-522, BAAQMD Manual of Procedures, Volume V. If necessary to comply with this requirement, the project owner shall install dual-span monitors. The type, specifications, and location of these monitors shall be subject to District review and approval. (Basis: Regulation 2, Rule 2, Section 419)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request.

AQ-7 The project owner shall not fire S-1, S-2, S-3, or S-4 Gas Turbine without abatement of nitrogen oxide emissions by the corresponding SCR System A-2, A-4, A-6, or A-8 and/or abatement of carbon monoxide emissions by the corresponding Oxidation Catalyst A-1, A-3, A-5, or A-7 for more than 200 hours each during the commissioning period. Such operation of any Gas Turbine (S-1, S-2, S-3, S-4) without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system and/or oxidation catalyst in place. Upon completion of these activities, the project owner shall provide written notice to the District Engineering and Enforcement Divisions and the unused balance of the 200 firing hours for each turbine without abatement shall expire. (Basis: BACT, Regulation 2, Rule 2, Section 409)

Verification: The project owner shall submit to the CPM and APCO for approval the commissioning plan as required in **AQ-4**. A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-8 The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM_{10}, and sulfur dioxide that are emitted by the Gas Turbines (S-1, S-2, S-3, and S-4) during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in **AQ-20**. (Basis: Regulation 2, Rule 2, Section 409)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-9 The owner/ operator shall not operate the Gas Turbines (S-1, S-2, S-3, and S-4) in a manner such that the combined pollutant emissions from the gas turbines will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1, S-2, S-3, S-4). In addition, commissioning activities will be conducted on no more than one turbine/day. (Basis: BACT, Regulation 2, Rule 2, Section 409)

NO_x (as NO_2):	16.3 tons per year
CO:	8.7 tons per year
POC (as CH_4):	1.0 ton per year
PM_{10}:	1.0 ton per year
SO_2:	0.54 ton per year

Verification: The above limits for NOx and CO both apply. A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-9a The owner/ operator shall not operate the Gas Turbines (S-1, S-2, S-3, and S-4) in a manner such that the pollutant emissions from each gas turbine will exceed the following limits during the commissioning period. These emission limits shall include emissions resulting from the start-up and shutdown of the Gas Turbines (S-1, S-2, S-3, S-4). In addition, commissioning activities will be conducted on no more than one turbine/day. (Basis: BACT, Regulation 2, Rule 2, Section 409)

NO_x (as NO_2):	408 pounds per calendar day
	51 pounds per hour
CO:	360 pounds per calendar day
	45 pounds per hour
POC (as CH_4):	36 pounds per calendar day
PM_{10}:	20 pounds per calendar day
SO_2:	10.8 pounds per calendar day

Verification: The above limits for NOx and CO both apply. A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-10 Within 90 days after startup of each turbine, the Project owner shall conduct District and CEC approved source tests on that turbine to determine compliance with the emission limitations specified in **AQ-17**. The source tests shall determine NO_x, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Thirty working days before the execution of the source tests, the Project owner shall submit to the District and the CEC Compliance Program Manager (CPM) a

detailed source test plan designed to satisfy the requirements of this Part. The District and the CEC CPM will notify the Project owner of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Project owner shall incorporate the District and CEC CPM comments into the test plan. The Project owner shall notify the District and the CEC CPM within seven (7) working days prior to the planned source testing date. The project owner shall submit the source test results to the District and the CEC CPM within 60 days of the source testing date. (Basis: Regulation 2, Rule 2, Section 419)

Verification: The project owner shall submit a source test plan to the CPM and APCO for approval as part of the commissioning plan required in **AQ-4**.

Conditions for the GE LM 6000 PC Sprint Simple-Cycle Gas Turbines (S-1, S-2, S-3, and S-4)

AQ-11 The project owner shall fire the Gas Turbines (S-1, S-2, S-3, and S-4) exclusively on PUC-regulated natural gas with a maximum sulfur content of 1 grain per 100 standard cubic feet. To demonstrate compliance with this limit, the operator of S-1, S-2, S-3 and S-4 shall sample and analyze the gas from each supply source at least monthly to determine the sulfur content of the gas. PG&E monthly sulfur data may be used provided that such data can be demonstrated to be representative of the gas delivered to the MEP. (Basis: BACT for SO2 and PM10)

Verification: The result of the natural gas fuel sulfur monitoring data and other fuel sulfur content source data shall be submitted to the District and CPM in the quarterly operation report (**AQ-SC8**).

AQ-12 The project owner shall not operate the units such that the heat input rate to each Gas Turbine (S-1, S-2, S-3, and S-4) exceeds 481 MMBtu (HHV) per hour. (Basis: 2-2-409)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-13 The project owner shall not operate the units such that the heat input rate to each Gas Turbine (S-1, S-2, S-3, and S-4) exceeds 11,544 MMBtu (HHV) per day. (Basis: 2-2-409, Cumulative Increase for PM_{10})

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-14 The project owner shall not operate the units such that the combined cumulative heat input rate for the Gas Turbines (S-1, S-2, S-3, and S-4) exceeds 8,128,900 MMBtu (HHV) per year. (Basis: 2-2-409, Offsets)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-15a The owner operator shall not operate any turbine S-1, S-2, S-3, or S-4 such that the hours of operation for any of the four units exceeds 5,200 hours per year (Basis: 2-2-409)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-15b The owner operator shall not operate the turbines S-1, S-2, S-3, or S-4 such that the hours of operation for the four units combined exceeds 16,900 hours per year. (Basis: Offsets, Cumulative Increase)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-16 The project owner shall ensure that each Gas Turbine (S-1, S-2, S-3, S-4) is abated by the properly operated and properly maintained Selective Catalytic Reduction (SCR) System A-2, A-4, A-6, or A-8 and Oxidation Catalyst System A-1, A-3, A-5, or A-7 whenever fuel is combusted at those sources and the corresponding SCR catalyst bed (A-2, A-4, A-6 or A-8) has reached minimum operating temperature. (Basis: BACT for NO_x, POC and CO)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB, and the Commission upon request. A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-17 The project owner shall ensure that the Gas Turbines (S-1, S-2, S-3, S-4) comply with requirements (a) through (i). Requirements (a) through (f) do not apply during a gas turbine start-up, and shutdown. (Basis: BACT and Regulation 2, Rule 5)

a) Nitrogen oxide mass emissions (calculated as NO_2) at each exhaust point P-1, P-2, P-3, and P-4 (exhaust point for S-1, S-2, S-3 and S-4 Gas Turbine after abatement by A-2, A-4, A-6 and A-8 SCR System) shall not exceed 4.4 pounds per hour. (Basis: BACT for NO_x).

b) The nitrogen oxide emission concentration at each exhaust point P-1, P-2, P-3 and P-4 shall not exceed 2.5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any 1-hour period. (Basis: BACT for NO_x)

c) Carbon monoxide mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.14 pounds per hour. (Basis: BACT for CO)

d) The carbon monoxide emission concentration at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 2.0 ppmv, on a dry basis, corrected to 15% O_2 averaged over any rolling 3-hour period. (Basis: BACT for CO)

e) Ammonia (NH_3) emission concentrations at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 5 ppmv, on a dry basis, corrected to 15% O_2, averaged over any rolling 3-hour period. This ammonia emission concentration shall be verified by the continuous recording of the ammonia

injection rate to each SCR System A-2, A-4, A-6, and A-8. The correlation between the gas turbine heat input rates, A-2, A-4, A-6, and A-8 SCR System ammonia injection rates, and corresponding ammonia emission concentration at emission points P-1, P-2, P-3 and P-4 shall be determined in accordance with **AQ-25** or a District approved alternative method. (Basis: Regulation 2, Rule 5)

f) Precursor organic compound (POC) mass emissions (as CH_4) at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 0.612 pounds per hour. (Basis: BACT for POC)

g) Sulfur dioxide (SO_2) mass emissions at each exhaust point P-1, P-2, P-3, and P-4 shall not exceed 1.347 pounds per hour. (Basis: BACT for SO_2)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-18 The project owner shall ensure that the regulated air pollutant mass emission rates from each of the Gas Turbines (S-1, S-2, S-3, and S-4) during a start-up or shutdown does not exceed the limits established below. Startups shall not exceed 30 minutes. Shutdowns shall not exceed 15 minutes. (Basis: BACT Limit for startup and shutdown operation)

TABLE 40. STARTUP AND SHUTDOWN			
Pollutant	Maximum Emissions Per Startup (lb/startup)	**Maximum Emissions During Hour with Startup and/or Shutdown(lb/hr)**	**Maximum Emissions Per Shutdown (lb/shutdown)**
NOx (as NO2)	14.2	18.5	3.2
CO	14.1	17.3	2.7
POC (as CH4)	1.1	1.4	0.12

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-19 The project owner shall not allow total combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, and shutdowns to exceed the following limits during any calendar day:

(a) 1100 pounds of NO_x (as NO_2) per day (Basis: Cumulative Increase)

(b) 934 pounds of CO per day (Basis: Cumulative Increase)

(c) 95 pounds of POC (as CH_4) per day (Basis: Cumulative Increase)

(d) 130 pounds of SO_2 per day (Basis: Cumulative Increase)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-20 The project owner shall not allow cumulative combined emissions from the Gas Turbines (S-1, S-2, S-3, and S-4), including emissions generated during gas turbine start-ups, shutdowns, and malfunctions to exceed the following limits during any consecutive twelve-month period:

(a) 45.6 tons of NO_x (as NO_2) per year (Basis: Offsets)

(b) 27.2 tons of CO per year (Basis: Cumulative Increase)

(c) 5.6 tons of POC (as CH_4) per year (Basis: Cumulative Increase)

(d) 18.6 tons of PM_{10} per year (Basis: Cumulative Increase)

(e) 2.9 tons of SO_2 per year (Basis: Cumulative Increase)

Emissions of PM_{10} from each gas turbine shall be calculated by multiplying turbine fuel usage times an emission factor determined by source testing of the turbine conducted in accordance with Part 26. The emission factor for each turbine shall be based on the average of the emissions rates observed during the 4 most recent source tests on that turbine (or, prior to the completion of 4 source tests on a turbine, on the average of the emission rates observed during all source tests on the turbine).

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-21 The project owner shall not allow the maximum projected annual toxic air contaminant emissions (per **AQ-24**) from the Gas Turbines (S-1, S-2, S-3, S-4) combined to exceed the following limits:

formaldehyde	3725.26 pounds per year
benzene	107.94 pounds per year
Specified polycyclic aromatic hydrocarbons (PAHs)	1.063 pounds per year

unless the following requirement is satisfied:

The project owner shall perform a health risk assessment to determine the total facility risk using the emission rates determined by source testing and the most current Bay Area Air Quality Management District approved procedures and unit risk factors in effect at the time of the analysis. The project owner shall submit the risk analysis to the District and the CEC CPM within 60 days of the source test date. The project owner may request that the District and the CEC CPM revise the carcinogenic compound emission limits specified above. If the project owner demonstrates to the satisfaction of the APCO that these revised emission limits will not result in a significant cancer risk, the District and the CEC CPM may, at their discretion, adjust the carcinogenic compound emission limits listed above. (Basis: Regulation 2, Rule 5)

Verification: Source test results obtained through compliance with **AQ-24** and **AQ-28** shall confirm the toxic air contaminant emission rates or the project owner shall submit an updated health risk assessment.

AQ-22 The project owner shall demonstrate compliance with **AQ-12** through **AQ-15**, **AQ-17**(a) through **AQ-17**(e), **AQ-18** (NO_x, and CO limits), **AQ-19**(a), **AQ-19**(b), **AQ-20**(a) and **AQ-20**(b) by using properly operated and maintained continuous monitors (during all hours of operation including gas turbine start-up, and shutdown periods). The project owner shall monitor for all of the following parameters:

(a) Firing Hours and Fuel Flow Rates for each of the following sources: S-1, S-2, S-3, and S-4

(b) Oxygen (O_2) concentration, Nitrogen Oxides (NO_x) concentration, and carbon monoxide (CO) concentration at exhaust points P-1, P-2, P-3, and P-4.

(c) Ammonia injection rate at A-2, A-4, A-6 and A-8 SCR Systems

The project owner shall record all of the above parameters at least every 15 minutes (excluding normal calibration periods) and shall summarize all of the above parameters for each clock hour. For each calendar day, the project owner shall calculate and record the total firing hours, the average hourly fuel flow rates, and pollutant emission concentrations.

The project owner shall use the parameters measured above and District-approved calculation methods to calculate the following parameters:

(d) Heat Input Rate for each of the following sources: S-1, S-2, S-3, and S-4

(e) Corrected NO_x concentration, NO_x mass emission rate (as NO_2), corrected CO concentration, and CO mass emission rate at each of the following exhaust points: P-1, P-2, P-3 and P-4.

For each source and exhaust point, the project owner shall record the parameters specified in **AQ-22**(d) and **AQ-22**(e) at least once every 15 minutes (excluding normal calibration periods). As specified below, the project owner shall calculate and record the following data:

(f) total Heat Input Rate for every clock hour and the average hourly Heat Input Rate for every rolling 3-hour period.

(g) on an hourly basis, the cumulative total Heat Input Rate for each calendar day for the following: each Gas Turbine and for S-1, S-2, S-3, and S-4 combined.

(h) the average NO_x mass emission rate (as NO_2), CO mass emission rate, and corrected NO_x and CO emission concentrations for every clock hour.

(i) on an hourly basis, the cumulative total NO_x mass emissions (as NO_2) and the cumulative total CO mass emissions, for each calendar day for the following: each Gas Turbine and for S-1, S-2, S-3 and S-4 combined.

(j) For each calendar day, the average hourly Heat Input Rates, corrected NO_x emission concentration, NO_x mass emission rate (as NO_2), corrected CO emission concentration, and CO mass emission rate for each Gas Turbine.

(k) on a monthly basis, the cumulative total NO_x mass emissions (as NO_2) and cumulative total CO mass emissions, for the previous consecutive twelve-month period for sources S-1, S-2, S-3, and S-4 combined. (Basis: 1-520.1, 9-9-501, BACT, Offsets, NSPS, Cumulative Increase)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission to verify the continuous monitoring and recordkeeping system is properly installed and operational.

AQ-23 To demonstrate compliance with **AQ-17**(f), **AQ-17**(g), **AQ-19**(c), **AQ-19**(d), **AQ-20**(c), **AQ-20**(d), **AQ-20**(e), the project owner shall calculate and record on a daily basis, the precursor organic compound (POC) mass emissions, fine particulate matter (PM_{10}) mass emissions (including condensable particulate matter), and sulfur dioxide (SO_2) mass emissions from each power train. The project owner shall use the actual heat input rates measured pursuant to **AQ-22**, actual Gas Turbine start-up times, actual Gas Turbine shutdown times, and CEC and District-approved emission factors developed pursuant to source testing under **AQ-26** to calculate these emissions. The project owner shall present the calculated emissions in the following format:

(a) For each calendar day, POC, PM_{10}, and SO_2 emissions, summarized for each power train (Gas Turbine) and S-1, S-2, S-3, and S-4 combined

(b) on a monthly basis, the cumulative total POC, PM_{10}, and SO_2 mass emissions, for each year for S-1, S-2, S-3, and S-4 combined. (Basis: Offsets, Cumulative Increase)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission to verify the calculation and recordkeeping system is properly installed and operational.

AQ-24 To demonstrate compliance with **AQ-21**, the project owner shall calculate and record on an annual basis the maximum projected annual emissions of: Formaldehyde, Benzene, and Specified PAHs. The project owner shall calculate the maximum projected annual emissions using the maximum annual heat input rate of 8,128,900 MMBtu/year for S-1, S-2, S-3, and S-4 combined and the highest emission factor (pounds of pollutant per MMBtu of heat input) determined by the most recent of any source test of the S-1, S-2, S-3, or S-4 Gas Turbines. If the highest emission factor for a given pollutant occurs during minimum-load turbine operation, a reduced annual heat input rate may be utilized to calculate the maximum projected annual emissions to reflect the reduced heat input rates during gas turbine start-up and minimum-load operation. The reduced annual heat input rate shall be subject to District review and approval. (Basis: Regulation 2, Rule 5)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission to verify the calculation and recordkeeping system is properly installed and operational.

AQ-25 Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint units, the project owner shall conduct a District-approved source test on exhaust point P-1, P-2, P-3, or P-4 to determine the corrected ammonia (NH_3)

emission concentration to determine compliance with **AQ-17**(e). The source test shall determine the correlation between the heat input rates of the gas turbine, A-2, A-4, A-6, or A-8 SCR System ammonia injection rate, and the corresponding NH_3 emission concentration at emission point P-1, P-2, P-3, or P-4. The source test shall be conducted over the expected operating range of the turbine (including, but not limited to, minimum and full load modes) to establish the range of ammonia injection rates necessary to achieve NO_x emission reductions while maintaining ammonia slip levels. The project owner shall repeat the source testing on an annual basis thereafter. Ongoing compliance with **AQ-17**(e) shall be demonstrated through calculations of corrected ammonia concentrations based upon the source test correlation and continuous records of ammonia injection rate. The project owner shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (Basis: Regulation 2, Rule 5)

Verification: The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-27**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-26 Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint units and on an annual basis thereafter, the project owner shall conduct a District-approved source test on exhaust points P-1, P-2, P-3 and P-4 while each Gas Turbine is operating at maximum load to determine compliance with **AQ-17**(a), **AQ-17**(b), **AQ-17**(c), **AQ-17**(d), **AQ-17**(f), **AQ-17**(g), and to determine a total particulate matter including condensable particulate matter emission factor, and while each Gas Turbine is operating at minimum load to determine compliance with **AQ-17**(c), and **AQ-17**(d) and to verify the accuracy of the continuous emission monitors required in **AQ-22**. The project owner shall test for (as a minimum): water content, stack gas flow rate, oxygen concentration, precursor organic compound concentration and mass emissions, nitrogen oxide concentration and mass emissions (as NO_2), carbon monoxide concentration and mass emissions, sulfur dioxide concentration and mass emissions, methane, ethane, and total particulate matter emissions including condensable particulate matter. The project owner shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. The project owner may conduct up to four tests per year for total particulate matter including condensable particulate matter. (Basis: BACT, Offsets)

Verification: The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-27**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-27 The project owner shall obtain approval for all source test procedures from the District's Source Test Section and the CEC CPM prior to conducting any tests. The project owner shall comply with all applicable testing requirements for continuous emission monitors as specified in Volume V of the District's Manual of Procedures. The project owner shall notify the District's Source

Test Section and the CEC CPM in writing of the source test protocols and projected test dates at least 7 days prior to the testing date(s). As indicated above, the Project owner shall measure the contribution of condensable PM (back half) to any measurement of the total particulate matter or PM_{10} emissions. However, the Project owner may propose alternative measuring techniques to measure condensable PM such as the use of a dilution tunnel or other appropriate method used to capture semi-volatile organic compounds. The project owner shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (Basis: BACT, Regulation 2, Rule 2, Section 419)

Verification: The project owner shall submit the proposed source test plan or protocol for the source tests seven days prior to the proposed source test date to both the District and CPM for approval. The project owner shall notify the District and CPM no later than seven days prior to the proposed source test date and time. The project owner shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests.

AQ-28 Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint gas turbines and on a biennial basis (once every two years) thereafter, the project owner shall conduct a District-approved source test on one of the following exhaust points P-1, P-2, P-3 or P-4 while the Gas Turbine is operating at maximum allowable operating rates to demonstrate compliance with **AQ-21**. The project owner shall also test the gas turbine while it is operating at minimum load. If three consecutive biennial source tests demonstrate that the annual emission rates calculated pursuant to **AQ-24** for any of the compounds listed below are less than the BAAQMD trigger levels, pursuant to Regulation 2, Rule 5, shown, then the project owner may discontinue future testing for that pollutant:

Benzene	≤ 3.8 pounds/year and 2.9 pounds/hour
Formaldehyde	< 18 pounds/year and 0.12 pounds/hour
Specified PAHs	≤ 0.0069 pounds/year

(Basis: Regulation 2, Rule 5)

Verification: The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-27**). Testing for toxic air contaminant emissions shall be conducted upon initial operation and at least once every 24 months.

AQ-29 The project owner shall calculate the sulfuric acid mist (SAM) emission rate using the total heat input for the sources and the highest results of any source testing conducted pursuant to **AQ-30**. If this SAM mass emission limit of **AQ-31** is exceeded, the project owner must utilize air dispersion modeling to determine the impact (in micrograms/cubic meter) of the sulfuric acid mist emissions pursuant to Regulation 2, Rule 2, Section 306. (Basis: Regulation 2, Rule 2, Section 306)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission to verify the calculation and

recordkeeping system is properly installed and operational. The quarterly operation report (**AQ-SC8**) shall include a determination of the impact if triggered by this condition.

AQ-30 Within 90 days of start-up of each of the MEP GE LM-6000 PC Sprint gas turbines and on an annual basis thereafter, the project owner shall conduct a District-approved source test on two of the four exhaust points P-1, P-2, P-3 and P-4 while each gas turbine is operating at maximum heat input rates to demonstrate compliance with the SAM emission rates specified in **AQ-31**. The project owner shall test for (as a minimum) SO_2, SO_3, and H_2SO_4. The project owner shall submit the source test results to the District and the CEC CPM within 60 days of conducting the tests. (Basis: Regulation 2, Rule 2, Section 306, and Regulation 2, Rule 2, Section 419)

Verification: The results and field data collected during source tests shall be submitted to the District and CPM within 60 days of testing and according to a pre-approved protocol (**AQ-27**). Testing for steady-state emissions shall be conducted upon initial operation and at least once every 12 months.

AQ-31 The project owner shall not allow sulfuric acid emissions (SAM) from stacks P-1, P-2, P-3, P-4 combined to exceed 7 tons in any consecutive 12 month period. (Basis: Regulation 2, Rule 2, Section 306, and Regulation 2, Rule 2, Section 419)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-32 The project owner shall ensure that the stack height of emission points P-1, P-2, P-3 and P-4 are each at least 79.5 feet above grade level at the stack base. (Basis: Regulation 2, Rule 5)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission.

AQ-33 The project owner of the MEP shall submit all reports to the District (including, but not limited to monthly CEM reports, monitor breakdown reports, emission excess reports, equipment breakdown reports, etc.) as required by District Rules or Regulations and in accordance with all procedures and time limits specified in the Rule, Regulation, Manual of Procedures, or Enforcement Division Policies & Procedures Manual. (Basis: Regulation 2, Rule 1, Section 403)

Verification: The project owner shall ensure that notifications and reports, including the quarterly operation report (**AQ-SC8**), are prepared and submitted in compliance with this condition.

AQ-34 The project owner of the MEP shall maintain all records and reports on site for a minimum of 5 years. These records shall include but are not limited to: continuous monitoring records (firing hours, fuel flows, emission rates, monitor excesses, breakdowns, etc.), source test and analytical records, natural gas

sulfur content analysis results, emission calculation records, records of plant upsets and related incidents. The project owner shall make all records and reports available to District and the CEC CPM staff upon request. (Basis: Regulation 2, Rule 1, Section 403, Regulation 2, Rule 6, Section 501)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission.

AQ-35 The project owner of the MEP shall notify the District and the CEC CPM of any violations of these permit conditions. Notification shall be submitted in a timely manner, in accordance with all applicable District Rules, Regulations, and the Manual of Procedures. Notwithstanding the notification and reporting requirements given in any District Rule, Regulation, or the Manual of Procedures, the project owner shall submit written notification (facsimile is acceptable) to the Enforcement Division within 96 hours of the violation of any permit condition. (Basis: Regulation 2, Rule 1, Section 403)

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-36 The Project owner of MEP shall provide adequate stack sampling ports and platforms to enable the performance of source testing. The location and configuration of the stack sampling ports shall comply with the District Manual of Procedures, Volume IV, Source Test Policy and Procedures, and shall be subject to BAAQMD review and approval, except that the facility shall provide four sampling ports that are at least 6 inches in diameter in the same plane of each gas turbine stack (P-1, P-2, P-3, P-4). (Basis: Regulation 1, Section 501)

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission.

AQ-37 Within 180 days of the issuance of the Authority to Construct for the MEP, the Project owner shall contact the BAAQMD Technical Services Division regarding requirements for the continuous emission monitors, sampling ports, platforms, and source tests required by **AQ-10**, **AQ-25**, **AQ-26**, **AQ-28** and **AQ-30**. The project owner shall conduct all source testing and monitoring in accordance with the District approved procedures. (Basis: Regulation 1, Section 501)

Verification: The project owner shall contact the District for specifications on monitors, ports, platforms and source tests and shall submit verification of this contact to the District and CPM with the initial source test protocol (**AQ-27**).

AQ-38 The project owner shall ensure that the MEP complies with the requirement to hold SO2 allowances in 40 CFR 72.9(c)(1) and the continuous emission monitoring requirements of 40 CFR Part 75. (Basis: Regulation 2, Rule 7)

Verification: The project owner shall submit to the CPM and District the results of audits of the monitoring system demonstrating compliance with this condition as part of the quarterly operation report (**AQ-SC8**).

Conditions for Diesel Fire Pump (S-5)

AQ-39 The project owner shall not exceed 50 hours per year per engine for reliability-related testing. [Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-40 The project owner shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, State or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, State or Federal emission limits is not limited.

[Basis: "Stationary Diesel Engine ATCM" section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(3) or (e)(2)(B)(3)]

Verification: A summary of significant operation and maintenance events and monitoring records required shall be included in the quarterly operation report (**AQ-SC8**).

AQ-41 The project owner shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. [Basis: "Stationary Diesel Engine ATCM" section 93115,title 17, CA Code of Regulations, subsection (e)(4)(G)(1)]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission. The project owner shall include a photograph of each totalizing meter in the quarterly operation report (**AQ-SC8**).

AQ-42 Records: The project owner shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

a. Hours of operation for reliability-related activities (maintenance and testing).

b. Hours of operation for emission testing to show compliance with emission limits.

c. Hours of operation (emergency).

d. For each emergency, the nature of the emergency condition.

e. Fuel usage for each engine(s).

[Basis: “Stationary Diesel Engine ATCM” section 93115, title 17, CA Code of Regulations, subsection (e)(4)(I), (or, Regulation 2-6-501)]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission.

AQ-43 At School and Near-School Operation:

- If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply:
  - The project owner shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:
    a. Whenever there is a school-sponsored activity (if the engine is located on school grounds)
    b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session.
  - “School” or “School Grounds” means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). “School” or “School Grounds” includes any building or structure, athletic field, or other areas of school property but does not include unimproved school property.
    [Basis: “Stationary Diesel Engine ATCM” section 93115, title 17, CA Code of Regulations, subsection (e)(2)(A)(1)] or (e)(2)(B)(2)]

Verification: The project owner shall make the site available for inspection by representatives of the District, ARB and the Commission.

DEFINITIONS

Hour:	Any continuous 60-minute period
Clock Hour:	Any continuous 60-minute period beginning on the hour
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours
Year:	Any consecutive twelve-month period of time
Rolling 3-hour period:	Any consecutive three hour period, not including start-up or shutdown periods
Rolling 3-hour period (CO)	Any consecutive three-hour period, not including commissioning, start-up or shutdown periods. Rolling 3-hour periods shall be calculated for normal steady state operation. The minutes shall be summed across normal operating periods and days until 180 minutes have accrued. Compliance with the CO limit shall be based on this 3-hour period. After each 3-hour period has elapsed, a new 3-hour period begins every 60 minutes after the beginning of the previous 3-hour period.

Heat Input: All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in BTU/scf

Firing Hours: Period of time during which fuel is flowing to a unit, measured in minutes

MMBtu: million British thermal units

Gas Turbine Start-up Mode: The lesser of the first 30 minutes of continuous fuel flow to the Turbine after fuel flow is initiated or the period of time from Gas Turbine fuel flow initiation until the Gas Turbine achieves two consecutive CEM data points in compliance with the emission concentration limits of **AQ-17**(b) and **AQ-17**(d).

Gas Turbine Shutdown Mode: The lesser of the 15 minute period immediately prior to the termination of fuel flow to the Gas Turbine or the period of time from non-compliance with any requirement listed in **AQ-17**(b) and **AQ-17**(d) until termination of fuel flow to the Gas Turbine

Specified PAHs: The polycyclic aromatic hydrocarbons listed below shall be considered to be Specified PAHs for these permit conditions. Any emission limits for Specified PAHs refer to the sum of the emissions for all six of the following compounds

Benzo[a]anthracene

Benzo[b]fluoranthene

Benzo[k]fluoranthene

Benzo[a]pyrene

Dibenzo[a,h]anthracene

Indeno[1,2,3-cd]pyrene

Corrected Concentration: The concentration of any pollutant (generally NOx, CO, or NH3) corrected to a standard stack gas oxygen concentration. For emission points P-1 (exhaust of S-1 Gas Turbine), P-2 (exhaust of S-2 Gas Turbine) P-3 (exhaust of S-3 Gas Turbine), P-4 (exhaust of S-4 Gas Turbine), the standard stack gas oxygen concentration is 15% O2 by volume on a dry basis

Commissioning Activities: All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the MEP construction contractor to insure safe and reliable steady-state operation of the gas turbines, balance of plant systems, and associated electrical delivery systems during the commissioning period

Commissioning Period: The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for

	commercial operation, and has initiated sales to the power exchange.
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate
CEC CPM:	California Energy Commission Compliance Program Manager
MEP:	Mariposa Energy Project
Total Particulate Matter:	The sum of all filterable and all condensable particulate matter.

ACRONYMS

AAQS	Ambient Air Quality Standard
ARB	Air Resource Board
BTU	British Thermal Unit
BAAQMD	Bay Area Air Quality Management District
BACT	Best Available Control Technology
Cal ISO	California Independent System Operator
CAISO	California Independent System Operator
CARB	California Air Resources Board
CEC	California Energy Commission
CEM	Continuous Emission Monitor
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CO2	Carbon Dioxide
CPUC	California Public Utilities Commission
CTG	Combustion Turbine Generator
EO/APCO	Executive Officer/Air Pollution Control Officer
EPA	Environmental Protection Agency
ERC	Emission Reduction Credit
FDOC	Final Determination of Compliance
FSNL	Full Speed No Load
GHG	Greenhouse Gases
GT	Gas Turbine
MW	Megawatt
NH_3	Ammonia
N2	Nitrogen
NO	Nitric Oxide
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides

NSR	New Source Review
O_2	Oxygen
LAER	Lowest Achievable Emissions Rate
LLC	Limited Liability Company
MEP	Mariposa Energy Project
MMBtu	Million Btu
NAAQS	National Ambient Air Quality Standard
PAH	Polycyclic Aromatic Hydrocarbon
PDOC	Preliminary Determination of Compliance
PG&E	Pacific Gas & Electric Company
PM10	Particulate Matter less than 10 Microns in Diameter
PM2.5	Particulate Matter less than 2.5 Microns in Diameter
POC	Precursor Organic Compounds
ppmvd	Parts Per Million by Volume, Dry
PSD	Prevention of Significant Deterioration
PUC	Public Utilities Commission
RACT	Reasonably Available Control Technology
RATA	Relative Accuracy Test Audit
SCAQMD	South Coast Air Quality Management District
SNCR	Selective Non-catalytic Reduction
SCR	Selective Catalytic Reduction
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SOx	Sulfur Oxides
TAC	Toxic Air Contaminant
TBACT	Toxics Best Available Control Technology
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

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AIR QUALITY APPENDIX AIR-1

Greenhouse Gas Emissions

Revised Testimony of Brewster Birdsall, P.E., QEP

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

The (MEP) project is a proposed addition to the state's electricity system. It would be an efficient, new, highly dispatchable natural gas-fired simple-cycle power plant that would produce greenhouse gas (GHG) emissions while generating electricity for California consumers. Its addition to the system would displace other less efficient, slower starting, and less flexible plants and facilitate the integration of renewable resources. Because the project will improve the efficiency of existing system resources and provide services needed to integrate renewable generation, the addition of MEP would contribute to a reduction of the California and overall Western Electricity Coordinating Council system GHG[3] emissions and GHG emission rate average.

Staff notes that mandatory reporting of the GHG emissions provides the necessary information for the California Air Resources Board (ARB) to develop greenhouse gas regulations and/or trading markets required by the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.). The facility will also be required to report GHG emissions to the federal government. The project may be subject to additional reporting requirements and GHG reductions or trading requirements as these regulations are more fully developed and implemented.

The Energy Commission adopted an order initiating an informational (OII) proceeding (08-GHG OII-1) to explore methods of assessing the greenhouse gas impacts of proposed new power plants in accordance with the California Environmental Quality Act (CEQA). This analysis provides the staff's conclusions regarding greenhouse gas emissions for this siting case. Future power plant siting cases are likely to be reviewed with the benefit of new information and policy direction from the Energy Commission and other agencies including ARB. This analysis recognizes that "prudent use" of natural gas for electricity generation will serve to optimize the system (for integrating intermittent renewable generation and providing reliability), but, without further analysis and policy direction by the Commission to refine this general understanding, this analysis leaves the implications for optimizing the system to future cases (CEC 2009a).

The operation of MEP would affect the overall electricity system operation and GHG emissions in several ways:

[3] Fuel-use closely correlates to carbon dioxide (CO_2) emissions from natural gas-fired power plants. And since CO_2 emissions from the fuel combustion dominate greenhouse gas (GHG) emissions from power plants, the terms CO_2 and GHG are used interchangeably in this section.

- MEP would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- MEP would displace some less efficient and less flexible local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in California and the overall Western Electricity Coordinating Council electric transmission system.
- MEP would facilitate to some degree the replacement of out-of-state coal electricity generation that must be phased out in conformance with the State's Greenhouse Gas Emissions Performance Standard.
- MEP would facilitate the replacement of generation provided by power plants that are aging and/or using once-through cooling.

The proposed MEP would be designed to provide flexible, dispatchable power with simple-cycle units that are quick-starting and fast-ramping. The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a net reduction in GHG emissions from power plants, would not worsen, but would improve, current conditions, and would, thus, not result in impacts that are cumulatively significant.

Staff concludes that the short-term emission of greenhouse gases during construction would be sufficiently reduced by "best practices" and would not be significant.

The project would not be subject to the limits of the greenhouse gas Emission Performance Standard (EPS) (Cal. Code Regs., tit. 20, section 2900 et seq.) because MEP is a simple-cycle power plant, designed and intended to provide electricity at an annualized plant capacity factor of less than 60% (MEP 2009a).

INTRODUCTION

Greenhouse gas (GHG) emissions are not criteria pollutants, but they are discussed in the context of cumulative impacts. In December 2009, the U.S. Environmental Protection Agency (EPA) declared that greenhouse gases (GHGs) threaten the public health and welfare of the American people (the endangerment finding), and this became effective on January 14, 2010. Regulating GHG at the federal level is furthered by the Prevention of Significant Deterioration (PSD) program and New Source Review (NSR) rule changes finalized by U.S. EPA in early 2010. These requirements apply after July 1, 2011 to new facilities whose carbon dioxide-equivalent emissions exceed 100,000 tons per year (U.S.EPA2010).

Federal rules that became effective December 29, 2009 (40 CFR 98) already require federal reporting of GHG. As federal rulemaking evolves, staff focuses on analyzing the ability of the project to comply with existing state-level policies and programs for GHG. The state has demonstrated its intent to address global climate change though research, adaptation,[4] and GHG inventory reductions. In that context, staff evaluates the

[4] While working to understand and reverse global climate change, it is prudent to also adapt to potential changes in the state's climate (for example, changing rainfall patterns).

GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Mandatory Reporting of Greenhouse Gases (40 CFR 98, Subpart D)	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	California Global Warming Solutions Act of 2006. This act requires the California Air Resources Board (ARB) to enact standards that will reduce GHG emissions to 1990 levels. Electricity production facilities will be regulated by the ARB.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	ARB regulations implementing mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
California Code of Regulations, tit. 20, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The 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 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lb CO_2/MWh).

GLOBAL CLIMATE CHANGE AND CALIFORNIA

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps substantially) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Health & Safety Code, sec. 38500).

In 1998, the 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 reporting of greenhouse gases or global climate change[5] emissions as a condition of state licensing

[5] Global climate change is the result of greenhouse gases, or emissions with global warming potentials, affecting the energy balance and, thereby, climate of the planet. The terms greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

of new electric generating facilities (CEC 2003, IEPR p. 42). Three years later, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020.[6] To achieve this, ARB has a mandate to define the 1990 emissions levels and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide scoping plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB 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 (ARB 2006). The regulations must be effective by January 1, 2011, and mandatory compliance commences on January 1, 2012. The mandatory reporting requirements are effective for electric generating facilities over 1 megawatt (MW) capacity, and the due date for initial reports by existing facilities this first year was June 1, 2009.

Examples of strategies that the state might pursue for managing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006). The scoping plan approved by the ARB in December 2008 builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The scoping plan includes a 33% Renewables Portfolio Standard (RPS), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008c).

It is possible that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40% reduction in GHG from the electricity sector, even though the sector currently only produces about 25% of the state's GHG emissions. In response, in September 2008 the Energy Commission and the California Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified points of regulation within the sector should ARB decide that a multi-sector cap and trade system is warranted.

The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addresses climate change within the electricity, natural gas, and transportation sectors (CEC

[6] Governor Schwarzenegger has also issued Executive Order S-3-05 establishing a goal of 80% below 1990 levels by 2050.

2007a). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% Renewables Portfolio Standard. The Energy Commission's *2009 Integrated Energy Policy Report* continued to emphasize the importance of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as phasing out use of once-through cooling in coastal California power plants (CEC 2009d).

SB 1368,[7] also enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibit California utilities from entering into long-term commitments with any base load facilities that exceed the Greenhouse Gas Emission Performance Standard of 0.500 metric tonnes CO_2 per megawatt-hour[8] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) 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. If a project, instate or out of state, plans to sell base load electricity to California utilities, the utilities will have to demonstrate that the project complies with the EPS. *Base load* units are defined as those designed and intended to provide electricity at an annualized plant capacity factor of at least 60%. Compliance with the EPS is determined by dividing the annual average carbon dioxide emissions by the annual average net electricity production in MWh. This determination is based on capacity factors, heat rates, and corresponding emissions rates that reflect the *expected* operations of the power plant and not on full load heat rates [20 CCR §2903(a)].

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap and trade market to reduce greenhouse gas emissions in the western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. As with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY PROJECT GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver the adequate and reliable electricity supply is complex and variable. But it operates as an integrated whole to meet demand, such that the dispatch of a new source of generation unavoidably curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[9] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation

[7] California Code of Regulations, Title 20 § 2900 and Public Utilities Code § 8340 et seq.
[8] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.
[9] See CEC 2009b, page 95.

resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

California is actively pursuing policies to reduce GHG emissions that include adding non-GHG emitting renewable generation resources to the system mix. In this context, and because fossil-fueled resources produce GHG emissions, it is important to consider the role and necessity of also adding fossil-fuel resources. A report prepared as a response to the GHG OII (CEC 2009a) defines five roles that gas-fired power plants are likely to fulfill in a high-renewables, low-GHG system (CEC 2009b, pp 93 and 94):

1. Intermittent generation support
2. Local capacity requirements
3. Grid operations support
4. Extreme load and system emergency
5. General energy support.

The Energy Commission staff-sponsored report reasonably assumes that non-renewable power plants added to the system would almost exclusively be natural gas-fueled. Nuclear, geothermal, and biomass plants are generally base load and not dispatchable. Solid fueled projects are also generally base load, not dispatchable and carbon sequestration technologies needed to reduce the GHG emission rates to meet the EPS are not yet developed (CEC 2009b, p. 92). Further, California has almost no sites available to add highly dispatchable hydroelectric generation.

Generation of electricity using any fossil fuel, including natural gas, can produce greenhouse gases with the criteria air pollutants that have been traditionally 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). Also included are 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 the 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 relative global warming potentials. Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison.

CONSTRUCTION

Construction of industrial facilities such as power plants requires coordination of a variety of equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of MEP would involve 14 months of activity and GHG

emissions (AFC Appendix 5.1A, MEP 2009a). The GHG emissions estimate, presented below in **Greenhouse Gas Table 2**, includes the total emissions for construction activity in terms of CO_2-equivalent.

Greenhouse Gas Table 2
MEP, Estimated Potential Construction Greenhouse Gas Emissions

Construction Source	Construction-Phase GHG Emissions (MTCO2E) [a, b]
Onsite construction equipment, diesel	1,201
Onsite construction equipment, gasoline	285
Onsite construction motor vehicles	4
Offsite motor vehicle use	441
Construction Total	1,932

Source: AFC Appendix 5.1A, Tables 5.1A.35 through 5.1A.59 (MEP 2009a).
Notes:
a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. Motor vehicle emissions of CO2-equivalent are approximately 95% CO_2.

OPERATIONS

The proposed MEP would provide a nominal capacity of 190 megawatts (MW) through four stationary combustion turbine-generators (four General Electric LM-6000 PC-Sprint) operating in simple-cycle mode with associated equipment. The MEP would provide peaking power, and it would be permitted to operate at an annual capacity factor of up to 46%. The actual operational profile of this peaking plant will depend on the variable demand for electricity, the supply of other generation including intermittent renewable resources, and the need to provide year-round electricity reliability. The applicant selected this technology to suit California's expected needs in integrating intermittent renewable energy.

The primary sources of GHG emissions would be the natural gas fired combustion turbines. There would also be a small amount of GHG emissions from sulfur hexafluoride (SF_6) leaking from new electrical equipment. The employee and delivery traffic GHG emissions from off-site activities are negligible in comparison with the gas turbine GHG emissions.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis if it operated at its maximum annual capacity factor of 46%. All emissions are converted to CO_2-equivalent and totaled. 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, but are nevertheless documented here as some of the compounds have very high relative global warming potentials. A small amount of new SF_6 containing equipment would be required for this project, and the leakage of SF_6 and its CO_2 equivalent emissions have been estimated.

Greenhouse Gas Table 3
MEP, Estimated Potential Greenhouse Gas (GHG) Emissions

Emissions Source	**Operational GHG Emissions (MTCO2E/yr)** [a]
Combustion Turbine Generators (Four CTGs)	432,848
Fire Water Pump Engine	58
Worker Commutes (Off-Site)	86
Material Deliveries (Off-Site)	10
Equipment Leaks (SF6)	28
Total Project GHG Emissions, excluding Off-Site Emissions (MTCO2E/yr)	**432,933**
Estimated Annual Energy Output (MWh/yr) [b]	**798,000**
Estimated Annualized GHG Performance (MTCO2/MWh)	**0.540**

Sources: AFC Table 5.1B-8R for CTGs (CH2M 2010b); AFC Table 5.1-20 for mobile sources (MEP 2009a); (BAAQMD 2010c).
Notes:

a. One metric tonne (MT) equals 1.1 short tons or 2,204.6 pounds or 1,000 kilograms.
b. Based on maximum permitted capacity of approximately 46% annually (BAAQMD 2010c).

The proposed project would be permitted, on an annual basis, to emit nearly 433,000 metric tonnes of CO_2-equivalent per year if operated at its maximum permitted level. The proposed MEP, at 0.54 MTCO2/MWh, would exceed the limits of SB 1368 and the Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh for base load generation. However, this simple-cycle facility would be limited by local air district permit conditions to no more than a 46% annual capacity factor (BAAQMD 2010c). This demonstrates that the facility would not be base load generation and that the MEP is not designed or intended to operate at greater than 60% capacity factor. Therefore, the project does not have to meet the EPS limit.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses the cumulative effects of GHG emissions caused by both construction and operation. As the name implies, construction impacts result from the emissions occurring during the project's construction phase. The operation impacts result from the emissions of the proposed project during operation. Staff is continuing to monitor development of AB 32 Scoping Plan implementation efforts and general trends and developments affecting GHG regulation in the electricity sector.

The impact of GHG emissions caused by this natural gas-fired facility is characterized by considering how the power plant would affect the overall electricity system. The integrated electricity system depends on generation resources to provide energy and satisfy local capacity needs. Energy Commission staff follows the concept of a "blueprint" to describe the long-term roles of fossil-fueled power plants in California's electricity system (CEC 2009a). The five separate roles that gas-fired power plants are most likely to fulfill in the future of a high-renewables, low-GHG system include: 1) Intermittent generation support; 2) Local capacity requirements; 3) Grid operations support; 4) Extreme load and system emergencies support; and 5) General energy support (CEC 2009b, p. 93). The proposed MEP is analyzed here for its role in providing local capacity and generation, intermittent generation support, and general energy support for expected generation retirements or replacements.

CONSTRUCTION IMPACTS

Staff does not believe that the minor GHG emission increases from construction activities would be significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures that staff recommends to address criteria pollutant emissions, such as limiting idling times and requiring, as appropriate, using equipment that meets the latest criteria pollutant emissions standards would further minimize greenhouse gas emissions to the extent feasible. The use of newer equipment will increase fuel efficiency and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment.

DIRECT/INDIRECT OPERATION IMPACTS AND MITIGATION

New, efficient, natural gas-fired generation promotes the state's efforts to improve GHG electrical generation efficiencies and, therefore, reduce the amount of natural gas used by electricity generation and greenhouse gas emissions. As the *2007 Integrated Energy Policy Report* (CEC 2007a, p. 184) noted:

> New natural gas-fueled electricity generation technologies offer efficiency, environmental, and other benefits to California, specifically by reducing the amount of natural gas used—and with less natural gas burned, fewer greenhouse gas emissions. Older combustion and steam turbines use outdated technology that makes them less fuel- and cost-efficient than newer, cleaner plants.…The 2003 and 2005 IEPRs noted that the state could help reduce natural gas consumption for electric generation by taking steps to retire older, less efficient natural gas power plants and replace or repower them with new, more efficient power plants.

Thus, in the context of the Energy Commission's *Integrated Energy Policy Report*, the MEP furthers the state's strategy to promote generation system efficiency and reduce fuel use and GHG emissions. As stated in the 2009 *Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California* (CEC 2009b, p.23):

> When one resource is added to the system, all else being held equal, another resource will generate less power. If the new resource has a lower cost or fewer emissions than the existing resource mix, the aggregate system characteristics will change to reflect the cheaper power and lower GHG emissions rate.

Net GHG emissions for the integrated electric system will decline when new gas-fired power plants are added to: 1) permit the penetration of renewable generation to the 33% target; 2) improve the overall efficiency of the electric system; or 3) serve load growth or capacity needs more efficiently than the existing fleet (CEC 2009b, p. 98).

The Role of MEP in Local Generation Displacement

The proposed MEP would have a net worst-case heat rate of approximately 10,187 Btu/kWh[10], which leads to a maximum estimated GHG performance factor of 0.54 MTCO2/MWh. The heat rate, energy output and GHG emissions of other local generation resources are listed in **Greenhouse Gas Table 4**. There are few other existing peaker power plants in the Greater San Francisco Bay Area. Compared to the other existing power plants that remain in place to provide local reliability and that MEP would be likely to displace, the proposed MEP would be more efficient, and emit fewer GHG emissions during any hour of operation. **Greenhouse Gas Table 4** shows that MEP would have a lower heat rate than many of the existing generating facilities currently used for peaking capacity in the Greater Bay Area. As such, the MEP would not increase the overall system heat rate for natural gas-fired power plants.

Local generating units with the best (lowest) heat rate or lowest GHG performance factor generally operate more than other units with higher heat rates, as shown by the relative amount of energy (GWh) produced in 2009 from the local units. Dispatch order generally follows economic or efficiency dispatch, although it can deviate during any one year or due to other concerns such as permit limits, contractual obligations, droughts, heat waves, local reliability needs or emergencies. These deviations, however, are likely to occur infrequently and are unplanned. Note that dispatch can also follow other characteristics, such as ability to quickly start and come up to full load. The flexibility of MEP ensures that MEP would not increase the overall system heat rate for natural gas-fired power plants because it would provide reliability service without running during times when less flexible units would otherwise be starting. The flexibility of MEP to quickly respond to changing grid conditions would make it preferential to other local units in the dispatch order.

[10] Based on the High Heating Value (HHV) of the fuel(s) used. HHV is used for all heat rate and fuel conversions to GHG mass emissions that are discussed in this document.

Greenhouse Gas Table 4
Greater Bay Area and San Joaquin County,
Local Generation Heat Rates and 2009 Energy Outputs

Plant Name	Heat Rate (Btu/kWh) [a]	2009 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Lodi STIG	8,999	33.1	0.477
Riverview Energy Center	10,162	18.5	0.539
MID Ripon 1	11,438	42.7	0.606
Tracy Peaker Plant	12,700	21.2	0.675
Moss Landing, Unit 6	10,211	227.2	0.541
Moss Landing, Unit 7	9,958	477.1	0.528
Contra Costa Power Plant, Unit 6	13,499	21.1	0.716
Contra Costa Power Plant, Unit 7	11,182	176.9	0.593
Pittsburg Power Plant, Unit 5	11,461	103.2	0.608
Pittsburg Power Plant, Unit 6	11,918	84.4	0.632
Pittsburg Power Plant, Unit 7	14,629	29.3	0.776
Potrero Power, Peaker, Unit 4	16,708	1.47	0.886
Potrero Power, Peaker, Unit 5	15,780	1.79	0.837
Potrero Power, Peaker, Unit 6	16,057	1.43	0.851
Proposed MEP	**10,187**	**798 (max est.)**	**0.540**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER); shows the proposed MEP at the proposed maximum annual capacity factor of approximately 46% (4,200 hours) of 190 MW net output.
Notes: a. Based on the Higher Heating Value or HHV of the fuel.

The proposed MEP would be interconnected to the transmission system at a point within the Greater Bay Area, which is a major local reliability area, and it would provide local reliability service that would be likely to displace other existing power plants within the area.

The Role of MEP in the Integration of Renewable Energy

As California moves towards an increased reliance on renewable energy, the bulk of new renewable generation available to, and used in California, will be intermittent wind generation with some intermittent solar (CEC 2009b, p.3). To accommodate the increased variability in generation due to increasing renewable penetration, compounded by increasing load variability, control authorities such as the California Independent System Operator (CAISO) need increased flexibility from other generation resources such as hydro generation, dispatchable pump loads, energy storage systems, and fast ramping and fast starting fossil fuel generation resources (CAISO 2007; CAISO 2010).

MEP would provide flexible, highly dispatchable, fast starting,[11] and fast ramping[12] power consistent with the CAISO use of these terms, and it would not obstruct penetration of renewable energy. MEP is likely to serve as an important firming source

[11] Energy Commission staff identified facilities with startup times less than 2 hours as *fast-start* in the report Expected Roles for Gas-Fired Generation (CEC2009b). The CAISO categorizes units with startup times less than 10 minutes as *fast-start* and units with startup times less than 2 hours as *short-start* in the report for 2010 Integration of Renewable Resources (CAISO 2010).
[12] The CAISO categorizes *fast-ramping* as a generator capable of going from lowest power to highest in under 20 minutes, or greater than 10 MW per minute.

for intermittent renewable resources in support of California's RPS and GHG goals. The simple-cycle gas turbines would support the CAISO need for flexible and dispatchable resources. Each of the four turbines would be capable of starting up and reaching full load in approximately 10 minutes with emissions stabilized at permitted levels or lower within 30 minutes (AFC Section 2.3.2, MEP 2009a). This would provide CAISO with an ancillary service of approximately 190 MW of non-spinning reserves. MEP also would have very low minimum operating times, which means that it can be started and ramped up quickly, then shutdown after a short duration to enhance the integration and backup of intermittent renewable deliveries.

The flexibility of the dispatchable fossil fuel generation fleet will have to be significantly increased to meet the statewide 20% RPS (CAISO 2010, p. xv); the 33% RPS will require even more flexibility to integrate the renewables. However, this does not suggest the existing and new fossil fuel capacity will operate more. **Greenhouse Gas Table 5** shows how the build-out of either the 20% or the 33% statewide RPS goal will affect generation from new and existing non-renewable resources. Should California reach its goal of meeting 33% of its retail demand in 2020 with renewable energy, non-renewable, most likely fossil-fueled, energy needs will fall by over 36,000 GWh/year. In other words, all growth will need to come from renewable resources to achieve the 33% RPS. And some existing and new fossil units will generate less energy than they currently do, given the expected growth in retail sales.

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted) energy efficiency are already embodied in the retail sales forecast.[13] Energy Commission staff estimates that as much as 18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming.[14] This would reduce non-renewable energy needs by a further 12,000 GWh given a 33% RPS.

The MEP would not interfere with generation from existing renewable facilities nor with the integration of new renewable generation. The MEP is designed to operate for reliability, namely for backup and renewable integration purposes, with a low annual capacity factor (MEP 2009a). MEP would be much more likely to foster integration of renewable energy than comparable non-renewable base load or intermediate energy resources.

[13] Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC2009c).

[14] See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25% to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

Greenhouse Gas Table 5
Estimated Changes in Non-Renewable Energy Potentially Needed to Meet California Loads, 2008 to 2020

California Electricity Supply	**Annual GWh**	
Statewide Retail Sales, 2008, actual [a]	264,794	
Statewide Retail Sales, 2020, forecast [a]	289,697	
Growth in Retail Sales, 2008-20	24,903	
Growth in Net Energy for Load, 2008-20 [b]	29,840	
California Renewable Electricity	**GWh @ 20% RPS**	**GWh @ 33% RPS**
Renewable Energy Requirements, 2020 [c]	57,939	95,600
Current Renewable Energy, 2008	29,174	
Change in Renewable Energy, 2008-20 [c]	28,765	66,426
Resulting Change in Non-Renewable Energy	176	-36,586

Source: Energy Commission staff 2010.
Notes:
a. 2009 IEPR Demand Forecast, Form 1.1c. Excludes pumping loads for entities that do not have an RPS.
b. 2009 IEPR Demand Forecast, Form 1.5a.
c. RPS requirements are a percentage of retail sales.

The Role of MEP in Retirements/Replacements

MEP would be permitted to provide about 798 GWh of natural gas-fired generation that could replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007a). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and will retire or be replaced.

Replacement of Coal-Fired Generation

Coal-fired resources are effectively prohibited from entering into new long-term, base load contracts for California deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under existing contracts will have to be replaced; these contracts are listed in **Greenhouse Gas Table 6**.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[15], all the coal contracts (including those in **Greenhouse Gas Table 6**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive. Also shown are the approximate 500 MW of in-state coal and petroleum coke-fired capacity that may not be able to enter into long-term contracts with California utilities due to the SB 1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from renewable generation; some will come from new and existing natural gas fired generation. New generation resources like MEP generally emit significantly less GHG

[15] A carbon adder or carbon tax is a specific value added to the cost of a project per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

than the coal and petroleum coke-fired generation, which average about 1.0 MTCO2/MWh, resulting in a significant net reduction in GHG emissions from the California electricity sector.

Greenhouse Gas Table 6
Expiring Long-term Contracts with Coal-fired Generation 2009 – 2020

Utility	Facility [a]	Contract Expiration	Annual GWh Delivered to CA
PG&E, SCE	Misc In-state Qual. Facilities [a]	2009-2019	4,086
LADWP	Intermountain	2009-2013	3,163 [b]
City of Riverside	Bonanza, Hunter	2010	385
Department of Water Resources	Reid Gardner	2013 [c]	1,211
SDG&E	Boardman	2013	555
SCE	Four Corners	2016	4,920
Turlock Irrigation District	Boardman	2018	370
LADWP	Navajo	2019	3,832
		TOTAL	**18,522**

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.
Notes:
a. All facilities are located out-of-state except for the Miscellaneous In-state Qualifying Facilities.
b. Estimated annual reduction in energy provided to LADWP by Utah utilities from their entitlement by 2013.
c. Contract not subject to Emissions Performance Standard, but the Department of Water Resources has stated its intention not to renew or extend.

Retirement of Generation Using Once-Through Cooling

New, dispatchable resources like MEP would also be required to provide generation capacity (that is, the ability to meet fluctuating, intermittent electricity loads) in the likely event that facilities utilizing once-through cooling (OTC) are retired. The State Water Resource Control Board (SWRCB) has proposed significant changes to OTC units, which would likely require retrofit, retirement, or significant curtailment of dozens of generating units. In 2008, these units collectively produced about 58,000 GWh. While those OTC facilities owned and operated by utilities and recently-built combined cycle plants may well install dry or wet cooling towers, it is unlikely that the aging, merchant plants will do so. Most of these units operate at low capacity factors, suggesting a limited ability to compete in the current electricity market. Although the timing would be uncertain, new resources would out-compete aging plants and would likely displace the energy provided by OTC facilities and accelerate the retirements.

Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced. These units constitute over 15,000 MW of merchant capacity and 17,800 GWh of merchant energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a large share of replacement capacity – absent transmission upgrades – to locations in the same local reliability area. **Greenhouse Gas Table 7** provides a summary of the utility and merchant energy supplies affected by the OTC regulations.

Greenhouse Gas Table 7
Units Utilizing Once-Through Cooling: Capacity and 2008 Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2008 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	17,091	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	15,392	Nuclear
Broadway 3 [b]	Utility	L.A. Basin	Yes	75	90	0.648
El Centro 3, 4 [b]	Utility	None	Yes	132	238	0.814
Grayson 3-5 [b]	Utility	LADWP	Yes	108	150	0.799
Grayson CC [b]	Utility	LADWP	Yes	130	27	0.896
Harbor CC	Utility	LADWP	No	227	203	0.509
Haynes 1, 2, 5, 6	Utility	LADWP	Yes	1,046	1,529	0.578
Haynes CC [c]	Utility	LADWP	No	560	3,423	0.376
Humboldt Bay 1, 2 [a]	Utility	Humboldt	Yes	107	507	0.683
Olive 1, 2 [b]	Utility	LADWP	Yes	110	11	1.008
Scattergood 1-3	Utility	LADWP	Yes	803	1,327	0.618
Utility-Owned				**7,776**	**39,988**	**0.693**
Alamitos 1 - 6	Merchant	L.A. Basin	Yes	1,970	2,533	0.661
Contra Costa 6, 7	Merchant	S.F. Bay Area	Yes	680	160	0.615
Coolwater 1-4 [b]	Merchant	None	Yes	727	576	0.633
El Segundo 3, 4	Merchant	L.A. Basin	Yes	670	508	0.576
Encina 1-5	Merchant	San Diego	Yes	951	997	0.674
Etiwanda 3, 4 [b]	Merchant	L.A. Basin	Yes	666	848	0.631
Huntington Beach 1, 2	Merchant	L.A. Basin	Yes	430	916	0.591
Huntington Beach 3, 4	Merchant	L.A. Basin	No	450	620	0.563
Mandalay 1, 2	Merchant	Ventura	Yes	436	597	0.528
Morro Bay 3, 4	Merchant	None	Yes	600	83	0.524
Moss Landing 6, 7	Merchant	None	Yes	1,404	1,375	0.661
Moss Landing 1, 2	Merchant	None	No	1,080	5,791	0.378
Ormond Beach 1, 2	Merchant	Ventura	Yes	1,612	783	0.573
Pittsburg 5-7	Merchant	S.F. Bay Area	Yes	1,332	180	0.673
Potrero 3	Merchant	S.F. Bay Area	Yes	207	530	0.587
Redondo Beach 5-8	Merchant	L.A. Basin	Yes	1,343	317	0.810
South Bay 1-4	Merchant	San Diego	Yes	696	1,015	0.611
Merchant-Owned				**15,254**	**17,828**	**0.605**
Total In-State OTC				**23,030**	**57,817**	

Source; Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings
Notes:

a. OTC Humboldt Bay Units 1 and 2 are included in this list. They must retire in 2010 when the new Humboldt Bay Generating Station (not ocean-cooled), currently under construction, enters commercial operation on October 1, 2010.

b. Units are aging but are not OTC.

c. The Los Angeles Department of Water and Power (LADWP) reported a 2007 aggregate energy number of 4,003 GWh for all the Haynes units. Staff allocated the energy between the units based on Haynes' current and historical output allocations in the LADWP fillings for 2009 IEPR.

New generation resources that can either provide local support or energy will emit significantly less GHGs than the OTC fleet. Existing aging and OTC natural gas generation averages 0.6 to 0.7 MTCO2/MWh, which is generally higher than the proposed MEP. When a project provides energy and capacity, depending on its location, it can provide a significant net reduction in GHG emissions from the electricity

sector. The MEP would provide improved efficiency and flexibility when compared with these aging and OTC facilities. Given the proposed transmission line connection, the MEP would be located in the Greater Bay Area Local Capacity Area, which is a major load pocket, and as such would provide local reliability support as well as potentially facilitate the retirement of aging and/or OTC power plants.

CUMULATIVE IMPACTS

Cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or...compound or increase other environmental impacts" (CEQA Guidelines § 15355). "A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts" (CEQA Guidelines § 15130[a][1]). Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

This entire assessment is a cumulative impact assessment. The project would emit greenhouse gases and, therefore, has been analyzed as a potential cumulative impact in the context of its effect on the electricity system, resulting GHG emissions from the system, and existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Ultimately, ARB's AB 32 regulations are likely to address both the degree of electricity generation sector emissions reductions (through cap-and-trade), and the method by which those reductions will be achieved (e.g., through command-and-control). However, the exact approach to be taken is currently under development. The ARB's regulations are likely to address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Energy Commission, but also from the older, higher-emitting facilities not subject to any GHG reduction standard that the Energy Commission could presently impose. This programmatic approach is likely to be more effective in reducing GHG emissions overall from the electricity sector than one that merely relies on displacing out-of-state coal plants ("leakage") or older "dirtier" facilities.

The Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified the regulation points should ARB decide that a multi-sector cap-and-trade system is warranted. As ARB improves the GHG inventories and methods, it may become apparent that emission reductions from the generation sector are less cost-effective than other sectors, and that other sectors of sources can achieve reductions with relative ease and cost-effectiveness.

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. The ARB's mandatory GHG emissions

reporting requirements do not indicate whether the project, as defined, would comply with the potential GHG emissions reduction regulations being formulated under AB 32. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB. Similarly, this project would be subject to federal mandatory reporting of GHG.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any applicable EPS that could be enacted in the next few years. The MEP would exceed the Emission Performance Standard in SB 1368 for base load generation, but as a simple-cycle power plant MEP is not designed or intended for base load generation. Therefore, the SB 1368 limitation does not apply to this facility.

The Energy Commission established a precedent decision in the Final Commission Decision for the Avenal Energy Project. This decision requires all new natural gas fired power plants certified by the Energy Commission to: (a) not increase the overall system heat rate for natural gas plants, (b) not interfere with generation from existing renewable facilities nor interfere with the integration of new renewable generation, and (c) take into account these factors to ensure a reduction of system-wide GHG emissions and support the goals and policies of AB 32 (CEC 2009e). The MEP project, with its low heat rate and high flexibility, rapid start and fast ramping capabilities, and low annual capacity factor, would satisfy these conditions.

NOTEWORTHY PUBLIC BENEFITS

Electricity is produced by operation of inter-connected generation resources and, by knowing the fuel used by the generation sector, the resulting GHG emissions can be known. The operation of MEP would affect the overall electricity system operation and GHG emissions in several ways:

- MEP would provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation.
- MEP would displace some less efficient and less flexible local generation in the dispatch order of gas-fired facilities that are required to provide electricity reliability in California and the overall Western Electricity Coordinating Council electric transmission system.
- MEP would facilitate to some degree the replacement of out-of-state coal electricity generation that must be phased out in conformance with the State's Greenhouse Gas Emissions Performance Standard.
- MEP would facilitate the replacement of generation provided by power plants that are aging and/or using once-through cooling.

The project would likely lead to a net reduction in GHG emissions across the electricity system providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state's power plants, would not worsen current conditions, would not increase the overall system heat

rate for natural gas-fired power plants, and would thus not result in impacts that are cumulatively significant. Moreover, it would be consistent with AB 32 goals.

The energy displaced by the proposed MEP would result in a reduction in GHG emissions from the electricity system compared to other peaking generation. In other system roles, as described in **Greenhouse Gas Table 8**, the proposed MEP would be able to minimize its GHG impacts by filling most of the expected future roles for gas-fired generation, in a high-renewables, low-GHG system.

Greenhouse Gas Table 8
MEP, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, Mariposa Energy Project
Integration of Renewable Energy	• Would provide fast startup capability (within 2 hours). • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves, and energy when renewable resources are unavailable.
Local Generation Displacement	• Would be able to satisfy/partially satisfy local capacity area (LCA) resource requirements. • Would provide voltage support. • *Would not* provide black start capability.
Ancillary Services, Grid System, and Emergency Support	• Would provide fast startup capability (within 2 hours). • Would have low minimum load levels. • Would provide rapid ramping capability. • Would have ability to provide regulation and reserves. • *Would not* provide black start capability.
General Energy Support	• Would provide general energy support. • Could facilitate some retirements and replacements • Would provide cost-competitive energy. • Would be able to help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

Source: Energy Commission staff; based on: Expected Roles for Gas-Fired Generation (CEC2009b, p. 7).

RESPONSES TO PUBLIC COMMENTS, SARVEY, INTERVENOR

Comment: Staff's Assessment should quantify life cycle GHG emissions from extraction, transportation, and usage of natural gas, including methane leakage from the natural gas infrastructure, which should be compared to coal as a fuel.

> **Response:** Life cycle analysis (i.e., assessing economy-wide GHG emissions from the processes in manufacturing and transporting all raw materials used in the project development and infrastructure) is not within the scope of this Staff Assessment. Current CEQA Guidelines reveal a lack of consensus guidance on conducting life-cycle analysis. The California Natural Resources Agency established that: (1) There exists no standard regulatory definition for lifecycle emissions, and (2) Even if a standard definition for 'lifecycle' existed, the term might be interpreted to refer to emissions "beyond those that could be considered 'indirect effects'" as defined by CEQA Guidelines, and therefore, beyond what a lead agency is required to consider

or able to mitigate.[16] Extraction, transportation, and usage of natural gas are generally far-removed from the time and place of the proposed MEP. The proposed MEP would not alter or change any part of the natural gas infrastructure other than the pipeline for interconnection. This means that methane leaked from the infrastructure would occur as it does in the baseline conditions.

Comment: Staff's Assessment should consider other variations of the proposed CTGs (within the General Electric LM 6000 product line) that may avoid GHG emissions through superior (lower) heat rates.

Response: The specific model of CTG proposed by MEP would have a thermal efficiency of approximately 55 to 56 percent (CH2M 2010w). Staff considers MEP's proposed system of CTGs in the context of its ability to add flexibility to the state's electricity system without increasing the overall system heat rate, and the CTG proposed by MEP satisfies these considerations. **Greenhouse Gas Table 4** provides data showing that the power plants that MEP would be likely to displace have higher heat rates. No additional analysis is necessary.

Comment: Staff's Assessment should consider other variations of the proposed CTGs (within the General Electric LM 6000 product line) that use dry low-NOx or dry low emissions (DLE) combustors, which could avoid the GHG emissions attributable to transportation and disposal of zero-liquid discharge (ZLD) waste.

Response: The GHG emissions attributable to handling ZLD waste would be minor compared to those caused by the CTGs directly. Approximately one truck trailer per year would be needed for ZLD disposal (AFC Table 2.3-4, MEP 2009a). The GHG emissions due to all materials delivery (and disposal), including delivery and removal of the demineralizer and ZLD trailer, are shown in **Greenhouse Gas Table 3**. No additional analysis is necessary.

Comment: Staff's Assessment should require use of fast start technology as the Best Available Control Technology for the CTGs to support intermittent renewable generation.

Response: The CTGs proposed by MEP would qualify as fast starting and fast ramping, by being capable of reaching full load in approximately 10 minutes, as described in the discussion of the "**Role of MEP in the Integration of Renewable Energy**", and this satisfies the need for MEP to demonstrate that it would not interfere with generation from renewable resources (CEC 2009e). MEP identifies faster starts as being undemonstrated in practice (CH2M 2010w). The Final Determination of Compliance provides a full analysis and discussion and a determination of BACT emissions limits for startup and shutdown conditions (Section 5.7, p. 63, BAAQMD 2010c). Additionally, MEP has incentives to minimize startup

[16] California Natural Resources Agency, Final Statement of Reasons for Regulatory Action, Amendments to the State CEQA Guidelines Addressing Analysis and Mitigation of Greenhouse Gas Emissions Pursuant to SB97. pp. 71−72. http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf. December 2009.

times and emissions. The emission limitations in Air Quality Conditions of Certification (including **AQ-18**, **AQ-19**, and **AQ-20**) apply during startups and shutdowns.

CONCLUSIONS

MEP would be an efficient, new, highly dispatchable natural gas-fired simple-cycle power plant that would cause GHG emissions while generating electricity for California consumers. AB 32 emphasizes that GHG emission reductions must be “big picture” reductions that do not lead to “leakage” of such reductions to other states or countries. The project’s GHG emissions per MWh would be lower than those of other peaking generation that the project would displace, and it offers superior operating flexibility and, thus, the MEP would contribute to continued improvement of the California and overall Western Electricity Coordinating Council system’s GHG emissions and GHG emission rate average.

The project would lead to a net reduction in GHG emissions across the electricity system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state’s power plants, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant.

Staff notes that mandatory reporting of GHG emissions per Air Resources Board greenhouse gas regulations would occur, and this would enable the ARB to gather the information needed to regulate the MEP in trading markets if required by the regulations implementing the California Global Warming Solutions Act of 2006 (AB 32). The project may be subject to additional reporting requirements and GHG reduction or trading requirements as these regulations are more fully developed and implemented by ARB and U.S. EPA.

Staff does not believe that the minor GHG emission increases from construction activities would be significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures, or best practices, that staff recommends for minimizing criteria pollutants, such as limiting construction vehicle idling times and requiring, as appropriate, equipment that meets the latest emissions standards, would further minimize greenhouse gas emissions since staff believes that the use of newer equipment would increase fuel efficiency and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. For all these reasons, staff concludes that the short-term emission of greenhouse gases during construction would be substantially reduced and would, therefore, not be significant.

The MEP would exceed the Emission Performance Standard in SB 1368 for base load generation, but as a simple-cycle power plant, MEP is not designed or intended for base load generation. Therefore, the SB 1368 requirements do not apply to MEP.

The MEP project would be consistent with the precedent decision regarding GHG emissions established by the Avenal Energy Project’s Final Commission Decision.

PROPOSED CONDITIONS OF CERTIFICATION

None proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (Cal. Code Regs., tit. 17, section 95100 et. seq.) and/or future GHG regulations formulated by the ARB and U.S. EPA, such as limits set by GHG emissions cap and trade markets.

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BIOLOGICAL RESOURCES

Revised Testimony of Sara Keeler

This section is revised from the Staff Assessment published on November 8, 2010

SUMMARY OF CONCLUSIONS

The proposed Mariposa Energy Project (MEP or project) site is located on 10 acres of annual grassland in northeastern Alameda County. Linear facilities associated with the power plant would include an access road, a 0.7-mile long transmission line, a 580-foot natural gas supply line, and a 1.8-mile water supply pipeline. The natural gas supply line, access road, and transmission line would also be in annual grassland; an existing gravel road would be widened and paved to provide the access road. The water supply pipeline would be placed in or along Bruns Road, and extend into Contra Costa County. It would cross state waters and potentially U.S. Army Corps of Engineers (USACE) - jurisdictional waters and wetlands, and run adjacent to the Byron Conservation Bank. Annual grassland, drainages, and wetlands within and adjacent to the proposed project site are known to support several special-status species, including San Joaquin kit fox, California tiger salamander, California red-legged frog, Swainson's hawk, burrowing owl, listed branchiopods, and several special-status plants. Surveys for many of these species have been completed or, based on habitat and proximity to known occurrences, the species is presumed present.

The proposed project would result in significant adverse impacts to habitat for federally- and state-listed species, wetlands, and California red-legged frog critical habitat. Construction of the MEP could result in direct mortality to California tiger salamanders and California red-legged frogs within the disturbance area. These impacts would be minimized through Energy Commission staff's proposed conditions of certification, which include impact avoidance, minimization, and mitigation measures.

With implementation of these measures, the proposed project would be in compliance with most LORS. However, the proposed project has not yet demonstrated compliance with the federal Endangered Species Act (ESA); a Biological Opinion (BO) with an Incidental Take Statement from the U.S. Fish and Wildlife Service (USFWS) is required to comply with the federal ESA, and a final (i.e. not draft) Biological Assessment (BA) determined to be adequate by the USFWS must be submitted before a BO can be issued. The applicant provided a draft BA to the USFWS April, 2010 and an updated BA October, 2010, which the USFWS is currently reviewing. Additionally, a USACE Nationwide #12 permit is required to comply with the Clean Water Act; the applicant has provided the USACE with information required for the permit, but the USACE cannot issue the permit until USFWS issues the BO.

Staff concludes that impacts to biological resources affected by the proposed project can be mitigated below a level of significance by implementation of the proposed conditions of certification in this Supplemental Staff Assessment (SSA). Staff's analysis and proposed conditions of certification were developed in coordination with USFWS and are expected to be consistent with the terms and conditions to be included in the

final BO. Therefore, implementation of the conditions pertaining to federally listed species as well as acquisition of a BO and implementation of the measures therein would ensure compliance with the federal ESA. However, because the BA has not yet been determined to be adequate by the USFWS, modifications to staff's impact analysis and conditions of certification may be necessary if revisions to the recent draft BA, during the applicant's consultation with USFWS, result in changes that are contradictory to staff's analysis or conditions. Staff will provide an errata to this SSA, or update the Committee at the evidentiary hearings, of any changes necessary to Staff's testimony based on USFWS's BO.

INTRODUCTION

This section provides the California Energy Commission staff's (staff) analysis of potential impacts to biological resources from the construction and operation of the Mariposa Energy Project (MEP or project) as proposed by Mariposa Energy, LLC (the applicant). This analysis addresses potential impacts to special-status species, wetlands, other waters of the United States, and waters of the state. Information contained in this document includes a description of the existing biotic environment, an analysis of potential impacts to biological resources, and, where necessary, specifies mitigation measures (conditions of certification) to avoid and minimize impacts or reduce potential impacts to less than significant levels. Additionally, this analysis assesses compliance with applicable laws, ordinances, regulations, and standards (LORS).

This analysis is based, in part, on information provided in the Mariposa Energy Project Application for Certification Volumes I and II (MEP 2009a), data adequacy supplements (CH2M 2009c), responses to data requests (CH2M 2009f), the applicant's request for waters of the United States jurisdiction determination and amendment (CH2M 2009e, CH2M 2009g), the Biological Assessment (CH2M 2010i) and updates (CH2M2010p, CH2M 2010af), staff's observations during a field visit on December 22, 2009, and discussions with the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The applicant would need to abide by the following laws, ordinances, regulations, and standards (LORS) during project construction and operation as listed in **Biological Resources Table 1**.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Section 404 of the Clean Water Act of 1977 (33 USC 1344)	Prohibits the discharge of dredged or fill material into the waters of the United States without a permit. The administering agency is the U.S. Army Corps of Engineers.
Section 401 of the Clean Water Act of 1977 (33 USC 1341)	Requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification from the State in which the

Applicable Law	Description
	discharge originates or would originate, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility.
Endangered Species Act (Title 16, United States Code, sections 1531 et seq.; Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for the protection of threatened and endangered plant and animal species and their critical habitat. The administering agencies are USFWS and National Marine Fisheries Service (NMFS).
Eagle Act (Title 50, Code of Federal Regulations, section 22.26)	Authorizes limited take of bald eagles (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) under the Eagle Act, where the taking is associated with, but not the purpose of activity, and cannot practicably be avoided.
Eagle Act (Title 50, Code of Federal Regulations, section 22.27)	Provides for the intentional take of eagle nests where necessary to alleviate a safety hazard to people or eagles; necessary to ensure public health and safety; the nest prevents the use of a human–engineered structure, or; the activity, or mitigation for the activity, will provide a net benefit to eagles. Only inactive nests would be allowed to be taken except in the case of safety emergencies.
Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)	This law provides for the protection of the bald eagle and the golden eagle 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.
Migratory Bird Treaty Act (Title 16, United States Code, sections 703–711)	Prohibits the take or possession of any migratory nongame bird (or any part of such migratory nongame bird), including nests with viable eggs. The administering agency is USFWS.
Executive Order 11312	Prevent and control invasive species.
State	
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Protects California's rare, threatened, and endangered species. CESA also allows for take incidental from otherwise lawful development projects. The administering agency is CDFG.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain species as fully protected and prohibits take of such species. The administering agency is CDFG.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Designates rare, threatened, and endangered plants in California and prohibits the taking of listed plants. The administering agency is CDFG.
Nest or Eggs (Fish and Game Code, section 3503)	Prohibits take, possession, or needless destruction of the nest or eggs of any bird. The administering agency is CDFG.
Birds of Prey (Fish and Game Code, section 3503.5)	Specifically protects California's birds of prey in the orders Falconiformes and Strigiformes by making it unlawful to take, possess, or destroy any such birds of prey or to take, possess, or destroy the nest or eggs of any such bird. The administering agency is CDFG.
Migratory Birds (Fish and Game Code, section 3513)	Prohibits take or possession of any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird. The administering agency is CDFG.
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 commission.
Streambed Alteration Notification (Fish and Game Code sections 1600 et seq.)	Requires notification to CDFG for activities that may divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake in California. Impacts to vegetation and wildlife

Applicable Law	Description
	resulting from disturbances to waterways are also reviewed and regulated. The administering agency is CDFG.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	CEQA defines rare species more broadly than the definitions for species listed under the state and federal Endangered Species Acts. Under 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.
Public Resources Code, sections 25500 and 25527	Prohibits siting of facilities in certain areas of critical concern for biological resource, such as ecological preserves, refuges, etc. The administering agency is the Energy Commission (with comment from CDFG).
Local	
Alameda County General Plan (East County Area Plan)	Under the East County Area Plan of the Alameda County General Plan, the goal for biological resources is to preserve a variety of plant communities and wildlife habitat. Several policies related to goal are included in the plan, including Policy 126 (no net loss of riparian and seasonal wetlands).
Contra Costa General Plan	The Contra Costa County General Plan presents the broad goals and policies, and specific implementation measures, which will guide decisions on future growth, development, and the conservation of resources through the year 2020. Overall conservation goals under the plan are to preserve and protect the ecological resources of the County; to conserve the natural resources of the County through control of the direction, extent, and timing of urban growth, and; to achieve a balance of uses of the County's natural and developed resources to meet the social and economic needs of the County's residents.

SETTING

REGIONAL SETTING

The proposed Mariposa Energy Project site is located in low-lying foothills on the lower, eastern slope of the Diablo Range, northeast of Altamont Pass, in eastern Alameda County, California. The project site is approximately 7 miles northeast of Livermore, 7 miles northwest of the Tracy, 6 miles southwest of Byron, and 2.5 miles west of the community of Mountain House.

PROJECT VICINITY

The power plant site would be located south of Kelso Road and east of Bruns Road on 10 acres of a 158-acre parcel that consists of non-irrigated grazing land, a former wind-turbine development, and an existing cogeneration (cogen) power plant.

The Central Valley Project (CVP) and California State Water Project (CSWP) are in the project vicinity (MEP 2009a, Figures 5.2-1 and 5.2-2). The CVP and CSWP are large-scale water and power conveyance projects consisting of aqueducts, forebays, and pumping and power stations. CVP's Delta-Mendota Canal is located less than 1 mile east of the project site and the associated Clifton Court Forebay is located slightly over 2 miles north of the project site. The CSWP manages and operates the California

Aqueduct, located less than 1 mile west of the project site. This aqueduct is more than 400 miles long and typically concrete-lined; it originates in the Delta, which supports numerous fish that are important to sport fishermen and considered special-status by the resource agencies. The Bethany Reservoir, located less than 1 mile southwest of the project site, functions as a forebay for the CVP conveyance system and represents the northern terminus of the California Aqueduct.

Pacific Gas and Electric Company's (PG&E's) Bethany Compressor Station and Kelso Electrical Substation are located across Bruns Road from the project site, the Western Area Power Administration Tracy Substation and transmission line infrastructure are located to the east, and a 6.5-megawatt (MW) Cogen Power Plant is located about 150 feet north of the project site (MEP 2009a). Additional land use within the project vicinity includes agriculture and cattle grazing.

PROPOSED PROJECT

The Mariposa Energy Project site consists of the proposed power plant site, construction laydown and staging areas, and all the associated linear facilities (CH2M 2010p).

- **Power generating facility**: The proposed power plant would be a nominal 200-MW simple-cycle generating facility consisting of four power blocks. Each power block would contain one GE LM6000 PC-Sprint natural gas-fired combustion turbine generator.
- **Wastewater and stormwater handling**: The proposed power plant would be a zero liquid discharge (ZLD) facility for wastewater. Process wastewater and stormwater runoff from power plant equipment process areas would be collected, treated, and recycled for use onsite. Stormwater outside of these areas would be collected and diverted to a retention basin, which would be designed to release water over a 48-hour period. Offsite stormwater would be directed around the site by two grass-lined swales and into the natural drainage using rip-rap energy dissipaters.
- **Construction laydown and staging area:** A temporary staging and laydown area would be located immediately east of the proposed power plant site, and would be in use approximately 12 months. Portions of the laydown area would require gravel or road base with an underlayment of geotextile fabric for stabilization. Topsoil stripped from the laydown area would be stockpiled onsite. A temporary laydown area for the water supply pipeline construction would be located within an existing maintenance yard at Byron Bethany Irrigation District (BBID) Headquarters.
- **Access roads:** An existing gravel road from Bruns Road provides access to the parcel. A portion of this road would be improved and used during operation and construction of the project; improvements include widening the road from 10 to 20 feet and adding an asphalt layer. Temporary overland access routes to the transmission line and gas line corridors would originate from this access road. All overland access routes would occur in upland grassland areas only.
- **Transmission line:** The proposed project would interconnect with the regional electrical grid by a new, approximately 0.7-mile-long, single-circuit, three-phase, 230kV transmission line. The transmission line would run north from the project site to connect on the north end of the Kelso Substation. The transmission line would

include eight new monopole structures, ranging in height from 84 to 95 feet, which would be located at appropriate intervals. A 10-foot-diameter concrete foundation would support each monopole structure. No new access roads would be needed along the transmission line corridor; access would be from the existing access road and overland within the transmission line construction zone.

- **Natural gas pipeline:** A proposed 580-foot-long 8-inch-diameter natural gas pipeline would connect with an existing PG&E high-pressure natural gas pipeline northeast of the power plant site.
- **Water supply pipeline and pumphouse:** The project proposes to use water supplied by the BBID through a 1.8-mile water supply pipeline. The water supply pipeline would be placed in or along Bruns Road and run from Canal 45 south to the power plant site. The water supply pipeline would cross seven culverts using either underground tunneling or open-cut trenching. From Bruns Road, the water supply pipeline would follow the existing access road to the power plant site. Associated facilities include a 36-square-foot concrete turnout structure and a 250-square-foot pump station at Canal 45.

Prior to construction, debris from a previous wind farm development, including concrete foundations and underground utility conduit, would be removed from the site (CH2M 2010i).

SPECIAL MANAGEMENT AREAS

Byron Conservation Bank

The Byron Conservation Bank (MEP 2009a, Figure 5.2-1) is located approximately 0.3 mile northwest of the power plant site, and is located across Bruns Road for a 0.5 mile section of the proposed water supply line route. This conservation bank is a 140-acre property owned by the California Department of Fish and Game (CDFG) and managed by the Alameda County Resource Conservation District. The bank provided mitigation credits for California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), western pond turtle (*Clemmys mamoratta*), San Joaquin kit fox (*Vulpes macrotis mutica*), and western burrowing owl (*Athene cunicularia*). Credits are no longer available for purchase from this conservation bank; this bank is preserved in perpetuity under a conservation easement as habitat for these species.

Critical Habitat

Critical habitat is a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Under Section 7 of the Endangered Species Act, federal agencies (USACE in this project) are required to consult with the USFWS on actions they carry out, fund, or authorize to ensure that their actions would not destroy or adversely modify critical habitat. The majority of the proposed project is located within California red-legged frog Critical Habitat Unit CCS-2B. In the Biological Opinion, USFWS will analyze the effects of the project, including the proposed habitat compensation, on the primary constituent elements in the CCS-2B Critical Habitat Unit, and on the ability of this unit to function. Impacts to critical habitat would include habitat

loss and disturbance, including both temporary and permanent impacts. Primary constituent elements of critical habitat specific to California red-legged frogs are:

1. Aquatic Breeding Habitat. Standing bodies of fresh water (with salinities less than 4.5 ppt), including natural and manmade (e.g. stock) ponds, slow-moving streams or pools within streams, and other ephemeral or permanent water bodies that typically become inundated during winter rains and hold water for a minimum of 20 weeks in all but the driest of years.
2. Aquatic Non-Breeding Habitat. Freshwater pond and stream habitats, as described above, that may not hold water long enough for the species to complete its aquatic life cycle but which provide for shelter, foraging, predator avoidance, and aquatic dispersal of juvenile and adult California red-legged frogs. Other wetland habitats considered to meet these criteria include, but are not limited to: plunge pools within intermittent creeks, seeps, quiet water refugia within streams during high water flows, and springs of sufficient flow to withstand short-term dry periods.
3. Upland Habitat. Upland areas adjacent to or surrounding breeding and non-breeding aquatic and riparian habitat up to a distance of 1 mile (1.6 km) in most cases (i.e., depending on surrounding landscape and dispersal barriers) including various vegetational types such as grassland, woodland, forest, wetland, or riparian areas that provide shelter, forage, and predator avoidance for the California red-legged frog. Upland features are also essential in that they are needed to maintain the hydrologic, geographic, topographic, ecological, and edaphic features that support and surround the aquatic, wetland, or riparian habitat. Upland habitat should include structural features such as boulders, rocks and organic debris (e.g., downed trees, logs), small mammal burrows, or moist leaf litter.
4. Dispersal Habitat. Accessible upland or riparian habitats within and between occupied or previously occupied sites that are located within 1 mile (1.6 km) of each other, and that support movement between such sites. Dispersal habitat includes various natural habitats, and altered habitats such as agricultural fields, that do not contain barriers (e.g., heavily traveled roads without bridges or culverts) to dispersal. Dispersal habitat does not include moderate- to high-density urban or industrial developments with large expanses of asphalt or concrete, nor does it include large lakes or reservoirs over 50 acres (20 hectares) in size, or other areas that do not contain those features identified in constituents 1, 2, or 3 as essential to the conservation of the species.

East Contra Costa County HCP/NCCP

The proposed water supply pipeline route enters into eastern Contra Costa County, which is within the plan area for the East Contra Costa Habitat Conservation Plan and Natural Community Conservation Plan (ECCCHCP/NCCP). The ECCCHCP/NCCP provides a coordinated, regional approach to conservation and regulation. The Final ECCCHCP/NCCP was published in October 2007; implementation of the ECCCHCP/NCCP allows the permittees to control endangered species permitting for activities and projects in the permit area while providing comprehensive species, wetlands, and ecosystem conservation. Within Contra Costa County, the proposed water supply pipeline route is along or adjacent to Bruns Road, as well as along an agricultural road that runs adjacent to Bruns Road. Impacts would be primarily in the

roadway or along a gravel shoulder; there would be no direct impacts to habitat for special-status species, and impacts would be mitigated with the rest of the Mariposa Energy Project impacts. Because construction would not result in disruption of habitat for special-status species and because impacts associated with development of the water supply pipeline will be mitigated as part of the Mariposa Energy Project, the segment of the project that is within Contra Costa County is not subject to the ECCCHCP/NCCP (CCCPC 2010a).

ENVIRONMENTAL SETTING

Habitat and Wildlife

The majority of the project disturbance area would be in annual grassland, including the disturbance area for the power plant site, transmission line, and natural gas supply line. The water supply line would be located in annual grassland, along or within existing roads and road shoulders characterized by ruderal vegetation, agricultural areas, and wetlands and ephemeral drainages. Construction and laydown areas would be in an existing maintenance yard at the Bethany Bay Irrigation District (BBID) headquarters and in annual grassland immediately adjacent to the proposed power plant site.

Annual Grassland

Annual grassland is the most common vegetation type within the project study area. Introduced (not native to California) annual grasses are the dominant plant species in this habitat; characteristic species include wild oats (*Avena barbata*), soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), and tall fescue (*Festuca arundinaceae*). Common forbs include broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), turkey mullein (*Croton setigerus*), popcorn flower (*Plagiobothrys* sp.), and many others. California poppy (*Eschscholzia californica*), the State flower, is found in this habitat. Vernal pools, which occur in small depressions with a hardpan soil layer, are also found within this habitat (Mayer and Laudenslayer eds. 1988).

Livestock grazing plays a large role in determining the structure of this habitat; heavy spring grazing favors the growth of summer-annual forbs, such as tarweed (*Hemizonia* sp.) and turkey mullein, and reduces the amount of standing dead material. The annual grassland habitat on the proposed project site is currently used for cattle grazing (MEP 2009a).

Wetlands and Other Waters

Ephemeral Drainages

Ephemeral drainages contain flowing water only seasonally and not necessarily every year. There are four ephemeral drainages located within the project site (see **Biological Resources Table 2**, D-1, D-2, D-3, and D-4 (CH2M 2009e, 2009g)). These drainages comprise seasonal wetland habitat and were delineated as part of the applicant's formal wetland delineation conducted in 2009. In a preliminary jurisdiction determination (CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination), these features were determined by the USACE to be potentially USACE-jurisdictional features (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination). Based on

a December 22, 2009 site visit, CDFG indicated that these drainages are also considered state waters. All four drainages appear to be hydrologically connected to Italian Slough located north of the project site. Three of the drainages are identified as having an obvious bed and bank while the fourth (D-2) is more swale-like. Vegetation within the drainages varied based upon the length and type of inundation.

The drainages identified as D-1 and D-2 are characterized by less frequent inundation and supported non-emergent species such as saltgrass (*Distichlis spicata*), rabbitsfoot grass (*Polypogon monspeliensis*), Italian ryegrass (*Lolium mulitfloroum*), and brass buttons (*Cotula coronopifolia*). D-1 continues from an impoundment into a low, swale-like drainage (D-1a) which is characterized by salt grass, Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), and other non-native grasses. D-1 also continues north of Kelso Road as a highly eroded channel (D-1b) with a poorly defined bed and bank devoid of vegetation. D-2 continues as small well defined ditch (D-2a) devoid of vegetation which has been realigned through the PG&E facility to the east.

The drainages D-3 and D-4 are characterized by more prolonged saturation and support both emergent and non-emergent vegetation. Drainage D-3 supports dense cosmopolitan bulrush (*Bolboschoenus maritmius*) with scattered rabbitsfoot grass, curly dock (*Rumex crispus*), and cattail (*Typha dominigensis*). Drainage D-4 is characterized by a well-defined channel which supports dense cattails (*Typha latifolia* and *T. dominigensis*) and saltgrass along the upper edges as well as scattered curly dock and Mexican rush (*Juncus mexicanus*). Drainages D-3 and D-4 flow into seasonal ponds located to the north and east, respectively.

Biological Resources Table 2
Wetland and Other Waters Features in the Proposed Project Study Area

Feature	Acreage	Description	Jurisdiction[1,2] (Federal/State)
Alkali Sink Wetland (ASW-1)	0.166	Wetland area is characterized by saltgrass (*Distichlis spicata*) and seepweed (*Suaeda moquinii*) with scattered sand spurry (*Spergularia marina*), alkali heath (*Frankenia salina*), and common spikeweed (*Hemizonia pungens*); strongly alkaline soils; shown as a Palustrine Unconsolidated Shore Seasonally Flooded wetland on the National Wetland Inventory Map.	USACE
Canal 45	0.046	Constructed and routinely maintained irrigation canal.	USACE/State
Drainage Channel (D-1b)	0.023	Defined channel with steep cut banks, largely devoid of vegetation, continuation of Drainage 1 on the north side of Kelso Road, blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE/State
Drainage Ditch (Ditch-1) Drainage Channel (D-2a)	0.052	Small, well-defined channel with defined bed and bank, channel is a continuation of Drainage 2, portion of the original channel has been realigned through the PG&E facility to the east; blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE/State
Drainage Wetland (D-1)	0.021	Defined drainage channel characterized by saltgrass (*Distichlis spicata*) within the channel; blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE/State
Drainage Wetland	0.006	Weakly expressed drainage swale characterized by	USACE/State

Feature	Acreage	Description	Jurisdiction[1,2] (Federal/State)
(D-1a)		saltgrass (*Distichlis spicata*), Mediterranean barley (*Hordeum marinum*), soft chess (*Bromus hordeaceus*), and foxtail barley (*Hordeum murinum*), blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	
Drainage Wetland (D-2)	0.032	Small swale-like feature characterized by saltgrass (*Distichlis spicata*), Italian ryegrass (*Lolium multiflorum*), and meadow barley (*Hordeum brachyantherum*) with some scouring evident along the channel; blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE/State
Drainage Wetland (D-3)	0.138	Shallow, well-defined drainage channel characterized by cosmopolitan bulrush (*Bolboschoenus maritimus*) with scattered rabbitsfoot grass (*Polypogon monspeliensis*), curly dock (*Rumex crispus*), and cattail (*Typha* spp.). Palustrine Emergent Permanently Flooded wetland on the National Wetland Inventory Map and is a blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE/State
Drainage Wetland (D-4)	0.053	Shallow, well-defined channel characterized by dense cattails (*Typha* spp.) growing in the center of the channel with dense saltgrass (*Distichlis spicata*) growing around the outer edges; Palustrine Emergent Semi-Permanently Flooded wetland on the National Wetland Inventory Map and is a blue line creek on USGS topographic map with apparent hydrologic connection with Italian Slough.	USACE/State
Erosional Channel (E-1)	0.002	Small, weakly expressed erosional rill resulting from direct runoff from the Kelso Substation.	USACE
Erosional Channel (E-2)	0.013	Erosional channel resulting from direct runoff from the Kelso Substation.	USACE
Erosional Channel (E-3)	0.022	Large, deeply scoured erosional channel resulting from direct runoff from the Kelso Substation.	USACE
Seasonal Wetland (SWL-1)	0.018	Two shallow, well-defined basins along access road to the Byron Power Cogen Power Plant connected by a corrugated metal pipe; slender popcorn flower (*Plagiobothrys stipitatus*) and other vernal pool plants scattered within the basin.	USACE
Seasonal Wetland (SWL-2)	0.007	Shallow, weakly expressed topographic low area with scattered coyote thistle (*Eryngium vaseyi*) and Italian ryegrass (*Lolium multiflorum*), adjacent to transmission line laydown area.	USACE
Swale (SW-1)	0.063	Low topographic swale characterized by Mediterranean barley (*Hordeum marinum*); appears to convey low-volume, short-duration flows in response to storm events but lacks evidence of prolonged inundation; water flows west and ponds in low areas around the Byron Power Cogen Power Plant.	USACE
Swale (SW-2)	0.045	Low topographic swale characterized by Mediterranean barley (*Hordeum marinum*); appears to convey low-volume, short-duration flows in response to storm events but lacks evidence of prolonged inundation; water flows west and ponds in low areas around the Byron Power Cogen Power Plant.	USACE
Swale (SW-3)	0.012	Small, weakly expressed swale from 12-inch-diameter culvert under Kelso Road; characterized by soft chess	USACE

Feature	Acreage	Description	Jurisdiction[1,2] (Federal/State)
		(*Bromus hordeaceus*), Italian ryegrass (*Lolium multiflorum*), and saltgrass (*Distichlis spicata*); appears to convey low, very-low volume flow for very short durations only in response to heavy rainfall.	

Source: Based on Table 3 in *USACE Wetland Delineation Amendment for the Mariposa Energy Project – Field Verification Including the Alternative Water Supply Pipeline Route* (CH2M 2009g; see Figures 2-1 and 2-2 in CH2M 2009g for location of these features).
1 – Determination for federal jurisdiction is of *potentially* jurisdictional features (CH2M 2010r). State determination source is the December 22, 2009 site visit with CDFG and USFWS.

Seasonal Wetlands

Seasonal wetlands are depression areas which may have wetland indicators of all three parameters (hydrophytic vegetation, hydric soils, and wetland hydrology) during the wetter portion of the growing season, but usually lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season (Environmental Laboratory 1987). There are three seasonal wetlands located within the project site which range in size from small isolated features to alkali sink wetlands. The large alkali sink wetland (ASW-1) is primarily characterized by saltgrass and common rusty molly (*Kochia californica*). This wetland was determined to be a jurisdictional feature and is located north of and directly abuts ephemeral drainage D-4. A small seasonal wetland (SWL-1) exists along the road to the Byron Power Cogen Power Plant and was also determined to be a potentially USACE-jurisdictional feature (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination). This wetland is characterized by two shallow well-defined basins hydrologically connected by a partially collapsed culvert. The vegetation within the basins is sparse and includes popcorn flower (*Plagiobotrys stipitatus*), coyote thistle (*Eryngium vaseyi*), wooly marbles (*Psilocarphus oregonus*), and other vernal pool plants as well as Italian ryegrass. A second small seasonal wetland (SWL-2) is located adjacent to the transmission laydown area. This wetland is isolated and characterized as a shallow, weakly defined depression with scattered coyote thistle and Italian ryegrass. This wetland was determined to be a potentially USACE-jurisdictional feature (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination).

Alkali Meadow

Alkali meadows occur in areas where the water table is shallow (one to three meters deep), and soils are alkaline. There is an alkali meadow in the project vicinity located northeast of the intersection of Bruns Road and Kelso Road adjacent to the proposed water supply pipeline to the east and north of the Kelso Substation. This area is not within the proposed disturbance area, however it is located adjacent to the alkali sink wetland that is. This area is characterized by low-growing and sparse plant cover with areas of barren earth and salt encrustation. Recurved larkspur (*Delphinium recurvatum*; a California Native Plant Society [CNPS] 1B.2 species) is known historically to occur within the meadow approximately 1,000 feet east of the proposed water supply pipeline. This species was not detected during the early spring 2009 protocol-level special-status plant survey.

Erosional Ditches, Swales

Three erosional channels were identified in the project area (E-1, E-2, and E-3). Erosional channels are a type of generally linear-shaped channel through which rainfall runoff is directed, functioning to drain precipitation of uplands (USACE 2010). All three erosional channels in the project area result from direct runoff from the Kelso Substation and all were determined to be potentially USACE-jurisdictional features (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination). These range in size from a small erosional rill to a large, deeply eroded channel. The channels are generally devoid of vegetation however the upper edges and sides are characterized by common upland grassland species.

Three weakly expressed swales were identified in the project area (SW-1, SW-2, and SW-3). A swale is a broad, shallow channel with vegetation growing along the side slopes and bottom. Swales are not considered wetlands, but can serve as connections between a wetland and some other surface water feature (USACE 2010). All three were determined to be potentially USACE-jurisdictional features (CH2M 2009g; CH2M 2010r, Attachment 3, Preliminary Jurisdictional Determination). Two of these swales (SW-1 and SW-2) are located northeast of the Byron Cogen Power Plant within California annual grassland. The swales were characterized as conveying short-duration flows in response to storm events with only shallow, intermittent inundation during the wet season. Vegetation within the two swales includes Mediterranean barley (*Hordeum marinum*) with sparse saltgrass, alkali heath, and Italian ryegrass. The third swale (SW-3) is a weakly expressed feature located along the water supply line on the east side of Bruns Road. This swale appears to convey very infrequent and very low-volume flows. Vegetation within the project area includes soft chess, Italian ryegrass, and salt grass with scattered gumweed (*Grindelia camporum*), alkali heath, and coyote thistle.

Canals

The Byron Bethany Irrigation District (BBID) Canal 45 is located at the northern end of the water supply pipeline route. The portion of the canal in the project area is routinely maintained and devoid of vegetation. The lower banks of the canal are characterized by cement rip rap. Canal 45 would supply service water to the project (CH2M 2009g).

Agricultural

Agricultural uses within the region include a mixture of irrigated crops including oat, hay, alfalfa, and tomatoes, and cattle grazing. In the immediate project area, current agricultural uses include irrigated alfalfa crops and grazing.

Developed

The approximately 1-acre, 6.5 MW Byron Power Cogen Power Plant is located immediately north of the proposed project site. A gravel access road accesses this power plant and the proposed project site. In addition, at the northeast corner of Kelso Road and Bruns Road are PG&E's Bethany Gas Compressor Station and the 230-kV Kelso Substation. These facilities are located on the same site, which totals approximately 17 acres, and are bordered by ornamental landscaping. Several existing transmission lines also occur in the proposed project area and vicinity.

Wildlife

The power plant site and most of the proposed linear facility alignments provide foraging, cover, and some nesting habitat for a variety of species. Mammals detected during the 2009 surveys include California ground squirrel (*Spermophilus beecheyi*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*). California ground squirrel burrows can provide important refuge sites for special-status species, including species expected within the project area. The project site lacks shrubs and trees, but could provide nesting habitat for ground-nesting birds or birds that nest in bulrush or cattail, which are present along the water supply pipeline route. The project area provides foraging or roosting habitat for a variety of bird species; some of the species observed in the project area include mallard (*Anas platyrhynchos*), black-necked stilt (*Himantopus mexicanus*), long-billed curlew (*Numenius americanus*), marsh wren (*Cistothorus palustris*), loggerhead shrike (*Lanius ludovicianus*), red-winged blackbird, and lark sparrow (*Chondestes grammacus*). Raptors detected foraging or roosting at the site include burrowing owl (*Athene cunicularia*), American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and northern harrier (*Circus cyaneus*).

Special-Status Species

Special-status species include those listed as threatened or endangered under the federal or state endangered species acts, species proposed for listing, California Species of Special Concern, and other species that have been identified by the California Native Plant Society, USFWS, or CDFG or other agencies as unique or rare.

Biological Resources Table 3 lists special-status species that are known to occur or could potentially occur in the project area and vicinity. Two of the special-status plant species listed below were detected in the project vicinity during the 2009 surveys (CH2M 2009f). Several special status wildlife species were observed during project surveys or are presumed present on the site (MEP 2009a, CH2M 2009f).

Biological Resources Table 3
Special-status Species Potentially Occurring in the MEP Study Area

Scientific Name	Status	Habitat	Potential to occur in the Study Area
Plants			
Amsinckia grandiflora large-flowered fiddleneck	FE, SE, G1, S1.1, List 1B.1	Cismontane woodland, Valley and foothill grassland. Blooms April – May.	Low
Amsinckia lunaris bent-flowered fiddleneck	G2, S2.2, List 1B.2	Cismontane woodland, Valley and foothill grassland. Openly wooded or somewhat shaded slopes in the hills, 200 to 1500 feet, San Francisco Bay region; open woods. Blooms March – June.	Low
Arctostaphylos auriculata Mt. Diablo manzanita	G2, S2.2, List 1B.3	Chaparral, Cismontane woodland. Mount Diablo manzanita is endemic to Contra Costa County, where it occurs only on Mount Diablo and in the adjacent foothills. It is found between 700 and 1,860 feet above sea level. Blooms January – March.	Absent

Scientific Name	Status	Habitat	Potential to occur in the Study Area
Astragalus tener var. *tener* alkali milk-vetch	G1T1, S1.1, List 1B.2	Alkali playa, Valley and foothill grassland, Vernal pool, Wetland; Alkali sink, Freshwater wetlands, Wetland-riparian; Habitat includes Playas, Vernal-pools; usually occurs in Wetlands, but occasionally found in non wetlands. Blooms March – June.	Moderate
Atriplex cordulata heartscale	G2?, S2.2?, List 1B.2	Chenopod scrub, Meadow and seep, Valley and foothill grassland. Blooms April – October. Observed in alkaline meadow north of PG&E Kelso Substation, just north of the project study area.	Present
Atriplex depressa brittlescale	G2Q, S2.2, List 1B.2	Alkali playa, Chenopod scrub, Meadow and seep, Valley and foothill grassland, Vernal pool, Wetland. Blooms April – October.	Moderate
Atriplex joaquiniana San Joaquin spearscale	G2, S2, List 1B.2	Chenopod scrub, Meadow and seep, Valley and foothill grassland. Blooms April – October.	Moderate
Balsamorhiza macrolepis var. *macrolepis* big-scale balsamroot	G3G4T2, S2.2, List 1B.2	Cismontane woodland, Ultramafic, Valley and foothill grassland. Blooms March – June.	Low
Blepharizonia plumosa big tarplant	G1, S1.1, List 1B.1	Valley and foothill grassland. Blooms July – October.	Moderate
California macrophylla (=Erodium macrophyllum) Round-leaved filaree	CEQA, G3, S3.1, List 1B.1	Cismontane woodland, Valley and foothill grassland; friable clay soils. Blooms March – May.	Moderate
Calochortus pulchellus Mt. Diablo fairy-lantern	G2, S2.1, List 1B.2	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland. Blooms April – June.	Absent
Carex comosa bristly sedge	G5, S2?, List 2.1	Freshwater marsh, Marsh and swamp, Wetland. Blooms May – September.	Low
Carex vulpinoidea brown fox sedge	G5, S2.2, List 2.2	Marshes and swamps, Riparian woodland. Blooms May – June.	Low
Caulanthus coulteri var. *lemmonii* Lemmon's jewel-flower	G4T2, S2.2, List 1B.2	Pinon and juniper woodlands, Valley and foothill grassland; dry, exposed slopes. Blooms March – May.	Low
Centromadia parryi ssp. *congdonii* Congdon's tarplant	G4T3, S3.2, List 1B.2	Valley and foothill grassland. Blooms May – October (November).	Moderate
Cordylanthus mollis ssp. *hispidus* hispid bird's-beak	G2T2, S2.1, List 1B.1	Alkali playa, Meadow and seep, Wetland. Blooms June – September.	Moderate
Cordylanthus palmatus palmate-bracted bird's-beak	FE, SE, G1, S1.1, List 1B.1	Chenopod scrub, Meadow and seep, Valley and foothill grassland, Wetland. Blooms May – October.	Moderate
Deinandra bacigalupii Livermore tarplant	G1, S1.2, List 1B.2	Meadow and seep. Blooms June – October.	Moderate
Delphinium californicum ssp. *interius* Hospital Canyon larkspur	G3T2?, S2?, List 1B.2	Chaparral, Cismontane woodland, Meadow and seep. Blooms April – June.	Low
Delphinium recurvatum recurved larkspur	G2, S2.2, List 1B.2,	Chenopod scrub, Cismontane woodland, Valley and foothill grassland. Blooms March – June.	High
Eryngium racemosum Delta button-celery	SE, G2Q, S2.1, List 1B.1	Riparian scrub, Wetland. Blooms June – October.	Low
Eschscholzia rhombipetala diamond-petaled California poppy	G1, S1.1, List 1B.1	Valley and foothill grassland. Blooms March – April.	Moderate
Fritillaria agrestis stinkbells	G3, S3.2, List 4.2	Chaparral, Cismontane woodland, Ultramafic soils, Valley and foothill grassland. Blooms March – June.	Moderate
Helianthella castanea Diablo helianthella	G3, S3.2, List 1B.2	Broadleaved upland forest, Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. Blooms March – June.	Moderate

Scientific Name	Status	Habitat	Potential to occur in the Study Area
Hesperolinon breweri Brewer's Dwarf Flax	G2, S2.2, List 1B.2	Chaparral, Cismontane woodland, Ultramafic, Valley and foothill grassland; dry hill or canyon sides, grassy open areas amongst oaks or brush, 400 to 1700 feet. Blooms May – July.	Low
Hibiscus lasiocarpos var. *occidentalis* woolly rose-mallow	G4, S2.2, List 2.2	Freshwater marsh, Marsh and swamp, Wetland. Moist, freshwater-soaked river banks and low peat islands in sloughs. In California, known from the delta watershed, 0 - 500 feet. Blooms June – September.	Low
Isocoma arguta Carquinez goldenbush	G1, S1.1, List 1B.1	Valley and foothill grassland. Alkaline soils, Flats, Lower hills. On low benches near drainages and on tops and sides of mounds in swale habitat. 1 to 70 feet. Blooms August – December.	Low
Lasthenia conjugens Contra Costa goldfields	FE, G1, S1.1, List 1B.1	Cismontane woodland, Valley and foothill grassland, Vernal pool, Wetland. Blooms March – June.	Low
Lathyrus jepsonii var. *jepsonii* Delta tule pea	G5T2, S2.2, List 1B.2	Freshwater marsh, Marsh and swamp, Wetland. Blooms May – July (September).	Low
Lilaeopsis masonii Mason's lilaeopsis	Rare, G3, S3.1, List 1B.1	Freshwater marsh, Marsh and swamp, Riparian scrub, Wetland. Blooms April – November.	Low
Limosella subulata Delta mudwort	G4?Q, S2.1, List 2.1	Brackish marsh, Freshwater marsh, Marsh and swamp, Riparian scrub, Wetland. Blooms May – August.	Low
Madia radiata showy golden madia	G2, S2.1, List 1B.1	Chenopod scrub, Cismontane woodland, Valley and foothill grassland. Blooms March – May.	Low
Myosurus minimus ssp. *apus* little mousetail	G5T2Q, S2.2, List 3.1	Vernal pools. Alkaline soils. 60 to 2100 feet. Blooms March – June. *Myosurus minimus* found on Lee Property, east of transmission line alignment study area; this sub-species is not currently recognized as a distinct taxon.	Present (species)
Navarretia nigelliformis ssp. *nigelliformis* adobe navarretia	G4T3, S3.2, List 4.2	Valley and foothill grassland, Vernal pool. Occurs in heavy clay soils of vernal pools and other low, seasonally moist areas in grasslands (Hickman 1993). Adobe navarretia appears to be restricted to areas with a vernally moist, summer-dry hydrologic regime 300 to 3,300 feet. Blooms April – June.	Moderate
Plagiobothrys glaber hairless popcorn-flower	GH, SH, List 1A	Marsh and swamp, Salt marsh, Vernal pool, Wetland. Blooms March – May.	Low
Scutellaria galericulata marsh skullcap	G5, S2.2?, List 2.2	Lower montane coniferous forest, Marsh and swamp, Meadow and seep, Wetland. Blooms June – September.	Low
Senecio aphanactis chaparral ragwort	G3?, S1.2, List 2.2	Cismontane woodland, Coastal scrub. Blooms January –April.	Low
Symphyotrichum lentum Suisun Marsh aster	G2, S2, List 1B.2	Brackish marsh, Freshwater marsh, Marsh and swamp, Wetland. Blooms May – November.	Low
Trifolium depauperatum var. *hydrophilum* saline clover	G5T2?, S2.2?, List 1B.2	Marsh and swamp, Valley and foothill grassland, Vernal pool, Wetland. Blooms April – June.	Low
Tropidocarpum capparideum caper fruited tropidocarpum	G1, S1.1, List 1B.1	Valley and foothill grassland. Blooms March – April.	Moderate
Reptiles and Amphibians			

Scientific Name	Status	Habitat	Potential to occur in the Study Area
Actinemys marmorata western pond turtle	CSC	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh and swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland	Moderate
Ambystoma californiense California tiger salamander	FT, ST	Cismontane woodland, Meadow and seep, Riparian woodland, Valley and foothill grassland, Vernal pool, Wetland	Presumed present
Anniella pulchra pulchra silvery legless lizard	CSC	Chaparral, Coastal dunes, Coastal scrub	Low
Masticophis flagellum ruddocki San Joaquin whipsnake	CSC	Chenopod scrub, Valley and foothill grassland	Low
Masticophis lateralis euryxanthus Alameda whipsnake	FT, ST	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	Low
Phrynosoma blainvillii coast horned lizard	CSC	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon and juniper woodlands, Riparian scrub, Riparian woodland, Valley and foothill grassland	Low
Rana boylii foothill yellow-legged frog	CSC	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow and seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters	Low
*Rana draytonii** California red-legged frog	FT, CSC	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh and swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland	Presumed present
Spea hammondii western spadefoot	CSC	Cismontane woodland, Coastal scrub, Valley and foothill grassland, Vernal pool, Wetland - requires sandy/gravely soils.	Low
Thamnophis gigas giant garter snake	FT, ST	Marsh and swamp, Riparian scrub, Wetland	Low
Mammals			
Antrozous pallidus pallid bat	CSC, WBWG-H	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley and foothill grassland	Low
Corynorhinus townsendii townsendii Townsend's big-eared bat	CSC, WBWG-H	Broadleaved upland forest, Chaparral, Chenopod scrub, Great Basin grassland, Great Basin scrub, Joshua tree woodland, Lower montane coniferous forest, Meadow and seep, Mojavean desert scrub, Riparian forest, Riparian woodland, Sonoran desert scrub, Sonoran thorn woodland, Upper montane coniferous forest, Valley and foothill grassland	Low
Eumops perotis californicus western mastiff bat	CSC, WBWG-H	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland	Low
Lasiurus cinereus hoary bat	WBWG-M	Broadleaved upland forest, Cismontane woodland, Lower montane coniferous forest, North coast coniferous forest	Low

Scientific Name	Status	Habitat	Potential to occur in the Study Area
Perognathus inornatus inornatus San Joaquin pocket mouse	--	Coastal scrub, Valley and foothill grassland. Hawbecker (1951) found that the San Joaquin pocket mouse occurred on shrubby ridge tops and hillsides. Grinnell (1933) characterized the habitat as being open, sandy areas with grasses and forbs. (Zeiner et. Al. 1988-1990, updated date unk.)	Low
Sylvilagus bachmani riparius riparian brush rabbit	FE, SE	Riparian forest. *S. b. riparius* is found only at Caswell Memorial State Park on the Stanislaus River, San Joaquin Co. (Zeiner et al. 1988-1990, updated May 2000).	None
Taxidea taxus American badger	CSC	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog and fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh and swamp, Meadow and seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley and foothill grassland.	Moderate
Vulpes macrotis mutica San Joaquin kit fox	FE, ST	Chenopod scrub, Valley and foothill grassland	Presumed present
Birds			
Agelaius tricolor tricolored blackbird	CSC, USFWS-BCC	Freshwater marsh, Marsh and swamp, Swamp, Wetland	Moderate
Ammodramus savannarum Grasshopper sparrow (nesting)	CSC	Native grassland with mix of grasses and forbs for nesting and foraging	Moderate
Aquila chrysaetos golden eagle	CFP, USFWS-BCC	Broadleaved upland forest, Cismontane woodland, Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon and juniper woodlands, Upper montane coniferous forest, Valley and foothill grassland	Present (foraging)
Ardea herodias great blue heron (rookery site)	--	Brackish marsh, Estuary, Freshwater marsh, Marsh and swamp, Riparian forest, Wetland	High (foraging)
Asio flammeus Short-eared owl (Nesting)	CSC	Usually found in open areas with few trees such as annual and perennial grasslands, prairies, dunes, wetlands, and irrigated lands.	Low
Athene cunicularia burrowing owl	CSC, USFWS-BCC	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley and foothill grassland	Present
Buteo regalis ferruginous hawk	USFWS-BCC	Great Basin grassland, Great Basin scrub, Pinon and juniper woodlands, Valley and foothill grassland	Moderate (non-breeding)
Buteo swainsoni Swainson's hawk	ST, USFWS-BCC	Great Basin grassland, Riparian forest, Riparian woodland, Valley and foothill grassland	High (foraging)
Circus cyaneus northern harrier	CSC	Coastal scrub, Great Basin grassland, Marsh and swamp, Riparian scrub, Valley and foothill grassland, Wetland	Present (foraging)

Scientific Name	Status	Habitat	Potential to occur in the Study Area
Elanus leucurus white-tailed kite	CFP	Cismontane woodland, Marsh and swamp, Riparian woodland, Valley and foothill grassland, Wetland	High (foraging)
Eremophila alpestris actia California horned lark	WL	Variety of open habitat where trees and large shrubs are present.	Moderate (foraging)
Falco mexicanus prairie falcon	USFWS-BCC	Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley and foothill grassland	Moderate (foraging)
Lanius ludovicianus loggerhead shrike	CSC, USFWS-BCC	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinon and juniper woodlands, Riparian woodland, Sonoran desert scrub	Present
Laterallus jamaicensis coturniculus California black rail	ST, CFP, USFWS-BCC	Brackish marsh, Freshwater marsh, Marsh and swamp, Salt marsh, Wetland	None
Xanthocephalus xanthocephalus Yellow-headed blackbird	CSC	Dense emergent wetland of cattails, tules, and other wetland plants, often along border of lake or pond.	Moderate
Invertebrates			
Branchinecta conservatio Conservancy fairy shrimp	FE	Large, cool-water vernal pools with moderately turbid water	Low
Branchinecta longiantenna *longhorn fairy shrimp*	FE	Valley and foothill grassland, Vernal pool, Wetland	Observed (*Branchinecta* sp.)
Branchinecta lynchi *vernal pool fairy shrimp*	FT	Valley and foothill grassland, Vernal pool, Wetland	Observed (*Branchinecta* sp.)
Branchinecta mesovallensis midvalley fairy shrimp	--	Vernal pool, Wetland	Observed (*Branchinecta* sp.)
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT	Riparian scrub	None
Hygrotus curvipes curved-foot hygrotus diving beetle	--	Aquatic	Low
Lepidurus packardi vernal pool tadpole shrimp	FE	Vernal pool wetlands	Low
Linderiella occidentalis California linderiella	--	Vernal pool	Moderate
Lytta molesta molestan blister beetle	--	Vernal pool, Wetland	Moderate
Perdita scitula antiochensis Antioch andrenid bee	--	Interior dunes	None
Fishes			
Acipenser medirostris green sturgeon	FT	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters	Absent
*Hypomesus transpacificus** *delta smelt*	FT, SE	Aquatic, Estuary	Absent
*Oncorhynchus mykiss** *steelhead (Coastal, Central Valley)*	FT	Aquatic	Absent
Oncorhynchus tshawytscha Central Valley spring-run, winter-run chinook salmon	FT (spring run) FE (winter run)	Aquatic, Sacramento/San Joaquin flowing waters	Absent

Sources: (CNDDB 2010, USFWS 2010a, CDFG 2009)

Status Legend:
"—" on CDFG's Special Animals List (CDFG 2009) but without other status tracked in this table.

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.
CFP = California Fully Protected
SE = State-listed as Endangered
ST = State-listed as Threatened
SCE = State candidate for listing as Endangered
Rare = State listed as rare
WL = State watch list

Western Bat Working Group
WBWG-H = High Priority are imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats.
WBWG-M = Medium Priority medium risk of imperilment based on available information on distribution, status, ecology and known threats.

California Native Plant Society (Plants only)
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)

Global Rank/State Rank (Included for plants only**)**
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.
Q = Questionable taxonomy that may reduce conservation priority.
H = Possibly extinct
? = Inexact numeric rank

Threat Rank
T/ .1 = very threatened
T/.2 = threatened
T/.3 = no current threats known

Definitions Regarding Potential Occurrence:

Present:	Species or sign of its presence observed on the site
High:	Species or sign not observed on the site, but reasonably certain to occur on the site
Moderate:	Species or sign not observed on the site, but conditions suitable for occurrence
Low:	Species or sign not observed on the site, conditions marginal for occurrence
Absent:	Species or sign not observed on the site, conditions unsuitable for occurrence

Special-status Wildlife

The applicant conducted several site visits and surveys, including biological resource surveys in February, November, and December 2009 for general reconnaissance, aquatic site mapping, habitat quality assessment for California red-legged frog and California tiger salamander, and den surveys (CH2M 2010i, Table 5-1). The proposed project site currently provides habitat for several special-status wildlife species. Special-status species are known, presumed, or highly likely to use the project site for foraging, breeding, cover, or dispersal. Rather than conduct protocol-level surveys for California red-legged frog, California tiger salamander, and San Joaquin kit fox, the applicant

proposes to infer presence and has submitted a Biological Assessment (CH2M 2010i) to USFWS. In addition, because of the proximity of known nests, the project site is presumed Swainson's hawk foraging habitat. These species, as well as those observed during surveys and site visits, are discussed below.

California Tiger Salamander (Federally Threatened, State Threatened)

The California tiger salamander historically inhabited grasslands throughout much of the state. Presently, they are distributed in remaining grassland/wetland habitats in the Central Valley, the Sierra Nevada foothills (below approximately 1,500-feet elevation), and the coastal region (Sonoma County south to Santa Barbara County) (ECCCHC 2007; Zeiner et al.1990). Conversion of valley and foothill grassland habitats to agricultural and urban uses has resulted in population declines for this species. The introduction of non-native predators, such as bullfrogs (*Rana catesbeiana*), has also been detrimental to this amphibian species (USFWS 2004).

Adult California tiger salamander breeds in vernal pools and ponds, and spend much of the year in subterranean burrows or soil crevices (Zeiner et al.1990). This species may also breed in artificial impoundments that do not contain fish and rarely in slow-moving streams. Breeding ponds must remain wet for a minimum of 10 weeks (generally until mid-May) to allow sufficient time for breeding and metamorphosis (Zeiner et al.1990). Other habitats used by this species include grasslands and oak woodlands (Zeiner et al.1990). Adults migrate at night during rain events, and may disperse one mile (1.6 km) between upland and aquatic breeding sites, depending on topography and vegetation, the distribution of ground squirrel or other rodent burrows, and climatic conditions (USFWS 2004; Zeiner et al.1990). At least 75% of historical California tiger salamander habitat has been lost, and its current distribution is discontinuous and fragmented (USFWS 2004).

Multiple California Natural Diversity Database (CNDDB) records exist for California tiger salamander within 5 miles of the proposed project area; four of these CNDDB records are within one mile, and two occurrences are from within 100 feet of the proposed project site (CNDDB 2010). This includes two breeding records that are located in water bodies (i.e., stock pond and vernal pool) that are both hydrologically connected to intermittent drainages that intersect the project's water supply pipeline route. In addition, the proposed project site is located adjacent to the Byron Conservation Bank, which formerly sold mitigation credits for this species (MEP 2009a). No California tiger salamanders were detected during the biological surveys of the site. However, protocol level surveys to determine absence of this species were not conducted by the applicant.

The project site contains suitable dispersal and burrow habitat. In addition, drainages within the project vicinity provide suitable breeding habitat. Based on the availability of habitat and proximity to known occurrences, this species is presumed present on the project site.

California Red-legged Frog (Federally Threatened, California Species of Special Concern)

California red-legged frog breeds in ponds and still waters in the coastal foothills and agricultural areas in the project area (Zeiner et al.1990). California red-legged frogs are locally abundant in some portions of the San Francisco Bay area and the Central Coast,

and there are isolated occurrences in the Sierra Nevada, northern coast, and northern Transverse Ranges. Population declines of this species have been caused by alteration of stream and wetland habitats, use of pesticides, habitat destruction, and competition and predation of introduced species such as fish and bullfrog (Davidson et al. 2001; USFWS 2002).

California red-legged frogs require various aquatic, riparian, and upland habitats including ephemeral ponds, intermittent streams, seasonal wetlands, springs, seeps, permanent ponds, perennial creeks, manmade aquatic features, marshes, dune ponds, lagoons, riparian corridors, blackberry thickets, non-native annual grasslands, and oak savannas (USFWS 2002; Zeiner et al.1990). The presence of willows, cattails, and woody riparian vegetation are indicators of higher quality breeding habitat (USFWS 2001; USFWS 2005). Long-term populations survival is also linked to the spatial proximity of breeding habitats so that inter-patch migration can be achieved (USFWS 2001).

Multiple CNDDB records exist for California red-legged frog within 5 miles of the proposed project area; 13 of these CNDDB records are within 1 mile of the proposed project site (CNDDB 2010). Three of these records include populations located in the vicinity of the proposed project site. These records include a population of adult frogs and a breeding record located along intermittent drainages that intersect the project's water supply pipeline route. A second breeding record is located at a stock pond which is hydrologically connected to an intermittent drainage also that intersects the project's water supply pipeline route. The proposed project site is located within USFWS-designated critical habitat for California red-legged frog (Unit CCS-2B). No California red-legged frogs were detected during the biological surveys of the site. However, protocol level surveys were not conducted by the applicant. The project area is in the range of the California red-legged frog and the project site provides suitable dispersal and upland habitat. Based on the availability of habitat and proximity to known occurrences, this species is presumed present on the project site.

Western Pond Turtle (California Species of Special Concern)

Western pond turtles are found throughout western California, and are associated with permanent or nearly permanent water in a variety of habitat types (Zeiner et al. 1988-1990). They require slack or slow-water aquatic habitat, both water and aerial basking sites, and shallow water with dense submergent or short emergent vegetation for hatchlings (Jennings and Hayes 1994). In addition, western pond turtles require an upland nest site for egg-laying, in the vicinity of aquatic habitat. There are two CNDDB records for this species within 1 mile of the proposed disturbance area, and multiple records within 5 miles. No western pond turtles were observed within the project site during project surveys.

San Joaquin Kit Fox (Federally Endangered, State Threatened)

The San Joaquin kit fox are primarily nocturnal, but are commonly seen during the day in late spring and early summer (Orloff et al. 1986). This species typically occurs in valley and foothill grassland, or mixed shrub/grassland habitats throughout low, rolling hills and valleys and also use habitats that have been altered by humans (e.g., agricultural land, oil fields). San Joaquin kit foxes can inhabit the margins of fallow lands

near irrigated row crops, orchards, and vineyards, and may forage occasionally within these agricultural areas (Cypher et al 2007). Warrick et al. (2007) found that San Joaquin kit foxes in an agricultural setting typically denned in small patches of grassland but that 40 to 50% of their nocturnal locations were in row crops or orchards. Kit foxes change dens frequently, sometimes only using a den for two or three days. They often enlarge ground squirrel burrows for use as a den and may use vacant badger dens for shelter (USFWS 1998), both of which occur within the proposed project area. Loss and degradation of habitat by agricultural, industrial, and urban development and associated practices continue to decrease available habitat. Hunting, road kill, and reduction of prey populations by poisoning have contributed to the species decline (USFWS 1998).

The proposed project site is located within the northern extent of the San Joaquin kit fox range. Thirty-four CNDDB records exist for San Joaquin kit fox within 10 miles of the proposed project area; five of these are within 1 mile of the proposed project site (CNDDB 2010). These records include three historic denning locations within 1 mile of the proposed project site (CNDDB 2010). Kit foxes are known to move though the project area, however no natal dens or burrows were detected during the biological surveys of the site or linears. Protocol level surveys to determine absence of this species were not conducted by the applicant. However, there were an abundance of ground squirrel burrows detected on the project site which would provide habitat for San Joaquin kit fox to establish dens in the future. In addition, California ground squirrels and other rodents in the project area provide a prey base for kit foxes. Given the biological requirements of this species, the ability of kit foxes to move an average of 5.8 to 9.1 miles per night (Spiegel 1996), detections in the project area, the presence of suitable habitat and potential denning sites, staff assumes that San Joaquin kit fox could currently inhabit the project area.

American badger (California Species of Special Concern)

American badgers were once fairly widespread throughout open grassland habitats of California but now are an uncommon permanent resident with a wide distribution across California, except from the North Coast area where they are absent. 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.

While this species was not observed during surveys for the proposed project, the project site contains ample habitat and this species is known to historically occur along the water supply pipeline route (CNDDB 2010).

Golden Eagle (California Fully Protected, Bird of Conservation Concern)

The golden eagle forages in grasslands or open agricultural lands, which occur within or adjacent to the proposed power plant site and the proposed water supply pipeline route, natural gas line route, and transmission line route. Suitable nesting habitat for golden eagle includes cliffs of all heights and large trees in open areas (Zeiner et al.1990).

The status of golden eagle populations in the United States is not well known, though there are indications populations may be in decline (USFWS 2009, 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 2009).

There is one CNDDB record for golden eagle within 5 miles of the project area, which is a nest site located approximately 4 1/2 miles west of the project site in a canyon with mixed riparian habitat (CNDDB 2010). One golden eagle was observed foraging over grasslands in the vicinity of the project site during biological surveys in 2009 as well as during a staff site visit (December 22, 2009). There is no suitable nesting habitat for golden eagle in the immediate project area. However, there is suitable foraging habitat for golden eagle in annual grassland and active agricultural fields within the proposed project area.

Burrowing Owl (California Species of Special Concern)

The burrowing owl is a yearlong resident of open, dry grassland, prairie, or desert floor habitats. Burrowing owls may be diurnal, crepuscular, or nocturnal, although hunting typically occurs at night. The burrowing owl is known to occur in urban, disturbed areas, and at the edges of agricultural fields, including orchards, and typically hunts from a perch or hops after prey on the ground. It typically nests in the vacant burrow of a ground squirrel or other small mammal although it is also known to occupy manmade structures including culverts, pipes, nest boxes, and piles of debris (CDFG 1995).

Multiple CNDDB occurrences exist within 10 miles of the proposed project site. This includes three records for active burrow sites, recorded between 1992 and 2004, located east and west of the proposed water supply pipeline route. One burrowing owl, in association with an active burrow, was detected within the project temporary laydown area during special-status plant surveys in 2009. The open agricultural fields and grasslands within the project site, including along the proposed water supply pipeline, natural gas line, and transmission line routes support prey for this species including insects, small mammals, lizards, and other birds. In addition, small mammal burrows located on the site provide suitable nesting opportunities.

Swainson's Hawk (State Threatened)

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 (*Quercus lobata*), cottonwood (*Populus fremontii*), walnut (*Juglans hindsii*), and willow (*Salix* spp.), and occasionally in non-native trees, such as eucalyptus (*Eucalyptus* spp.) within riparian woodlands, along roadsides, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands (CDFG 1993). Habitat loss due to residential and commercial development is currently the most significant threat to the remaining Swainson's hawk population in California (CDFG 1993).

There are no suitable nest trees within the project site; however, potential nest trees (e.g., ornamental trees) are present in the project area near the PG&E facilities and in the immediate proposed project vicinity. A Swainson's hawk nest was recorded in 2009 and 2010 in the proposed Mountain House Conservation Bank (Grefsrud pers. comm.), which is directly west of the proposed project. The nest is within 1/4 mile of the proposed water supply line and the proposed access road disturbance area, and is approximately 1/4 mile from the proposed power plant site disturbance area. Two Swainson's hawks were observed in this area during project surveys (CH2M 2010p, *MEP Swainson's Hawk Survey*). There is additional Swainson's hawk nest habitat east of the power plant site (between 1/4-mile and 1/2-mile distant), and an additional Swainson's hawk was observed in this area (CH2M 2010p, *MEP Swainson's Hawk* Survey).

Multiple CNDDB records for Swainson's hawk exist within 10 miles of the project area; twenty of these CNDDB records are nests located within 5 miles of the project site dated between 1997 and 2003 (CNDDB 2010). These records are located between approximately 3 to 5 miles northeast of the project site near Clifton Court Forebay and the Old River as well as 3 to 5 miles east of the project site along the Old River and the Fabian and Bell Canal. Foraging habitat occurs in annual grassland as well as active agricultural fields within the proposed project area, including along the proposed water supply pipeline, natural gas pipeline, and transmission line routes.

Northern Harrier (California Species of Special Concern)

Northern harriers forage in grasslands or open agricultural lands and nest on the ground in shrubby vegetation, usually near a marsh edge (Zeiner et al.1990). There is one CNDDB record for northern harrier in the project vicinity, which includes a nest site located approximately three miles northeast of the project site (CNDDB 2010). A northern harrier was observed foraging near the proposed water supply pipeline route during the biological surveys of the site. The project site contains foraging habitat for this species, as does portions of the proposed water supply pipeline and transmission line routes.

Loggerhead Shrike (California Species of Special Concern, Bird of Conservation Concern)

Loggerhead shrikes forage in grasslands or open agricultural lands. This species nests on densely-foliaged shrubs or tree. There is one CNDDB record for loggerhead shrike within 10 mile of the project area, which includes a breeding pair detected at a nesting site approximately 3 miles southeast of the project site (CNDDB 2010). One loggerhead shrike was observed foraging near the proposed water supply pipeline route during biological surveys of the site. There is no suitable nesting habitat for loggerhead shrike within the project site however suitable habitat is located near the PG&E facilities. There is suitable foraging habitat for this species within the project site, including portions of the proposed water supply pipeline, natural gas line, and transmission line routes.

Vernal Pool Invertebrates (Federal Endangered/ Threatened)

Vernal pool invertebrates, including the longhorn fairy shrimp (Federally Endangered) and vernal pool fairy shrimp (Federally Threatened), have been identified as possibly occurring within the project area, in association with ephemeral pools. Typical habitat for

these vernal pool invertebrates includes vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats (USFWS 2003). Other kinds of depressions that hold water of a similar volume, depth, and area, and for a similar duration and seasonality as vernal pools and ponded areas within swales also may be potential habitat (ECCCHC 2007).

There are six CNDDB occurrences for vernal pool invertebrates within five miles of the project area; this includes two records for longhorn fairy shrimp approximately five miles west of the project site (CNDDB 2010). This also includes two CNDDB records each for vernal pool fairy shrimp and midvalley fairy shrimp (no status) located one mile north of the project site. A single *Branchinecta* sp. was detected in a shallow 0.01-acre seasonal wetland near the Byron Power Cogen Power Plant during biological surveys. There are several vernal pools and other seasonal wetlands within the proposed project area that would provide suitable habitat for vernal pool invertebrates.

Special-status Plants

The applicant conducted protocol-level special-status plant surveys April 7 and 15, May 20, and August 18, 2009 (CH2M 2010i, Table 5-1). No special-status plant species were observed within the project disturbance area; however, two species, discussed below, were found within the project vicinity (CH2M 2009f, Attachment DR19-1, Table 2-1).

Heartscale (*Atriplex cordulata;* CNPS List 1B.2)

Heartscale is endemic to California, and is primarily limited to the Central Valley. Decline of this species is attributed to the introduction of exotic plants, though it is also possibly threatened by trampling (CNPS 2010). Heartscale grows on saline or alkaline soils within chenopod scrub as well as meadows and seeps and sandy areas within annual grasslands at elevations up to 1,000 feet and blooms from April to October.

There are 3 CNDDB occurrences for heartscale within 10 miles of the project area; the closest record is located approximately 7 miles southwest of the project site (CNDDB 2010). This species was detected in the vicinity of the proposed transmission line route, in the alkaline meadow north of the PG&E Kelso Substation (CH2M 2009i). There is appropriate habitat for this species within the project site, including along portions of the proposed water line, natural gas line, and transmission line routes.

Little Mousetail (*Myosurus minimus* ssp. *apus;* CNPS List 3.1)

Little mousetail is a CNPS List 3.1 species, indicating it is a review list species that requires more information but that it is potentially seriously endangered in California. The geographic range in California is limited to vernal pool habitats ranging from Butte County to Riverside County. Decline of this species is attributed to loss of vernal pool habitat as well as impacts from vehicles, grazing, development, and agriculture (CNPS 2010). Little mousetail grows on alkaline soils within vernal pools from elevations of 65 to 2,100 feet and blooms from March to June. This species was detected during surveys on the Lee Property, east of transmission line route. There is appropriate habitat for this species adjacent to the project site, including along portions of the proposed water line, natural gas line, and transmission line routes.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The threshold for determining significance is based on the biological resources present or potentially present within the proposed project area in consideration of the proposed project description. A proposed project would have a significant impact to biological resources, if it would:

- Have an adverse impact, either directly through take, or indirectly through habitat modification or interruption of migration corridors, on any state- or federally-listed species;
- Have an indirect or direct adverse effect on any sensitive natural community or habitat identified in federal, state or local plans, policies, or regulations;
- Interfere with the movement of any native wildlife species (resident or migratory) or with established native wildlife (resident or migratory) corridors; or
- Conflict with applicable federal, state, or local laws, ordinances, regulations, and standards protecting biological resources, as listed in **Biological Resources Table 1**.

DIRECT AND INDIRECT IMPACTS AND MITIGATION

The California Environmental Quality Act (CEQA) Guidelines define “direct” impacts as those impacts that result from the project and occur at the same time and place. “Indirect” impacts are caused by the project, but can occur later in time or farther removed in distance and are still reasonably foreseeable and related to the operation of the project. Significance of impacts is generally determined by compliance with applicable LORS; however, guidelines adopted by resource agencies may also be used.

This section analyzes the potential for direct and indirect impacts of construction and operation of the proposed project to biological resources and provides mitigation, as necessary, in an effort to reduce the severity of potentially adverse impacts.

The applicant must provide a Biological Assessment (BA) deemed adequate by the USFWS, in order for USACE to complete Section 7 consultation with USFWS. The applicant recently submitted an updated BA to the USFWS, which the USFWS is currently reviewing. Modifications to the staff’s impact analysis and compensatory mitigation ratios and acreages, as well as conditions of certification may be necessary if revisions to the draft BA that are contradictory to staff’s analysis are required in order to complete the final BA.

General Impact Avoidance, Minimization, and Mitigation Measures

Staff recommends that a Designated Biologist and biological monitor(s) be assigned to ensure avoidance and minimization of the impacts described below and protection of the sensitive biological resources described above. Selection criteria and minimum qualifications of the Designated Biologist and biological monitor(s) (such as an appropriate degree and/or field experience) are described in staff’s proposed Conditions of Certification **BIO-1** (Designated Biologist Selection) and **BIO-3** (Biological Monitor Qualifications). The Designated Biologist and Biological Monitor duties (such as

required presence on-site and involvement in preparing plans and reports) and authority (including the authority to halt project activities under certain circumstances) are described in staff's proposed Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-4** (Designated Biologist and Biological Monitor Authority), respectively. The Designated Biologist and/or biological monitor(s) would be responsible, in part, for developing and implementing the Worker Environmental Awareness Program (WEAP) (see Condition of Certification **BIO-5**), which is a mechanism for training the workers on protection of the biological resources described in this document.

Staff's proposed Condition of Certification **BIO-6** (Biological Resources Mitigation Implementation and Monitoring Plan) provides for the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), which consolidates all project resource mitigation, monitoring, and compliance measures, as well as other information necessary to ensure compliance with, and effectiveness of, all project-specific required impact avoidance, minimization, and mitigation measures.

Staff's proposed Condition of Certification **BIO-7** (General Impact Avoidance and Minimization Measures), describes general measures to be in place throughout project construction to avoid and minimize impacts to biological resources from the proposed project during site mobilization, pre-construction debris removal, ground disturbance, grading, construction, operation, maintenance, and closure.

The applicant has proposed several mitigation measures that relate to the Designated Biologist duties, the WEAP, and general impact avoidance, minimization, and mitigation (MEP 2009a, CH2M 2010p). This includes measures proposing biological monitors and requirements for their presence on site during sensitive work; protecting drainages and other waterways from sediment and other pollutants; dust control; site restoration; protections for special-status species, and; an on-site construction personnel education program. Staff agrees with many of these proposals, and, where appropriate, has incorporated these items into staff's proposed conditions of certification.

Project Impacts and Compensatory Mitigation

The project site would permanently affect 10.1 acres and temporarily affect 24.2 acres of habitat (CH2M 2010p), including annual grassland, wetlands and ephemeral drainages, and agricultural land (see **Biological Resources Table 4**). Of the 24.2 acres of temporary impacts, 12.1 acres would be disturbed by construction parking, temporary laydown, and cut and fill for the laydown and access road. This area would be disturbed for an entire breeding season, and therefore would require the same compensation levels as for permanent impacts (CEC 2010x).

Biological Resources Table 4
Project Impacts to Habitat [1]

Work Area	Short-term Temporary Impacts (< 1 season; acres)	Long-term Temporary impacts (> 1 season; acres)	Permanent Impacts (acres)
MEP Power Plant Site	--	2.9	9.7
MEP Access Road	--	--	0.4
MEP Laydown Yard	--	9.2	--
Natural Gas Line	1.0	--	--
230-kV Transmission Line	8.5	--	0.01
Water Supply Line	2.6	--	0.006
Total:	**12.1**	**12.1**	**10.1**

Source: CH2M 2010p

1 – Includes undeveloped areas only; includes impacts to annual grassland, wetlands, and ephemeral drainages.

- Short-term Temporary Impacts: Impacts from installing linear features, where the impact would be short-term and transient along the linear facility.
- Long-term Temporary Impacts: Impacts that result in the loss of habitat functionality for greater than 12 months or, in some cases, loss for one breeding season. These include impacts from construction site laydown and parking, and cut and fill areas.
- Permanent Impacts: Permanent project features, including the power plant, previously undeveloped sections of the access road, and the transmission line poles.

Mitigation ratios and compensatory mitigation acreages are listed in **Biological Resources Table 6**. Mitigation ratios were developed in consultation with the USFWS and CDFG, and are based on past projects in similar habitat types.

The applicant has proposed to mitigate for these project impacts by purchasing credits at the proposed Mountain House Mitigation Bank. The 144-acre proposed bank is located directly adjacent to the project site, and provides suitable habitat for California tiger salamander, California red-legged frog, burrowing owl, San Joaquin kit fox, Swainson's hawk, and vernal pool branchiopods (CH2M 2010p). However, this bank has not yet been finalized, and would need to be approved by both CDFG and USFWS in order to satisfy mitigation and compensation requirements.

If the proposed Mountain House Mitigation Bank is finalized and approved by both the CDFG and USFWS for the species discussed above, and sufficient credits for affected species are available to mitigate for project impacts, this would likely be an appropriate way to compensate for project impacts. However, credits must be purchased within 18 months following construction initiation and before commercial operation commences.

Another mitigation strategy proposed by the applicant would be to participate in the East Contra Costa County Habitat Conservation Plan and Natural Communities Conservation Plan (ECCCHCP/NCCP; CH2M 2010p). CDFG, however, has indicated to the applicant that this strategy would not be acceptable. Among the reasons this strategy would not be acceptable to CDFG are: the project is outside of the planning area for the HCP/NCCP; the mitigation fees would have to be applied to the purchase of land over and above the ECCCHCP/NCCP mitigation cap since the project is not a covered activity (see ECCCHC 2007, Section 2.3 for Covered Activities); the East Contra Costa Conservancy (Conservancy), which implements the ECCCHCP/NCCP, was not designed to be a land purchase agent for applicants other than those covered by the plan; there is no assurance that land purchased by the Conservancy would be mitigating for the same species impacted at the MEP, and; there would be no assurance that the land would be purchased within a specific time frame (CEC 2010w).

Staff's proposed Condition of Certification **BIO-16**, Compensatory Mitigation, describes the compensatory mitigation required for California tiger salamander, California red-legged frog, burrowing owl, San Joaquin kit fox, Swainson's hawk, listed branchiopods, and wetlands. Because it is unclear whether the proposed conservation bank would be finalized within the required timeframe, this condition provides the option to either purchase credits at an approved mitigation bank or to mitigate through the acquisition and enhancement and preservation of habitat, including an endowment to cover maintenance, monitoring, and security of the conservation easement area in perpetuity. Habitat to be acquired and preserved must be approved by the CPM, CDFG, and USFWS to ensure it fulfills mitigation requirements.

Unless agency-approved compensation is completed prior to construction, the project owner would need to provide financial assurances prior to project site mobilization or ground disturbance. The financial assurance would be based on the estimated cost to compensate for project impacts through land acquisition, one-time enhancement, and to create an endowment for land management in perpetuity (see **Biological Resources Table 5)**. Compensatory mitigation must be completed within 18 months of the start of project ground-disturbing activities, or prior to commercial operation, whichever occurs first. Financial assurance can be provided in the form of an irrevocable letter of credit, or another form of security ("Security") approved by the CPM. Estimated costs for acquisition, enhancement, and the long-term management endowment are provided by CDFG, and are estimates based on costs within a similar region. The Security is based on the compensatory acreages included in **Biological Resources Table 6**, and assumes the applicant would be able to mitigate for all species with the minimum required acreage.

Biological Resources Table 5
Project Security

Category [1]	Cost [2]
Acquisition ($10,000/acre)	$799,000
One-time enhancement for 79.9 acres	$100,000
Long-term management endowment ($22,000/year at 3% return)	$733,333
Other fees [3]	$44,000
Total	**$1,676,333**

1 – Estimates provided by CDFG (CEC 2010v).
2 – These costs are based on acquisition, enhancement, and endowment of 79.9 acres, which assumes the project owner would purchase lands that are suitable for all species listed in **Biological Resources Table 6**.
3 – Other fees include conservation easement fee, accounting, copying, tracking, documents fee, fee for PAR review, grantee orientation, initiation of management, etc.

Biological Resources Table 6
Compensatory Mitigation [1,2]

Resource	Acres Impacted	Mitigation Ratio	Recommended Compensation (acres) [1]
Branchiopods/Wetlands			
Permanent **Total**	**0.018**	**3:1**	**0.054**
CA tiger salamander			
Permanent	10.1	3:1	30.3
Long-term Temporary (> 1 season)	12.1	3:1	36.3
Short-term Temporary (< 1 season)	12.1	1.1:1	13.3
Total			**79.9**

CA red-legged frog			
Permanent	10.1	3:1	30.3
Long-term Temporary (> 1 season)	12.1	3:1	36.3
Short-term Temporary (< 1 season)	12.1	1.1:1	13.3
Total			**79.9**
San Joaquin kit fox			
Permanent	10.1	3:1	30.3
Long-term Temporary (> 1 season)	12.1	3:1	36.3
Short-term Temporary (< 1 season)	12.1	1.1:1	13.3
Total			**79.9**
Swainson's hawk (nest within 1 mile)			
Permanent	10.1	1:1	10.1
Long-term Temporary (> 1 season)	12.1	1:1	12.1
Short-term Temporary (< 1 season)	12.1	N/A	0
Total			**19.3**
Western burrowing owl			
Permanent	10.1	2:1	20.2
Long-term Temporary (> 1 season)	12.1	2:1	24.2
Short-term Temporary (< 1 season)	12.1	N/A	0
Total			**44.2** [3]

1 – Details of impact analysis and mitigation requirements are still in progress.
2 – Mitigation can be combined, if compensatory mitigation requirements for each species are met.
3 – 44.2 acres if the compensation site supports double the number of owls displaced by the project. Otherwise, the compensation acreage amount (not to fall below 44.2 acres) that achieves that requirement.

Impacts to Wetlands and Waters

There are multiple wetlands and other waters within the project vicinity, including ephemeral drainages, seasonal wetlands, alkali meadow, erosional ditches, and swales. Direct impacts include permanent impacts to the entire 0.018-acre seasonal wetland north of the proposed power plant site, along the proposed access road disturbance route (CH2M 2010p; SWL-1, see CH2M 2009g); permanent impacts to a 0.0008-acre area of an irrigation canal (CH2M 2010r, Canal 45); temporary impacts to a 0.0004-acre area of an unvegetated streambed (D-2), and; temporary impacts to 0.0008-acre of alkali sink wetland (ASW-1). Other impacts could result from erosion, sedimentation, and discharge of contaminated water into drainages or wetlands.

These direct and indirect impacts are significant impacts to potentially jurisdictional wetlands and other waters (D-2, ASW-1, SWL-1, and Canal 45) as well as waters of the state (D-2, Canal 45). Staff's proposed Condition of Certification **BIO-9** (Special-status Invertebrates Impact Avoidance, Minimization, and Mitigation Measures) provides impact avoidance and minimization measures (such as establishing buffer zones, and timing of work) and Condition of Certification **BIO-16** provides mitigation ratio requirements for the permanent impacts to seasonal wetland SWL-1. The Alameda County General Plan – East County Area Plan (ECAP) Policy No. 126 calls for "no net loss" of wetlands within the county. However, staff in consultation with the county has concluded that, while it is preferable to mitigate within the county, their priority is to find the highest quality mitigation option and to ensure that agency staff are satisfied with the appropriateness of the mitigation (AC 2010h). With implementation of Conditions of Certification **BIO-16** staff expects these impacts to be reduced below a level of significance.

Staff's proposed conditions of certification **BIO-17** (Waters and Wetlands Impact Avoidance and Minimization Measures) and **BIO-18** (Revegetation and Restoration Plan) would provide measures to avoid and minimize impacts to the remaining wetlands and waters, including measures to protect waterways from pollutants including sediment, establish buffer zones, and install erosion control, as well as measures directing revegetation such as topsoil storage and use. Implementation of staff's proposed conditions of certification **BIO-7, BIO-9, BIO-16, BIO-17, and BIO-18** would reduce impacts to these resources below a level of significance. However, until USACE completes consultation with USFWS for federally listed species, the USACE cannot issue a permit for impacts to waters of the United States from this project. This permit is required before the project could be constructed.

The proposed water supply line route would cross several additional culverts associated with drainages or roadside ditches (CH2M 2010p). The applicant proposes to use an underground tunneling method, such as pipe ramming, to install the water supply pipeline under these culverts. "Frac-out", or inadvertent return of drilling lubricant, could affect sensitive aquatic habitat and species. This impact is a concern if a method such as Horizontal Directional Drilling, which would require the lubricant bentonite, is selected. Staff's proposed Condition of Certification **BIO-17** (#4) provides a measure to avoid and minimize this impact. This measure would be triggered by the use of bentonite, and would require an Emergency Spill Response Plan and other monitoring plans. With implementation of this Condition of Certification, this impact would be reduced below a level of significance.

Impacts to Special-status Species

The proposed project site provides breeding, cover, foraging, and dispersal habitat for many wildlife species including several special-status wildlife species, and potential habitat for special-status plant species.

Staff's proposed conditions of certification **BIO-1**, **BIO-2**, **BIO-3**, **BIO-4**, **BIO-5**, **BIO-6**, and **BIO-7** provide general measures that apply to both plants and wildlife and, if implemented, would reduce the impacts from this project. Species-specific impacts and proposed avoidance, minimization, and mitigation measures are discussed in more detail below.

Special-status Wildlife

Special-status Invertebrates (Federal Endangered, Federal Threatened)

There are three seasonal wetlands within the proposed project disturbance area, and a *Branchinecta* species was observed within one of these wetlands. An additional unidentified branchiopod was observed in a swale near, but not within, the project disturbance area. Therefore, the applicant has proposed to presume presence of special-status branchiopods. The seasonal wetland in which a *Branchinecta* sp. was observed is a small seasonal wetland located south of the Byron Cogen Power Plant, within 250 feet of the power plant site disturbance area. This entire seasonal wetland (0.018 acres) would be permanently affected by power plant site construction (CH2M 2010p). In addition to the occupied seasonal wetland near the proposed power plant site disturbance area, there is additional habitat along the transmission line corridor.

The applicant has indicated that direct impacts to these seasonal wetlands are not expected. Because of the proximity of this habitat to proposed disturbance areas, however, special-status branchiopods and habitat could be directly affected if personnel, construction vehicles, or machinery cause disturbance to these seasonal wetlands. In addition, special-status branchiopods and habitat could be subject to indirect impacts from project-related erosion, sedimentation, or contamination from construction materials or equipment. Impacts to federally listed branchiopods would be significant. The applicant has proposed several impact avoidance, minimization, and mitigation measures, such as worker education, onsite biological monitors, and buffers, to protect listed branchiopods. Staff agrees with many of the proposals, and has incorporated them into staff's proposed conditions of certification. Staff's proposed Condition of Certification **BIO-9** (Special-status Invertebrate Impact Avoidance and Minimization Measures) establishes a construction buffer and a seasonal work window to minimize the risk of adverse impacts. Staff has concluded that implementation of **BIO-9**, as well as **BIO-16** and **BIO-17**, would reduce impacts to federally listed branchiopods below a level of significance. The applicant needs to provide USFWS with a final BA, in order for the USFWS to issue a BO. The applicant recently submitted an updated BA to the USFWS, which the USFWS is currently reviewing. Modifications to the staff's impact analysis and compensatory mitigation ratios and acreages, as well as conditions of certification may be necessary if future revisions to the BA are contradictory to staff's analysis.

San Joaquin Kit Fox (Federally Endangered, State Threatened)

While no San Joaquin kit fox, natal dens, or burrows were observed on the project site during den and other site surveys, the project is within this species' range and ground squirrel burrows provide an opportunity for this species to establish dens in the future. Therefore, the construction of this project would result in the loss of suitable foraging and potential breeding habitat for this species. If present on the project site during construction, San Joaquin kit fox could be killed by heavy equipment or ground disturbance could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. These impacts to a federally- and state-listed species would be significant. The applicant has proposed several impact avoidance, minimization, and mitigation measures, such as exclusion zones, speed limits, and measures to avoid attracting San Joaquin kit fox and to allow individuals on the site to safely escape. Staff agrees with many of the proposals, and has incorporated them with some modifications (such as adjustments to buffer distances) into staff's proposed conditions of certification. Staff's proposed Condition of Certification **BIO-14** (San Joaquin Kit Fox Impact Avoidance and Minimization Measures) requires that a qualified biologist perform a pre-construction survey for San Joaquin kit fox dens in the project area, including areas within 200 feet of all project facilities, utility corridors, and access roads. **BIO-14** also includes impact and avoidance measures if San Joaquin kit fox or their dens are found, such as establishing exclusion zones, required methods for den destruction, establishing speed limits, providing for escape routes, and other measures to minimize harassment or other disturbance. If staff's proposed conditions of certification **BIO-14** and **BIO-7**, which includes a measure to minimize habitat disturbance, are implemented, impacts from construction and operation of this project would be minimized.

The project would permanently remove approximately 10.1 acres of foraging and denning habitat for San Joaquin kit foxes and would fragment and reduce the value of foraging and denning habitat adjacent to the project site. An additional 12.1 acres would be lost to this species for longer than one breeding season. The project is within the northern part of the San Joaquin kit fox range, which is heavily threatened by habitat loss and fragmentation. If implemented, staff's proposed Condition of Certification **BIO-16**, Compensatory Mitigation, would minimize impacts due to loss of habitat.

Staff has concluded that impacts to San Joaquin kit fox can be mitigated below a level of significance by implementation of the conditions described above. However, the applicant needs to provide USFWS with a final BA, in order for the USFWS to issue a BO. The applicant recently submitted an updated BA to the USFWS, which the USFWS is currently reviewing. Modifications to the staff's impact analysis and compensatory mitigation ratios and acreages, as well as conditions of certification may be necessary if future revisions to the BA are contradictory to staff's analysis.

American Badger (California Species of Special Concern)

American badgers were not detected on the project site, but the site includes moderately suitable foraging and denning habitat for this species. The American badger is protected under Title 14, California Code of Regulations (sections 670.2 and 670.5), and potential impacts to individuals of this species must be mitigated to less-than-significant levels. Construction of the project could kill or injure American badgers by crushing them with heavy equipment or could entomb them within a den. Construction activities could also result in disturbance or harassment of individuals. These impacts would be considered significant. The applicant has proposed several impact avoidance, minimization, and mitigation measures, such as pre-construction surveys and protective buffers. Staff agrees with many of the proposals, and has incorporated them into staff's proposed conditions of certification. Staff's proposed Condition of Certification **BIO-13** (American Badger Impact Avoidance and Minimization) requires that a qualified biologist perform a pre-construction survey for badger dens in the project area, including areas within 200 feet of all project facilities, utility corridors, and access roads, and provides avoidance measures if a den is detected. Implementation of **BIO-13** would reduce impacts to this species below a level of significance.

California Red-legged Frog (Federally Threatened, California Species of Special Concern)

The proposed project is located within California red-legged frog Critical Habitat Unit CCS-2B, and there are multiple records for this species within one mile of the proposed project including one record on the project parcel (CNDDB 2010; CH2M 2010i). The proposed water supply pipeline route crosses the drainage with California red-legged frog records, as well as other drainages that may provide suitable breeding, dispersal, and cover habitat. Construction of this project would result in the loss of suitable dispersal and upland refugia habitat and disturbance to dispersal habitat for this species; this impact would be significant. Implementation of staff's proposed Condition of Certification **BIO-16**, Compensatory Mitigation, would minimize impacts from habitat loss.

If present on the project site during construction, California red-legged frogs could be killed by heavy equipment. Adults seeking cover in burrows within the boundaries of the

exclusion fence could be crushed or entombed during grading, cut and fill activities, or other ground disturbance; adults seeking cover in burrows within the proposed linear routes could be crushed or entombed during trenching or monopole installation. In addition, adults could be crushed or entombed from impacts to burrows from construction or transmission line maintenance traffic. Construction activities could also result in disturbance or harassment of individuals and increase the risk of predation. Staff concludes these impacts would be significant. The applicant has proposed several impact avoidance, minimization, and mitigation measures, such as pre-construction surveys, on-site biological monitors, worker education, exclusionary fencing, and protective buffers. Staff agrees with many of the proposals, and has incorporated them into staff's proposed conditions of certification. Staff's proposed Condition of Certification **BIO-10** requires that measures to minimize impacts to burrowed adults be implemented as a part of this project. This would include measures to avoid potential burrows, install exclusionary fencing, conduct clearance surveys, delineate work areas for linear routes, limit off-road access, limit construction and construction activity in the wet season, and minimize access to the power plant site by this species. Staff's proposed conditions of certification **BIO-10** and **BIO-16,** as well as measures in **BIO-7** (such as measures to limit habitat disturbance, to avoid attracting predators, and provide for on-site Biological Monitors) would minimize impacts from this project.

Staff has concluded that impacts to California red-legged frog can be mitigated below a level of significance by implementation of the conditions described above. However, the applicant needs to provide USFWS with a final BA, in order for the USFWS to issue a BO. The applicant recently submitted an updated BA to the USFWS, which the USFWS is currently reviewing. Modifications to the staff's impact analysis and compensatory mitigation ratios and acreages, as well as conditions of certification may be necessary if future revisions to the BA are contradictory to staff's analysis.

California Tiger Salamander (Federally Threatened, State Threatened)

There are multiple California tiger salamander breeding sites in close proximity to the proposed project, including a site within approximately 100 feet of the water supply pipeline disturbance area (CH2M 2010i). In addition, the proposed water supply pipeline route crosses drainages that may provide suitable dispersal and cover habitat. Construction of this project would result in the loss of suitable dispersal and upland subterranean burrow habitat and disturbance to subterranean burrowing, dispersal, and potential breeding habitat for this species. Staff has concluded that these impacts would be significant. Implementation of staff's proposed Condition of Certification **BIO-16**, Compensatory Mitigation, would minimize impacts from loss of habitat.

If present on the project site during construction, construction of the project could kill or injure California tiger salamander by crushing them with heavy equipment. Adults in subterranean burrows within the boundaries of the exclusion fence could be crushed or entombed during grading and cut and fill activities; adults in subterranean burrows within the proposed linear routes could be crushed or entombed during trenching or monopole installation. In addition, adults could be crushed or entombed from impacts to burrows from construction or transmission line maintenance traffic. Construction activities could also result in disturbance or harassment of individuals and increase the risk of predation. Staff concludes these impacts would be significant. The applicant has

proposed several impact avoidance, minimization, and mitigation measures, such as pre-construction surveys, on-site biological monitors, worker education, exclusionary fencing, and protective buffers. Staff agrees with many of these proposals, and has incorporated them into staff's proposed conditions of certification. Staff's proposed Condition of Certification **BIO-10** requires that measures to minimize impacts to burrowed adults would be implemented as a part of this project. This would include measures to avoid potential burrows, install exclusionary fencing, conduct clearance surveys, delineate work areas for linear routes, limit off-road access, limit construction and construction activity in the wet season, and minimize access to the power plant site by this species. If staff's proposed conditions of certification **BIO-10**, **BIO-7**, which includes measures to limit habitat disturbance, avoid attracting predators, and to provide for on-site biological monitors, are implemented, impacts from construction and operation of this project would be minimized.

Staff has concluded that impacts to California tiger salamander can be mitigated below a level of significance by implementation of the conditions described above. However, the applicant needs to provide USFWS with a final BA, in order for the USFWS to issue a BO. The applicant recently submitted an updated BA to the USFWS, which the USFWS is currently reviewing. Modifications to the staff's impact analysis and compensatory mitigation ratios and acreages, as well as conditions of certification may be necessary if future revisions to the BA are contradictory to staff's analysis.

Western Pond Turtle (California Species of Special Concern)

There are multiple CNDDB records of this species in the project vicinity, and the proposed water supply pipeline route would cross drainages that may provide suitable dispersal, cover, and foraging habitat. If present on the project site during construction, western pond turtles could be injured or killed by construction equipment. In addition, western pond turtles and habitat could be subject to indirect impacts from project-related erosion, sedimentation, or contamination from construction materials or equipment. The applicant has proposed several impact avoidance, minimization, and mitigation measures, such as pre-construction surveys, on-site biological monitors, avoidance, and exclusionary fencing. Staff agrees with many of these proposals, and has incorporated them into staff's proposed conditions of certification. Implementation of staff's proposed Condition of Certification **BIO-11** (Western Pond Turtle Impact Avoidance and Minimization Measures) provides for pre-construction surveys and relocation if western pond turtles are found. Implementation of this condition would ensure impacts to this species are below a level of significance.

Western Burrowing Owl (California Species of Special Concern)

Western burrowing owls have been observed within the project site including owls and active burrows within the proposed laydown area (MEP 2009a) and near the proposed natural gas line route (Ellwood, pers. com.). Phase III Focused Surveys were completed in June and July of 2010; five burrows, which comprised three burrowing owl territories, were observed adjacent to the project site (CH2M 2010y).

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 breeding season, before ground disturbance); permanent loss of breeding and foraging habitat; and disturbance of

nesting and foraging activities for burrowing owls within the project 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 present within the project disturbance area would need to be relocated prior to 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 owls. 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 because relocated or displaced owls are tenacious about returning to their familiar burrows and are inclined to move back to the impact site if the impact site is still visible to the owl and/or if the impact site is not completely graded (Bloom pers. comm. in CEC 2010). 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. in CEC 2010). 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 relocation site, artificial burrows should be installed if significant grassland or appropriate agricultural crop type is present (Bloom 2003). Reports on passive relocation (Trulio 1995; 1997) do not provide long term analyses associated with passive relocation efforts to determine if passively relocated burrowing owls are present in the area after one or more years. The lack of documented success of passive relocations raises concerns regarding the fate of evicted owls.

Active relocation 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.

While active relocation might have some benefits over passive relocation for moving owls, California Fish and Game Code 3503.3 prohibits the active relocation of burrowing owls unless the effort is designed as a research project. Staff therefore recommends implementation of passive relocation for burrowing owls present within the project disturbance area that need to be relocated to avoid direct impacts. The California Burrowing Owl Consortium (CBOC 1993) guidelines state that offsite suitable habitat for use by burrowing owl must be acquired at one of the following ratios:

- Replacement of occupied habitat with occupied habitat at 9.75 acres (6.5 acres times 1.5 acres) per pair or single bird;
- Replacement of occupied habitat with habitat contiguous to currently occupied habitat at 13.0 (6.5 acres times 2) acres per single pair or single bird, or;

- Replacement of occupied habitat with suitable unoccupied habitat at 19.5 (6.5 acres times 3) acres per pair or single bird.

The USFWS notes that the above guidelines were developed for owls nesting in coastal habitats, and their efficacy in other environments has not been ascertained (Sorenson pers. comm. in CEC 2010). These ratios are not based on the amount of habitat known to be required by owls, but rather on a minimal buffer area thought to be necessary around a burrow to avoid disturbance from construction activities; this standard does not adequately compensate for habitat loss. In addition, CDFG has indicated they are moving away from recommending the ratios described above (CDFG 2010a).

Acquisition of the appropriate amount of offsite habitat for burrowing owl should take into consideration the number of owls being displaced as a result of the project, the amount of foraging habitat being impacted by the project, and the average home ranges and foraging distances of breeding and non-breeding owls. Diurnal home range for owls can be 150 feet on both sides of a burrow. Nocturnal home range is much larger, 1 square mile per owl pair, and several owls can overlap in that 1 square mile (Bloom pers. comm. in CEC 2010). The mean home range for 11 male burrowing owls in 1998 and 22 males in 1999 was 177 ha (437 acres) and 189 hectares (467 acres), respectively, at Naval Air Station in Lemoore, California which is located south of Fresno (Bloom 2003). Male burrowing owls often move greater than 1,000 meters when foraging in the breeding season and home ranges can often times overlap (Bloom 2003).

This species is a state and federal Species of Special Concern, in part because of declines in suitable habitat and populations (CDFG 1995). Because this species is experiencing declines in the region, and loss of habitat is a primary threat (Gervais et al. 2008), this project's impacts and mitigation must mitigate for impacts to this species. The following compensatory mitigation would be recommended:

- <u>For impacts to foraging habitat (no active burrows)</u>: Compensatory mitigation at a ratio of 2 acres for every 1 acre of habitat lost is recommended.
- <u>For impacts to habitat with active burrows</u>: Compensatory mitigation at a ratio of 2 acres for every 1 acre of habitat lost is recommended. In addition, if mitigation is fulfilled by acquisition, the acquisition lands must support double the number of owls displaced by the proposed project. If mitigation is fulfilled by purchasing credits in a conservation bank, the same ratio applies but the lands would be presumed to support a sufficient number of owls.

An "active" burrow means any burrow active within the last three years; an active burrow is known to occur in the proposed laydown area.

Staff has proposed Condition of Certification **BIO-12** (Burrowing Owl Impact Avoidance, Minimization, and Mitigation Measures) which requires a pre-construction survey to determine the current number of owls occupying the project disturbance area and surrounding buffer area. **BIO-12** recommends avoidance and minimization measures to protect owls nesting near but not within the project disturbance area. Implementation of this condition would minimize impacts to this species, and implementation of **BIO-16** would provide compensatory mitigation for habitat loss. Implementation of these measures would reduce impacts to this species below a level of significance.

Swainson's Hawk (State Threatened)

The project site's grasslands provide Swainson's hawk foraging habitat, and construction of the project would result in the permanent loss of approximately 10.1 acres, and long-term loss of 9.2 acres of this habitat. In addition, certain construction activities within 1/2 mile of an active nest during the breeding season (March 1 - September 15) could cause nest abandonment or forced fledging (CDFG 1994). Mitigation ratios suggested by CDFG to address foraging habitat loss are outlined in the *Staff Report regarding Mitigation for Impacts to Swainson's Hawks (*Buteo swainsoni*) in the Central Valley of California* (CDFG 1994):

- Projects within one mile of an active nest shall provide one acre of habitat management land for each acre of development authorized (1:1 ratio) or one-half acre of habitat management land for each acre of development authorized (0.5:1 ratio) if lands are actively managed for prey production;
- Projects within 5 miles of an active nest tree but greater than 1 mile from the nest tree shall provide 0.75 acres of habitat management land for each acre of urban development authorized (0.75:1 ratio), and;
- Projects within 10 miles of an active nest tree but greater than 5 miles from an active nest tree shall provide 0.5 acres of habitat management land for each acre of urban development authorized (0.5:1 ratio).

CDFG considers active nests to be those used at least once in the past five years (CDFG 1994). There is a Swainson's hawk nest approximately 0.25 mile from the proposed project site, and there are several nests recorded in the CNDDB (2010) within five miles of the project site that are presumed extant. Staff's proposed Condition of Certification **BIO-15** (Swainson's Hawk Impact Avoidance, Minimization, and Mitigation Measure) specifies pre-construction surveys and directs the project owner to follow impact avoidance and minimization measures in the *Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California* (CDFG 1994). The impact avoidance and minimization measures in the report include limiting new disturbances within specified buffers, and timing if the disturbance cannot be avoided. Implementation of this condition, along with **BIO-16,** Compensatory Mitigation, would reduce impacts to this species below a level of significance.

Golden Eagle (California Fully Protected, Bird of Conservation Concern)

Golden eagles can be extremely susceptible to disturbance during the breeding season (Anderson et al. 1990; USFWS 2009), 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). While golden eagles are known to occur in the region and have been observed foraging on the project site, the closest known nest is approximately 4 1/2 miles west of the project site (CNDDB 2010).

Recent guidance from the USFWS Migratory Bird Office (MBO) indicates that if a nest is within up to 2 miles (depending on topography) of the Mariposa Energy Project, construction could cause disturbance to golden eagles (USFWS 2010b). The applicant conducted a survey of the project vicinity, and did not detect any potential golden eagles nests within the line-of-site of the project (CH2M 2010z).

This project would contribute to the loss of foraging habitat for this species. Implementation of **BIO-16**, Compensatory Mitigation, provides for habitat compensation for several special-status species (such as upland habitat for California tiger salamander and California red-legged frog, San Joaquin kit fox, and western burrowing owl) at a 3:1 mitigation ratio. The compensatory mitigation habitat required for these species would also be golden eagle foraging habitat. Implementation of this condition would ensure impacts to golden eagles are less than significant.

Special-status and Migratory Birds

Special-status and migratory birds would be affected by the permanent and long-term temporary loss of nesting, overwintering, and foraging habitat. Several special-status or migratory species, such as loggerhead shrike and white-tailed kite breed in the region, but would not breed on the site due to lack of suitable habitat. Other species, such as ferruginous hawk, would not breed in the region but may use the site as overwintering habitat or during migration. Ground or marsh nesting birds, such as grasshopper sparrow or marsh wren, may use the site for breeding. Staff's proposed Condition of Certification **BIO-16**, Compensatory Mitigation, would reduce impacts from loss of habitat for these species to below a level of significance.

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. The applicant has proposed mitigation measures to avoid and minimize impacts to nesting birds, such as pre-construction bird surveys and protective buffers, that have been incorporated into staff's proposed conditions of certification including: **BIO-7,** which limits disturbance off-site, and **BIO-8** (Pre-construction Nest Surveys and Impact Avoidance and Minimization Measures) which would require pre-construction bird surveys and buffers if nests are found. Implementation of these proposed conditions of certification would avoid direct impacts to nests, eggs, or young of migratory birds, and would reduce the impacts from construction disturbance to resident and migratory birds below a level of significance.

Special-status Plants

No special-status plants were observed within the project disturbance area, though one species, heartscale, was observed immediately adjacent to the proposed transmission line route. Heartscale is a CNPS List 1B.2 species and a California endemic. Plants of List 1B are rare, threatened, or endangered in California but more common elsewhere, and plants with a 0.2 rating are considered fairly threatened in California. All of the plants on List 1B meet the criteria for protection under Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing (CNPS 2010). Therefore, staff concludes impacts to this species would be considered significant. Potential direct impacts to this plant include accidental harm during construction or maintenance. Potential indirect impacts to this plant include alteration of drainage patterns during construction or maintenance; alteration of water quality from construction or maintenance activities; impact from herbicide drift; spread of noxious weeds; and, disruption of photosynthesis and other metabolic processes from fugitive dust during construction or maintenance.

An additional species, little mousetail, was found within the project vicinity. The subspecies *Myosurus minimus* ssp. *apus* is a CNPS List 3.1 species. The California Native Plant Society lacks the necessary information to assign List 3 species to one of the other lists or to reject them. This subspecies has taxonomic problems, and the nomenclature is considered unresolved (Jepson Interchange). Some of the plants constituting List 3 meet the criteria for protection under Sec. 1901, Chapter 10 (Native Plant Protection Act) or Secs. 2062 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code, and are eligible for state listing, and therefore List 3 plants should be evaluated for consideration during preparation of environmental documents relating to CEQA. It is unclear from the information provided by the applicant whether the little mousetail occurrence conforms with the characteristics of the subspecies, as described by Hickman (1993) or other available sources. In addition, it is also unclear exactly where the occurrence is in relation to the project site; the location is listed as "on Lee Property, east of transmission line alignment study area." In addition to these species found during project surveys, adjacent habitat, such as the alkali sink wetland east of the water supply route, is known to provide habitat for several special-status plant species including recurved larkspur. Staff's proposed conditions of certification **BIO-7**, **BIO-17**, and **BIO-18** (Revegetation and Restoration Plan) provide measures to protect adjacent habitat, off-site special-status plant species, and water quality, such as limiting off-road disturbance, establishing buffer zones to protect resources, and providing measures to limit the introduction of sediment and other pollutants into waterways. Implementation of these measures would reduce impacts to special-status plant species to less-than-significant levels

Construction Traffic, Lighting, and Noise

During peak construction, construction traffic would more than double along Bruns Road between Kelso Road and Christenson Road (from 286 to 622 Average Annual Daily Trips [AADT]; see the **Traffic and Transportation** section of this report for more information). Traffic would also increase on Bruns Road adjacent to the Byron Conservation Bank, which provides habitat for several species that would be vulnerable to impacts from increases in traffic, such as direct mortality from vehicles. Staff's proposed conditions of certification **BIO-7** and **BIO-10** include measures to minimize impacts from construction traffic, such as restricting off-road access, defining work areas, requiring protective buffers, and requiring wet-season monitoring when construction traffic would arrive or depart before dawn or after dusk. Implementation of these conditions would reduce impacts from construction traffic below a level of significance.

Noise and construction activities during construction could temporarily displace wildlife from foraging and nesting in the proposed project area and vicinity. Staff's proposed conditions of certification **VIS-3** and **BIO-7** include a measure to limit the amount of light from construction that is shed off-site, and **BIO-7** and **BIO-8** includes provisions for pre-construction surveys and protective buffers if nests are found. Implementation of the conditions would reduce impacts from construction noise and lighting below a level of significance.

Operation Impacts and Mitigation

Potential operation-related impacts include impacts to birds due to collision with and/or electrocution by the transmission line, disturbance to wildlife due to increased noise and lighting, and impacts to special-status plant and wildlife through impacts to habitat disturbance from maintenance activities.

Avian Collision and Electrocution

The proposed project would include four 80-foot tall stacks and a new 0.7-mile 230-kV transmission line.

Collision

Birds are known to collide with transmission lines, exhaust stacks, and other structures, causing mortality to the birds. Bird collisions with power lines and structures generally occur when a power line or other structure transects a daily flight path used by a concentration of birds and these birds are traveling at reduced altitudes and encounter tall structures in their path (Brown 1993). Collision rates generally increase in low light conditions, during inclement weather, during strong winds, and during panic flushes when birds are startled by a disturbance or are fleeing danger. Collisions are more probable near wetlands, within valleys that are bisected by power lines, and within narrow passes where power lines run perpendicular to flight paths (APLIC 1994); aside from the wetland, these features are not present near the proposed project area. The wetland in the project vicinity is north of the proposed transmission line, and north of an existing substation.

The four proposed exhaust stacks would be approximately 80 feet tall, and would be within a small valley adjacent to existing transmission lines. The proposed 230-kV transmission line monopoles would range in height from 84 to 95 feet (MEP 2009a, Electric Transmission). Structures over 500 feet tall present a greater risk to migratory songbirds than shorter structures (Kerlinger 2000); bird mortality is significantly lower at towers shorter than 350 feet (Longcore et al 2008). Because the project exhaust stacks and transmission lines would be significantly shorter than 350 feet tall, these proposed project features would pose a relatively low height-related collision risk to migrating birds. Staff concludes that the project structures would not pose a significant collision threat to resident or migratory bird populations.

Electrocution

Raptors, and other large aerial perching birds, including those accorded state and/or federal protection, are susceptible to transmission line electrocution if they simultaneously contact two energized phase conductors or an energized conductor and grounded hardware. This happens most frequently when a bird attempts to perch on a transmission tower or pole with insufficient clearance between these energized elements. The majority of bird electrocutions are caused by lines that are energized at voltage levels between 1-kV and 60-kV, and “the likelihood of electrocutions occurring at voltages greater than 60-kV is low” 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 line would be 230-kV; therefore, phase-to-phase and phase-to-ground clearances are expected to be sufficient to minimize bird electrocutions.

Staff's proposed Condition of Certification **BIO-7** specifies that all electrical components of the proposed project, including transmission lines, be designed, installed, and maintained in accordance with the Avian Power Line Interaction committee (APLIC), *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006* (APLIC 2006) to reduce the likelihood of electrocutions of large birds. Among other requirements, following these guidelines would require that 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). Implementation of this condition would ensure that significant impacts from electrocution would be avoided.

Thermal Plumes

The proposed project is a gas-fired peaker power plant that, during operation, would emit high velocity thermal plumes from four 80-foot high exhaust stacks (for more information, see the **Traffic and Transportation** section of this SA). The proposed project would only generate a plume during operation, which is projected to be approximately 600 hours annually, although the proposed project would be permitted to operate for up to 4,000 hours annually. In a data request to the applicant, the Contra Costa Airport Land Use Commission posed three questions related to avian interactions with the thermal plume (CCCALUC 2009b, Information Request #7): 1) would birds be diverted away from the power plant by the thermal plume, and would such a diversion concentrate birds near the main runway approach path to the Byron Airport; 2) would birds of prey try to ride the rising plume, and; 3) would the plume kill small birds, upon which birds of prey would feed? Additionally, further questions focused on whether ravens would be attracted to the power plant site because of the thermal plume.

Energy Commission staff has reviewed the information provided by the applicant (CH2M 2010l, CH2M 2010u), reviewed information provided by Alaska Game and Fish staff (ADFG 2010a), and discussed these topics with other Energy Commission Staff with experience with both thermals and airport issues (Walters, pers. comm.) and with CDFG personnel (Weightman, pers. comm.).

Staff sees no indication that birds would be diverted by the thermal plume to such an extent that they would concentrate birds near the Byron Airport approach path, which is approximately 1 mile away. Typically, birds would be expected to minimally alter their flight path around the plume, but continue on the same overall flight path. For a similar reason, staff does not anticipate that the thermal plume would result in direct mortality to small birds; birds would be expected to sense the plume, and alter their flight path to avoid the plume when necessary.

Both raptors and ravens may use the thermal plume to gain lift, however there are several features of both the region and the proposed project that make it unlikely that the thermal plume would serve to attract birds to the area. The region, in general, has naturally occurring updrafts, so this plume would provide neither a unique nor an unusual feature in the landscape. The proposed project is within a wind resource area;

under typical conditions wind would serve to dissipate plume buoyancy. As a peaker, one of the typical times the power plant would be expected to run (hot afternoons) is the time when wind is usually higher. Because this plume would be neither a consistent nor unique feature of the landscape, it is unlikely to attract birds to the area. A power plant near Anchorage, Alaska is known to attract ravens. The reason this power plant attracts ravens appears to be because it is between the night roost site and Anchorage (where the ravens spend their days) and provides a powerful updraft (ADFG 2010a). This situation does not correspond to the Mariposa Energy Project site; the thermal plume, as discussed above, would not be a consistent resource and staff have no information indicating that the plume lies on a well used path between raven roosting and foraging sites.

Nitrogen Deposition

Nitrogen deposition is the input of nitrogen oxide (NOx) and ammonia (NH3) derived pollutants from the atmosphere to the biosphere. Nitrogen deposition can lead to impacts to sensitive species from direct toxicity, changes in species composition among native plants, and enhancement of invasive species (Fenn et al 2003; Weiss 2006). The increased dominance and growth of invasive annual grasses is especially prevalent in low-biomass vegetation communities that are naturally nitrogen-limited, such as coastal sage scrub, serpentine grassland, desert scrub, and sand dunes (Weiss 2006).

The nearest occurrences of nitrogen-limited habitat in the region are serpentine outcrops along Bald Ridge in the Mount Diablo State Park located approximately 20 miles west of the project site (CH2M 2010i). The project site is located in an area with predominantly westerly (from the west) prevailing winds, and therefore this habitat would not be affected by the project operations due to both the distance and direction from the project.

Lighting

Bright lighting at night could disturb the resting, foraging, or mating activities of wildlife and make wildlife more visible to predators. Also, night lighting could be disorienting to migratory birds. The proposed project may operate 24 hours per day and a slight resultant increase in light is expected to occur during operation. To avoid and minimize backscatter, outdoor lighting should be directed downwards toward the center of the power plant (MEP 2009a), be shielded, and be the minimum wattage required for safety (Burkett, pers. comm.). These measures have been incorporated into **VIS-3** and **BIO-7**. Implementation of these conditions would ensure significant impacts from operation lighting would be avoided.

Noise

The project site is immediately south of the 6.5-MW Byron Cogen Power Plant, which produces some noise, but is otherwise isolated from traffic or urban noise; a substantial increase in noise during operation could disturb sensitive wildlife species.

Noise levels from project operation would increase above existing ambient conditions (MEP 2009a, Noise). Average noise levels at the project site currently range from 43 to 57 dBA; predicted noise levels during power plant operation would be 65 to 90 dBA (MEP 2009a, Noise). A conservative estimate indicates noise would attenuate to less

than 60 dBA at a distance of 1/4 mile from the power plant site (CH2M 2010t). This estimate does not take into account the site topography. The proposed project would be located in a small valley, which would serve to reduce the distance it would take for noise to attenuate to less than 60 dBA. Studies have shown that noise levels over 60 dBA can affect the behavior of certain bird species (Dooling and Popper 2007).

Noise from the power plant operation would not be expected to affect sensitive breeding or nesting areas, such as nest trees or freshwater marshes, which are further than 1/4 mile away and shielded by site topography, or to affect listed bird species. Birds that nest within annual grassland could be affected by noise from the power plant. This power plant would be a peaker power plant, and would operate intermittently. The project is seeking a license for up to 4,000 hours per year, and anticipates it would run approximately 600 hours per year, with 200 stop and start cycles (MEP 2009a, Project Description). Based on the frequency of operation, it is anticipated birds in the vicinity would become habituated to the power plant operation noise. Staff concludes there would be no significant impacts to biological resources by increased operational noise and no mitigation beyond Staff's Condition of Certification **NOISE-1** (in the Noise section of the Supplemental Staff Assessment) is proposed.

Operation Traffic

Operation of the Mariposa Energy Project would result in a maximum of 16 daily trips (see the **Traffic and Transportation** section for more details). This is a minimal increase in traffic, and implementation of staff's proposed conditions of certification **BIO-5**, which provides for worker education, **BIO-6**, which includes exclusionary fencing, **BIO-7**, which would minimize off-site impacts and restrict off-road access, and **BIO-10**, which establishes speed limits, would ensure significant impacts are avoided.

Permanent Water Supply

To mitigate for loss of grazing land, staff's proposed Condition of Certification **Land-2** would require installation of a permanent water source near the proposed plant site. In some situations, such as when water is scarce, installing a water source could attract predators to an area which could affect native wildlife. However, there are currently several permanent water sources within 1 mile of the proposed project (CH2M 2010p, Attachment 4), and this water source would not be a unique or even unusual feature in the landscape. Therefore, staff concludes impacts from this water source would be less than significant.

Impacts to Special Management Areas

Byron Conservation Bank

The Byron Conservation Bank is immediately west of a segment of the proposed water supply pipeline route. All project construction would be constrained to the east side of Bruns Road. Potential direct impacts to species moving in and out of the conservation bank would be addressed by implementation of workers environmental awareness training (**BIO-5)** and of wet-season monitoring or other protective measures (**BIO-10**). Indirect impacts, such as impacts from noise, lighting, and traffic could occur and are

discussed. Implementation of staff's proposed conditions of certification including **BIO-7**, which includes measures to avoid off-site impacts from construction equipment and lighting, and **BIO-10** would ensure that significant impacts would be avoided.

Critical Habitat

The project is located within the CCS-2B Critical Habitat Unit for California red-legged frog, and would impact habitat, including primary constituent elements of this habitat, for this species. Impacts include loss of upland habitat, disturbance of aquatic non-breeding habitat, and loss and disturbance of dispersal habitat. Staff's proposed conditions of certification **BIO-7** and **BIO-17** includes measures to minimize off-site impacts, **BIO-10** includes measures to avoid impacts to California red-legged frog habitat, and **BIO-16** provides for compensatory mitigation for impacts to habitat. With implementation of these proposed conditions of certification, impacts to critical habitat would be minimized. Acquisition of and compliance with a Biological Opinion and Incidental Take Statement would reduce impacts below a level of significance.

PLANT CLOSURE AND DECOMMISSIONING

At some point, the Mariposa Energy Project would experience either a planned closure or would be unexpectedly (either temporarily or permanently) closed. When facility closure occurs, it must be done in such a way as to protect the environment and public health and safety. To address facility closure, an "onsite contingency plan" would be developed by the project owner, and approved by the Energy Commission Compliance Project Manager (CPM). Facility closure mitigation measures would also be included in the BRMIMP prepared by the applicant.

The restoration of the annual grassland habitat on the proposed project footprint would need to be addressed in any discussion of facility closure. Habitat restoration plans should include address removal of all structures and the immediate implementation of habitat restoration measures.

Staff does not have any biological resource facility closure recommendations in the event of an unexpected temporary closure of the project. However, in the event that the Energy Commission CPM decides that the facility is permanently closed, the facility closure measures provided in the onsite contingency plan and BRMIMP would need to be implemented.

CUMULATIVE IMPACTS

A project could result in a significant adverse cumulative impact where its effects are cumulatively considerable. Cumulatively considerable means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, of other current projects, and of probable future projects (California Code of Regulations, Title 14, section 15130).

The proposed project is located adjacent to the 1-acre Byron Cogen Power Plant and near the approximately 17-acre PG&E's Bethany Gas Compressor Station and the 230-kV Kelso Substation site. In addition, there are several structures in the vicinity related

to the Central Valley Project and California State Water Project. The residential subdivision Mountain House Community is located approximately 2.5 miles from the proposed project site; the Mountain House Master Plan was approved in 1994 and construction started in 2001. The maximum geographic extent of growth for the community, estimated to be completed by 2022, is 4,784 acres. A review of proposed projects within or bordering the foothills of southern Contra Costa, Alameda, San Joaquin, and northern Stanislaus counties identified two proposed power plant projects: the East Altamont Energy Center (EAEC) and the GWF Tracy Combined-Cycle Power Plant (GWF Tracy). EAEC is approximately 1 mile to the east of the proposed project and would occupy 40 acres. GWF Tracy is approximately 8 miles to the southeast, and would occupy 16.38 acres. Both projects were approved by the Energy Commission, but neither project was built. Both the GWF Tracy and EAEC projects include mitigation measures to reduce project impacts below a level of significance. The Final Environmental Impact Report for the Mountain House includes mitigation to reduce project impacts, but identifies unavoidable significant impacts including loss of wildlife habitat.

These projects may result in additional loss of habitat western burrowing owl, Swainson's hawk, California red-legged frog, California tiger salamander, American badger, San Joaquin kit fox, and western pond turtle. The proposed projects would result in potentially significant cumulative adverse impacts to terrestrial habitat for special-status species, including California tiger salamander and San Joaquin kit fox.

The Mariposa Energy Project, when considered with past, present, and reasonable foreseeable future projects, would contribute to the cumulative loss and degradation of habitats essential to the persistence and recovery of special-status wildlife species. Staff has concluded that the proposed project's contribution to cumulative impacts to special-status species can be mitigated below a cumulatively considerable level by implementation of the conditions of certification included within this Supplemental Staff Assessment. However, the applicant needs to provide USFWS with a final BA, in order for the USFWS to issue a BO. The applicant recently submitted an updated BA to the USFWS, which the USFWS is currently reviewing. Modifications to the staff's impact analysis and compensatory mitigation ratios and acreages, as well as conditions of certification may be necessary if future revisions to the BA are contradictory to staff's analysis. Staff will provide an errata to this SSA, or update the Committee at the evidentiary hearings, of any changes necessary to Staff's testimony based on USFWS's BO.

COMPLIANCE WITH LORS

The proposed project must comply with state and federal laws, ordinances, regulations, and standards that address state and federally listed species, as well as other sensitive species and their habitats. These LORS are presented in **Biological Resources Table 1**. Under the Warren-Alquist Act (Public Resources Code § 25500) the Energy Commission's certificate for thermal power plants 50 MW and more is "in lieu of" other state, local, and regional permits (ibid.). Staff will incorporate all required terms and conditions that might otherwise be included in state permits into the Energy Commission's certification process. When conditions of certification are finalized they

would satisfy the following state LORS and take the place of terms and conditions that, but for the Commission's exclusive authority, would have been included in state permits. The Mariposa Energy Project is subject to the federal, state, and local LORS included in **Biological Resources Tables 1** and **7**. **Biological Resources Table 7** also includes whether the proposed project is in compliance with the applicable LORS, and a discussion of the compliance status.

Biological Resources Table 7
Compliance with Federal, State, and Local LORS

Applicable LORS	In Compliance	Discussion
Federal		
Section 404 of the Clean Water Act of 1977 (33 USC 1344)	Undetermined	Discharge of dredged or fill material into the waters of the United States requires a permit from the U.S. Army Corps of Engineers (USACE). The applicant has completed a wetland delineation report and amendment, and has received a preliminary jurisdictional determination from the USACE Sacramento District. The USACE is currently drafting the CWA 404 authorization to construct the project under Nationwide Permit #12, but the permit cannot be issued to Mariposa Energy until Section 7 ESA consultation is finished (i.e., Biological Opinion sent to the USACE).
Section 401 of the Clean Water Act of 1977 (33 USC 1341)	Undetermined	Any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States must obtain a certification from the State in which the discharge originates or would originate, that the discharge would comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. The applicant has submitted a Section 401 Water Quality Certification Application to the California Regional Water Quality Control Board (CRWQCB) Central Valley Region, and will also submit a memo outlining changes to the original application. Certification from the CRWQCB is pending.
Endangered Species Act (Title 16, United States Code, sections 1531 et seq.; Title 50, Code of Federal Regulations, part 17.1 et seq.)	Undetermined	Potential take of California tiger salamander, California red-legged frog, San Joaquin kit fox, and branchiopods (federally-listed species), requires compliance with the federal Endangered Species Act (ESA). "Take" of a federally-listed species is prohibited without an Incidental Take Statement, which would be obtained through a Section 7 consultation between the USACE and USFWS. The applicant has submitted a Biological Assessment and updates for the project to the USFWS, and the USFWS is currently reviewing this information.
Eagle Act (Title 50, Code of Federal Regulations, sections	Yes	Condition of Certification **BIO-16** requires protection of compensation habitat for California tiger salamander, California red-

Applicable LORS	In Compliance	Discussion
22.26 and 22.27) and Bald and Golden Eagle Protection Act (Title 16, United States Code section 668)		legged frog, San Joaquin kit fox, western burrowing owl, and other special-status species. Habitat preserved for these species would also serve as golden eagle foraging habitat.
Migratory Bird Treaty Act (Title 16, United States Code, sections 703–711)	Yes	Condition of Certification **BIO-8** provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification **BIO-7** limits off-site disturbance.
Executive Order 11312	Yes	Conditions of certification **BIO-7** and **BIO-18** limit species used in revegetation, and also call for a revegetation plan for disturbed areas.
State		
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Yes	Construction and operation of the proposed project could result in the "take" of Swainson's hawk, California tiger salamander, and San Joaquin kit fox, listed under CESA. Condition of Certification **BIO-16** specifies compensatory mitigation for loss of habitat for these species. Conditions of certification **BIO-10, BIO-14,** and **BIO-15** provide measures to avoid and minimize impacts to these species. This funding and mitigation approach would reduce impacts below a level of significance in regards to CESA.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Yes	Golden eagles and other bird species that may use the site are California Fully Protected species. Condition of Certification **BIO-8** provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification **BIO-7** limits off-site disturbance.
Native Plant Protection Act (Fish and Game Code, section 1900 et seq.)	Yes	No special-status plants were observed on-site. Special-status plants do occur, or are known to historically occur, adjacent to the proposed project. Condition of Certification **BIO-7** would require pre-construction surveys and includes a provision if special-status plant species are observed, and **BIO-7** and **BIO-17** provide measures to limit off-site disturbance.
Nest or Eggs (Fish and Game Code, section 3503)	Yes	Condition of Certification **BIO-8** provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, Condition of Certification **BIO-7** limits off-site disturbance, and **BIO-5** includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3503.
Birds of Prey (Fish and Game Code, section 3503.5)	Yes	Condition of Certification **BIO-8** provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, Condition of Certification **BIO-7** limits off-site disturbance, and **BIO-5** includes a Worker Environmental Awareness Program to educate workers about compliance with

Applicable LORS	In Compliance	Discussion
		environmental regulations, including Fish and Game Code section 3503.5.
Migratory Birds (Fish and Game Code, section 3513)	Yes	Condition of Certification **BIO-8** provides for pre-construction nest surveys, protective buffers, and monitoring if nests are found, and Condition of Certification **BIO-7** limits off-site disturbance, and **BIO-5** includes a Worker Environmental Awareness Program to educate workers about compliance with environmental regulations, including Fish and Game Code section 3513.
Nongame mammals (Fish and Game Code section 4150)	Yes	**BIO-7**, which provides for pre-construction surveys and exclusionary fencing, would ensure compliance with this provision.
Streambed Alteration Notification (Fish and Game Code sections 1600 et seq.)	Yes	Condition of Certification **BIO-17** includes measures to minimize, avoid, and compensate for impacts to jurisdictional waters of the State.
California Environmental Quality Act (CEQA), CEQA Guidelines section 15380	Yes	Implementation of Staff's proposed conditions of certification **BIO-1** through **BIO-19** would serve to reduce the projects impacts to biological resources below a level of significance under CEQA.
Public Resources Code, sections 25500 and 25527	Yes	The proposed project is not sited in an area of critical concern for biological resources.
Local		
Alameda County General Plan - East County Area Plan (ECAP)	Yes	Condition of Certification **BIO-16** requires that permanent impacts to wetlands be mitigated. ECAP Policy No. 126 encourages no net loss of wetlands within the county. However, Alameda County has determined that the mitigation proposed in **BIO-9**, including compensation ratios, and **BIO-10**, which provides for compensatory mitigation and agency approval, fulfills the needs of this policy.
Contra Costa General Plan	Yes	Impacts within Contra Costa County are within previously disturbed lands.

NOTEWORTHY PUBLIC BENEFITS

Construction and operation of the proposed project would not result in any noteworthy public benefits with regard to biological resources.

CONCLUSIONS

The proposed project would affect state waters and potential USACE- jurisdictional waters, as well as special-status species including both state- and federally-listed wildlife species such as Swainson's hawk, California tiger salamander, and California red-legged frog. Many of these impacts would be considered significant. In addition, the proposed project would affect critical habitat for California red-legged frog.

With implementation of staff's proposed conditions of certification, the proposed project would be in compliance with most LORS. However, the proposed project has not yet demonstrated compliance with the federal Endangered Species Act (ESA); a Biological Opinion (BO) with an Incidental Take Statement from the USFWS is required to comply with the federal ESA, and a final (i.e. not draft) Biological Assessment (BA) determined to be adequate by the USFWS must be submitted before a BO can be issued. The applicant provided a draft BA to the USFWS April, 2010 and an updated BA October, 2010, which the USFWS is currently reviewing. Additionally, a USACE Nationwide #12 permit is required to comply with the Clean Water Act; the applicant has provided the USACE with information required for the permit, but the USACE cannot issue the permit until USFWS issues the BO.

Staff concludes that impacts to biological resources affected by the proposed project can be mitigated below a level of significance by implementation of the proposed conditions of certification in this Supplemental Staff Assessment. Staff's analysis and proposed conditions of certification were developed in coordination with USFWS and are expected to be consistent with the terms and conditions required in the BO. Therefore, implementation of the conditions pertaining to federally listed species as well as acquisition of a BO and implementation of the measures therein would ensure compliance with the federal ESA. However, because a final BA has not yet been accepted by the USFWS, modifications to the impact analysis and conditions of certification may be necessary if revisions to the recent draft BA are contradictory to staff's analysis or conditions. Staff will provide an errata to this Supplemental Staff Assessment, or update the Committee at the evidentiary hearings, of any changes necessary to Staff's testimony based on USFWS's BO.

CONDITIONS OF CERTIFICATION

Staff proposes the following Conditions of Certification:

DESIGNATED BIOLOGIST SELECTION

BIO-1 The project owner shall assign a Designated Biologist to the project. The project owner shall submit the resume of the proposed Designated Biologist, with at least 3 references and contact information, to the Energy Commission Compliance Project Manager (CPM) for approval, in consultation with CDFG and USFWS. The Designated Biologist must meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field; and
2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and
3. Demonstrated field experience in the identification and life history of California tiger salamander, California red-legged frog, and San Joaquin kit fox, and demonstrated field experience identifying burrowing owl burrows and other burrowing owl sign, and demonstrated experience in identifying Swainson's hawks, and;

4. Be in possession of required state and federal permits and/or approvals from CDFG and USFWS.

In lieu of the above requirements (excepting the permit requirements), the resume shall demonstrate to the satisfaction of the CPM, that the proposed Designated Biologist or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 60 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities, including pre-construction debris removal, shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten (10) working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following duties during any site (or related facilities) pre-construction debris removal, mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s), but remains the contact for the project owner and CPM.

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;
2. Consult on the preparation of the Biological Resources Mitigation Implementation and Monitoring Plan (BRMIMP), to be submitted by the project owner;
3. Supervise, conduct, and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species or their habitat;
4. Clearly mark sensitive biological resource areas, if present, and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;
5. Inspect active construction areas where animals may have become trapped prior to construction commencing each day. At the end of the day, inspect for the installation of structures that prevent entrapment or allow escape during periods of construction inactivity. Periodically inspect areas with high vehicle activity (i.e. parking lots) for animals in harm’s way;
6. Notify the project owner and the CPM of any non-compliance with any biological resources conditions of certification;

7. Respond directly to inquiries of the CPM regarding biological resource issues;
8. Maintain written records of the tasks specified above and those included in the BRMIMP. Summaries of these records shall be submitted in the Monthly Compliance Report and the Annual Report; and
9. Train the Biological Monitors as appropriate, and ensure their familiarity with the BRMIMP, Worker Environmental Awareness Program (WEAP) training and all permits.

Verification: The Designated Biologist shall submit in the Monthly Construction Compliance Report to the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation, a Designated Biologist shall be available for monitoring and reporting. During project operation, the Designated Biologist shall submit record summaries in the Annual Compliance Report unless their duties are determined to be unnecessary by the CPM.

BIOLOGICAL MONITOR QUALIFICATIONS

BIO-3 The project owner's CPM-approved Designated Biologist shall submit the resume, including at least 3 references and contact information, of the proposed Biological Monitors to the CPM for approval, in consultation with CDFG and USFWS.

Enough biological monitors must be on site during pre-construction debris removal, before and during, water supply pipeline, natural gas pipeline, and transmission line construction and prior to fencing the power plant site to collectively meet the minimum qualifications:

1. Demonstrated field experience in the identification and life history of:
   a. California tiger salamander
   b. California red-legged frog
   c. San Joaquin kit fox
2. Demonstrated field experience identifying burrowing owls burrows and other burrowing owl sign.

   All biological monitors on site during pre-construction debris removal, before and during, water supply pipeline, natural gas pipeline, and transmission line construction and prior to fencing the power plant site must meet the following minimum qualification:
3. Be in possession of required state and federal permits and/or approvals from CDFG and USFWS.

Verification: The project owner shall submit the specified information to the CDFG and USFWS for review and comment and the CPM for approval no less than 30 days prior to the start of any site (or related facilities) mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that the individual Biological Monitor(s) have been trained including the date when training was completed. If additional biological monitors are needed during construction, the specified information

shall be submitted to the CDFG and USFWS for review and comment and the CPM for approval no less than 14 days prior to their first day of monitoring activities.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-4 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist and Biological Monitor(s) the project owner's Construction/Operation Manager shall halt all site mobilization, pre-construction debris removal, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;
2. Inform the project owner and the Construction/Operation Manager when to resume activities; and
3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or will be instituted, as a result of the work stoppage.

If the Designated Biologist is unavailable for direct consultation, the Biological Monitor shall act on behalf of the Designated Biologist.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, pre-construction debris removal, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure will be made by the CPM within 5 working days after receipt of notice that corrective action is completed, or the project owner will be notified by the CPM that coordination with other agencies will require additional time before a determination can be made.

WORKER ENVIRONMENTAL AWARENESS PROGRAM

BIO-5 The project owner shall develop and implement a CPM-approved Worker Environmental Awareness Program (WEAP) in which each of its employees, as well as employees of contractors and subcontractors who work on the project site or any related facilities during site mobilization, pre-construction debris removal, ground disturbance, grading, construction, operation, and closure are informed about sensitive biological resources associated with the project.

The WEAP must:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting written material and electronic media is made available to all participants;
2. Discuss the locations and types of sensitive biological resources on the project site and adjacent areas;
3. Present the reasons for protecting these resources;
4. Present the meaning of various temporary and permanent habitat protection measures as necessary;
5. Discuss penalties for violation of applicable LORS (e.g., federal and state endangered species acts);
6. Identify whom to contact if there are further comments and questions about the material discussed in the program; and
7. Include a training acknowledgment form to be signed by each worker indicating that they received training and shall abide by the guidelines.

The specific program can be administered by a competent individual(s) acceptable to the Designated Biologist.

Verification: No less than 30 days prior to the start of any site (or related facilities) mobilization, the project owner shall provide to the CPM the final WEAP and all supporting written materials and electronic media prepared or reviewed by the Designated Biologist and a resume of the person(s) administering the program.

The project owner shall provide in the Monthly Compliance Report the number of persons who have completed the training in the prior month and a running total of all persons who have completed the training to date. No less than 10 days prior to site and related facilities mobilization submit two copies of the CPM-approved materials.

Training acknowledgement forms signed during construction shall be kept on file by the project owner for a period of at least 6 months after the start of commercial operation.

During project operation, signed statements for operational personnel shall be kept on file for 6 months following the termination of an individual's employment.

BIOLOGICAL RESOURCES MITIGATION IMPLEMENTATION AND MONITORING PLAN (BRMIMP)

BIO-6 The project owner shall develop a BRMIMP and submit two copies of the proposed BRMIMP to the CDFG and USFWS for review and comment and the CPM for approval and shall implement the measures identified in the approved BRMIMP.

The BRMIMP shall be prepared in consultation with the Designated Biologist and shall identify:

1. All biological resource mitigation, monitoring, and compliance measures proposed and agreed to by the project owner;
2. All applicant-proposed mitigation measures presented in the Application For Certification, data responses, and workshop responses;

3. All biological resource conditions of certification in the Commission Decision;
4. All biological resource mitigation, monitoring and compliance measures required in other state agency terms and conditions, such as those provided in the CWA 404 permits and the USFWS Biological Opinion;
5. All biological resource mitigation, monitoring, and compliance measures required in local agency permits, such as site grading and landscaping requirements;
6. A list all sensitive biological resources to be impacted, avoided, or mitigated by project construction, operation, and closure;
7. All required mitigation measures for each sensitive biological resource;
8. A detailed description of measures that shall be taken to avoid or mitigate temporary disturbances from construction activities;
9. All locations on a map, at an approved scale, of sensitive biological resource areas subject to disturbance and areas requiring temporary protection and avoidance during construction;
10. Aerial photographs (at an approved scale), a GPS foot survey, or other verifiable means (as approved by the CPM) to document all areas to be disturbed during project construction activities — one set prior to any site (and related facilities) mobilization disturbance and one set subsequent to completion of project construction. Include planned timing of aerial photography or other method and a description of why times were chosen;
11. Duration for each type of monitoring and a description of monitoring methodologies and frequency;
12. Performance standards to be used to help decide if/when proposed mitigation is or is not successful;
13. All performance standards and remedial measures to be implemented if performance standards are not met;
14. A preliminary discussion of biological resources-related facility closure measures; and
15. A process for proposing plan modifications to the CPM and appropriate agencies for review and approval.

Verification: The project owner shall provide the specified draft document at least 60 days prior to start of any site (or related facilities) mobilization.

The CPM will determine the BRMIMP's acceptability within 45 days of receipt. If there are any permits that have not yet been received when the BRMIMP is first submitted, these permits shall be submitted to the CPM within 5 days of their receipt, and the BRMIMP shall be revised or supplemented to reflect the permit condition within 10 days of their receipt by the project owner. 10 days prior to site and related facilities mobilization the revised BRMIMP shall be resubmitted to the CPM.

The project owner shall notify the CPM no less than 5 working days before implementing any modifications to the approved BRMIMP to obtain CPM approval.

Any changes to the approved BRMIMP must also be approved by the CPM in consultation with other appropriate agencies to ensure no conflicts exist.

Implementation of BRMIMP measures will be reported in the Monthly Compliance Reports by the Designated Biologist (i.e., survey results, construction activities that were monitored, species observed). Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction closure report identifying which items of the BRMIMP have been completed, a summary of all modifications to mitigation measures made during the project's site mobilization, ground disturbance, grading, and construction phases, and which mitigation and monitoring items are still outstanding.

GENERAL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-7 The following measures shall be implemented to avoid and minimize impacts to biological resources from the proposed project during site mobilization, pre-construction debris removal, ground disturbance, grading, construction, operation, maintenance, and closure.

1. Design, install, and maintain natural gas supply pipelines, water supply pipelines, transmission lines, access roads, and laydown and parking areas to avoid or minimize impacts to identified sensitive resources;
2. Design, install, and maintain the transmission lines and all other electrical components in accordance with the Avian Power Line Interaction Committee (APLIC), Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 2006 to reduce the likelihood of electrocutions of large birds;
3. Eliminate from landscaping plans any List A California exotic pest plants of concern as defined by the California Exotic Pest Plant Council;
4. Prescribe a road sealant that is non-toxic to wildlife and plants;
5. Design, install, and maintain construction and facility lighting to minimize the amount of light off-site, including directing and shielding lights to prevent side casting of light towards wildlife habitat, and using the minimum wattage required for safety;
6. Pre- and post-construction photo-documentation of all habitats shall be prepared and made part of the project report;
7. The project site shall be surveyed for the special-status species prior to ground disturbing activities including pre-construction debris removal or construction equipment staging.
    a. If special-status wildlife species are found within the construction area, species-specific contingencies described in **BIO-8, 9, 10, 11, 12, 13, 14,** and **15** shall be followed. If the species is not covered under these conditions, the CPM and the CDFG and/or USFWS shall be contacted for further guidance.

b. If special-status plant species are found within the construction area, they shall be avoided and the CPM and the CDFG and/or USFWS shall be contacted for further guidance.

c. Once it has been sufficiently determined that there are no special-status wildlife species present, the power plant site, laydown, and access road construction areas shall be fenced with USFWS- and CDFG-approved exclusion fencing to ensure that no special-status wildlife species enter the site.

8. Clearly demarcate construction exclusion zones around biologically sensitive areas and any nests or other sensitive resources identified during surveys;

9. The Designated Biologist (or approved designee) shall be onsite during any construction activity near sensitive habitat and shall ensure implementation of, and compliance with, mitigation measures. The Designated Biologist (or approved designee) has the authority to stop work and determine alternative work practices in consultation with construction personnel if construction activities are likely to impact sensitive biological resources.

10. Vehicles shall be confined to established roadways and pre-approved overland access routes. Limit access routes and the number and size of staging areas and work areas to the minimum necessary to achieve the project goals. Routes and boundaries of work areas, including access roads, shall be clearly marked prior to initiating project construction.

11. Construction along the project linears shall be constrained within a designated temporary construction corridor.

12. Trash dumping, firearms, open fires (such as barbecues), hunting, and pets shall be prohibited in the project area.

13. To avoid attracting predators of the target species of concern, the project site shall be kept as clean of debris as possible. All food-related trash items shall be enclosed in sealed containers and regularly removed from the site(s).

14. Road-killed animals or other carcasses detected by personnel on roads associated with the project area will be reported immediately to a Biological Monitor or Designated Biologists, who will remove the road-kill promptly. For special-status species road-kill, the Biological Monitor shall contact CDFG and USFWS within 1 working day of receipt of the carcass for guidance on disposal or storage of the carcass. Species name, physical characteristics of the animal (sex, age class, length, weight), and other pertinent information shall be noted and reported in the Monthly Compliance Reports. Injured animals shall be reported to CDFG or USFWS and the project owner shall follow instructions that are provided by CDFG or USFWS;

Verification: No less than 10 days prior to the start of any ground disturbing activities or construction equipment staging, the project owner shall provide the CPM a

letter-report describing the findings of the pre-construction surveys; e-mails or letter reports may be used to document the findings of the pre-construction surveys conducted 1 day and immediately prior to construction. The letter shall describe survey personnel, dates, and conditions; specific area surveyed (with figure); species included in the survey, and; results of the survey.

All mitigation measures and their implementation methods shall be included in the BRMIMP. Implementation of the measures will be reported in the Monthly Compliance Reports by the Designated Biologist. Within 30 days after completion of project construction, the project owner shall provide to the CPM, for review and approval, a written construction termination report identifying how measures have been completed.

PRE-CONSTRUCTION NEST SURVEYS AND IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-8 Pre-construction nest surveys shall be conducted if construction activities will occur from February 1 through August 31. The Designated Biologist or Biological Monitor shall perform surveys in accordance with the following guidelines:

1. Surveys shall cover all potential nesting habitat in the project site and within 500 feet of the boundaries of the power plant site and linear facilities (except for Swainson's Hawk, see **BIO-15**);
2. At least two pre-construction surveys shall be conducted, separated by a minimum 10-day interval. One of the surveys needs to be conducted within the 14-day period preceding initiation of construction activity. Additional follow-up surveys may be required if periods of construction inactivity exceed three weeks in any given area, an interval during which birds may establish a nesting territory and initiate egg laying and incubation;
3. If active nests are detected during the survey, a no-disturbance buffer zone (protected area surrounding the nest, the size of which is to be determined by the Designated Biologist in consultation with CDFG and USFWS Migratory Bird Office) and monitoring plan shall be developed. The monitoring plan shall include avoidance measures and remedial actions if the avoidance measures are not successful. Nest locations shall be mapped using GPS technology and submitted, along with a weekly report stating the survey results, to the CPM; and
4. The Designated Biologist shall monitor the nest until he or she determines that nestlings have fledged and dispersed; activities that might, in the opinion of the Designated Biologist, disturb nesting activities, shall be prohibited within the buffer zone until such a determination is made.

Verification: No less than 2 days prior to the start of any ground disturbing activities or construction equipment staging, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction nest surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed.

If active nests are detected during the survey, the report shall include a map or aerial photo identifying the location of the nest and shall depict the boundaries of the no-disturbance buffer zone around the nest, and a monitoring plan shall be submitted to the CDFG and USFWS Migratory Bird Office for review and comment and the CPM for approval. Approval of the plan is required before construction may commence.

SPECIAL-STATUS INVERTEBRATE IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-9 The project owner shall implement the following measures to manage their construction site, and related facilities, in a manner to avoid or minimize impacts to listed fairy shrimp or tadpole shrimp species and habitat.

1. Avoidance and Minimization:
    a. A buffer zone of 250 feet or the limit of the immediate watershed supporting the seasonal wetland (whichever is larger) shall be established around all known and potentially occupied branchiopod habitat. The buffer zone shall be delineated with temporary fencing. The fencing shall be kept in good repair and remain installed for the duration of MEP construction. If this buffer zone is not feasible for any potential habitat, a buffer zone shall be delineated in consultation with CDFG and USFWS.
    b. A biological monitor will be onsite during all ground disturbing work within 250 feet of potential branchiopod habitat, and will oversee all off-road vehicle access for the project.
    c. To the extent possible, construction of the linear projects will occur during the dry summer season to minimize the potential for indirect effects on nearby branchiopod habitat.

Verification: No less than 10 days prior to ground disturbance, the project owner shall provide a report detailing the locations of buffer zone fencing, and that includes both a figure and photographs showing the location of the fencing. The project owner shall report monthly to the CPM, CDFG, and USFWS for the duration of construction on the implementation of listed branchiopod habitat avoidance and minimization measures. Within 30 days after completion of construction the project owner shall provide to the CDFG, USFWS, and CPM a written construction termination report identifying how impact minimization measures have been completed.

CALIFORNIA TIGER SALAMANDER AND CALIFORNIA RED-LEGGED FROG IMPACT AVOIDANCE AND MINIMIZATION MEASURES AND MANAGEMENT PLAN

BIO-10 The project owner, in consultation with the Designated Biologist, shall prepare and implement a California Tiger Salamander and California Red-legged Frog Management Plan that presents measures to manage the construction site, and related facilities, in a manner to avoid and minimize impacts to California red-legged frogs (CRLF) and California tiger salamanders (CTS). The measures should be developed in coordination with the CDFG and USFWS, shall be approved by the CPM (in consultation with the USFWS and CDFG), and shall include, at a minimum, the following:

1. Minimize Construction Impacts.

   a. Avoidance: During project implementation, concentrations of small mammal burrows and other refugia that may support CRLF or CTS shall be avoided to the extent feasible.

   b. Install Exclusionary Fencing: Prior to any site work, including debris removal, a solid barrier fence will be installed around the power plant site, and laydown area, and shall remain in place for the duration of the project. The biological monitor shall survey and delineate the fence route, and shall be present during fence installation. Ramps or other means of escape for CTS and CRLF shall be provided. This exclusionary fence shall be routinely inspected for good repair for the duration of MEP construction; any damage, such as holes or gaps, shall be repaired immediately.

   c. Clearance surveys. Clearance surveys within the exclusionary fence shall be conducted by a qualified biologist 48 hours to 1 week prior to ground disturbance. In addition, after the first major rain event (as agreed upon with the CPM, in consultation with the CDFG and USFWS), clearance surveys must be conducted within the exclusionary fence before construction can commence. If CRLF or CTS are discovered during pre-construction surveys, individuals shall be relocated to a CPM- (in consultation with CDFG) and USFWS-approved site. Only biologists with the appropriate permits or those approved by the CPM, USFWS, and CDFG for the project shall capture and relocate these species.

   d. Linear Routes:

      i) Prior to ground disturbance, linear routes will be mapped, marked in the field, and surveyed for burrows. Burrows will be avoided to the extent possible as described above. Burrows within a vehicle access route that cannot be avoided will be temporarily reinforced with pvc pipe or by other measures as deemed effective by the biological monitor, and approved by the CPM (in consultation with CDFG and USFWS), (dry season only) prior to allowing vehicle access, and removed immediately after access is completed. A biological monitor shall be present during all linear route construction.

      ii) Before disturbance to aquatic habitat, the Designated Biologist or biological monitor shall check for CRLF and CTS within the aquatic habitat or surrounding area.

      iii) Before the start of linear work each morning, the designated biologist or biological monitor shall check for CRLF and CTS under any equipment such as vehicles and stored pipes. The biological monitor shall check all excavated steep-walled holes or trenches greater each morning before sunrise for any CRLF and CTS. CRLF and CTS shall be removed by the Designated Biologist or Biological Monitor and relocated to the USFWS and CDFG-approved

relocation site. All excavated holes or trenches located outside the MEP site shall be ramped at the end of the work day, or escape boards will be placed in the trench to allow the animals to escape.

e. Timing: Construction outside of fenced areas shall be scheduled to occur during the dry summer months between June 15 and October 15. Work shall not take place outside of fenced areas during the wet season, unless approved by the CPM (in consultation with CDFG) and USFWS.

f. Off-road access: Prior to off-road vehicle access for construction or maintenance, the vehicle route shall be mapped and marked. Burrows within the route will be avoided to the extent possible. Burrows that cannot be avoided shall be reinforced with pvc pipe (dry season only) to prevent collapse.

g. Environmentally Sensitive Areas: An environmentally sensitive area fence shall be installed along linear routes to protect potential breeding sites. Construction personnel shall not enter the environmentally sensitive areas.

h. Speed limit: A 10-mile-per-hour speed limit shall be enforced at all construction sites, except on roads with a posted speed limit. On roads with posted speed limits, construction traffic shall go the minimum safe speed.

i. Bruns Road and Access Road Monitoring:

i) During wet-season construction (mid-November through October, though earlier or later if conditions are wet and CTS are observed) if there will be large volumes of construction traffic (25 vehicles or more) scheduled to arrive or depart after dusk or before dawn. CTS moving between breeding sites and burrows shall be protected by one of these methods:

(1) Biological monitors shall walk (or slowly drive if deemed necessary for personnel safety) along Bruns Road from Canal 45 to the project site access road, and along the access road, to detect and move any CTS (or CRLF). This shall be completed prior to the expected construction traffic arrival time before dawn, and prior to departure after dusk. If the survey is done by driving, the vehicle must avoid pulling off the road unless the shoulder or pull-out is clear of CTS and CRLF.

(a) Any CTS or CRLF that are detected will be moved by the biologist only if, in the biologist's judgment, the animal would be in danger from vehicles.

(b) The project owner shall contact the CPM to indicate when the construction traffic threshold is anticipated to be met, and therefore when surveys are anticipated.

(2) During wet-season construction, construction worker traffic may be directed away from Bruns Road north of Kelso Road, and be directed to use Kelso Road and Mountain House Road east of the project site. If this option is selected, surveys need only be done along the access road and Bruns Road to Kelso Road.

(3) Alterations to the protective measure described in (1) and (2) above may be made if they will provide for more efficient or greater protection of CTS and CRLF, and if the alteration is approved by the CPM (in consultation with CDFG) and USFWS. An alternative means of protection (such as protective barriers) may also be implemented in lieu of or in conjunction with either (1) or (2) with approval from the CPM (in consultation with CDFG) and USFWS.

ii) Throughout wet-season construction (including when surveys have not been conducted) as soon as practicable after the work crew arrives or departs, the biologist shall drive slowly along the survey route to determine if any CTS or CRLF have been affected. Any dead or injured CTS or CRLF shall be reported as described in **BIO-7, #14**. In the event that dead or injured CTS or CRLF are found, the biologist shall consult with the CPM, CDFG, and USFWS to determine which, if any, adaptive management measures shall be implemented. These measures may include more frequent surveys (lower traffic threshold), more intensive surveys, or controlled arrival and departures for construction-crew traffic.

j. Best Management Practices: Best Management Practices (BMPs) listed in the Stormwater Pollution Prevention Plan (**BIO-17**) shall be implemented during project construction to protect against adverse affects on sensitive aquatic areas. Dust control measures shall be implemented during construction in the dry season. Work areas and dirt access roads shall be watered regularly to minimize airborne dust and soil particles generated by construction.

2. Minimize Operation Impacts:

a. Include a barrier on the permanent fence sufficient to block access to the power plant site by CRLF and CTS.

Verification: No less than 30 days prior to the start of any project-related ground disturbance, the project owner shall provide a final Management Plan to the CPM, CDFG, and USFWS. The final, approved Management Plan shall be incorporated into the BRMIMP within 10 days of completion of the plan, and implemented. No less than 10 days prior to the start of any ground disturbing activities or construction equipment staging, the project owner shall provide the CPM a letter-report describing the findings of the pre-construction surveys, including the time, date, and duration of the survey; identity and qualifications of the surveyor(s); and a list of species observed, number of CTS and CRLF observed and moved, and location to which they were moved. The project owner shall report monthly to the CPM, CDFG and USFWS for the duration of

construction on the implementation of CTS and CRLF avoidance and minimization measures. Within 30 days after completion of construction the project owner shall provide to the CDFG and CPM a written construction termination report identifying how mitigation measures described in the plan have been completed.

Within 60 days of completion of the permanent power plant site fence, the project owner shall submit a figure and photographs to the CPM, CDFG, and USFWS of the CTS and CRLF barrier fence.

WESTERN POND TURTLE IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-11 To avoid direct impacts to western pond turtles, pre-construction surveys shall be conducted concurrent with the California red-legged frog and California tiger salamander pre-construction surveys. Western pond turtles shall be avoided to the extent possible. Avoidance areas shall be delineated by exclusionary fencing. If western pond turtles are found within the project Disturbance area that cannot be avoided, the western pond turtles shall be relocated to the CPM (in consultation with CDFG)-approved relocation site.

Verification: The project owner shall submit a report to the CPM and CDFG no less than 10 days prior to the start of any ground disturbing activities or construction equipment staging that describes when surveys were completed, observations, and proposed impact minimization measures. Within 30 days after completion of construction of the project linears, the project owner shall provide to the CDFG and CPM a written construction termination report identifying how impact minimization measures have been completed.

BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES AND MANAGEMENT PLAN

BIO-12 The project owner shall implement the following measures to manage their construction site, and related facilities, in a manner to avoid or minimize impacts to breeding and foraging burrowing owls.

1. Pre-Construction Surveys. The Designated Biologist or Biological Monitor shall conduct pre-construction surveys for burrowing owls in accordance with CDFG guidelines (California Burrowing Owl Consortium 1993). The survey area shall include the project disturbance area and surrounding 500 foot survey buffer. If ground-disturbing activities are delayed or suspended for more than 30 days after the pre-construction survey, the site will be resurveyed.

2. Implement Avoidance Measures. If an active burrowing owl burrow is detected within 500 feet from the project disturbance area the following avoidance and minimization measures shall be implemented:

   a. Establish Non-Disturbance Buffer. Fencing shall be installed at a 250-foot radius from the occupied burrow to create a non-disturbance buffer around the burrow. The non-disturbance buffer and fence line may be reduced to 160 feet if all project-related activities that might disturb burrowing owls would be conducted during the non-breeding

season (September 1st through January 31st). Signs shall be posted in English and Spanish at the fence line indicating no entry or disturbance is permitted within the fenced buffer.

b. Monitoring: If construction activities would occur within 500 feet of the occupied burrow during the nesting season (February 1 – August 31st), the Designated Biologist or Biological Monitor shall monitor to determine if these activities have potential to adversely affect nesting efforts, and shall implement measures to minimize or avoid such disturbance.

3. Implement Burrowing Owl Mitigation Plan. If pre-construction surveys indicate the presence of burrowing owls or active burrowing owl burrows within the project disturbance area, the project owner shall prepare and implement a Burrowing Owl Mitigation Plan, in addition to the avoidance measures described above. The final Burrowing Owl Mitigation Plan shall be approved by the CPM, in consultation with CDFG, and shall:

   a. Identify and describe suitable relocation sites within 1 mile of the project disturbance area, and describe measures to ensure that burrow installation or improvements would not affect sensitive species habitat or existing burrowing owl colonies in the relocation area;

   b. Provide guidelines for creation or enhancement of at least two natural or artificial burrows per relocated owl, including a discussion of timing of burrow improvements, specific location of burrow installation, and burrow design. Design of the artificial burrows shall be consistent with CDFG guidelines (CDFG 1995) and shall be approved by the CPM in consultation with CDFG;

   c. Provide detailed methods and guidance for passive relocation of burrowing owls occurring within the project disturbance area (including burrow destruction); and

   d. Describe monitoring and management of the relocated burrowing owl site, and provide a reporting plan.

Verification: The Designated Biologist shall provide to the CPM and CDFG pre-construction survey results within 10 days of the completion of the survey.

If pre-construction surveys detect burrowing owls within 500 feet of proposed construction activities, the Designated Biologist shall provide to the CPM and CDFG documentation indicating that non-disturbance buffer fencing has been installed no less than 10 days prior to the start of any project-related site disturbance activities. The documentation shall include both a figure and photographs showing the location of the fencing.

If pre-construction surveys detect burrowing owls or active burrowing owl burrows within the project disturbance area, the project owner shall provide to the CPM and CDFG a final Burrowing Owl Mitigation Plan no less than 10 days prior to the start of construction. The measures described in the plan shall be incorporated into the BRMIMP no less than 10 days of completion of the plan, and implemented.

The project owner shall report monthly to the CPM and CDFG for the duration of construction on the implementation of burrowing owl avoidance and minimization measures. Within 30 days after completion of construction the project owner shall provide to the CDFG and CPM a written construction termination report identifying how mitigation measures, including those measures described in the plan if a plan was required, have been completed.

AMERICAN BADGER IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-13 To avoid direct impacts to American badgers, pre-construction surveys shall be conducted concurrent with the San Joaquin kit fox and burrowing owl pre-construction surveys. Surveys shall be conducted as described below:

The Designated Biologist shall perform pre-construction surveys for badger dens in the project area, including areas within 200 feet of all project facilities, utility corridors, and access roads. If dens are detected each den shall be classified as inactive, potentially active, or definitely active. Den avoidance, monitoring, and destruction methods shall adhere to those prescribed for San Joaquin kit fox avoidance and minimization in Condition of Certification **BIO-14**.

Verification: The project owner shall submit a report to the CPM and CDFG no less than 10 days prior to the start of any ground disturbing activities or construction equipment staging that describes when surveys were completed, observations, and proposed impact minimization measures. Within 30 days after completion of construction of the project, the project owner shall provide to the CDFG and CPM a written construction termination report identifying how impact minimization measures have been completed.

SAN JOAQUIN KIT FOX IMPACT AVOIDANCE AND MINIMIZATION MEASURES AND MANAGEMENT PLAN

BIO-14 The project owner shall prepare and implement a San Joaquin kit fox Management Plan that includes the following measures, developed in cooperation with USFWS and CDFG.

1. Pre-construction Surveys. Before project construction begins, a USFWS- and CPM-(in consultation with CDFG)approved biologist will conduct a pre-construction survey for San Joaquin kit fox dens in the project area, including areas within 200 feet of all project facilities, utility corridors, and access roads. If dens are detected each den shall be classified as a known, potential, atypical, or natal/pupping den. Den avoidance, monitoring, and destruction methods are described below.
2. Exclusion Zones. The configuration of exclusion zones around the San Joaquin kit fox dens should have a radius measured outward from the entrance or cluster of entrances. The following radii are minimums, and if they cannot be followed the CPM, USFWS, and CDFG must be contacted:
   - Known den: 100 feet
   - Potential den: 50 feet

- Atypical den: 50 feet
- Natal/pupping den (occupied and unoccupied): the CPM, USFWS, and CDFG must be contacted

a. Known den: To ensure protection, the exclusion zone should be demarcated by fencing that encircles each den at the appropriate distance and does not prevent access to the den by San Joaquin kit foxes. Exclusion zone fencing should be maintained until all construction related or operational disturbances have been terminated. At that time, all fencing shall be removed to avoid attracting subsequent attention to the dens.

b. Potential and Atypical dens: Placement of 4-5 flagged stakes 50 feet from the den entrance(s) will suffice to identify the den location; fencing will not be required, but the exclusion zone must be observed.

c. Construction and other project activities should be prohibited or greatly restricted within these exclusion zones. Only essential vehicle operation on existing roads and foot traffic should be permitted. Otherwise, all construction, vehicle operation, material storage, or any other type of surface-disturbing activity should be prohibited within the exclusion zones.

3. Destruction of Dens. Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Protection provided by San Joaquin kit fox dens for use as shelter, escape, cover, and reproduction is vital to the survival of the species. Limited destruction of San Joaquin kit fox dens may be allowed, if avoidance is not a reasonable alternative, provided the following procedures are observed. Potential, Known, and/or occupied San Joaquin kit fox dens shall not be destroyed unless the project owner has an Incidental Take Statement from the USFWS. The following measures will be implemented for any natal/pupping dens, active dens (non natal), and potential dens observed during pre-construction project surveys:

a. Natal/pupping dens will be avoided and USFWS contacted for further guidance. Natal/pupping dens will not be disturbed by the proposed project.

b. Known dens occurring within the footprint of the activity must be monitored for three days with tracking medium or an infra-red beam camera to determine the current use. If no San Joaquin kit fox activity is observed during this period, the den should be destroyed immediately to preclude subsequent use. If San Joaquin kit fox activity is observed at the den during this period, the den should be monitored for at least five consecutive days from the time of the observation to allow any resident animal to move to another den during its normal activity. Use of the den can be discouraged during this period by partially plugging its entrances(s) with soil in such a manner that any resident animal can escape easily. Only when the den is determined to be unoccupied may the den be excavated under the direction of the biologist. If the animal is still present after five or more consecutive

days of plugging and monitoring, the den may have to be excavated when, in the judgment of a biologist, it is temporarily vacant, for example during the animal's normal foraging activities. Energy Commission staff, USFWS, and CDFG encourage hand excavation, but realize that soil conditions may necessitate the use of excavating equipment. However, extreme caution must be exercised.

c. Destruction of the den should be accomplished by careful excavation until it is certain that no San Joaquin kit foxes are inside. The den should be fully excavated, filled with dirt and compacted to ensure that San Joaquin kit foxes cannot reenter or use the den during the construction period. If at any point during excavation a San Joaquin kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above should be resumed. Destruction of the den may be completed when in the judgment of the biologist, the animal has escaped from the partially destroyed den.

d. If any den was considered unoccupied, but upon commencement of den destruction determined to be occupied, then destruction shall cease and the CPM, USFWS, and CDFG shall be notified immediately.

4. Construction and Operational Requirements. Habitat subject to permanent and temporary construction disturbances and other types of project-related disturbance should be minimized. Project designs should limit or cluster permanent project features to the smallest area possible while still permitting project goals to be achieved. To minimize temporary disturbances, all project-related vehicle traffic should be restricted to established roads, construction areas, and other designated areas. These areas should also be included in pre-construction surveys and, to the extent possible, should be established in locations disturbed by previous activities to prevent further impacts. The following measures shall also be implemented:

   a. Procedure for San Joaquin Kit Fox Discovery Onsite. If construction personnel encounter a San Joaquin kit fox or any animal that construction personnel believe may be San Joaquin kit fox, the following protocol shall be followed:

      i) All work that could result in direct injury, disturbance, or harassment of the individual animal will immediately cease.

      ii) The construction manager will be immediately notified.

      iii) The construction manager will notify the approved onsite biologist.

      iv) The animal will be allowed to leave the site on its own.

   b. Before any ground is disturbed, the boundaries of the construction zone will be clearly delineated with orange colored plastic construction fencing or solid barriers (for example, a wildlife exclusion fence) to discourage workers or equipment from inadvertently straying from the project area.

c. Project-related vehicles should observe a 10-mph speed limit in all project areas, except on county roads and state and federal highways; this is particularly important at night when San Joaquin kit foxes are most active. To the extent possible, night-time construction should be minimized. Off-road traffic outside of designated project areas should be prohibited.

d. To prevent inadvertent entrapment of San Joaquin kit foxes or other animals during the construction phase of a project, all excavated, steep-walled holes or trenches more than 2 feet deep should be covered at the close of each working day by plywood or similar materials, or provided with one or more escape ramps constructed of earth fill or wooden planks. Before such holes or trenches are filled, they should be thoroughly inspected for trapped animals. If at any time a trapped or injured San Joaquin kit fox is discovered, the procedures under item “m” below must be followed.

e. San Joaquin kit foxes are attracted to den-like structures such as pipes and may enter stored pipe becoming trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored at a construction site for one or more overnight periods should be thoroughly inspected for San Joaquin kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a San Joaquin kit fox is discovered inside a pipe, that section of pipe should not be moved until the CPM, USFWS, and CDFG have been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved once to remove it from the path of construction activity, until the San Joaquin kit fox has escaped.

f. All food-related trash items such as wrappers, cans, bottles, and food scraps should be disposed of in closed containers and removed at least once a week from a construction or project site.

g. No firearms shall be allowed on the project site.

h. To prevent harassment, mortality of San Joaquin kit foxes, or destruction of dens by dogs or cats, no pets shall be permitted on project sites.

i. A representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a San Joaquin kit fox or who finds a dead, injured or entrapped individual, including animals struck by project vehicles. The representative will be identified during the employee education program. The representative's name and telephone number shall be provided to the CPM, CDFG, and USFWS.

j. An employee education program should be conducted for any project that has expected impacts to San Joaquin kit fox or other endangered species. The program should consist of a brief presentation by persons knowledgeable in San Joaquin kit fox biology and legislative protection

to explain endangered species concerns to contractors, their employees, and military and agency personnel involved in the project. The program should include the following: a description of the San Joaquin kit fox and its habitat needs; a report of the occurrence of San Joaquin kit fox in the project area; an explanation of the status of the species and its protection under the Endangered Species Acts; and a list of measures being taken to reduce impacts to the species during project construction and implementation. A fact sheet conveying this information should be prepared for distribution to the above-mentioned people and anyone else who may enter the project site.

k. Upon completion of the project, all areas subject to temporary ground disturbances, including storage and staging areas, temporary roads, pipeline corridors, etc. should be re-contoured if necessary, and revegetated to promote restoration of the area to pre-project conditions. An area subject to "temporary" disturbance means any area that is disturbed during project construction, but that after completion of project construction will not be subject to further disturbance and has the potential to be revegetated. Appropriate methods and plant species used to revegetate such areas should be determined on a site-specific basis in consultation with the CPM, USFWS, CDFG, and revegetation experts.

l. In the case of trapped animals, escape ramps or structures should be installed immediately to allow the animal(s) to escape, or the USFWS, CPM, and CDFG should be contacted for advice.

m. The CPM, USFWS, and CDFG will be notified immediately within three working days of the accidental death or injury to a San Joaquin kit fox during project related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, 2800 Cottage Way, Room W-2605, Sacramento, CA 95825, (916) 414-6600. The CDFG contact for immediate assistance is State Dispatch at (831) 649-2817. They will contact the local warden or biologist. Also contact Ms. Marcia Grefsrud at PO Box 47, Yountville, California, 94599, (707) 644-2812.

Verification: The project owner shall submit to the CPM, CDFG, and USFWS the final San Joaquin Kit Fox Management Plan no less than 30 days prior to the start of ground disturbing activities or construction equipment staging. The mitigation measures in the plan shall be incorporated into the BRMIMP within 10 days of completion of the plan, and implemented.

The project owner shall submit the resume and qualifications of the proposed biologist(s) to the CDFG and USFWS for review and comment and the CPM for approval no less than 30 days prior to the start of preconstruction surveys.

The project owner shall submit a report to the CPM and CDFG at least 10 days prior to the start of any ground disturbing activities or construction equipment staging that describes when surveys were completed, observations, and proposed minimization

measures. No less than 30 days after completion of construction of the project linears, the project owner shall provide to the USFWS, CDFG, and CPM a written construction termination report identifying how impact minimization measures in the plan have been completed.

SWAINSON'S HAWK IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-15 If construction is proposed during the Swainson's hawk breeding season (March-August), a pre-construction nest survey shall be conducted within 30 days prior to the beginning of construction activities by a qualified biologist in order to identify active nests in the project site vicinity.

Surveys shall be conducted according to the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee 2000).

If active nests are found within 1/2 mile of the project disturbance area, an initial temporary nest disturbance buffer shall be established. If project related activities within the temporary nest disturbance buffer are determined to be necessary during the nesting season (approximately March 1 and September 1), then a biologist experienced with raptor behavior shall be retained by the project owner to monitor the nest, and shall along with the project owner, consult with the CPM and CDFG to determine the best course of action necessary to avoid nest abandonment or take of individuals. Work may be allowed to proceed within the temporary nest disturbance buffer if raptors are not exhibiting agitated behavior such as defensive flights at intruders, getting up from a brooding position, or flying off the nest. The biological monitor or designated biologist approved for raptor monitoring shall be on-site daily while construction related activities are taking place and shall have the authority to stop work if raptors are exhibiting agitated behavior. In consultation with the CPM and CDFG and depending on the behavior of the raptors, over time it may be determined that the on-site biologist/monitor may no longer be necessary due to the raptors' acclimation to construction related activities.

Verification: The project owner shall submit a report to the CPM and CDFG no less than 10 days prior to the start of any ground disturbing activities or construction equipment staging, that describes when Swainson's hawk surveys were completed, identification and qualifications of the biologist conducting the surveys, observations, and, if required, updates to the BRMIMP based upon findings. If project-related work is required within a Swainson's hawk nest buffer, the project owner shall submit the name and qualification of the proposed monitor to the CDFG for comment and the CPM for approval no less than 30 days prior to disturbance within the nest buffer. The designated biologist shall contact the CPM and CDFG within 2 days of a work stoppage due to disturbance to the nesting Swainson's hawks. No less than 30 days after completion of construction within the nest buffer, the project owner shall provide to the CDFG and CPM a written construction termination report identifying the results of monitoring during disturbance within the nest buffer.

COMPENSATORY MITIGATION FOR IMPACTS TO SPECIAL-STATUS WILDLIFE SPECIES AND WETLANDS

BIO-16 To mitigate for impacts to wetlands and habitat loss and potential take of listed branchiopods, San Joaquin kit fox, California red-legged frog, California tiger salamander, western burrowing owl, Swainson's hawk, and wetlands, the project owner shall provide compensatory mitigation for permanent, long-term temporary, and short-term temporary impacts at the following ratios:

BIO-16 Table 1

Species	Mitigation Ratios for Impacts		
	Permanent	Long-term Temporary	Short-term Temporary
Wetlands	1:1	--	--
Branchiopod	3:1	3:1	--
California tiger salamander	3:1	3:1	1.1:1
California red-legged frog	3:1	3:1	1.1:1
San Joaquin kit fox	3:1	3:1	1.1:1
Western burrowing owl	2:1	2:1	--
Swainson's hawk	1:1	1:1	--

The project owner shall provide Security as described in **Section A** below. The project owner shall acquire, initially improve, endow, and transfer to CDFG (or a qualified non-profit organization), as described in **Section A** below, the acreages listed below (final costs will be adjusted to reflect final project footprint).

BIO-16 Table 2

Species	Compensation (Acres)
Wetland	0.018
Branchiopod	0.054
California tiger salamander	79.9
California red-legged frog	79.9
San Joaquin kit fox	79.9
Western burrowing owl	44.2
Swainson's hawk	19.3

In lieu of acquiring lands itself, the project owner may purchase credits in an approved conservation bank, as described in **Section B**, below.

A. The acquisition and management of compensation lands shall include the following elements:

1. General Selection Criteria for Compensation Lands. Compensation lands may be purchased to cover acquisition requirements for more than one species only if all criteria for each species included in the acquisition are met. Compensation lands must be approved by the CPM, CDFG, and USFWS. Compensation lands shall:

   a. provide comparable or better value habitat than that of the affected area, and with capacity to improve in quality and value for the species;

   b. be adjacent to, or in close proximity to, larger blocks of lands that are already protected such that there is connectivity between the acquired lands and the protected lands;

c. be as close to the impact site as feasible, and within the geographical range approved by the CPM, CDFG, and USFWS;

d. not have a history of intensive recreational use or other disturbance that might make habitat recovery and restoration infeasible;

e. not be characterized by high densities of invasive species, either on or immediately adjacent to the parcels under consideration, that might jeopardize habitat recovery and restoration;

f. not be encumbered by easements or uses that would preclude fencing of the site or preclude or unacceptably constrain management of the site for the primary benefit of the species and their habitat for which compensation mitigation lands were secured, and;

g. not contain hazardous wastes.

2. Specific Selection Criteria for Compensation Lands.

a. *San Joaquin kit fox*: In addition to the measures described above, compensation lands selected for acquisition shall:

i) Compensation lands should be occupied by, or be connected to lands currently occupied by the San Joaquin kit fox, however, due to the scarcity of known occurrences in this region, compensation lands with historical occurrences, or connected to lands with a historical occurrence, or other lands approved by the CPM, CDFG, and USFWS, are acceptable. Connection must be free of barriers, and have features of suitable dispersal habitat for this species.

b. *California red-legged frog*: In addition to the measures described above, compensation lands selected for acquisition shall:

i) Be within California red-legged frog Critical Habitat Unit CCS-2B.

ii) Contain known California red-legged frog breeding habitat or, with approval from the CPM and USFWS, contain potential California red-legged frog breeding habitat and be within 1 mile (with a barrier-free connection qualifying as dispersal habitat) of known California red-legged frog breeding habitat.

iii) Contain suitable California red-legged frog upland habitat

c. *California tiger salamander*: In addition to the measures described above, compensation lands selected for acquisition shall:

i) Contain known California tiger salamander breeding habitat or, with approval of the CPM, CDFG, and USFWS,, contain potential California tiger salamander breeding habitat and be within 1 mile (with a barrier-free connection qualifying as dispersal habitat) of known protected California tiger salamander breeding sites, and;

ii) Contain suitable upland habitat.

d. *Western burrowing owl*: In addition to the measures described above, compensation lands selected for acquisition shall:

i) Currently supports burrowing owls at twice the number of owls displaced by the project site. This requirement will be presumed to be met if compensation is through a conservation bank.

ii) If no owls displaced by the project, the compensatory lands must currently support burrowing owls or be within 1-mile of an active burrowing owl colony, or as approved by the CPM and CDFG.

e. *Swainson's hawk*: In addition to the measures described above, compensation lands selected for acquisition shall:

i) Either currently support a nesting site or be within 5 miles of a documented Swainson's hawk nest.

f. *Branchiopods:* In addition to the measures described above, compensation lands selected for acquisition shall**:**

i) Currently support either vernal pool fairy shrimp and/or longhorn fairy shrimp, based upon agency approval.

3. Review and Approval of Compensation Lands Prior to Acquisition. The project owner shall submit a formal acquisition proposal to the CPM, CDFG, and USFWS describing the parcel(s) intended for purchase. This acquisition proposal shall discuss the suitability of the proposed parcel(s) as compensation lands for the target species in relation to the criteria listed above. Approval from the CPM, CDFG, and USFWS, shall be required for acquisition of all parcels comprising the compensation lands.

4. Compensation Lands Acquisition Requirements. The project owner shall comply with the following requirements relating to acquisition of the compensation lands after the CPM, CDFG, and, USFWS, has approved the proposed compensation lands:

a. Preliminary Report. The project owner, or approved third party, shall provide a recent preliminary title report, initial hazardous materials survey report, biological analysis, draft conservation easement and other necessary or requested documents for the proposed compensation land to the CPM, CDFG, and USFWS. All documents conveying or conserving compensation lands and all conditions of title are subject to review and approval by the CPM, CDFG, and USFWS. For conveyances to the State, approval may also be required from the California Department of General Services, the Fish and Game Commission and the Wildlife Conservation Board.

b. Title/Conveyance. The project owner shall transfer fee title to the compensation lands, a conservation easement over the lands, or both fee title and conservation easement as required by the CPM, CDFG, and USFWS. Any transfer of a conservation easement or fee title must be to CDFG or a non-profit organization qualified to hold title to and manage compensation lands (pursuant to California Government Code section 65965) and must be approved by CDFG. If an approved non-profit organization holds title to the compensation lands, the conservation easement shall be recorded in favor of CDFG, or a non-

profit approved by the CDFG and CPM, in a form approved by CDFG. If an approved non-profit holds the conservation easement, CDFG shall be named a third party beneficiary.

c. Initial Habitat Improvement Fund. The project owner shall fund the initial protection and habitat improvement of the compensation lands by an irrevocable letter of credit or other mechanism approved by the CPM and CDFG. Alternatively, a non-profit organization may hold the habitat improvement funds if it is qualified to manage the compensation lands (pursuant to California Government Code section 65965) and if it meets the approval of the CPM, CDFG, and USFWS. If CDFG takes fee title to the compensation lands, the habitat improvement fund must be paid to CDFG or its designee.

d. Property Analysis Record. Upon identification of the compensation lands, the project owner shall conduct a Property Analysis Record (PAR) or PAR-like analysis to establish the appropriate long-term maintenance and management fee to fund the in-perpetuity management of the acquired mitigation lands.

e. Long-term Maintenance and Management Fund. The project owner shall provide to CDFG, or approved non-profit organization, a fee for maintenance and management, in perpetuity, of the compensation lands in the amount determined through the PAR or PAR-like analysis conducted for the compensation lands. Long-term maintenance and management fees will be determined through a PAR or PAR-like analysis that will be based upon an approved Management Plan. The project owner must cover the full amount of the fee for this long-term maintenance and management. If the fee is less than the Security described in **BIO-16 Table 3**, the excess money shall be returned to the project owner. The CPM, CDFG, and USFWS, may designate another non-profit organization to hold the long-term maintenance and management fee if the organization is qualified to manage the compensation lands in perpetuity. If CDFG takes fee title to the compensation lands, CDFG shall determine whether it will hold the long-term management endowment fee in the special deposit fund or designate another entity to manage the long-term maintenance and management fee for CDFG and with CDFG supervision.

f. Interest and Principal. The project owner, with approval from the CPM, CDFG, and USFWS, shall ensure that an agreement is in place with the long-term maintenance and management fee holder/manager to ensure the following conditions:

   i) Interest. Interest generated from the initial capital long-term maintenance and management fee shall be available for reinvestment into the principal and for the operation, management, and protection, in perpetuity, of the approved compensation lands, including reasonable administrative overhead, biological monitoring, improvements to carrying capacity, law enforcement measures, and any other action approved by the CPM, CDFG, and

USFWS, designed to protect or improve the habitat values of the compensation lands.

ii) Withdrawal of Principal. The long-term maintenance and management fee principal shall not be drawn upon unless such withdrawal is deemed necessary by the CDFG or the approved third-party long-term maintenance and management fee manager to ensure the continued viability of the species on the compensation lands. If CDFG takes fee title to the compensation lands, monies received by CDFG pursuant to this provision shall be deposited in a special deposit fund established solely for the purpose to manage lands in perpetuity unless CDFG designates another entity to manage the long-term maintenance and management fee for CDFG.

g. Other expenses. In addition to the costs listed above, the project owner shall be responsible for all other costs related to acquisition of compensation lands and conservation easements, including but not limited to title and document review costs, expenses incurred from other state agency reviews, and overhead related to providing compensation lands to CDFG or an approved third party; escrow fees or costs; environmental contaminants clearance; and other site cleanup measures. An estimate of this cost is included in the Security, **BIO-16 Table 3**. The project owner shall be responsible for the full cost of other expenses; if the other expenses are less than the Security described in **BIO-16 Table 3**, the excess money shall be returned to the project owner.

h. Mitigation Security. The project owner shall provide financial assurances to the CPM with copies of the document(s) to CDFG and the USFWS, to guarantee that an adequate level of funding is available to implement the mitigation measures described in this condition. These funds shall be used solely for implementation of the measures associated with the project in the event the project owner fails to comply with the requirements specified in this condition, or shall be returned to the project owner upon successful compliance with the requirements in **Section A**. The CPM's use of the Security to implement measures in this condition may not fully satisfy the project owner's obligations under this condition. Financial assurance can be provided to the CPM in the form of an irrevocable letter of credit or another form of security ("Security") approved by the CPM. Prior to submitting the Security to the CPM, the project owner shall obtain approval from the CPM, CDFG, and USFWS, of the form of the Security. Security shall be provided in the amount as follows:

BIO-16 Table 3

Security for:	Cost
Acquisition ($10,000/acre)	$799,000
Initial protection and improvement activities	$100,000
Long-term management ($22,000/year at 3% interest)	$733,333
Other fees	$44,000
Total Security:	**$1,676,333**

Source: CDFG (CEC 2010v); estimate for acquisition, enhancement, and long-term management endowment of 79.9 acres.
1 – Other fees include conservation easement fee, accounting, copying, tracking, documents fee, fee for PAR review, grantee orientation, initiation of management, etc.

The amount of Security shall be adjusted for any change in the project footprint.

i. The project owner may elect to fund the acquisition and initial improvement of compensation lands through an approved third party. Approval is by written agreement from the CPM. Such delegation shall be subject to approval by the CPM, CDFG, and USFWS, prior to land acquisition, enhancement or management activities.

Initial deposits for this purpose must be made in the same amounts as the acquisition, initial protection and improvement, and other expenses Securities required in **BIO-16 Table 3**, above, and may be provided in lieu of these Securities. If this option is used for the acquisition and initial improvement, the project owner must cover the actual acquisition costs and administrative costs and fees of the compensation land proposed for purchase once land is identified and the actual costs are known. If the total actual costs for and fees are less than the Security described in **BIO-16 Table 3**, the excess money shall be returned to the project owner.

B. In lieu of the requirements of **Section A**, the project owner may purchase compensatory mitigation credits in an approved conservation bank.

1. Credits must be purchased in the amounts equivalent to the compensatory mitigation acreage requirements included in **BIO-16 Table 2.**
2. The conservation bank must be approved by the CPM, CDFG, and USFWS.
3. Multiple conservation banks, if necessary, may be used to fulfill compensatory mitigation requirements.

Verification: If the mitigation actions required under **Section A** or **Section B** of this condition are not completed prior to the start of ground-disturbing activities, the project owner shall provide the CPM with an approved Security in accordance with this condition of certification, no less than 30 days prior to beginning project ground-disturbing activities.

<u>If the project owner chooses to mitigate under **Section A** of this condition:</u>

Agreements to delegate land acquisition to an approved third party shall be implemented within 6 months of the start of project ground-disturbing activities. If the project owner elects to delegate land acquisition prior to project construction, the project

owner shall provide to the CPM, CDFG, and USFWS a delegation proposal that identifies the third party and includes their qualifications to complete land acquisition and initial protection and improvement, and shall obtain approval from the CPM, CDFG, and USFWS, prior to delegation or transfer of funds. The project owner shall remain responsible for demonstrating compliance with the timelines and requirements described below.

No less than 90 days prior to acquisition of the property, the project owner shall submit a formal acquisition proposal to the CPM, CDFG, USFWS, describing the parcels intended for purchase and shall obtain approval from the CPM, CDFG, and USFWS prior to the acquisition.

The project owner, or an approved third party, shall complete and provide written verification to the CPM, CDFG, and USFWS of the compensation lands acquisition and transfer within 18 months of the start of project ground-disturbing activities, or prior to commercial operation, whichever occurs first.

The project owner, or an approved third party, shall provide the CPM, CDFG, and USFWS with a Compensation Lands Management Plan, for approval, within 180 days of the land or easement purchase, as determined by the date on the title. If additional long-term management fees are required, these fees shall be paid by the project owner no more than 90 days from approval of the Management Plan.

Within 90 days after completion of all project related ground disturbance, the project owner shall provide to the CPM, CDFG, and USFWS an analysis, based on aerial photography, with the final accounting of the amount of habitat disturbed during project construction. This shall be the basis for the final number of acres required to be acquired.

<u>If the project owner chooses to mitigate under **Section B** of this condition:</u>

No less than 90 days prior to purchase of credits, the project owner shall submit to the CPM and CDFG for review and approval, and the USFWS for review and comment, the proposed conservation bank(s), species to be mitigated at the bank, and evidence that credits are available for purchase.

The project owner shall complete and provide written verification to the CPM, CDFG, and USFWS of the credit purchase within 18 months of the start of project ground-disturbing activities, or prior to commercial operation, whichever occurs first. The verification shall be a letter from the conservation bank, or other method approved by the CPM and CDFG, in consultation with the USFWS, and shall include the name of the conservation bank, number of credits purchased, and the species covered under the purchase.

WATERS AND WETLANDS IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-17 To avoid and minimize impacts to wetlands and waters, the project owner shall implement the following measures:

1. Waters, wetlands, and drainage or channel shall be avoided to the maximum extent possible.
2. For all wetlands and waters to be avoided, a buffer zone shall be established to protect the resource and the immediate watershed. The buffer zone shall be delineated with temporary protective fencing.
3. A Stormwater Pollution Prevention Plan (SWPPP) shall be developed that describes sediment and hazardous materials control, fueling and equipment management practices, and other factors deemed necessary for the project.
4. If bentonite is required to install pipeline under a drainage, an Emergency Spill Response Plan, “Frac out” Monitoring Plan, and a Biological Monitoring Plan shall be developed for approval by the CPM in consultation with the CDFG. A designated biologist must be onsite during the installation.
5. Erosion control measures shall be monitored on a regularly scheduled basis, particularly during times of heavy rainfall. Corrective measures shall be implemented in the event erosion control strategies are inadequate. Sediment/erosion control measures shall be continued at the project site until such time as the revegetation efforts are successful at soil stabilization.
6. All equipment will be maintained so that there will be no leaks of automotive fluids such as fuels, solvents, or oils. Hazardous materials such as these will be stored in sealable containers in a designated location that is at least 250 feet from aquatic habitats. All refueling and maintenance of vehicles and other construction equipment and staging areas shall occur at least 250 feet from any aquatic habitat.
7. No discharge of sediment-laden water from project-related work will be allowed into storm drains, wetlands, or water courses.
8. Erodible fill material shall not be deposited into water courses. Brush, loose soils, or other similar debris material will not be stockpiled in the drainage channel or on its banks.
9. Equipment and personnel will not be allowed to enter aquatic habitats or be on the banks unless otherwise authorized by the resource agencies.
10. Erosion and sedimentation control devices (such as silt fences and fiber rolls) shall be implemented as necessary during the wet season and before forecasted rain events.
11. Dust control shall be implemented, including the use of water trucks to control dust in disturbed areas, rocking of temporary access road entrances and exits, and placement of geotextile mats and rock on access road areas to be used in the wet season.

Verification: No less than 10 days prior to ground disturbance, the project owner shall provide the CPM, CDFG, and USFWS with a report identifying the location of any protective fencing, including a figure and photographs that show the fencing.

If bentonite will be used, an Emergency Spill Response Plan, “Frac out” Monitoring Plan, and a Biological Monitoring Plan shall be submitted to the CDFG for review and comment and to the CPM for approval no less than 30 days prior to the start of project ground-disturbing activities. Plan approval shall be required before construction using bentonite may commence.

The project owner shall report monthly to the CPM, CDFG and USFWS for the duration of construction on the implementation avoidance and minimization measures. Within 30 days after completion of construction the project owner shall provide to the USFWS, CDFG and CPM a written construction termination report identifying how mitigation measures have been completed.

REVEGETATION AND RESTORATION

BIO-18 The project owner shall revegetate all temporarily affected areas:

1. Topsoil stripped from the project site shall be stockpiled onsite for later use during restoration of the temporary impact areas.
2. In areas subject to compaction, ripping will be performed to facilitate restoration. Ripping will be to a depth no less than 2 feet.
3. Affected areas will be reseeded with species typical of annual grassland.
4. Temporary erosion control measures including silt fences, erosion control blankets, and fiber rolls will be installed as necessary to prevent any observed erosion until revegetation measures are fully implemented.

Verification: Within 30 days after completion of restoration the project owner shall provide to the USFWS, CDFG and CPM a written report identifying revegetation has been completed.

If an occupied nest is detected within 2 miles of the project boundary during the inventory, no less than 30 days prior to the start of any pre-construction site mobilization the project owner shall provide the CPM, CDFG, and USFWS with the final version of the Golden Eagle Monitoring and Management Plan. This final Plan shall have been reviewed and approved by the CPM in consultation with USFWS MBO. Plans measures shall be incorporated into the BRMIMP within 10 days of completion of the Plan, and implemented.

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HAZARDOUS MATERIALS MANAGEMENT

Revised Testimony of Rick Tyler

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Mariposa Energy Project (MEP), along with staff's proposed mitigation measures, indicates that hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations, and standards. In response to Health and Safety Code, section 25531 et seq. Mariposa Energy, LLC (the applicant) would be required to develop a risk management plan. To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Alameda County Department of Environmental Health (ACDEH) and Energy Commission staff. In addition, staff's proposed conditions of certification require that the ACDEH review the risk management plan and that staff approve the plan prior to delivery of any hazardous materials to the MEP project site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed MEP has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this document describes applicable requirements for the protection of workers from these risks.

Aqueous ammonia (19 percent ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at the MEP project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (URS 2008c, Table 14-1). Aqueous ammonia will be used to control oxides of nitrogen (NOx) emissions through selective catalytic reduction and is proposed to be stored in one-10,000 gallon tank. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with the use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form, which is stored as a liquefied

gas at high pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, water treatment chemicals, and welding gasses will be present at the proposed MEP project. No acutely toxic hazardous materials will be used on site during demolition and 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.

Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. The proposed MEP would connect to an existing Pacific Gas and Electric (PG&E) natural gas line via a new 4 inch diameter 580-foot long, that would run directly west from a connection point to the PG&E pipeline (MEP 2009a). The MEP project would also require the transportation of aqueous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

HAZARDOUS MATERIALS MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §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 172.800	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.
The Clean Water Act (CWA) (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.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, 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.
Title 49, Code of Federal Regulations, 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.
Federal Register (6 CFR Part 27) interim final rule	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.
State	
Title 8, California Code of Regulations, 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.
Title 8, California Code of Regulations, section 458 and sections 500 to 515	Sets forth requirements for the design, construction, and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1 and the National Boiler and Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (CalARP) requires the preparation of a Risk Management Plan (RMP) and off-site consequence analysis (OCA) and submittal to the local Certified Unified Program Agency for approval.
California HSC Sections 25270 through 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. These regulations 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).
California Health and Safety Code, 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 (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
California Public Utilities Commission General Order 112-E and 58-A	Contains standards for gas piping construction and service.
Local	
East County Area Plan	Requirements for hazardous materials management.
Uniform Fire Code Article 79 and 80	Require secondary containment, monitoring and treatment for accidental releases of toxic gases.

The Certified Unified Program Agency (CUPA) with the responsibility to review Risk Management Plans (RMPs) and Hazardous Materials Business Plans (HMBPs) is the ACEHD With regard to seismic safety issues, the project will designed to seismic requirements of the 2007 CBC (MEP 2009a).

SETTING

The project would be located on a 158-acre parcel southeast of the intersection of Burns Road and Kelso Road in northeastern Alameda County (MEP 2009a).

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:

- local meteorology;
- terrain characteristics; and
- location of population centers and sensitive receptors relative to the project.

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 their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and directions are described in the **Air Quality** section (5.1) of the Application for Certification (AFC) (MEP 2009a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and a temperature of 88.0°F are appropriate for conducting the worst-case off-site consequence analysis (MEP 2009a).

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. Significant concentrations of ammonia will be confined to the project site. Thus, elevated terrain is of no concern for the proposed MEP Project.

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. Sensitive receptors in the project vicinity (within a six-mile radius) are listed and shown in on

Figure 5.5-1(MEP 2009a). Sensitive receptor locations are of no concern for the MEP Project as no significant off-site concentrations of hazardous materials will result from any accidental release at the proposed facility.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated. Staff's 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, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner by which they will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant's proposed engineering and administrative controls concerning hazardous materials usage. 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 which 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 will 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.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (MEP 2009a, Section 5.5). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Table 5.5-1 of the MEP AFC (MEP 2009a) and determined the need and appropriateness of their use.
- Step 2: 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 were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and evaluated. These included 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: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. 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: Staff analyzed 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 are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

In conducting the analysis, staff determined in Steps one and two that some hazardous materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in a solid form or in smaller quantities, have low mobility, or have low levels of toxicity. These hazardous materials, which were eliminated from further consideration, are briefly discussed below.

During the construction phase of the project, the only hazardous materials proposed for use are paint, paint thinner, flushing and cleaning fluids, solvents, sealants, gasoline, diesel fuel, motor oil, hydraulic fluid, lubricants, antifreeze, and pesticides. Any impact of spills or other releases of these materials will 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.

During operations, hazardous chemicals such as cleaning agents, lube oil, mineral insulating oil, water treatment chemicals and other various chemicals (see **Hazardous Materials Appendix B** for a list of all chemicals proposed to be used and stored at MEP) 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.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps one and two, staff continued with Steps three, four, and five to review the remaining hazardous materials: natural gas and aqueous ammonia. However, the project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of the SA as per staff's proposed condition **HAZ-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 is

lighter than air. Natural gas can cause asphyxiation when methane is 90 percent in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, 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 (Lees 1998), 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 conditions (as demonstrated by the July 2004 natural gas detonation in Belgium).

While natural gas will be used in significant quantities, it will not be stored on site. It will be delivered by PG&E via a new 580-foot long, 8-inch pipeline that would run directly west from an existing gas line. The risk of a fire and/or explosion on site can be reduced to insignificant 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 will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start up, thereby precluding the presence of an explosive mixture. 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.

From the connection with gas transmission line to the metering station, the natural gas pipeline will be owned, constructed and maintained by the gas utility company, PG&E. The natural gas pipeline will be constructed and operated in accordance with the California Public Utilities Commission (CPUC) General Order 112 standards and the Federal Department of Transportation (DOT) regulations, Title 49, Code of Federal Regulations (CFR), Parts 190, 191, and 192 (see **Table 1 LORS**). Staff concludes that existing LORS are sufficient to ensure minimal risks of pipeline failure

Staff reviewed the gas pipeline route and determined that is on private land that is in agricultural use. There is no potential for impact on the public along the new pipline route. Staff, therefore, concludes that the pipeline does not require further mitigation.

Aqueous Ammonia

Aqueous ammonia will be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the MEP. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. MEP would use 19 percent aqueous ammonia solution stored in one stationary above-ground storage tank, with a maximum capacity of 10,000 gallons to minimize the potential for overflow during filling (MEP 2009a).

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose the risk of off-site impact. The use of aqueous ammonia can result in the formation and release of toxic gases in the event of a spill even without interaction with other chemicals. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that will be used and stored on site. However, the

use of aqueous ammonia poses far less risk than the use of the far more hazardous anhydrous ammonia (ammonia that is not diluted with water).

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses four bench mark exposure levels of ammonia gas occurring offsite. These include:

1. the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm);

2. the immediately dangerous to life and health level of 300 ppm;

3. the emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by US EPA and California; and

4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm.

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will assume that the potential release poses a risk of significant impact. However, staff will also assess the probability of occurrence of the release and/or the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

Section 5.2 of the AFC (MEP 2009a) describes the modeling used for the worst-case and alternative accidental releases of aqueous ammonia in the applicant's off-site consequence analysis (OCA). Pursuant to the California Accidental Release Program (CalARP) regulations (federal risk management plan regulations do not apply to sources that store or use aqueous ammonia solutions below 20 percent), the OCA was performed for a worst-case release scenario involving the failure and complete discharge of the storage tank (MEP 2009a, Section 5.5).

Ammonia emissions from the potential release scenarios were calculated following methods provided in the RMP off-site consequence analysis guidance, US EPA, April 1999. The highest average daily temperature recorded in the area was (112°F), a wind speed of 1.5 meters per second, and atmospheric stability class F were used for emission and dispersion calculations for the worst-case scenario

Hazardous Materials Management Table 2 shows the applicant's modeled distance to the four benchmark criteria concentrations.

Hazardous Materials Management Table 2
Distance to EPA/CalARP and CEC Toxic Endpoints (source: Section 7.12.2.2 of URS 2008a)

Scenario	Distance in Feet To Lethal Conc. (2,000 ppm)	Distance in Feet to IDLH (300 ppm)	Distance in Feet to CalARP Toxic Endpoint (200 ppm)	Distance in Feet to CEC Significance level (75 ppm)
Worst Case	20	23	25	25

The results of the applicant's modeling show that concentrations exceeding CEC's level of significance of 75 ppm would not extend beyond the facility fence line. Staff has reviewed the applicant's modeling and accepts the results. Staff reviewed the existing aqueous ammonia storage and piping systems and spill prevention and control measures and found them to be more than adequate for the proposed MEP project. Furthermore, the potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan are summarized below. Therefore, staff has determined that no off-site public would experience a significant risk of an adverse health effect should an accidental release of aqueous ammonia occur due to tank failure or transfer activities.

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 project. The engineered safety features proposed by the applicant for use at the MEP project include:

- storage of containerized hazardous materials in properly labeled original containers within structures protected by a secondary containment berm. Incompatible materials would be separated and flammable materials would be stored in a flammable storage cabinet,
- installation of a fire protection system for hazardous materials storage areas;
- construction of a concrete containment area surrounding the aqueous ammonia storage tank with 90 percent covering.
- construction of a sloped concrete pad beneath the ammonia truck unloading area that would drain into the storage tank's underground containment sump through a 24-inch-diameter opening; and
- process protective systems including continuous tank level monitors, automated leak detectors, temperature and pressure monitors, alarms, and emergency block valves.

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety laws, ordinances, and standards.

A worker health and safety program will be prepared by the applicant and include (but not be limited to) the following elements (see the **Worker Safety and Fire Protection** section for specific regulatory requirements):

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- procedures to ensure the proper use of personal protective equipment;

- safety operating procedures for the operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

The applicant will also prepare a risk management plan for aqueous ammonia, as required by both CalARP regulations and Condition of Certification **HAZ-2**. This condition also includes the requirement for a program for the prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (MEP 2009a, Section 5.5). Other administrative controls would be required in proposed Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and **HAZ-3** (development of a safety management plan).

On-Site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements. Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response. The presence of oil in a quantity greater than 1,320 gallons might invoke a requirement to prepare a Spill Prevention, Control, and Countermeasure (SPCC) Plan. The quantity of oil contained in any one of the planned 230/500 kV transformers would be in excess of the minimum quantity that requires such a plan. However, there are known Waters of the United States adjoining the site (the San Joaquin River), as well as Waters of the State, and thus staff's position is that an SPCC Plan is required by 40 CFR 112 (and California HSC Sections 25270 through 25270.13 because the project will store 10,000 gallons or more of petroleum on-site). The above 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 CUPA (the ACDEH).

In the event of a large spill, a full hazardous materials response would be provided by the Alameda County Fire Department. The Fire Department is capable of handling any hazardous materials-related incident at the proposed facility and would respond within about 30 minutes. Staff finds that the County is capable of responding to a hazardous materials emergency call from the MEP with an adequate response time.

Transportation of Hazardous Materials

Hazardous materials including aqueous ammonia will be transported to the facility by tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the applicant's proposed transportation routes for hazardous materials delivery. Trucks would travel on I-580 and /or I-205 to Northwest on Byron Bethany Road and south on Burns Road. Deliveries form Contra Costa County would be proceed on Byron Bethany to Burns Road. Hazardous materials deliveries along these routes do not pose a significant risk to local sensitive receptors.

Ammonia can be released during a transportation accident and the extent of impact in the event of such a release would depend upon the location of the accident and the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent upon three factors:

- the skill of the tanker truck driver;
- the type of vehicle used for transport; and
- accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves main highways. Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence.

To address the issue of tanker truck safety, aqueous ammonia will be delivered to the proposed facility in DOT-certified vehicles with design capacities of 8,000 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed to haul caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risk of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article, which references both the 1990 Harwood et al. and 1993 Harwood studies, to determine that the frequency of release for the transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per 1,000,000 miles traveled on well-designed roads and highways. The

applicant estimated that routine operation of the proposed MEP would require a maximum of 33 deliveries per year (MEP 2009a, Section 5.5). Each delivery will travel approximately 8.1 miles after leaving the main highway.

This would result in a maximum of 267 miles of delivery tanker truck travel in the project area per year (with a full load). Staff believes that the risk over this distance is insignificant. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in 1,000,000.

In addition, staff used a transportation risk assessment model (developed by staff) in order to calculate the probability of an accident resulting in a release of a hazardous material due to delivery from the freeway to the facility. Results show a risk of .8 in 1,000,000 for one trip from the main highway to the facility and a total annual risk of 274 in 1,000,000 for 33 deliveries. This risk was calculated using accident rates on various types of roads (in this case, rural two-lane) with distances traveled on each type of road computed separately. Although it is an extremely conservative model in that it includes risk of accidental release from all modes of hazardous materials transportation and does not distinguish between a high-integrity steel tanker truck and other less secure modes, the results still show that the risk of a transportation accident is insignificant.

Staff therefore believes that the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant because of the remote possibility that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor infrequent. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

Based on the environmental mobility, toxicity, the quantities at the site, and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of ammonia transportation.

Seismic Issues

It is plausible that an earthquake could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in a release of hazardous materials, however, modeling of the potential offsite consequences demonstrates there would be no impacts offsite. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, and the earthquake in Kobe, Japan, in January 1995, have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks

sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia, Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of that earthquake. Staff notes that the proposed facility would be designed and constructed to the standards of the 2007 California Building Code for Seismic Design (MEP 2009a, Section 2.4). Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks), staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Staff has also begun a review of the impacts of the recent earthquakes in Haiti (January 12, 2010; magnitude 7.0) and Chile (February 27, 2010; magnitude 8.8). The building standards in Haiti are extremely lax while those in Chile are as stringent and modern as California seismic building codes. Yet, the preliminary reports show a lack of impact on hazardous materials storage and pipelines infrastructure in both countries. For Haiti, this most likely reflects a lack of industrial storage tanks and gas pipelines; for Chile, this most likely reflects the use of strong safety codes.

Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled *Chemical Facility Vulnerability Assessment Methodology* (US DOJ 2002), the North American Electric Reliability Council published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy (DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published in the Federal Register (6 CFR Part 27) an interim final rule requiring that facilities that use or store certain hazardous materials conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. While the rule applies to aqueous ammonia solutions of 20 percent or greater and this proposed facility plans to utilize a 19 percent aqueous ammonia solution, staff still believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

In order to ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents. The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist

attacks. The level of security needed for the MEP project is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of the consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP was used, in part, to determine the severity of consequences of a catastrophic event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the North American Electric Reliability Council's (NERC) 2002 guidelines, the U.S. DOE VAM-CF model, and the U.S. Department of Homeland Security regulations published in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of low vulnerability due to the industrial setting and lack of nearby sensitive receptors.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact. Existing locations that use or store gaseous or liquid hazardous materials, or locations where such facilities might likely be built, were both considered. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one uncontrolled release occurring are remote. The chance of two or more occurring simultaneously, with resulting airborne plumes mingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant.

The applicant for the proposed MEP predicted an ammonia concentration of 75 ppm at a distance of 25 feet from the MEP ammonia tank. The applicant modeled with worst-case assumptions (temperature 112°F, wind speed 1.5 meters per sec. Staff agrees with the applicant's analysis. This worst case assessment does not predict impacts beyond the site boundary. Thus there is no significant potential for cumulative impact.

These accidental - or intentional - release scenarios are highly unlikely because the applicant will develop and implement a hazardous material storage and handling program for MEP independent of any other projects considered for potential cumulative impacts and implement enhanced site security measures. Staff believes that the facility, as proposed by the applicant poses a less than significant risk of accidental release that could result in off-site impacts. It is unlikely that an accidental release that has very low probability of occurrence (about one in one million per year) would independently occur at the MEP site and another facility at the same time. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the MEP project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of hazardous materials management.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use will pose no significant impact to the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to develop a Risk Management Plan (RMP). To ensure the adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the ACDEH and by Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval of the RMP by staff prior to the delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia, in addition to site security matters.

Staff recommends that the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed, and operated to comply with all applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release. If all mitigation proposed by the applicant and staff are required and implemented, the use, storage, and transportation of hazardous materials will not present a significant risk to the public.

Staff proposes eight conditions of certification mentioned throughout the text (above), and listed below. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **Appendix B** of the staff assessment, unless there is prior approval by the Energy Commission compliance project manager. Condition of Certification **HAZ-2** requires that an RMP be prepared and submitted prior to the delivery of aqueous ammonia.

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario and therefore proposes Condition of Certification (**HAZ-3**) requiring the development of a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. The development of a safety management plan addressing the delivery of all liquid hazardous materials during construction, commissioning, and operations will further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the required RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. Condition of Certification **HAZ-4** requires that the aqueous ammonia storage tank be designed to

certain rigid specifications. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-5**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-6** and **HAZ-7.**

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in **Appendix B**, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a Business Plan, a Spill Prevention, Control, and Countermeasure Plan (SPCC), and a Risk Management Plan (RMP) prepared pursuant to the California Accidental Release Program (CalARP) to the Alameda County Department of Environmental Health (ACDEH) and the CPM for review. After receiving comments from the ACDEH and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final Business Plan, SPCC Plan, and RMP shall then be provided to the ACDEH and the Alameda County Fire Department (ACFD) for information and to the CPM for approval.

Verification: At least 30 days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan and SPCC Plan to the CPM for approval. At least thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the ACDEH and the ACFD for information and to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials by tanker truck. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least 30 days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125 percent of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The

final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

Verification: At least 60 days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307.

Verification: At least 30 days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the CPM for review and approval. The Construction Security Plan shall include the following:

1. written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;
2. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and
3. Evacuation procedures.

Verification: At least 30 days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-7 The project owner shall also prepare a site-specific security plan for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. evacuation procedures;
2. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;
3. written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;
4. A. a statement (refer to sample, **Attachment A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and

shall be conducted in accordance with state and federal laws regarding security and privacy;

B. a statement(s) (refer to sample, **Attachment B**), signed by the contractor or authorized representative(s) for any permanent contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy.;

5. a statement(s) (refer to sample, **Attachment C**), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.802, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

6. closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, the main entrance gate, the outside entrance to the control room, the ammonia storage tank, and the entire boundary of the MEP site.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components—transformers, gas lines, and compressors—depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with both appropriate law enforcement agencies and the applicant.

Verification: At least 30 days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval. In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed, and that updated certification statements have been appended to the operations security plan. In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for employment at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for contract work at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

_____

(Company name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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HAZARDOUS MATERIALS
Appendix A

Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

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BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (ppm) to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by the U.S. Environmental Protection Agency and the California Environmental Protection Agency in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. California Environmental Quality Act requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. Table 1 provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL.

HAZARDOUS MATERIALS Appendix A Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 minutes	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible Injury, or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 minutes	Protects nearly all segments of general population from irreversible effects.
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	Significant irritation, but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one-time exposure.
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 minutes 30 minutes 10 minutes	Significant irritation, but protects nearly all segments of general population from irreversible acute or late effects. One-time accidental exposure.
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hours	No toxicity or irritation on continuous exposure for repeated 8-hour work shifts.
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 minutes	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin).

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)
* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.
** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The WHO (1986) warned that the young, elderly, asthmatics, those with bronchitis, and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

Protocol: AIHA. 1989. American Industrial Hygienists Association, Emergency Response Planning Guideline, Ammonia, (and Preface) AIHA, Akron, OH.

Protocol: EPA. 1987. U.S. Environmental Protection Agency, Technical Guidance for Hazards Analysis, EPA, Washington, D.C.

Protocol: NRC. 1985. National Research Council, Criteria and Methods for Preparing Emergency Exposure Guidance Levels (EEGL), Short-Term Public Emergency Guidance Level (SPEGL), and Continuous Exposure Guidance Level (CEGL) documents, NRC, Washington, D.C.

Protocol: NRC. 1972. Guideline for Short-Term Exposure of the Public to Air Pollutants. IV. Guide for Ammonia, NRC, Washington, D.C.

Protocol: NIOSH. 1994. National Institute of Occupational Safety and Health, Pocket Guide to Chemical Hazards, U.S. Department of Health and Human Services, Washington D.C., Publication numbers 94-116.

Protocol: WHO. 1986. World Health Organization, Environmental Health Criteria 54, Ammonia, WHO, Geneva, Switzerland.

ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists

AIHA, American Industrial Hygienists Association

EEGL, Emergency Exposure Guidance Level

EPA, Environmental Protection Agency

ERPG, Emergency Response Planning Guidelines

IDLH, Immediately Dangerous to Life and Health Level

NIOSH, National Institute of Occupational Safety and Health

NRC, National Research Council

STEL, Short Term Exposure Limit

STPEL, Short Term Public Emergency Limit

TLV, Threshold Limit Value

WHO, World Health Organization

HAZARDOUS MATERIALS
Appendix B

Hazardous Materials Proposed for Use at the MEP

HAZARDOUS MATERIALS Appendix B
Hazardous Materials Proposed for Use at the MEP*

Chemical	Use	Quantity	Storage Location (GA Location Code)	State
Aqueous Ammonia (19% NH3 by weight)	Control oxides of nitrogen (NOx) emissions through selective catalytic reduction	8,500 gallons	Onsite storage tanks with secondary containment (38)	Liquid
R 134A (1-1-1-2-Tetrafluoroethane)	Refrigerant in the inlet air chiller system	110,000 pounds	Inlet air chiller system (21)	Liquid
Cleaning chemicals/detergents	Periodic cleaning of combustion turbine	Varies (less than 300 gallons liquids or 100 pounds solids for each chemical)	Chemical storage tote or drums at a protected temporary storage location onsite (40)	Liquid
Diesel No. 2	Fuel back-up fire pump	200 gallons	Permanent onsite storage in above ground storage tank with secondary containment (32)	Liquid
Hydraulic oil	High-pressure combustion turbine starting system, turbine control valve actuators	270 gallons	Onsite 55-gallon drums (9), 160 gallons in CT tanks	Liquid
Laboratory reagents	Water/wastewater laboratory analysis	Varies (less than 5 gallons liquids or 10 pounds solids for each chemical)	Laboratory chemical storage cabinets (stored in original chemical storage containers/bags) (43)	Liquid and granular solid
Lubrication oil	Lubricate rotating equipment (e.g., gas turbine and steam turbine bearings)	3,200 gallons	Onsite 55-gallon drums, 200-gallon waste oil storage tank (5), and 2,600 gallons in CT/ Gen tanks	Liquid
Mineral insulating oil	Transformers/ switchyard	36,000 gallons	Inside the transformers; no mineral actually stored on site (18)	Liquid
Sodium carbonate	Alkalinity source for nitrification reactor	200 pounds	Dry storage area	Solid Powder
Sodium hypochlorite (12.5 % solution)	Biocide/biofilm control for potable, fire, and service water systems	500 gallons	Water treatment chemical feed storage (40)	Liquid
Acetylene	Welding gas	185 pounds	Maintenance / warehouse building	Gas

			(40)	
Oxygen	Welding gas	250 pounds	Maintenance / warehouse building (40)	Gas
Propane	Torch gas	300 pounds	Maintenance /warehouse building (40)	Gas
EPA protocol gases	Calibration gases	25 pounds	CEMS enclosures (2), Maintenance / Warehouse (40)	Gas
Cleaning chemicals	Cleaning	Varies (less than 25 gallons liquids or 100 pounds solids for each chemical)	Admin/control building, maintenance/warehouse building (40)	Liquid or solid
Paint	Touchup of painted surfaces	Varies (less than 25 gallons liquids or 100 pounds solids for each type)	Maintenance /warehouse building (40)	Liquid

*Sources: Table 5.5-1 of the Application for Certification for Mariposa Energy Project (MEP 2009a)

LAND USE

Revised Testimony of Lisa Worrall

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

This section of the Supplemental Staff Assessment (SSA) analyzes the potential effects on land use that would occur by construction and operation of the proposed Mariposa Energy Project (MEP). Based on an assessment of the proposed MEP, staff concludes the MEP would not convert any farmland (as classified by the Farmland Monitoring and Mapping Program) to non-agricultural use or conflict with existing agricultural zoning or Williamson Act contracts; would not disrupt or divide the physical arrangement of an established community; would not disrupt an existing or recently approved land use; with staff's proposed Conditions of Certification **LAND-1**, **LAND-2**, **LAND-3**, and **LAND-4,** would be consistent with applicable Alameda and Contra Costa County laws, ordinances, regulations, and standards; and would not contribute to significant adverse cumulative land use impacts.

INTRODUCTION

The California Energy Commission staff (hereafter referred to as "staff") have reviewed the proposed Mariposa Energy Project (MEP or "proposed project" or AFC) in accordance with the requirements of the California Environmental Quality Act (CEQA).

This section addresses project compatibility with existing or reasonably foreseeable[1] land uses; consistency with the applicable laws, ordinances, regulations, and standards (LORS); and potential project-related direct, indirect, and cumulative environmental effects. It discusses land use issues including concerns related to agricultural, recreation, and airport uses. It also recommends conditions of certification intended to reduce or eliminate impacts associated with any potentially significant environmental effects. In addition to the effects associated with land use, an energy generating system and its related facilities generally have the potential to create environmental impacts to other natural and human resources. Issues related to these individual resource areas are discussed in detail in separate sections of this SSA.

The MEP is proposed on a 158-acre parcel of privately-owned land currently leased by the Diamond Generating Corporation (parent company of Mariposa Energy, LLC). The project site would comprise 10 acres of the 158-acre parcel. The northern section of the transmission towers and lines (transmission tie-in site) is proposed on privately-owned

[1] "Reasonably foreseeable" is defined in the California Environmental Quality Act (CEQA) as approved projects under construction; approved related projects not yet under construction; unapproved (planned) projects, with related impacts, currently under environmental review; and projects under review by the Lead Agency or other relevant public agencies. Planned developments, such as those identified in an airport Master Plan, may also be considered, provided there is evidence that measures are actually being taken to implement the plans. The analysis must also take into consideration the most probable development patterns and future activities that are a reasonably foreseeable consequence of the initial project.

property, and the northern 1,000-foot section of the water supply pipeline and associated equipment are proposed on land publicly-owned by the Byron Bethany Irrigation District (BBID) (BBID property).

As requested by Energy Commission staff, on May 20,2010, Alameda County submitted a letter on the proposed MEP's consistency with the county's general plan (East County Area Plan, or ECAP), the Alameda County Ordinance Code (Title 17: Zoning) and the Williamson Act contract # C-89-1195, which the subject property is currently encumbered. In summary, the county considers the MEP to be consistent with all county policies, ordinances, and contracts with bearing on the project site. This letter is cited in this SSA as the "Alameda County May 2010 letter". Alameda County submitted a second letter on September 22, 2010 supplementing and clarifying their previous letter in May. The September letter from Alameda County is cited as the "Alameda County September 2010 letter" in this SSA and discusses the Byron Airport in Contra Costa County. In the section "Assessment of Impacts and Discussion of Mitigation" staff provides a thorough analysis of the MEP's compliance with all state and local LORS.

In analyzing the MEP, staff has also reviewed Alameda County consistency determinations for two other natural gas-fired power plants; the 1,120 megawatt (MW) Tesla Power Project (also known as Midway Power, LLC) (hereafter referred to as "Tesla") and 1,100 MW East Altamont Energy Center (hereafter referred to as "East Altamont"). As with the MEP, both projects were proposed on land designated in the ECAP as Large Parcel Agriculture and zoned within the Agricultural District ("A" District). The county determined both the Tesla and East Altamont projects were in full compliance with the county ECAP "if an appropriate agricultural land mitigation agreement was successfully entered into by the county and the applicant" (AC 2010f & AC 2010e). During the Energy Commission licensing process, all impacts to agricultural land were mitigated to less than significant.

Tesla was certified by the Energy Commission on June 16, 2004; construction has not started and the applicant's request for an extension of the construction commencement date was denied by the Commission on September 23, 2009, and as of October 16, 2009 the project no longer has a certificate (CEC 2009w). East Altamont was certified on August 20, 2003 and construction has not started. The applicant filed and the Commission granted an extension of the deadline to commence construction on East Altamont to August 19, 2011 (CEC 2008).

This SSA references the Alameda County May and September 2010 letters and discusses project consistency with local LORS where appropriate. The letter presenting Alameda County's determination of project consistency for the East Altamont project is cited in the SSA as the "East Altamont 2002 letter". Previous Alameda County actions on the project property with respect to the Byron Power Cogeneration Plant and the subject property's Williamson Act contract have also been reviewed by staff.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Land Use Table 1 lists the state and local land use LORS applicable to the proposed project and surrounding lands. There are no Federal LORS applicable to the proposed

project and surrounding lands. The project's compatibility with each LORS is analyzed under Assessment of Impacts and Discussion of Mitigation.

LAND USE Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
State	
California Land Conservation Act of 1965 Government Code § 51238.1(a) (Williamson Act)	This Act, commonly referred to as the Williamson Act, enables private landowners to voluntarily enter into contracts with local governments for the purpose of restricting specific parcels of land to agricultural or related open space uses. This section of the Act lists three principles of compatibility used for determining the compatibility of uses with contracted land. All three principles must be met for a use to be considered compatible.
Local	
East County Area Plan (ECAP) (section of the Alameda County General Plan)	The ECAP presents the County's intent for future development and resource conservation in the East County with goals and policies as a guide as to the County's position on land use-related concerns and day-to-day decision making.
Land Use Designation: Large Parcel Agriculture	This land use designation specifies minimum parcel size, minimum and maximum building intensity, development envelope size and configuration requirements, and permitted uses.
Land Use -Subregional Planning; Urban/Open Space Delineation *Policy 1*	This policy addresses the county's Urban Growth Boundary.
-Urban & Rural Development; Location: Incorporated & Unincorporated *Policy 13*	This policy addresses the provision of public facilities and other infrastructure[2] in excess of what is needed for permissible development consistent with the Save Agriculture and Open Space Lands Initiative[3]. This policy identifies the type of additional or replacement of infrastructure that is not barred by this policy.
-Sensitive Lands and Regionally Significant Open Space; General Open Space *Policy 52*	This policy addresses preservation of open space areas.
Policy 54	This policy addresses the approval of open space, park, recreational, agricultural, limited infrastructure, public facilities, and other similar compatible uses outside the Urban Growth Boundary.
-Sensitive Lands & Regionally Significant Open Space; Agriculture *Policy 72*	This policy addresses the preservation of the Mountain House area for intensive agricultural use.
Policy 73	This policy addresses the requirement of buffers between agricultural uses and new non-agricultural uses areas and within agricultural areas or abutting parcels to provide for the protection of the maximum amount of arable, pasture, and grazing land feasible.
Policy 89	This policy addresses the retention of rangeland in large, contiguous blocks in sufficient size to enable commercially viable grazing.

[2] "Infrastructure" includes public facilities, community facilities, and all structures and development necessary to provide public services and utilities.
[3] Previously known as Measure D, this initiative was passed in November 2000 by the Alameda County electorate and effective on December 22, 2000.

Applicable LORS	Description
-Special Land Uses; Windfarms *Policy 173*	This policy addresses the uses and structures not compatible with wind energy operations within with Wind Resource Area.
Public Services and Facilities -General Services and Facilities; Infrastructure and Services *Policy 218*	This policy addresses the types of development and expansion allowed in appropriate locations inside and outside the Urban Growth Boundary.
Alameda County Ordinance Code (Title 17: Zoning)	The zoning code establishes districts, based on the division of unincorporated territory within the county, where the use of land and buildings, including the height and open space surrounding the buildings are regulated.
17.06 – A Districts	Agricultural Districts (A Districts) are established to promote the implementation of the general plan land use proposals for agricultural and other non-urban uses, to conserve and protect existing agricultural uses, and to provide space for and encourage uses in places where more intensive development is not desirable or necessary for general welfare.
17.52 – General Requirements	The general regulations, special provisions and exemptions that the zoning provisions are subject to are identified in this chapter of the zoning code.
17.54 – Procedures	The procedures for zoning-related actions are identified in this chapter of the zoning code.
Contra Costa County General Plan	The Contra Costa County General Plan presents the broad goals and policies, and specific implementation measures, which will guide decisions on future growth, development, and the conservation of resources through the year 2020.
Land Use Designation: AL – Agricultural Lands	This land use designation preserves and protects lands capable of and generally used for the production of food, fiber, and plant materials.
PS – Public/Semi-Public	This land use designation includes properties owned by public governmental agencies and public transportation corridors and privately owned transportation and utility corridors.
Land Use Element- *Policy 3-10*	This policy addresses the discouragement of extending urban services into agricultural areas outside the Urban Limit Line.
Policy 3-69	This policy addresses the extension of urban services into agricultural areas outside the Urban Limit Line and limiting new land uses to those compatible with the primary agricultural and watershed purposes of the area.
Conservation Element- *Policy 8-29*	This policy addresses the retention of large contiguous areas of Contra Costa County in agricultural production.
Policy 8-32	This policy addresses the protection of agriculture to assure a balance in land use.
Contra Costa Airport Land Use Compatibility Plan (Byron Airport)	Provides a plan promoting compatibility between the airports in Contra Costa County and the surrounding land uses.
Compatibility Zone 'D' Criteria 6.7.4. Height Limitations -	This policy addresses height limitations within Zone D.
6.9. Compatibility Criteria — All Zones 6.9.3. Hazards to Flight —	This policy addresses the prohibition of land uses which result in an increased attraction of birds or would create a visual or electronic hazard to flight.

SETTING

PROJECT SITE

The proposed project is a natural gas-fired simple cycle peaking facility to be located on a ten-acre portion (hereafter referred to as the project site) of a 158-acre parcel (Assessor Parcel Number [APN] 99B-7050-001-10) (hereafter referred to as the project property) in the unincorporated area of Alameda County. The project property is located southeast of the intersection of Bruns Road and Kelso Road and the project site is proposed in the southern portion of the property.

Situated in northeastern Alameda County, the project site is approximately six miles south of Byron (Contra Costa County), approximately 2.5 miles west of the community of Mountain House (San Joaquin County), seven miles northwest of Tracy (San Joaquin County), and seven miles east of Livermore (Alameda County). The site is approximately 2.7 miles south of the Byron Airport in Contra Costa County, one mile from the nearest runway approach centerline, and within the Byron Airport area of influence.

The site is used for cattle grazing on non-irrigated non-native annual grassland. The unrelated 6.5 MW Byron Power Cogeneration Plant occupies two acres of the property. A wind turbine development traversed the property, but has since ceased operation. A few concrete pads, felled poles, and other associated minor debris remain. Land Use Figure 1 presents the existing land use on the project site and adjacent land within a one mile radius of the project site and within 0.25 mile of the water supply pipeline route. These uses include agricultural, public/utilities, residences, and water management.

Generating Facilities

The facility would have a nominal generating capacity of 200 MW and would consist of four power blocks, each with one natural gas-fired combustion turbine. A portion of the power block would be paved for internal access to all project facilities and onsite buildings. The remaining areas around the equipment would have a gravel surface. The 10-acre generating facility would be fenced. Within the fenced facility a detention pond, a warehouse and maintenance building, and a control/administration building would be part of the project. The applicant has not provided details as to the type and height of the fencing. The general arrangement figure in the AFC, Figure 2.3-1, presents the proposed facility layout (MEP 2009a).

The tallest facilities would be the exhaust stacks at 80 feet and the transmission towers, ranging from 84 to 95 feet. The facility would be dug into the two existing small hills, and the facility footprint would be graded and fully fenced. Access to the facility would be from Bruns Road, via a new 1,100-foot long road along the route of the existing unpaved access road that connects the Byron Power Cogeneration Plant to Bruns Road. The access road connects to Bruns Road approximately 1,637 feet (0.31 mile) south of the intersection of Bruns Road and Kelso Road.

Temporary construction facilities would include a 9.2-acre worker parking and laydown area immediately east of the project site on the project property, a 1-acre water supply pipeline parking and laydown area located at the BBID headquarters facility (APN 001-041-030) in Contra Costa County, and a 0.6-acre laydown area along the transmission line route on PG&E property (APN 94B-7030-0002-01).

Transmission Lines and Infrastructure

A new approximately 0.7-mile-long, 230-kilovolt (kV) transmission line would connect the plant with the regional electrical grid at the Pacific Gas and Electric (PG&E) Kelso Substation, directly across Kelso Road to the north. The 230-kV transmission line would be within a new 100-foot wide easement along a route extending from the plant; staying east of the Byron Power Cogeneration Plant, crossing Kelso Road onto PG&E property (APN 99B-7030-0002-01), and staying east of the PG&E Bethany Compressor Station, where it would turn west just north of the Kelso Substation and then turn south to the final interconnect point at the Kelso Substation. Mariposa Energy would own, operate and maintain the 230-kV transmission line from the project site up to the point at which it enters PG&E's property. PG&E would own, operate and maintain the transmission line within their property (CH2M 2009c).

Natural gas would be delivered to the site via a new 580-footlong natural gas pipeline that would connect the project site to PG&E's Line 2, an existing high-pressure natural gas pipeline located northeast of the project site. The new gas supply piping would consist of an 8-inch-diameter pipeline.

Service and process water would be fresh irrigation water provided from a new direct connection to the Byron Bethany Irrigation District (BBID) in Contra Costa County. The water would be supplied via a concrete turnout structure along the bank of canal 45, a new pump station, and a 1.8-mile pipeline, ten inches in diameter. The majority of the pipeline would be located outside the edge of the Bruns Road pavement. A 1,000-foot section of the pipeline would be on BBID property (APN 001-041-061). A little over 1,000-foot section of the pipeline would be on the project property. BBID would construct, own and maintain the pump station, concrete turnout structure, and water supply pipeline (up to the project property boundary).

SURROUNDING AREA

An existing 230-kV transmission line is located on the project property, adjacent to the western project property boundary; two existing 500 kV transmission lines are adjacent to the eastern project property boundary; an existing 69-kV transmission line parallels Bruns Road north of the project site then turns to parallel Kelso Road and terminate at the Tracy Substation. The 230-kV line is approximately 600 feet from the project site at its closest point. The two 500-kV lines parallel each other and are approximately 1,200 feet from the project site at their closest point. Land Use Figure 1 shows the location of the existing transmission lines near the project site.

There are a few scattered residences within one mile of the project site, the closest approximately 0.4 mile northwest of the site. The closest urbanized area is the community of Mountain House in San Joaquin County, approximately 2.5 miles east of the project site. Mountain House is a partially developed master plan community with

approximately 14,000 – 16,000 homes, located within a 4,780-acre area (SJ 2007). The community is located adjacent to the Alameda County/San Joaquin County boundary and is bordered by Great Valley Parkway to the west, Mountain House Parkway to the east, Interstate 205 to the south, and is bounded to the north by Old River (a distributary of the San Joaquin River).

Existing permitted industrial uses in the project area include the Byron Power Cogeneration Plant (on the project property, 0.1 mile northeast of the power plant), PG&E Bethany Compressor (0.4 mile north of the power plant) and Kelso Substation (0.5 mile north of the power plant), Tracy Pumping Station (one mile northeast of the power plant), Tracy Substation (one mile northeast of the power plant), and Delta Pumping Plant (one mile northwest of the power plant). Other similar land uses include the California Aqueduct, 1.3 miles to the northwest, Delta Mendota Canal 0.8 mile to the east, and Bethany Reservoir 0.8 mile to the south. Once operational, the proposed project would be similar in nature to these existing surrounding uses.

The Byron Airport is in southeast Contra Costa County, but the airport's influence area extends south into Alameda County. The project site is approximately 2.7 miles southeast of the nearest airport runway (Byron Airport), within the airport's influence area, and over one mile from visual and instrument flight paths (including the runway approach surface). Runway 12-30 (running northwest-southeast) is the airport's primary runway. The MEP site is located about 1 mile southwest of the runway's approach centerline (runway 12-30) and within 0.65 mile of the closest approach boundary. The Byron Airport is a general aviation public airport catering to general aircraft operations, sky diving, gliders, and ultralight aircraft (AirNav 2010). The Contra Costa County Airport Land Use Compatibility Plan (CCCALUCP) includes policies for the Byron Airport to ensure compatibility between new development in the airport influence area and the airport. The proposed project is within Compatibility Zone D (CCCALUC 2000, Byron Airport Compatibility Map). Land Use Figure 2 presents the proposed project with respect to the Byron Airport compatibility zones. While the water supply pipeline extends into Compatibility Zone B2, the pipeline would be located underground and not incompatible.

AGRICULTURE

The project site and transmission tie-in site are designated grazing land according to farmland classification of these sites by the Farmland Monitoring and Mapping Program (FMMP). The proposed project site is grazed by a neighbor's cattle and is not irrigated. The properties adjacent to the project site are also designated as grazing land according to the FMMP. Operated by the Department of Conservation, the FMMP produces maps that are used for analyzing impacts to agricultural resources. These resources are rated according to soil quality and irrigation status.

The BBID properties where the section of water supply pipeline and pipeline construction laydown area are proposed are designated Farmland of Local Importance. The property where the 1,000-foot section of water supply pipeline, pump station, and turnout structure are proposed has been in agricultural production. As of February 2010, it was planted with alfalfa, and the ground surface within a swath of land where the pipeline is proposed was disturbed. An existing landscape water supply pipeline is

adjacent to the MEP-proposed pipeline. The 1-acre pipeline construction parking and laydown area adjacent to BBID headquarters was not in agricultural production when staff visited the site in February 2010. The site was mostly gravel with little vegetation, and according to BBID staff, there are no future plans for agricultural operations for this 1-acre site (BBID 2010a).

SPECIAL DISTRICTS

BBID is a multi-county special district formed under the provisions of the California Water Code (General Code [GC] § 20500 et. seq.) and serves Alameda, Contra Costa, and San Joaquin counties (BBID 2009a). A special district is defined by state law as "any agency of the state for the local performance of governmental or propriety functions within limited boundaries." (GC § 16271). Case law has established that districts are also considered local agencies. BBID is an independent public agency statutorily authorized to serve water to lands within its boundaries for any beneficial use, including municipal and industrial uses (GC § 22076).

The Government Code provides that certain district facilities are exempt from city and county building and zoning ordinances:

> Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency (GC § 53091[d]).
>
> Zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, or for the production or generation of electrical energy, facilities that are subject to Section 12808.5 of the Public Utilities Code, or electrical substations in an electrical transmission system that receives electricity at less than 100,000 volts. Zoning ordinances of a county or city shall apply to the location or construction of facilities for the storage or transmission of electrical energy by a local agency, if the zoning ordinances make provision for those facilities (GC § 53091[e]).

A district has a legal obligation to ensure provision of reliable water services; therefore, a district is exempt from compliance with city and county building and zoning ordinances for facilities that are connected and integral to the provision of water services.

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

The power plant, construction laydown areas for the power plant and transmission line, and a section of the water supply pipeline are proposed on land designated by Alameda County as Large Parcel Agriculture and zoned as A-100 (100 acre minimum parcel size) in the Agricultural District ("A" District) (AC 2000, Land Use Diagram). The project is also within the Wind Resource Area and is identified as Open Space Land on the Open Space Diagram (AC 2000, Open Space Diagram- Figure 4).

A section of the water supply pipeline, the pump station, turnout structure, and pipeline construction laydown area are all proposed on lands within Contra Costa County. The

pipeline, pump station, and turnout structure are designated as Agricultural Lands (AL); the pipeline construction laydown area is designated as Public/Semi-Public (PS) (CCC 2005, Land Use Element map). The water supply pipeline, pump station and turnout structure are on property zoned in the Agricultural Preserve District (A-4) and the pipeline construction laydown area is zoned in the Heavy Agricultural District (A-3). Because BBID would construct, own and maintain the pump station, concrete turnout structure, and water supply pipeline up to the project property boundary, the project would be exempt from any requirements in the Contra Costa County zoning districts.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The determinations of significance under CEQA, as identified by the Energy Commission in this section, are based on scientific and factual data related to issues addressed in Appendix G of the CEQA Guidelines, performance standards, or thresholds identified by the Energy Commission staff, and thresholds recommended by other public agencies or subject experts, as supported by substantial evidence. (CCR 2009)[4]

Agriculture and Forest

Would the project:

- Convert Prime Farmland, Unique Farmland, Farmland of Statewide Importance as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring program of the California Department of Conservation (FMMP), or Farmland of Local Importance to non-agricultural use[5].
- Conflict with existing zoning for agricultural use or a Williamson Act contract.
- Conflict with existing zoning for, or cause rezoning of, forest land [as defined in PRC §12220(g)], timberland (as defined by PRC §4526), or timberland zoned Timberland Production [as defined by GC §51104(g)].
- Result in the loss of forest land or conversion of forest land to non-forest use.
- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses or forest land to non-forest use.

Land Use Compatibility and LORS Compliance

Would the project:

- Directly or indirectly divide an established community or disrupt an existing or recently approved land use.

[4] Pursuant to CEQA Guideline Amendments, adopted December 30, 2009.

[5] Prime Farmland, Unique Farmland, Farmland of Statewide Importance, or Farmland of Local Importance, as defined in FMMP 2004, p.6.

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project, adopted for the purpose of avoiding or mitigating environmental effects.
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Cumulative Land Use Effects

Would the project:

- Result in incremental impacts that, although individually limited, are cumulatively considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.[6]

A power plant and its related facilities may also be incompatible with existing or planned land uses if they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or preclude, interfere with, or unduly restrict existing or future uses. Issues related to these areas of potential impacts are also discussed in greater detail in other sections of this SSA.

DIRECT/INDIRECT IMPACTS AND MITIGATION

This section discusses the applicable potential project impacts and associated methods and thresholds of significance referenced above.

Agriculture and Forest

Would the project convert Farmland to non-agricultural use

The project site and transmission tie-in site are designated as “grazing” and the BBID property is designated “Farmland of Local Importance” according to the FMMP. Disturbance from construction of the pipeline and use of land for pipeline construction laydown and parking would be temporary and construction time would be minimal. Land Use Figure 3 presents an aerial showing the water supply pipeline route on BBID property, the location of the pump station and concrete turnout structure, and the location of the pipeline construction laydown and parking area. Contra Costa County does not have any LORS dictating the depth at which infrastructure could be placed underground without hindering agricultural operations. Staff contacted BBID to determine what depth requirements they might have and was informed that a minimum cover of three feet would be required for the construction of the water supply pipeline (BBID 2010a). The pipeline would be placed within a trench depth of four feet. At this depth and with the proposed ten-inch diameter pipeline, a cover of three feet two inches would be provided, thus meeting the three-foot cover minimum standard required by BBID. It is reasonable to conclude that a pipeline constructed to BBID standards would not conflict with agricultural operations. Timing construction activities so they would not conflict with agricultural operations would limit disruption to the agricultural use of the

[6] Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects and can result from individually minor, but collectively significant actions taking place over a period of time (CEQA Guidelines §15355; 40 CFR 1508.7).

land. The proposed Condition of Certification **LAND-1** would ensure the pipeline is constructed in conformance with BBID standards and construction is timed appropriately.

The 1-acre construction area was not in agricultural production at the time of the staff site visit in February 2010 and BBID staff stated that they have no future agricultural plans for the 1-acre site (BBID 2010a). The proposed use of this site for pipeline laydown and parking during construction would be temporary and would not preclude future agricultural operations. This area would not be converted to non-agricultural use.

As stated above, the pump station would be located on land designated Farmland of Local Importance. The pump station would be a permanent structure that would convert the underlying farmland to non-agricultural use. The turnout structure would be located along the inside bank of canal 45. Staff communication with Mr. Urry, the applicant's consultant with CH2M Hill, clarified the size of proposed pump station (CH2M 2010o). The footprint of the pump station would be approximately 250 square feet. The proposed pump station would be located near an existing similar structure and adjacent to a gravel access road. The conversion of 250 square feet out of a larger 23-acre property would not be substantial.

Construction of the section of water supply pipeline would result in temporary impacts to agricultural land. Construction of the pump station and concrete turnout structure would result in permanent impacts. Use of the 1-acre pipeline construction laydown and parking area would not result in an impact.

Staff concludes that the conversion of approximately 250 square feet of Farmland of Local Importance to non-agricultural use (pump station) and construction of the water supply pipeline and turnout structure would result in a less than significant impact**.** The inclusion of the proposed Condition of Certification **LAND-1** would ensure no additional agricultural land is converted to urban use and pipeline construction is in accordance with BBID requirements. Project impacts to farmland are **less than significant**.

Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses.

The two BBID properties are the only land the project would directly use that is classified as Farmland. Apart from the insubstantial conversion of Farmland resulting from the pump station and turnout structure, there are no other project components (such as transmission towers and lines, natural gas pipeline, and power plant) that would result in the conversion of additional Farmland to non-agricultural use. Project impacts to farmland are **less than significant**.

Would the project conflict with existing zoning for agricultural use or a Williamson Act contract.

The proposed power plant site and transmission line tie-in site are zoned Agricultural District (or A District). The A District allows "public utility building or use" as a conditional

use approved by the Board of Zoning Adjustments [AC 2009 §17.06.040(J)]. Staff discusses the project's compatibility with existing zoning under the heading LORS Compliance, below.

The project site is part of a larger property that has continuously been within an Alameda County Agricultural Preserve since 1971(no. 1971-34). The project property is currently subject to Land Conservation Agreement (LCA) with Alameda County # C-89-1195 (Williamson Act contract). The current LCA does not identify the proposed power plant, associated facilities, and associated linear features (water supply line, gas supply line, and transmission towers and lines) as a compatible use (CH2M 2010h).

Correspondence between the Department of Conservation (DOC) and the applicant provides the history of land use on the project property and discusses the issue of compatibility of the MEP with the Williamson Act (DOC 2009a). The DOC considers the proposed use consistent with the three required principles of compatibility (DOC 2009a, Government Code [GC] §51238.1) listed below:

1. The use will not significantly compromise the long-term productive agricultural capability of the subject contracted parcel or parcels or on other contracted lands in agricultural preserves.

2. The use will not significantly displace or impair current or reasonably foreseeable agricultural operations on the subject contracted parcel or parcels or on other contracted lands in agricultural preserves. Uses that significantly displace agricultural operations on the subject contracted parcel or parcels may be deemed compatible if they relate directly to the production of commercial agricultural products on the subject contracted parcel or parcels or neighboring lands, including activities such as harvesting, processing, or shipping.

3. The use will not result in the significant removal of adjacent contracted land from agricultural or open-space use. In evaluating compatibility a board or council shall consider the impacts on non-contracted lands in the agricultural preserve or preserves.

Department of Conservation staff (Mr. Brian Leahy) indicated in his July 2009 letter to the applicant that the MEP "appears to be a compatible use with the on-going agricultural activities occurring on the 158-acre parcel." Mr. Leahy's letter continued, "[B]ecause the contacted land in question will continue to have an agricultural use (grazing), the conclusion that the proposed use is compatible is based on the provisions contained in Government Code (GC) §51238.1…" The DOC further indicated that:

- The use of ten acres on a 158-acre parcel does not appear to significantly compromise the long-term productive agricultural capability of the subject contracted parcel, especially when the [applicant] has agreed to make improvements to the remaining rangeland that will make up for the loss of the current carrying capacity of the parcel due to the land requirements of the proposed project.
- Because the area in question has a long history of acting as a major energy and other infrastructure corridor of the State, an additional small facility will not create additional stress on neighboring agricultural operations.

- …grazing is about the only likely agricultural activity that can occur on non-irrigated land of this low quality, there is no reason to believe that the proposed project will significantly displace or impair current or reasonably foreseeable agricultural operations.
- It is unlikely that the proposed project will result in the significant removal of adjacent contracted land from agricultural or open-space use. (DOC 2009a).

Staff solicited Alameda County's comments regarding the MEP's consistency with the Williamson Act. The Alameda County May 2010 letter to Energy Commission staff in response to staff solicitation states that county "[s]taff believes that the project is compatible and consistent with the Williamson Act contract, which would require neither cancellation nor non-renewal as a result of the project."

Staff agrees with Alameda County consideration of project compatibility with the Williamson Act contract and the DOC consideration of project consistency with the three principles of compatibility. Staff concludes the proposed MEP would not conflict with the Williamson Act based on the July 2009 DOC letter and Alameda County May 2010 letter stating the project is compatible with the Williamson Act and because the project meets the three principles of compatibility identified in § 51238.1(a) of the CLCA.

Staff concludes the project would not conflict with agricultural zoning as the project meets the findings for issuance of a conditional use permit (but for the exclusive jurisdiction of the Energy Commission). Therefore, project impacts related to potential conflicts with zoning for agricultural use and the Williamson Act contract are **less than significant**.

Would the project conflict with existing zoning for, or cause rezoning of, forest land [as defined in PRC §12220(g)], timberland (as defined by PRC §4526), or timberland zoned Timberland Production [as defined by GC §51104(g)].

The project site is not zoned for forest land, timberland, or for timberland production. Within one mile of the project site, there is no land zoned for such purposes; therefore, no conflict with or cause for rezoning of forest land or timberland would result from the project. **No Impact**.

Would the project result in the loss of forest land or conversion of forest land to non-forest use.

There is no forest land on the project site or within one mile of the site; therefore, no loss or conversion of forest land would result from the project. **No Impact**.

Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of forest land to non-forest use.

There is no forest land on the project site or within one mile of the site; therefore, no other changes in the existing environment could result in the conversion of forest land as a result from the project. **No Impact**.

Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project, adopted for the purpose of avoiding or mitigating environmental effects.

Staff reviewed the ECAP, the Alameda County Ordinance Code, Contra Costa County General Plan, Ordinance Code of Contra Costa County, and the Contra Costa County Airport Land Use Compatibility Plan for the Byron Airport. The analysis of the applicable LORS is included in the LORS Compatibility section below. The project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction.

Would the project conflict with any applicable habitat conservation plan (HCP) or natural community conservation plan (NCCP).

The East Contra Costa County HCP/NCCP Plan Area is within Contra Costa County and covers the area where a section of the water supply pipeline, pump station, concrete turnout structure, and pipeline construction laydown and parking area are proposed. The East Contra Costa County Habitat Conservancy oversees the East Contra Costa County HCP/NCP. The East Contra Costa County HCP/NCCP is intended to provide regional conservation and development guidelines to protect natural resources while improving and streamlining the permit process for endangered species and wetland regulations (ECCCHC 2010, Overview/History).

The 1,000 foot section of the water supply pipeline, pump station, and concrete turnout structure are proposed on land designated as Agriculture and the pipeline construction laydown and parking area is proposed on land designated as Public Facilities with Undeveloped Land (ECCCHC 2007, Figure 2-1 Land Use Designation Types). Both the pipeline and associated structures and the construction area are proposed in an area designated by the HCP/NCCP as being a lower acquisition effort (ECCCHC 2007, Figure 5-3 Acquisition Priorities with Maximum Urban Development Area). Existing public lands do not count toward land acquisition requirements (ECCCHC 2007, Conservation Strategy, page 5-25). As the section of water supply pipeline and associated structures and construction laydown and parking area are proposed on public land (owned by BBID), the project would not conflict with the HCP/NCCP's acquisition efforts.

In addition, Biological Resources staff concludes the segment of the water supply pipeline within Contra Costa County is not subject to the ECCCHCP/NCCP because there would be no sensitive habitat affected. See the **Biological Resources** section of this SSA for more details on project impacts to biological resources and proposed conditions of certification.

There are two HCP/NCCP's in development that cover the project site; the East County Parks HCP/NCCP and the East Alameda County Conservation Strategy (EBRPD 2010, EACCS 2009). The East County Parks HCP/NCCP includes eastern Contra Costa County and northern Alameda County, while the East Alameda County Conservation Strategy includes East Alameda County only. The Bethany Reservoir State Recreation area, located approximately 0.76 mile south of the power plant site, is governed by the Bethany Reservoir State Recreation Area Resource Management Plan and General Development Plan (StateParks&Rec. 1973).

The Bethany Reservoir State Recreation Area Resource Management Plan and General Development Plan prepared by the state Department of Parks and Recreation governs the development of the Bethany Reservoir as a quiet recreation area with an emphasis on fishing, picnicking, bicycling, and non-power boating (StateParks&Rec. 1973). The allowable use intensity plan identifies areas that can support intensive recreation use, those that can support moderate use, and those that should not support recreational use. Areas where there is higher intensity development indicated are those areas where there are lower resources.

The proposed MEP is approximately 0.76 mile north of the recreation area and would therefore have no direct impact to the resource area. Indirect impacts could result from changes to the visual quality or noise level experienced at the State Recreation Area (SRA). Visual Resources staff concludes that surface treatment would be required for the proposed transmission poles to minimize their visual impact and proposed Condition of Certification **VIS-1** to ensure the transmission poles and exteriors of all major project equipment have surface treatment in place. Impacts to visual resources are discussed in more detail in the **Visual Resources** section of this SSA.

As discussed in detail in the **Noise and Vibration** section of this SSA, if built and operated in conformance with the **Noise and Vibration** proposed conditions of certification, the project would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the noise affected area, directly, indirectly, or cumulatively. Based on conclusions within the **Noise and Vibration** section, no significant adverse noise impacts attributed to construction or operation of the power plant would be expected at the SRA.

Staff concludes the project would not conflict with the Bethany Reservoir State Recreation Area Resource Management Plan and General Development Plan as potential visual impacts are less than significant and impacts to the ambient noise environment of the reservoir would be a level which is typically not detectable.

Staff concludes the project would not conflict the East Contra Costa County HCP/NCCP or the Bethany Reservoir State Recreation Management Pan and General Development Plan and therefore project impacts are considered **less than significant**.

Land Use Compatibility and LORS Compliance

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design and operational components, and siting to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority (PRC 2005). As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code § 25523[d] [1]). The Energy Commission must either find that a project conforms to all applicable LORS, either by design or with the implementation of appropriate conditions of certification, or make

specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code § 25525). When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project would be consistent with that agency's zoning and general plan. On past projects, staff has requested that the affected local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with that agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

As part of staff's analysis of local LORS compliance, staff spoke with Bruce Jensen, Senior Planner in the Planning Department with the Alameda County Community Development Agency (Alameda County staff) to solicit the County's position on MEP's compatibility with ECAP goals, policies, and implementation programs, and consistency with the Alameda County Ordinance Code (Title 17: Zoning). Staff also consulted with Contra Costa County staff to solicit their position on consistency of the MEP with the Contra Costa County General Plan for components of the project proposed to be located within the county. Because the license granted by the Energy Commission is in lieu of any permit issued by a local agency, staff will address the land use issues typically reviewed by Alameda County and Contra Costa County, were they the permitting agencies.

Land Use Compatibility

Would the project divide an established community or disrupt an existing or recently approved land use.

Divide an Established Community

Division of an established community can occur when a proposed land use physically divides a community or cuts off access. As discussed in detail above in the "Setting" subsection, the proposed MEP is located on land in unincorporated Alameda County, zoned in the "A" District, and in an area that consists of grazing land plus some water management and electrical infrastructure. Land uses within one mile of the project site are mostly agricultural plus some electric utilities and water management infrastructure. A few scattered residences are present. Construction of the proposed project would not result in new development that would physically divide an existing community as there is no existing community established within one mile of the project site. Also, the project's linear facilities would not present new physical barriers. The transmission towers and overhead lines would be constructed on the project property, cross Kelso Road to tie into the PG&E Kelso Substation to the north (a public/utility land use), and the water supply pipeline and natural gas pipeline would be placed underground. Staff concludes the proposed MEP would not divide an established community or disrupt an existing or recently approved land use. **No Impact**.

Compatibility with Existing or Approved Land Uses

Incompatibility with an existing or recently approved land use can occur for example, when nuisance producing land uses such as heavy industry are located adjacent to residential uses. Existing land development on the project site includes the two-acre

Byron Power Cogeneneration Plant, leftover equipment from a discontinued wind turbine operation, and a 230-kV transmission line and associated towers (along the western property boundary). The addition of the new 230-kV transmission lines and associated towers connecting to the PG&E Keslo Substation are proposed in a location that would not conflict with existing development. The project would not displace any existing development. The project is compatible with existing land uses with the inclusion of the proposed Conditions of Certification **AQ-SC3**, **AQ-SC4**, **BIO-7**, **LAND-4**, **VIS-1**, **VIS-3**, and **VIS-4**. Staff communication with the Alameda County staff regarding recently approved land uses indicates there are no known projects in Alameda County east of the Altamont Pass (CEC 2010j). **Less than Significant with Mitigation**.

Sensitive Receptors

A proposed siting location may be considered an incompatible use if a new source of pollution or hazard is located within proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, and the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, churches, and residential areas, are considered sensitive receptor sites for the purposes of determining a potentially significant environmental impact. Depending on the applicable code, proximity is defined as “within 1000 feet” of a school (California Health & Safety Code §§42301.6-9) or within 0.25 mile of a sensitive receptor, under CEQA. Proximity is not necessarily the deciding factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

There are no schools, day-care facilities, hospitals, churches, or nursing homes within one mile of the proposed site. The Mountain House School is approximately 1.3 miles east of the project site. The proposed MEP would be within one mile of scattered rural residences off Kelso Road and Christensen Road, with the closest residence approximately 0.4 mile northwest of the project. There are no sensitive receptors within 0.25 mile of the project site.

Public Health staff does not expect any significant adverse cancer or short- or long-term health effects associated with construction and operation of the project. Air Quality staff finds that with the adoption of the proposed Conditions of Certification **AQ-SC1**, **AQ-SC2**,**AQ-SC3**, **AQ-SC4**, **AQ-SC5**, **AQ-SC6**, **AQ-SC7**, **AQ-SC8**, **AQ-SC9**, and **AQ-SC10**, the project would not result in significant air quality-related impacts. Noise and Vibration staff conclude if the project were built and operated with the proposed Conditions of Certification **NOISE-1**, **NOISE-2**, **NOISE-3**, **NOISE-4**, **NOISE-5**, and **NOISE-6**, the project would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively.

Staff concludes from a land use perspective the project would be compatible with sensitive receptors. In addition the project would not generate pollutants, toxins, noise, dust, or other related consequence or activity with the inclusion of the above-listed proposed conditions of certification. **No Impact**.

LORS Compliance

The project's compliance with State and local LORS is summarized in **LAND USE Table 2**.

East County Area Plan (ECAP)

The Alameda County General Plan consists of three General Plans, one for each geographical area. Policies governing physical development within the area that includes the project site are in the East County Area Plan (ECAP). The East County encompasses 418 square miles of eastern Alameda County and includes the cities of Dublin, Livermore, Pleasanton, and a portion of Hayward, plus surrounding unincorporated areas (AC 2000). In November 2000, the Alameda County electorate approved the Save Agriculture and Open Space Lands Initiative (Measure D, effective date December 22, 2000) (Initiative) which amended portions of the ECAP. The purpose of the Initiative is to "preserve and enhance agriculture and agricultural lands, and to protect the natural qualities, the wildlife habitats, the watersheds and the beautiful open space of Alameda County from excessive, badly located and harmful development ."(AC 2000). The ECAP presents the county's intent concerning the future development and resource conservation within the East County. The ECAP provides the basis for County zoning and subdivision approvals (AC 2000).

The power plant and associated equipment, natural gas pipeline, transmission corridors portions of the water supply pipeline, utility and access easements, two construction laydown areas, and construction parking area are proposed on land designated as Large Parcel Agriculture and within the Wind Resource Area (AC 2000 Open Space Diagram- Figure 4).

The ECAP describes the Large Parcel Agriculture land use designation as:

> "…requir[ing] a minimum parcel size of 100 acres... The maximum building intensity for non-residential buildings shall be .01 FAR (floor area ratio) but not less than 20,000 square feet… Apart from infrastructure under Policy 13, all buildings shall be located on a contiguous development envelope not to exceed 2 acres except they may be located outside the envelope if necessary for security reasons or, if structures for agricultural use, necessary for agricultural use. Subject to the provisions of the Initiative, this designation permits … public and quasi-public uses [and] … utility corridors…" (AC 2000, Land Use, page 47).

In the Alameda County May 2010 letter, the county stated "[t]he ECAP does not preclude construction of a power plant…on lands designated for Large Parcel Agricultural use." The letter continues, stating the "County considers a power generation facility a land use allowed under the [Large Parcel Agriculture] LPA description of the ECAP, provided that mitigation for agricultural land permanently removed from production as a result of the construction and presence of the facility is mitigated." Staff requested clarification on the mitigation the county would require to make the project consistent with the LPA and Mr. Jensen responded that the applicant's proposed "9.2-acre improvement [re-seeding construction laydown area with an improved seed mix] and water source [permanent water supply for livestock] is fully adequate as mitigation in the County's view." (AC 2010c).

The property where the power plant is proposed is 158 acres in size, is owned by a single party, and is leased in whole (minus the cogeneration plant) by the Diamond Generating Corporation. According to Figure 2.3-1 in the AFC, both the individual and combined areas of the two proposed buildings are less than the minimum 20,000 square feet identified in this land use designation. According to Mr. Jensen, "…if the combined buildings cover less than 20k square feet [20,000 square feet], then they do not exceed the maximum FAR requirement of 0.01 for a parcel of this size, which is much larger than this figure (allowance of more than an acre). The project is in compliance with this [building intensity] policy." (AC 2010d). The County considers "infrastructure" under Policy 13 as public facilities, community facilities, and all structures and development necessary to provide public services and utilities (AC 2000). In the Alameda County May 2010 letter, the county stated, "County Staff believes the [p]roject is appropriately called a 'public facility' as well as 'structures and development necessary to the provision of…public utilities' because it would substantially serve a key need of the public at large…the proposed facility fits within a reasonable definition of the term 'infrastructure'…" Given this position, the project would not be restricted to a maximum contiguous development envelope of 2 acres. The project would generate and supply electricity to PG&E via the proposed 230-kV transmission line, connecting the power plant to the PG&E Kelso Substation, north of the project site. The project would be considered a public utility and the transmission towers and associated lines would be within a new 100-foot easement utility corridor. The project would be consistent with the specifications of the Large Parcel Agriculture land use designation. Staff agrees with the county's determination that the project is consistent with the Large Parcel Agriculture land use designation and the project is appropriately called a public facility and fits the definition of "infrastructure" under Policy 13.

Staff concludes the project would be consistent with the Large Parcel Agriculture land use description as the ECAP does not preclude the construction of power plants on land of such designation and the project would be consistent with the specifications of the Large Parcel Agriculture land use designation. The proposed Condition of Certification **LAND-2** would meet the county's mitigation requirement discussed above to ensure project consistency with the LPA land use designation. Staff concludes the project would be consistent with the LPA land use designation.

The following policies in the ECAP are applicable to the MEP:

<u>Policy 1</u> addresses the identification and maintenance of an Urban Growth Boundary, dividing areas inside the Boundary, (more suitable for urban development), from areas outside the Boundary, (more suitable for long-term protection of natural resources, agriculture, public health and safety and buffers between communities).

In the Alameda County May 2010 letter, the county stated "The ECAP does not preclude construction of a power plant outside of the Urban Growth Boundary (UGB)". The project site is located outside the UGB. While the MEP could be considered an urban use, the MEP is not an urban use in the traditional sense based on the East Altamont 2002 letter where the county stated "we do not consider the EAEC

development, or any similarly-sited and conceived development, as urban; no conflict exists with Policy 1." (AC 2010e). Commission staff considers the MEP an example of a similarly-sited and conceived development.

The project property is developed with the Byron Power Cogeneration plant and previously supported a wind turbine development. The PG&E Bethany Compressor Station and Kelso Substation are directly opposite the project property, to the north. The Kelso Substation is the project's transmission line tie in point. The project is proposed in an area with similar infrastructure to that of the project. The project site supports on-going cattle grazing and according to Mr. Leahy with the DOC, the project "appears to be a compatible use with the on-going agricultural activities occurring on the 158-acre parcel." (DOC 2009a).

Staff concludes the project would be consistent with this policy as a power plant is not precluded from construction outside the UGB, the project is not an urban use, and the project is appropriately located adjacent to similar infrastructure.

Policy 13 addresses the provision or authorization of public facilities or other infrastructure in excess of that needed for permissible development consistent with the Measure D Initiative. The following specific types of public facilities and infrastructure that shall not be prohibited by this policy include the following:

1. New, expanded or replacement infrastructure necessary to create adequate service for the East County;

2. Maintenance, repair or improvements of public facilities which do not increase capacity;

3. Infrastructure such as pipelines, canals, and power transmission lines which have no excessive growth-inducing effect on the East County area and have permit conditions to ensure that no service can be provided beyond that consistent with development allowed by the Initiative.

As discussed above with respect to the Large Parcel Agriculture land use designation, Alameda County determined that the project is considered "infrastructure" as allowed under policy 13. Therefore, staff concludes that the project would be consistent with this policy as the project is considered infrastructure allowed under this policy.

Policy 52 addresses the preservation of open space for the production of natural resources (e.g., agriculture, windpower, and mineral extraction), provision of recreational opportunities, protection of sensitive viewsheds (e.g. ridgelines, hilltops, large contiguous open space areas) (key observation points or KOPs), preservation of biological resources, and for the physical separation between neighboring communities. This is done through the identification of land types in the Open Space Diagram (AC 2000 Open Space Diagram- Figure 4).

In the Alameda County May 2010 letter, the county stated "[t]he Mariposa Power [Energy] Project would be consistent with the preservation of agricultural/open space areas as presented under Policy 52…" The letter continues, "[f]or uses defined under

this policy, including health and safety, recreational opportunities, production of natural resources, protection of sensitive viewsheds as defined in the ECAP, biological preservation and physical separation of communities, the Project is both compatible and consistent with the ECAP. The placement of the proposed power plant in this location would not significantly compromise any of the values stated in this policy, especially with the mitigation being proposed [proposed Condition of Certification **LAND-2**] for biological and agricultural resources. County staff does not see a significant or unavoidable inconsistency with the proposed use."

Staff agrees with the county's determination of MEP's consistency with this policy as the project site has no recreation opportunities, the project is a compatible land use with grazing, the project design and isolated location would not encourage urban infill development and increased urbanization of open space areas, and the project would not impact wind operations or mineral extraction. Impacts to biological resources would be less than significant with the inclusion of the proposed Conditions of Certification **BIO-7** through **15, 17** and **18**. The proposed Conditions of Certification **VIS-1**, **VIS-2**, **VIS-3**, **VIS-4**, **VIS-5**, and **VIS-6** would ensure impacts to visual resources would be less than significant. It is for the above reasons staff concludes the project would be consistent with this policy.

Policy 54 states "[t]he County shall approve only open space, park, recreational, agricultural, limited infrastructure, public facilities (e.g., limited infrastructure, hospitals, research facilities, landfill sites, jails, etc.) and other similar and compatible uses outside the Urban Growth Boundary." (AC 2000).

In the Alameda County May 2010 letter, the county states "[t]he ECAP does not preclude construction of a power plant outside of the Urban Growth Boundary (UGB) on lands designated for Large Parcel Agriculture use" As stated above, staff agrees with Alameda County that the project is considered a public facility. Because the Urban Growth Boundary (Figure 3 of the ECAP) shows the MEP site as outside the UGB, staff considers the MEP consistent with Policy 54.

Policy 72 addresses the need to preserve the Mountain House area for intensive agriculture use (high yield agriculture production including vineyards, orchards, and row crops as distinguished from low-intensity agriculture such as cattle and horse grazing). The Mountain House area boundaries are defined by the California Aqueduct to the west, Contra Costa County line to the north, San Joaquin County line to the east, and Interstate routes 580 and 205 to the south. The project property is within the Mountain House area.

In the Alameda County May 2010 letter, the county stated "[t]he project site, while in the Mountain House area, is not suitable in general for intensive agriculture use. Unlike much of the area, the sloped land is not valley bottomland or characterized by high quality soils… [the project site] has been used for marginal levels of grazing in the past. The Project would therefore not displace any existing or possible intensive agriculture in the area. Further, the project proposed mitigation [proposed Condition of Certification **LAND-2**] on the site to enhance the existing agriculture, that of grazing. For these reasons, the project would not undermine preservation of intensive agriculture in the Mountain House area, and would be consistent with this policy."

Staff agrees with Alameda County's consideration of the project site as not suitable for intensive agricultural use, a position supported by Mr. Leahy's (DOC) report that "…grazing is about the only likely agricultural activity that can occur on non-irrigated land of this low quality… (DOC 2009a)," and concludes the project would be consistent with this policy as the site is more suited to low-intensity agriculture versus intensive agricultural use.

Policy 73 addresses the requirement of buffers between areas designated for agricultural use and new non-agricultural uses within agricultural areas or abutting parcels. These buffers are required to protect the maximum amount of arable, pasture, and grazing lands feasible. The project use is considered compatible with agricultural use (grazing), therefore, staff believes that the project is not the type of non-agricultural use that would require buffers. Project features that aid in the protection of the on-site grazing land include the fence around the plant, which would prevent cattle from entering the facility; the location of the plant in the southern section of the property, adjacent to Bruns Road; the limited loss of grazing land (6.5%); and clustering of plant equipment.

Staff concludes for these reasons, the project would be compatible with this policy.

Policy 89 addresses the retention of rangeland in large, contiguous blocks of sufficient size to enable commercially viable grazing. The project property is grazed by the neighboring landowner's cattle. Currently, with the exception of the Byron Cogeneration Plant, almost the entire project property is available for grazing. Should the MEP be developed, the available grazing area would be reduced by 10 acres (6%). The power plant facility would cluster equipment and would be fenced, ensuring cattle would not enter the plant. The plant is proposed towards the southern section of the property between two small hills. As discussed earlier, the DOC considers the power plant a compatible use with the on-going grazing activities on the project property.

Staff concludes for these reasons the project would be consistent with this policy.

Policy 173 addresses the development of uses and structures within the Wind Resources Area; ensuring they are compatible with wind energy operations. The project is located within the Wind Resources Area (see AC 2000 Open Space Diagram- Figure 4) and previously had a wind energy development on-site. Adjacent properties are not developed with wind operations. The closest existing wind operation is approximately 1.4 miles to the west of the project site.

The project would be a peaker plant and would support renewable resources in the area, providing power to supplement the power provided by the intermittent power generation from the renewable resources.

Staff concludes the project would be consistent with this policy as the project would not impact wind development or preclude the future development of such an operation.

Policy 218 addresses the development and expansion of public facilities inside and outside of the Urban Growth Boundary. According to this policy, when public facilities are located in appropriate locations and consistent with the policies and Land Use

Diagram of the ECAP, the development and expansion of public facilities, such as utilities, is allowed. As discussed above with respect to the LPA land use designation, the project would be consistent with this designation with the inclusion of the proposed Condition of Certification **LAND-2** and also as discussed above with respect to the LPA land use designation and Policy 54, the project is appropriately called a public facility. The location of the project is appropriate as it is proximate to electrical generation equipment and other similar infrastructure, and there are no sensitive receptors within 0.25 mile of the site. The closes residence is approximately 0.4 mile to the northwest and the closest urbanized area, the community of Mountain house, is approximately 2.5 miles to the east (in San Joaquin County).

Staff concludes the project would be consistent with this policy for reasons discussed above.

Alameda County Ordinance Code

The Alameda County Ordinance Code is made up of 17 titles which serve as a broad category under which ordinances on a related subject to the specific title are composed. The zoning ordinances provide for the division of the unincorporated area of the county into parts or districts. Each district identifies and regulates the uses of land and buildings and the height and bulk of buildings and the open spaces about buildings.

The power plant site, construction laydown area, and the natural gas pipeline are proposed on land zoned in the Agricultural District ("A" District). In the Alameda County May 2010 letter, the county stated "[i]nfrastructure, such as power plants and transmission line facilities, are permitted in the 'A' – Agriculture Zoning District; in particular, a power plant such as the Project would be permitted with a Conditional Use Permit (CUP), the process for which would be in lieu of the CEC [California Energy Commission] process, and for which the CEC process is a fully acceptable substitute."

The following sections of Title 17 of the Alameda County Ordinance Code are applicable to the project:

<u>Section 17.06.040</u> pertains to conditional uses approved by the board of zoning adjustments. Public utility building or uses, excluding a business office, storage garage, repair shop or corporation yard are permitted in an "A" District only if approved by the board of zoning adjustments (§17.06.040, item J). The MEP is considered a public utility for the purposes of supplying energy that ultimately serves the public need. Staff concludes the project would be consistent with this section of the zoning code as the project is considered a public utility use and meets all finding requirements consistent with §17.54.130 of the zoning code for a CUP (see discussion for §17.54.130 below).

<u>Section 17.06.050</u> pertains to accessory uses permitted in an "A" district, and subordinate to a lawful use. Permitted uses include an administrative office and maintenance building, when accessory to a principal use permitted by §17.06.040. As discussed above for §17.06.040, the project is a permitted use with a conditional use permit (the Commission certification process is directly parallel to Alameda County's process for a CUP). Staff concludes the proposed warehouse and maintenance building

and control/administration building associated with the power plant are considered accessory uses to the permitted power plant and therefore would be consistent with this section of the zoning code.

Section 17.06.060 pertains to the minimum building site area for every use in the "A" District. The building site must be a minimum of 100 acres. The project property is a 158-acre single parcel of land developed with a two-acre cogeneration plant. Diamond Generating Corporation, the parent company of Mariposa Energy, LLC, has leased the project property. The lease differentiates areas on the property as the "occupied premises" (10-acre power plant) and "additional occupied premises" (construction laydown area) and gives Diamond Generating Corporation the right of ingress and egress necessary to perform the activities described in the lease (CH2M 2010h, Land Lease and Rental Agreement). Staff concludes the project would be consistent with this section of the zoning code as the lease for the project covers the required 100 acre minimum building site area.

Section17.06.070 identifies the yard requirements in the "A" District, which are also subject to §17.52.330. The depth of the front yard cannot be less than 30 feet and the depth of the rear and side yard cannot be less than 10 feet each. Section 17.52.330 addresses the general reasoning for specific yard requirements, which is to secure a minimum basic provision for light, air, privacy and safety from fire hazards through the requirement that every building constructed is on a building site with the dimensions specified by the applicable district. According to the ALTA/ACSM Land Title Survey prepared for the MEP, the location of the power plant footprint shown with respect to the larger project property would provide sufficient area to meet the county's yard requirements (MEP 2009a, Volume 2, Appendix 1: Executive Summary). Staff concludes the project would be consistent with this section of the zoning code as the proposed location of the power plant on the larger project property would allow the yard requirements to be met.

Section 17.06.080 prohibits illuminated signs in the "A" District. The AFC and supplements do not discuss the installation of publicly visible signs for the project. Visual Resources staff has proposed Condition of Certification **VIS-5** requiring exterior publicly visible signs to comply with the signage regulations of the applicable "A" zone district and with §17.06.080 of the Alameda County Ordinance Code. See the **Visual Resources** section of this SSA for more details. Staff concludes the project would be consistent with this section of the zoning code as the inclusion of the proposed Condition of Certification **VIS-5** would ensure project compliance.

Section 17.52.440 identifies the exceptions to the height limitations of fences, walls, and hedges. The height limitations do not apply when a higher fence is required by another county ordinance or by state or federal regulation or when a higher fence is made a condition of approval of a conditional use or a variance pursuant to the county zoning ordinance, provided that no condition requires or permits a fence in excess of 12 feet.

According to the Energy Commission Hazardous Materials staff, the project owner would be required to prepare a site-specific security plan for the commissioning and operational phases. The project's Operation Security Plan would include a requirement for a permanent full perimeter fence or wall, at least eight feet high. See the **Hazardous**

Materials Management section of this SSA for more details. Staff concludes that the project would be consistent with this section of the zoning code with the inclusion of the proposed Condition of Certification **HAZ-7**.

Section 17.52.930 identifies parking space requirements for business establishments, including manufacturing, industrial, and public utilities. Based on the design capacity of the largest work shift, one space is required for each two employees for the power plant. With eight full-time employees, the AFC estimates a maximum of four employees on-site simultaneously. The general arrangement figure (MEP 2009a, Figure 2.3-1, Section 2.0) identifies 10 parking spaces, which would meet the two parking spaces required. The construction workforce would peak at 177 employees and average 90 employees during the 14-month construction period. As stated in the **Traffic and Transportation** section, a 10 percent carpool reduction assumption would translate to a peak of 159 employees would commute to the project site. Based on the 159 commuting employees, 80 parking spaces would be required during construction. The 9.2-acre construction parking and laydown area would be able to accommodate the required number of construction parking spaces. The proposed Condition of Certification **TRANS-3** would ensure the required parking spaces are provided during project construction and operation. Staff concludes the project would be consistent with parking space requirements during project construction and operation with the inclusion of the proposed Condition of Certification **TRANS-3**.

Section 17.54.130 identifies the four findings necessary for approval of a conditional use. The findings are:

(A) Is the use required by the public need?

On April 1, 2008, PG&E published a request for offers to procure 800-1200 MW of new resources, with a preference for easily dispatchable, operationally flexible resources (PG&E 2010). Also, in the Alameda County May 2010 letter, the county said, “even with growth constraints built into the ECAP, [Alameda County] will require significant electrical energy especially at times of peak demand.”

(B) Is the use properly related to other land uses and transportation and service facilities in the vicinity?

The location of the project is directly opposite the PG&E Kelso Substation where the electricity generated by the project would tie in to supply PG&E for distribution to the public. There is an existing PG&E natural gas pipeline extending through the project property. A new pipeline, approximately 580 feet east of the power plant would tap into the existing pipeline to supply the plant. Water would be supplied by BBID exclusively to the project site via a new 1.8 mile long pipeline though an agreement between Diamond Generating Corporation and BBID.

Other land uses within a one-mile radius of the project are agricultural and utility infrastructure, specifically electricity and water. In addition to the PG&E Kelso Substation, the PG&E Bethany Compressor, Byron Power Cogeneration Plant, Tracy Substation, Tracy Pumping Station, Delta-Mendota Canal, Bethany Reservoir, and four transmission lines are all within a one mile radius of the project site. Additional similar

infrastructure is just beyond a one mile radius. There are a few residences within one mile of the project; the closest is approximately 0.4-mile northwest of the plant. Agricultural land surrounds the project property and make up the majority of land uses within one mile of the project property. Both the Energy Commission staff and DOC staff consider the project use compatible with the ongoing agricultural operations (grazing).

(C) Will the use, if permitted, under all the circumstances and conditions of the particular case, materially affect adversely the health or safety of persons residing or working in the vicinity, or be materially detrimental to the public welfare or injurious to property or improvements in the neighborhood?

As discussed in the "Land Use Compatibility" subsection regarding the division of an existing community, there is no existing community established within one mile of the project site. The closest residents are approximately 0.4-mile from the project site. Within in a one mile radius of the project, there are very few residences. Land within the one mile radius is predominantly used for agriculture. With respect to project compatibility with existing and recently approved land uses, the project would be compatible with the existing land uses and there are no recently-approved land uses east of the Altamont Pass (CEC 2010j). The project would also be compatible with sensitive receptors proximate to the site.

Public Health staff does not expect that there would be any significant adverse cancer or short- or long-term health effects associated with construction and operation of the project. Transmission Line Safety and Nuisance staff concludes the proposed transmission line would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to transmission line safety and nuisance if staff's recommended conditions of certification are adopted and implemented (**TLSN-1**, **TLSN-2**, **TLSN-3**, and **TLSN-4**). Hazardous Materials staff's evaluation of the proposed Mariposa Energy Project, along with staff's proposed conditions of certification (**HAZ-1**, **HAZ-2**, **HAZ-3**, **HAZ-4**, **HAZ-5**, **HAZ-6**, and **HAZ-7**), indicates that hazardous materials use at the site would not present a significant impact to the public and there will be no significant cumulative impact. Worker Safety & Fire Protection staff concludes that with the inclusion of the proposed Conditions of Certification **WORKER SAFETY-1** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety. Staff also concludes that the operation of this power plant would not present a significant incremental or cumulative impact on the local fire department. See the **Public Health**, **Transmission Line Safety and Nuisance**, **Hazardous Materials Management**, and **Worker Safety and Fire Protection** sections of this SSA for more details.

(D) Will the use be contrary to the specific intent clauses or performance standards established for the district in which it is to be located?

According to §17.06.010 of the Alameda County Ordinance Code, the intent of the agricultural district is to (1) promote implementation of general plan land use proposals for agricultural and other nonurban uses, (2) conserve and protect existing agricultural uses, and (3) provide space for and encourage such uses in places where more intensive development is not desirable or necessary for the general welfare. Alameda County's determination that a "power generation facility [is] a land use allowed under

the LPA [Large Parcel Agriculture] description of the ECAP provided that mitigation for agricultural land permanently removed from production as a result of construction and presence of the facility is mitigated." (AC 2010b). Both the Commission staff and DOC staff consider the project use compatible with the on-going agricultural operations (grazing). Refer to the "LORS Compatibility" discussion above regarding the California Land Conservation Act for more details. The project would develop approximately 10 acres of the 158-acre project property, of which two acres have been developed as the Byron Cogeneration Plant. Approximately, 146 acres would remain for grazing. The project would not hinder continued grazing activities. Staff believes the project would not be contrary to the specific intent clauses or performance standards established for the "A" district.

Staff concludes the project would meet all finding requirements required by Alameda County for issuance of a CUP as the project use is required by the public need, is properly related to other land uses and transportation and service facilities in the vicinity. Under all the circumstances and conditions the project would not materially affect adversely the health or safety of persons residing or working in the vicinity, would not be materially detrimental to the public welfare or injurious to property or improvements in the neighborhood, and would not be contrary to the specific intent clauses or performance standards established for the "A" District. Staff concludes the project would be consistent with this section of the zoning code with the inclusion of the proposed Conditions of Certification **TLSN-1** through **TLSN-4, HAZ-1** through **HAZ-7**, and **WORKER SAFETY-1** through **WORKER SAFETY-5**.

Contra Costa County General Plan

The Contra Costa County General Plan expresses the broad goals, policies, and specific implementation measures which guide the decisions on development, future growth, and the conservation of resources through 2020. Through the voter-approved Measure C in 1988 (Revised Contra Costa Transportation Improvement and Growth Management Program), the scope of the Growth Management Element was created and established. Measure C in 1990 (65/35 Contra Costa County Land Preservation Plan) established key policies concerning the preservation of open space and agriculture, the creation of an Urban Limit Line, protection of open hillsides and significant ridge lines, growth management, affordable housing, plus other issues that the county had been preparing to adopt as part of its General Plan (CCC 2005, Introduction).

The county is divided into three distinct areas (west, central, and east) and six different sub-areas. The water supply pipeline, pump station, turnout and pipeline construction laydown area are within the "Other East County" sub-area, which includes the cities of Brentwood and Oakley, and the unincorporated areas of Bethel Island, Knightsen, Byron, and Discovery Bay). In addition to county-wide policies, policies are adopted for specific geographic areas. A section of the water supply pipeline, pump station, and turnout structure are proposed within Contra Costa County, specifically within the Southeast County Area of Contra Costa County.

The 1,000-foot section of water supply pipeline, pump station, and concrete turnout structure are proposed on BBID property designated as Agricultural Land (AL) and the

pipeline construction laydown area is proposed on BBID property designated as Public/Semi-Public (PS). These uses are outside of the Urban Limit Line (CCC 2005, Land Use Element map).

The Contra Costa County General Plan describes the Agricultural Lands land use designation as:

> … includ[ing] non-prime agricultural lands in flat East County areas… The purpose of the Agricultural Lands designation is to preserve and protect lands capable of and generally used for the production of food, fiber, and plant materials. The uses that are allowed in the Agricultural Lands designation include all land-dependent and non-land dependent agricultural production and related activities…. (CCC 2005, Land Use Element, page 3-24).

The proposed pipeline, pump station, and turnout structure would be located adjacent to existing similar structures and are proposed along the northern and western margins of the property. The property is approximately 23 acres in size and approximately 250 square feet would be permanently used for the pump station. The turnout structure is proposed in canal 45 along the inside bank. The 1,000-foot section of pipeline would be six inches in diameter and buried in a four foot trench, thus maintaining the three-foot cover required by BBID. Disturbance during the installation of the pipeline would be limited to the construction activities. The proposed Condition of Certification **LAND-1** would ensure the pipeline is constructed to BBID standards and would require that the areas disturbed during construction are remediated to pre-construction conditions. Also, to minimize disturbance to the on-site agricultural operations, construction would be scheduled to not conflict with these operations.

Staff concludes the project would result in a minor loss of land used for agricultural production due to the pump station (approximately 250 square feet). The proposed Condition of Certification **LAND-1** would ensure no additional agricultural land is lost through conversion to urban use and the pipeline construction is in accordance with BBID requirements. The protection of the agricultural land, the loss of such land along the northern margin of the property, and the size of the loss of agricultural land would not be inconsistent with the purpose of the Agricultural Lands designation; therefore, the project would be consistent with this land use designation.

The Contra Costa County General Plan describes the Public and Semi-Public land use designation as:

> … [allowing a] wide variety of public and private uses … (CCC 2005, Land Use Element, page 3-23).

The temporary pipeline construction laydown and parking area is necessary to support construction of the project pipeline, pump station and concrete turnout structure. BBID would construct the water supply infrastructure and as BBID is a public entity, staff concludes the project would be consistent with this land use designation as the construction area would be used by a construction team affiliated with a public entity.

The following policies in the Contra Costa County General Plan are applicable to the project:

Policy 3-10 addresses the extension of urban services into agricultural areas outside the Urban Limit Line. Growth-inducing infrastructure is generally discouraged. As documented in the BBID letter, BBID would provide water to the project (BBID 2009a). This pipeline would only serve the project through an agreement between BBID and Diamond Generating Corporation. Staff concludes the project would be consistent with this policy as water would be provided only to the project; therefore, the project would not induce growth.

Policy 3-69 addresses the need for new land uses within the Southeast County Area to be limited to those which are compatible with the primary agricultural and watershed purposes of the area (e.g. farming, ranching, raising poultry, animal breeding, horticulture, and similar agricultural uses and structures). This policy lists several generally consistent uses, including pipelines and transmission lines. Staff concludes the project would be consistent with this policy as pipelines are generally consistent uses and as it is reasonable to consider the pump station necessary to operate the pipelines, the pump station would also be consistent.

Policy 8-29 addresses the county's desire to encourage large contiguous areas in the county to remain in agricultural production as long as economically viable. The property where the water supply pipeline, pump station, and turnout structure are proposed has been in agricultural production and as of February 2010, was planted with alfalfa. The turnout station would be along the inside bank in canal 45. The 1,000 foot section of water supply pipeline would be installed according to BBID standards, allowing continued agricultural production. The proposed Condition of Certification **LAND-1** would ensure areas disturbed during construction are remediated to pre-construction conditions. The pump station would be the only permanent impact to agricultural land in Contra Costa County as a result of the project (FMMP-designated Farmland of Local Importance). As described above for the discussion regarding the Agricultural Lands land use designation on this property, the pump station would permanently use 250 square feet of the 23-acre property. The pump station is proposed adjacent to similar existing structures and a gravel access road and is located along the northern margins of the property.

Staff concludes the project would be consistent with this policy as the project would not result in a significant loss of land that could be used for agricultural production. Also the proximity of the proposed pump station to a gravel access road further minimizes the impact of loss of land for agricultural production. The inclusion of the proposed Condition of Certification **LAND-1** would ensure no additional agricultural land is converted to urban use and pipeline construction is in accordance with BBID requirements.

Policy 8-32 addresses the protection of agriculture to assure a balance in land use. The pump station would result in a minor permanent impact to agricultural land (250 square feet out of 23 acres). The loss of agricultural land would be along the northern margin of the property in an area adjacent to similar existing equipment and a gravel access road. The water supply pipeline would be installed at depth that would not hinder agricultural

operations, and therefore would not convert additional land from agricultural use to non-agricultural use. The proposed Condition of Certification **LAND-1** would ensure that the water supply pipeline is constructed to BBID standards, thus allowing the land continued use for agricultural operations. See the "Agriculture and Forest" subsection above for more details. Staff concludes the project would result in a minor loss of agricultural land and would therefore not affect the balance of land use in Contra Costa County.

Contra Costa Airport Land Use Compatibility Plan (Byron Airport)

The Contra Costa County Airport Land Use Compatibility Plan (ALUCP) contains criteria for assessing whether a land use plan, ordinance, or development proposal is compatible with the operation of Byron Airport. The power plant is located within the Byron Airport influence area, within the conical surface air protection surface, and within Compatibility Zone D. The water supply pipeline, pump station and turnout structure are within Compatibility Zone C1; however, as they would not impact the airport, they are not discussed further. Land Use Figure 2 presents the proposed project in relation to the Byron Airport and compatibility zones as designated on the Byron Airport Compatibility Map.

Of the communication received by Energy Commission staff, two letters pertain to land use. One letter was from Alameda County Community Development Agency (hereafter referenced as the "Alameda County September 2010 letter") and the other from Contra Costa County Airport Land Use Commission (hereafter referenced as the "Contra Costa County ALUCP November 2009 letter"). These two letters are also addressed in the Response to Agency and Public Comments section of this document.

The following policies in the Contra Costa County ALUCP are applicable to the MEP:

Section 6.7.4 identifies height limitation criteria for projects within Compatibility Zone D, which are the same as those in Compatibility Zone C1. According to this section, objects less than 100 feet in height or a solitary object, such as an antenna or tower, that is not more than 35 feet taller than other nearby objects, generally are not of concern. An Airport Land Use Commission (ALUC) review is required for objects taller than 100 feet.

The eight new steel monopole overhead transmission towers proposed for the project are less than 100 feet in height, with heights ranging from 84 to 95 feet. The four proposed exhaust stacks would be 80 feet in height. There are several existing transmission towers and lines bordering the project site on the west and east. Land Use Figure 1 identifies the existing transmission lines near the project site.

The Contra Costa County ALUC November 2010 letter, stated, "[t]here do[es] not appear to be any height hazards with the project."(CCCALUC 2010a). Alameda County stated in the Alameda County September 2010 letter "the Project meets all the criteria set forth in this policy, namely that all of the Project's facilities are below 100' AGL [above ground level] as required by Compatibility Zone 'D' Criteria, and all of the Project's facilities are below the Air Protection Surfaces." (AC 2010g).

Staff concludes the project would be consistent with this policy as the maximum height of the transmission towers and lines would be less than 100 feet in height and not more than 35 feet taller than other nearby objects.

Section 6.9.3 pertains to the restriction of land uses that pose a hazard to flight. Land uses which would result in an increased attraction of birds or would create a visual or electronic hazard to flight are not permitted anywhere within the Byron Airport influence area. This section refers readers to Section 4.3.6 which is part of a list of countywide policies. The following are the specific characteristics identified in this policy that are to be avoided:

(a) glare or distracting lights which could be mistaken for airport lights;

The major project features would not have surfaces that are highly reflective. Visual Resources staff has proposed Condition of Certification **VIS-1** to ensure that the color and finish the surfaces of all project structures and buildings minimize glare. During construction, lighting may be necessary for nighttime construction activities. The proposed Condition of Certification **VIS-3** would ensure potential night lighting impacts on the construction site and the construction laydown area are minimized. Permanent exterior lighting would be designed and installed consistent with the proposed Condition of Certification **VIS-4** to ensure that there would be no obtrusive spill light beyond the project site, no excessive reflected glare, and illumination of the project and its immediate vicinity would be minimized. Direct lighting would not illuminate the nighttime sky, lighting would be directed downward or toward the area to be illuminated, and lighting would be the minimum necessary brightness consistent with operational safety and security.

The Alameda County September 2010 letter states "[f]or visual hazards, the Project's lights [as proposed] will be shielded to prevent glare and there will be no visible plumes from the Project stacks."

(b) sources of dust, steam, or smoke which may impair pilot visibility;

The **Visual Resources** section of the SSA discusses publicly visible water vapor plumes. Visual Resources staff states that the project's use of an air cooled condenser would eliminate the emission of publicly visible water vapor plumes. The air cooled condenser condenses the exhaust steam from the steam turbine, captures the condensate in pipes and returns the condensate to the boiler water system. Due to the proposed MEP's technology, the power plant would not release significant amounts of moisture into the air and would therefore not exacerbate tule fog. See the **Visual Resources** section of this SSA for more information.

The Contra Costa County ALUC raised concerns in their November 2009 letter regarding the possibility of the plumes emitted from the power plant stacks drawing water content from the tule fog (a ground hugging fog during Winter) and combining with the water content in the plumes to condense at a higher altitude of the plume and potentially posing a visual obstruction for aircraft (CCCALUC 2009b).

The only source of water vapor plumes are from the exhaust stacks, which would have the potential to create small visible plumes only when the plant is operating at times of low temperature and high humidity (MEP 2009a, p. 5.13-36). Because the license would limit project operations to a maximum of 4,000 hours per year, the possible production of plumes would be limited and intermittent. Also, the MEP's operating time would take place on hot days during the summer when electrical loads are the greatest (MEP 2009a, p. 5.13-36). These hot summer days are the times at which plumes are the least likely to form. The probability of visible plume formation from the MEP is unlikely at cooler ambient temperatures and highly unlikely at warmer ambient temperatures (MEP 2009a, Appendix 5.13).

The **Air Quality** section of the SSA discusses project-generated dust. Air Quality staff has proposed Condition of Certification **AQ-SC3** (construction fugitive dust control) and **AQ-SC4 (**dust plume response requirement). Both conditions of certification contain measures to prevent fugitive dust and dust plumes from leaving the project and linear construction sites. Visible emissions are generally prohibited by Bay Area Air Quality Management District (BAAQMD) Regulation 6. As stated in the Preliminary Determination of Compliance issued by the BAAQMD "…the combustion of natural gas at the gas turbines is not expected to result in visible emissions." (BAAQMD 2010b).

(c) sources of electrical interference with aircraft communications or navigation; and

A potential source of electrical interference with aircraft communications or navigation from the project could result from the use of communication devices over radio frequencies used by aviation. In response to Traffic and Transportation staff queries regarding project-related radio frequency interference, the applicant responded that the project "will typically be using communications equipment in the 20 to 50 megahertz or 148 to 174 megahertz ranges, which are outside the frequency ranges reserved for aviation use." (CH2M 2010n). The Byron Airport and nearby airports use a range of frequencies to communicate; specifically frequencies 114 through 117, 123, 203, and 374 are used (AirNav 2010). Interference with airport communication can be avoided through the proposed Condition of Certification **LAND-4** prohibiting the project's use of radio frequencies used by Byron Airport and nearby airports.

(d) any use, especially landfills and certain agricultural uses, which may attract an increased number of birds.

The project proposes an industrial land use and the project features that could attract an increased number of birds are the additional transmission towers and lines (perching), standing water in the detention pond (bathing and drinking), and the open disposal of garbage (food). While the project is proposing a detention pond, according to the AFC the pond "is designed to release site stormwater runoff … over a minimum 48-hour period." (MEP 2009a, Section 5.15 Water Resources, p. 5.15-16). The addition of eight transmission towers and associated lines (0.7 mile in length) would not substantially induce an increase in bird presence on the project property as there are several existing transmission towers and lines flanking the project property on the west and east. Open garbage disposal would be more likely to occur during construction activities. Biological Resources staff has proposed Condition of Certification **BIO-7** prohibiting the dumping of trash and ensuring the project site is kept as clean of debris as possible.

The Contra Costa County ALUC November 2009 letter expressed concerns about the power plant attracting or diverting birds. Biological Resources staff concludes that birds would not be diverted by the thermal plume to such an extent that they would concentrate near the Byron Airport approach path and thermal plume would not result in direct mortality to small birds. See the **Biological Resources** section of the SSA for more details.

Staff concludes the following:

- The project would not generate glare or distracting lights which could be mistaken for airport lights for the reasons discussed above and with the inclusion of the proposed Conditions of Certification **VIS-1**, **VIS-3**, and **VIS-4**.
- The project would not be a source of dust, steam, or smoke which may impair pilot visibility for the reasons discussed above and with the inclusion of the proposed Conditions of Certification **AQ-SQ3** and **AQ-SQ4**.
- The project would not be a source of electrical interference with aircraft communications or navigation for the reasons discussed above and with the inclusion of the proposed Condition of Certification **LAND-4**.
- The project is unlikely to attract birds to the area for the reasons discussed above and in the **Biological Resources** section of the SSA and with the inclusion of the proposed Condition of Certification **BIO-7**.

Staff therefore concludes the project would be consistent with policy 6.7.4 with the inclusion of the above-listed proposed conditions of certification.

While this policy addresses land uses that pose a hazard to flight and the project would be consistent with the policy as written, the policy does not address the potential risk to pilots from thermal plumes. The subject of thermal plumes and their potential risk to pilots and aviation safety is discussed in the **Traffic and Transportation** section of this SSA. Traffic and Transportation staff concludes impacts to airport traffic safety would be less than significant with the inclusion of the proposed Conditions of Certification **TRANS-7** and **TRANS-8**.

Section 6.9.4 pertains to the minimization of risks to the people on board, should an aircraft be forced to land away from an airport, by providing “as much open land area as possible within the airport vicinity.” According to this policy, the concept for the provision of open land is “based upon the fact that many light aircraft accidents and incidents occurring away from an airport runway are controlled emergency landings in which the pilot has reasonable opportunity to select the landing site.” (CCCALUC 2000). Unlike Compatibility Zone B1 which requires open land characteristics to be provided on at least 20 percent of the land and Zone C1 which requires open land characteristics provided on at least 10 percent of the land, there is no minimum requirement identified for land in Zone D.

(a) To qualify as open land, an area should be:

(1) Free of most structures and other major obstacles such as walls, large trees or poles (greater than 4 inches in diameter, measured 4 feet above the ground), and overhead wires.

There are four separate existing transmission lines and associated towers adjacent to the project property; two adjacent to the west property boundary (on the project site), and the other two adjacent to the east property boundary (on the adjacent property). The height of these existing transmission towers is unknown to staff. The single story Byron Cogeneration Plant and its associated transmission line and telephone line account for approximately 2 acres of developed land (structures) on the project property. The project would add the proposed power plant and eight transmission towers and lines accounting for approximately 10 acres of additional structures on the project property. The proposed location of the transmission towers is presented in Land Use Figure 1. There are approximately 156 acres of open space (98.7% of the 158-acre property) and with the project there would be approximately 146 acres of open space (92.4% of the 158-acre property) remaining. Conversely, approximately 1.3 percent of the project property is currently developed with structures and other obstacles. The addition of the project the developed area on the project property would increase the developed area to approximately 7.6 percent.

The project property is toward the base of the Altamont Pass foothills where terrain consists of small rolling hills. The project is proposed in the southern portion of the property with the transmission towers extending north to connect with the PG&E Kelso Substation. See Land Use Figure 1 for the proposed alignment of the transmission towers and location of the project power plant. The project would intensify the developed area of the project property.

(2) Have minimum dimensions of approximately 75 feet by 300 feet.

The project property meets the minimum dimensions.

While the project property meets the minimum dimensions required of open land, it does not appear that the project property meets the requirement of being free of most structures and other major obstacles, which is required to qualify an area as open land. Staff concludes the project site and property do not qualify as open land. As there is no minimum requirement for open land in Zone D and the amount of open land required decreases with distance from the airport (e.g. 20% for Zone B1 and 10% for C1), the project property and site would not necessarily be required to provide open land. See Land Use Figure 2 for the relative proximity of the compatibility zones to the airport. Staff concludes this policy is not applicable to the project as the project property does not qualify as open land and thus the project could not meet open land provision requirements.

The Alameda County September 2010 letter states, “[b]ecause there are existing structures on the 158-acre property the project would occupy (e.g., an existing cogeneration facility and several high voltage transmission lines), the property would not qualify as ‘Open Land’ under Policy 6.9.4 .a – even though the Project site occupies 10 of 158 acres, thus potentially falling within the limits of Policy 6.9.4.b. However, the Project must fall under both sections of the Policy 6.9.4 for the site to be considered

‘Open Land’. As it does not, the Project should be deemed compatible with the Policy.” (AC 2010g).

Staff agrees with Alameda County that the project property does not qualify as open land, but for this reason, staff considers the policy not applicable to the project, as discussed above.

LORS Consistency Summary

LAND USE Table 2 presents the applicable LORS, project consistency determination, and basis for determination. Staff concludes that with the inclusion of the proposed Conditions of Certification **LAND-1, 2, 3,** and **4**, project impacts would be **less than significant**.

LAND USE Table 2
Project Compliance with Adopted Applicable Land Use LORS

Applicable LORS	Consistency Determination	Basis for Determination
State		
California Land Conservation Act of 1965 (Williamson Act) (Gov. Code §51238.1(a))	Yes, as conditioned	Staff agrees with Alameda County and the DOC that the MEP would be consistent with the three principles of compatibility identified in GC § 51238.1(a) of the California land Conservation Act (CLCA). Staff has concluded the MEP is compatible with the CLCA with the inclusion of the proposed Condition of Certification **LAND-2**.
Local		
East County Area Plan (ECAP) (general plan) Land Use Designation: Large Parcel Agriculture	Yes, as conditioned	The ECAP does not preclude the construction of power plants on land of such designation and the project would be consistent with the specifications of the Large Parcel Agriculture land use designation. The proposed Condition of Certification **LAND-2** would meet the county's mitigation requirement for loss of land in agricultural production.
Land Use - -Subregional Planning; Urban/Open Space Delineation *Policy 1*	Yes	A power plant is not precluded from construction outside the UGB, the project is not an urban use, and the project is appropriately located adjacent to similar infrastructure.
-Urban and Rural Development; Location: Incorporated and Unincorporated *Policy 13*	Yes	The project is considered infrastructure allowed under this policy.
-Sensitive Lands and Regionally Significant Open Space; General Open Space *Policy 52*	Yes, as conditioned	The project site has no recreation opportunities, the project is a compatible land use with grazing, grazing is the only likely agricultural activity on this site, the project design and isolated location would not encourage urban infill development and increased urbanization of open space areas, and the project would not impact wind operations or mineral extraction and impacts to biological resources are less than significant with the inclusion of the proposed Conditions of Certification **BIO-7** through **15**, **17** and **18**. The proposed Conditions of Certification **VIS-1**, **VIS-2**, **VIS-3**, **VIS-4**, **VIS-5**, and **VIS-6** would ensure impacts to visual resources are less than significant.
Policy 54	Yes	The project is not precluded from construction outside the UGB, the project is a public facility, and is comparable to limited infrastructure.
-Sensitive Lands and Regionally Significant Open Space; Agriculture *Policy 72*	Yes	The site is more suited to low-intensity agriculture versus intensive agricultural use.

Applicable LORS	Consistency Determination	Basis for Determination
Policy 73	Yes	The project does not require buffers due to its compatibility with the on-site grazing. The proposed fencing around the plant, clustering of equipment, and small loss of grazing land further aid in the protection of agricultural areas.
Policy 89	Yes	The project would result in a minimal loss of rangeland, retain the majority of the property for grazing use, and cluster the equipment within a fenced area located in proximity to the southern property boundary.
- Special Land Uses; Windfarms *Policy 173*	Yes	The project would not impact wind development or preclude the future development of such an operation.
Public Services and Facilities--General Services and Facilities; Infrastructure and Services *Policy 218*	Yes, as conditioned	The project would be consistent with the ECAP land use designation for the project site with the inclusion of Condition of Certification **LAND-2** would be consistent with applicable policies, the project is appropriately located in proximity to other electrical infrastructure, and the project is more than 0.25 mile from sensitive receptors and residences.
Alameda County Ordinance Code (Title 17: Zoning) 17.06.040 - Conditional uses—Board of zoning adjustments.	Yes	The project is considered a public utility use and meets all finding requirements consistent with §17.54.130 of the zoning code for a CUP.
17.06.050 - Accessory uses.	Yes	The proposed warehouse and maintenance building and control/administration building associated with the power plant are considered accessory uses to the permitted power plant.
17.06.060 - Building site.	Yes	The lease for the project covers the required 100 acre minimum building site area.
17.06.070 - Yards.	Yes	The proposed location of the power plant on the larger project property would allow the yard requirements to be met.
17.06.080 - Signs.	Yes, as conditioned	The inclusion of the proposed Condition of Certification **VIS-5** would ensure project compliance with this section of the zoning code.
17.52.440 - Fences, walls and hedges - Exceptions to height limitations	Yes, as conditioned	The project would be consistent with this section of the zoning code with the inclusion of the proposed Condition of Certification **HAZ-7**.
17.52.930 - Parking spaces required - Business establishments	Yes, as conditioned	The proposed Condition of Certification **TRANS-3** would ensure the project would be consistent with parking space requirements during project construction and operation.
17.54.130 - Conditional uses.	Yes, as conditioned	The project meets all finding requirements of Alameda County for issuance of a CUP as the project use is required by the public need: is properly related to other land uses and transportation and service facilities in

Applicable LORS	Consistency Determination	Basis for Determination
		the vicinity: would not, under all the circumstances and conditions materially affect adversely the health or safety of persons residing or working in the vicinity; would not be materially detrimental to the public welfare or injurious to property or improvements in the neighborhood; and would not be contrary to the specific intent clauses or performance standards established for the "A" District. The project would be consistent with this section of the zoning code with the inclusion of the proposed Conditions of Certification **TLSN-1** through **TLSN-4**, **HAZ-1**, through **HAZ-7,** and **WORKER SAFETY-1** through **WORKER SAFETY-5**.
Contra Costa County General Plan Land Use Designation: AL- Agricultural Lands	Yes, as conditioned	The project would result in a minor loss of land used for agricultural production due to the pump station (approximately 250 square feet). The proposed Condition of Certification **LAND-1** would ensure no additional agricultural land is lost through conversion to urban use and the pipeline construction is in accordance with BBID requirements.
PS- Public/Semi-Public	Yes	The construction area would be used by a construction team affiliated with a public entity.
Land Use Element- *Policy 3-10*	Yes	Water will be provided only to the project through an agreement with Diamond Generating Corporation and Byron Bethany Irrigation District; therefore, the project would not induce growth.
Policy 3-69	Yes	Pipelines are generally consistent uses and as it is reasonable to consider the pump station necessary to operate the pipelines, the pump station would also be consistent.
Conservation Element- *Policy 8-29*	Yes, as conditioned	The project would not result in a significant loss of land that could be used for agricultural production. The inclusion of the proposed Condition of Certification **LAND-1** would ensure no additional agricultural land is converted to urban use and pipeline construction is in accordance with BBID requirements.
Policy 8-32	Yes	The project would result in a minor loss of agricultural land and would therefore not affect the balance of land use in Contra Costa County.
Contra Costa County Airport Land Use Compatibility Plan (Byron Airport) Compatibility Zone 'D' Criteria 6.7.4. Height Limitations -	Yes	The maximum height of the transmission towers and lines would be less than 100 feet in height and not more than 35 feet taller than other nearby objects.
6.9. Compatibility Criteria — All Zones 6.9.3. Hazards to Flight — Air protection surface- conical surface	Yes, as conditioned	The major project features would not have surfaces that are highly reflective, construction and permanent lighting would be designed so there would be no obtrusive spill light beyond the project site, no excessive reflected glare, and illumination of the project and its immediate vicinity. The inclusion of the proposed Conditions of Certification **VIS-1**, **VIS-3**, and **VIS-4** would ensure the project would not generate glare or distracting lights which could be mistaken for airport lights. The project's use of an air cooled condenser would eliminate the emission of publicly visible water vapor plumes and preventative measures for fugitive dust and dust plumes from leaving the project and linear construction sites would be proposed as

Applicable LORS	Consistency Determination	Basis for Determination
		Conditions of Certification for the project. The inclusion of the proposed Conditions of Certification **AQ-SC3** and **AQ-SC4** would ensure the project would not be a source of dust, steam, or smoke which may impair pilot visibility. The project would typically be using communications equipment outside the frequency ranges reserved for aviation use. The inclusion of the proposed Condition of Certification **LAND-4** would ensure the project would not be a source of electrical interference with aircraft communications or navigation. The addition of the project transmission towers and line would not substantially induce an increase in bird presence on the project property. The detention pond would be designed to release stormwater runoff over a minimum period of 48 hours. Dumping of trash would be prohibited and during construction the project site would be kept as clean of debris as possible. The inclusion of the proposed Condition of Certification **BIO-7** would ensure that the project would be unlikely to attract an increased number of birds.

Cumulative Land Use Effects

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CCR 2009, §15065[A][3]).

The location of these projects with respect to the MEP is presented in Land Use Figure 4. **LAND USE Table 3** presents the development projects within northeastern Alameda, southeastern Contra Costa, and northwestern San Joaquin counties, plus other power plant projects within the tri-county region (Alameda, Contra Costa, and San Joaquin counties).

LAND USE Table 3
Development Considered in the Cumulative Condition

Project	County	Distance from Project Site	Conversion of Ag Land	Mitigation of Ag Land	Project Impacts Mitigated to Less than Significant level	Status of Project*
Altamont Motorpark Sports Rezone	Alameda	4 miles to the southeast	No	Not Applicable	Not Applicable	**On Hold**. Draft EIR released but not made final. Project not approved.
East Altamont Energy Center**	Alameda	1.5 miles to the northeast	55 acres prime out of 174 acres	1:1	Yes	**Approved** but not built. Construction start date extended to August 19, 2011 (CEC, 2008).
GreenVolts Solar Field	Alameda	0.8 mile to the northeast	10 acres prime out of 62 acres	1:1	Yes	**Approved** but not built. Project still active and currently being redesigned. Additional environmental analysis may be required.
Marsh Landing Generating Station	Contra Costa	18 miles to the northwest	No	Not applicable	Yes	**Approved**
Oakley Generating Station	Contra Costa	17 miles to the north	No	Not applicable	Unknown	**Under Review**
Willow Pass Generating Station	Contra Costa	19 miles to the northwest	No	Not applicable	Unknown	**Under Review**
Gateway Generating	Contra Costa	18 miles to the	No	Not applicable	Yes	**Built**

Project	County	Distance from Project Site	Conversion of Ag Land	Mitigation of Ag Land	Project Impacts Mitigated to Less than Significant level	Status of Project*
Station		northwest				
Mountain House Community	San Joaquin	2.5 miles to the east	3,600 acres prime out of 4,780	Agricultural mitigation fee for each acre converted to urban use if Countywide agricultural mitigation fee were established.	No. Land use impacts- Significant and unavoidable	**Approved**. In construction.
GWF Tracy Combined Cycle Power Plant Project	San Joaquin	8 miles to the southeast	10.3 acres prime out of 40 acres	Payment of mitigation fee for the protection of farmland in San Joaquin County.	Yes	**Approved**
Lodi Energy Center Power Plant Project	San Joaquin	25 miles to the north	No	Not applicable	Yes	**Approved**

* Status as of November 4, 2010. CEC 2010t.
** Distance from the East Altamont Energy Center to the Byron Airport is approximately (based on Traffic and Transportation Figure 3 3 miles) and the distance to Runway 12-30 is approximately 0.5-mile.

The MEP would not result in incremental land use-related impacts which would be cumulatively considerable for the following reasons:

Agriculture-

- While the amount of agricultural land in the state of California, and specifically in Alameda, Contra Costa, and San Joaquin counties has been declining over time, the MEP would not contribute to the loss of agricultural land because the project's conversion of 250 square feet of Farmland of Local Importance in Contra Costa County for the pump station is not substantial and the power plant site is proposed on grazing land in Alameda County and would therefore not convert agricultural land.
- There is no land zoned for forest, timberland, or for timberland production on the project site or within one mile of the site.
- The project is a compatible use with the existing Williamson Act contract.
- The project would not result in changes which would convert Farmland to non-agricultural use.

Land Use Compatibility and LORS Compliance-

- The project would not physically divide an existing community as land uses within one mile of the project site are mostly agricultural plus some electric utilities and water management infrastructure and a few scattered residences. There is no existing community established within one mile of the project site.

- Staff's analysis shows the project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction with the inclusion of the proposed conditions of certification.
- The project would not conflict with the Bethany Reservoir State Recreation Management Plan and General Development Plan and the project would not be subject to the East Contra Costa County HCP/NCCP as the project features within the plan area are on land where the habitat is not sensitive.

For these reasons, the MEP would not result in cumulative land use impacts.

FACILITY CLOSURE

At some point in the future, the proposed power plant facility would permanently cease operation and close down. At that time, it would be necessary to ensure that closure is carried out in such a way that public health and safety and the environment are protected from adverse impacts.

The planned lifetime of the plant is 40 years; however, if the plant is still economically viable, it can operate longer. It is also possible that the plant could become economically noncompetitive earlier than 40 years and be permanently closed earlier. When the plant is permanently closed, a decommissioning plan would be developed detailing the closure procedure to ensure that public health and safety and the environment are protected. At least 12 months prior to decommissioning, the applicant would prepare a Facility Closure Plan for Energy Commission review and approval prior to decommissioning. The review and approval process would be public and allow participation by interested parties and other regulatory agencies. At the time of closure, all pertinent LORS would be identified and the closure plan would discuss conformance of decommissioning, restoration, and remediation activities with these LORS. All of these activities would be under the authority of the Energy Commission.

There are two other circumstances in which a facility closure can occur; unexpected temporary closure or unexpected permanent closure. Staff has not identified any LORS from a land use perspective that the applicant would need to comply with in the event of an unexpected temporary or permanent closure of the MEP.

NOTEWORTHY PUBLIC BENEFITS

There are no land use-related benefits associated with the MEP.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received the following comments on aspects of the MEP related to land use:

CONTRA COSTA COUNTY AIRPORT LAND USE COMMISSION

November 30, 2009 (CCCALUC 2009b)

David E. Durant, Chair of the Contra Costa County Land Use Commission, submitted a letter outlining the Commission's questions and concerns regarding the proposed MEP.

Two questions in the letter related to land use. The first was the possible visual hazards created by the presence of tule fog in combination with visible water vapor plumes emitted by the project's stacks. Visual Resources staff has discussed the creation of visible water vapor plumes and concluded the project would not emit publicly visible water vapor plumes due to the project's proposed use of an air cooled condenser. See the **Visual Resources** section of this SSA for more information. Traffic and Transportation staff has discussed the addition of tule fog with the plume to create a visual hazard. Staff concluded the project's technology would not release significant amounts of moisture into the air and would therefore not exacerbate tule fog. See the **Traffic and Transportation** section of this SSA for more details.

The second question was regarding of bird activity around the power plant. Biological Resources staff has discussed this concern and concludes the plume would not concentrate birds near the Byron Airport and the plume would not result in direct mortality to small birds. See the **Biological Resources** section of this SSA for more information.

Land Use staff therefore concludes the project is consistent with the related policy (6.9.3b & d).

October 14, 2010 (CCCALUC 2010a)

David E. Durant, Chair of the Contra Costa County Land Use Commission, submitted a letter of determination of the project's inconsistency with the Contra Costa County Airport Land Use Compatibility Plan.

Traffic and Transportation staff have analyzed and considered all the information provided to the Energy Commission, including this letter and found the project compatible. Land Use staff has therefore found the project compatible with all applicable policies of the ALUCP. See the **Traffic and Transportation** section of this SSA for more details.

ALAMEDA COUNTY COMMUNITY DEVELOPMENT AGENCY

September 17, 2010 (AC 2010g)

Chris Bazar, Director of the Alameda County Community Development Agency, provided comments on the proposed Mariposa Energy Project's consistency with Alameda County's General Plan, as a supplement and clarification of the county's previous letter sent on May 20, 2010 on the same subject.

Staff has addressed the county's concerns in the discussion of project consistency with the Contra Costa County ALUCP under the LORS Consistency Summary.

ROBERT ANDERSON

December 8, 2010 (RA 2010a)

Comment: Robert Anderson submitted comments in response to the letter from Chris Bazar, Director of the Alameda County Community Development Agency, dated May 20, 2010 (referenced in this document as the Alameda County May 2010 letter, AC 2010c). Mr. Anderson's comments generally pertain to Alameda County's consideration of project compatibility with the ECAP, specifically Measure D (Initiative).

> **Response:** Staff has completed a thorough independent review of the project and its compatibility with the ECAP and stands by its conclusions that the MEP is consistent with ECAP policies with the inclusion of the proposed Condition of Certification **LAND-2**. Staff conclusions are consistent with Alameda County's interpretation of the project's compatibility with the ECAP and the county's interpretation of compatibility with previous similarly-sited projects, the East Altamont Energy Center and Telsa Power Project. Refer to the discussion of the ECAP under the LORS Compliance section in this SSA for more details.

CALPILOTS

December 9, 2010 (CPA 2010c)

Comment: Andy Wilson, representative of CALPILOTS submitted several comments related to land use. Mr. Wilson requests that staff indicate the distance of the project from Byron Airport and the airport's runway 30. Also, he requests that staff show the distance of the East Altamont Energy Center, a certified power plant, to Byron Airport and the airport's runway 30.

> **Response:** Staff has included the distance of the MEP to the airport's runway 12-30 (1 mile of the runway centerline and within 0.65 mile of the closest approach boundary) on page 4.12-7 of this SSA. The distance of the MEP to the Byron Airport (approximately 2.7 miles) was already reported. Staff has included the distance of the East Altamont Energy Center to the Byron Airport (approximately 3 miles) and to the airport's runway 12-30 (0.5-mile of the runway) on page 4.12-41 of this SSA. **Traffic and Transportation Figure 3** in the **Traffic and Transportation SSA** identifies the location of the MEP and the East Altamont Energy Center with respect to the Byron Airport and Runway 12-30. Distances from the East Altamont Energy Center and the Byron Airport and runway 12-30 were estimated based on **Traffic and Transportation Figure 3**.

Comment: Mr. Wilson listed the policies in the Contra Costa County Airport Land Use Compatibility Plan that apply to the project.

> **Response:** Staff has considered the policies in the land use analysis and stands by its conclusions of compatibility with the Contra Costa County Airport Land Use Compatibility Plan policies.

Comment: Mr. Wilson listed Programs 63 and 64 and Policy 150 from the ECAP that apply to the project.

Response: Staff is aware of these directions to Alameda County in the ECAP and has considered them in its analysis.

ROBERT SARVEY

December 9, 2010 (RS 2010e)

Comment: Robert Sarvey submitted several comments related to land use. Mr. Sarvey disagrees with staff's assessment of the project's compatibility with the ECAP and the provisions of the Williamson Act.

Response: Staff has completed a thorough independent review of the project and worked in close coordination with the Alameda County Community Development Agency and the California Department of Conservation. Staff stands by its review of and conclusions on the project's compatibility with the ECAP and Williamson Act Contract on the property.

CONCLUSIONS AND RECOMMENDATIONS

The proposed MEP would be located outside of the Urban Growth Boundary in unincorporated eastern Alameda County.

Staff concludes the MEP:

- Would convert a less than significant amount of farmland of local importance to non-agricultural use.
- Would not conflict with existing zoning for agricultural use or a Williamson Act contract.
- Would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production.
- Would not result in the loss of forest land or conversion of forest land to non-forest use.
- Would not involve changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural uses or forest land to non-forest use.
- Would not directly or indirectly divide an established community or disrupt an existing or recently approved land use.
- The project would not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project, adopted for the purpose of avoiding or mitigating environmental effects.
- Would not conflict with any applicable habitat conservation plan or natural community conservation plan.

- Would not result in incremental impacts that, although individually limited, are cumulatively considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.

While the project is consistent with the Contra Costa County Airport Land Use Compatibility Plan, as discussed earlier in this section of the SSA, the policy addressing land uses that pose a hazard to flight does not address the potential hazards to aircraft from thermal plumes. The **Traffic and Transportation** section of this SSA discusses this subject. Staff concludes that impacts to aviation would be less than significant with the implementation of **TRANS-7** and **TRANS-8**.

Land use impacts resulting from the proposed MEP can be mitigated to a less than significant level with the inclusion of the proposed Conditions of Certification **LAND-1**, **LAND-2**, **LAND-3**, and **LAND-4**.

PROPOSED CONDITIONS OF CERTIFICATION

LAND-1 Construction of the section of the water supply pipeline on the Byron Bethany Irrigation District (BBID) property shall be carried out in compliance with BBID standards for pipeline construction, which require a minimum three foot cover. Construction of this section of pipeline shall be scheduled and carried out so as not to conflict with agricultural operations on the property. Once construction has been completed, the land shall be returned to pre-construction site conditions.

Verification: At least 30 calendar days prior to start of construction, the project owner shall submit to the Compliance Project Manager (CPM) for review and approval, (1) documentation showing construction of the section of water supply pipeline on the Byron Bethany Irrigation District property will be carried out consistent with BBID's standards for pipeline construction and (2) a construction schedule that does not conflict with the agricultural use of the land. Once construction is completed, the project owner shall submit to the CPM documentation showing the area disturbed by construction activities has been returned to pre-construction conditions.

LAND-2 The project owner shall provide year-round water supply for grazing livestock on the remaining 146 acres of the subject property for the life of the project.

Verification: At least 30 calendar days prior to start of operation, the project owner shall submit to the CPM evidence that a year-round water supply for livestock has been installed and water supply is maintained on a monthly basis for the life of the project.

LAND- 3 The project owner shall reseed the temporary construction laydown area on the project property with an improved seed mix over what site conditions currently provide.

Verification: Within 120 calendar days after commercial operation, the project owner shall submit to the CPM evidence that the construction laydown area has been

re-seeded and a management plan that ensures the re-seeded area will be maintained and suitable for grazing for the life of the project.

LAND-4 Communication devices used by the project that operate over radio frequencies shall not conflict with frequencies used by Byron Airport and the surrounding airports; specifically frequencies 114 through 117, 123, 203, and 374 MHz shall be avoided.

Verification: At least 30 days prior to project construction, the project owner shall provide documentation to the Director of Airports with Contra Costa County for review and comment and to the CPM for review and approval, showing project communication devices will not conflict with the frequencies used by the Byron Airport and surrounding airports. Any comments received from the Director of Contra Costa County Airports shall be forwarded to the CPM without delay.

REFERENCES

AC 2000- East County Area Plan (Alameda County general plan), Revised November 2000, http://www.acgov.org/cda/planning/plans.htm

AC 2003- Alameda County Parks, Recreation, & Historic Sites Directory, 2003, Alameda County Community Development Agency, State/Regional Park Section, http://www.acgov.org/cda/parks/index.htm

AC 2009- Alameda County Ordinance Code, November 10, 2009, http://library.municode.com/index.aspx?clientId=16425&stateId=5&stateName=California

AC 2010b- Alameda County / C. Bazar (TN 56771). Proposed Mariposa Energy Project, consistency with Alameda County General Plan and Williamson Act Contracts. Dated 5/20/10. Submitted to CEC on 5/21/2010

AC 2010c- Alameda County / B. Jensen (TN 56879). Clarification from B. Jensen on potential agriculture mitigation. Dated 5/27/10. Submitted to CEC on 5/27/2010

AC 2010d- Alameda County / B. Jensen (TN 57216). Mariposa Energy Project-Question regarding maximum building intensity in LPA land. Dated 6/18/10. Submitted to CEC on 6/18/2010

AC 2010e- Alameda County (TN 57282). Alameda County Community Development Agency letter (dated April 26, 2002) regarding East Altamont Energy Center LLC (EAEC), (01-AFC-4), County of Alameda Community Development Agency (CDA) response to California Energy Commission (CEC) letter of March 7, 2002. Submitted to CEC on 6/22/2010

AC 2010f- Alameda County (TN 57464). Alameda County Community Development Agency letter (dated April 30, 2002) regarding proposed Tesla Power Plant Consistency with Alameda County General Plan and Williamson Act

Contracts. Submitted to CEC on 6/22/2010

AC 2010g- Alameda County / C Bazar (TN 58582). Mariposa Energy Project-Consistency with Alameda County General Plan. Dated 9/17/10. Submitted to CEC on 9/22/2010

AirNav 2010- C83- Byron Airport, Byron, California, USA. FAA information effective April 8, 2010. http://www.airnav.com/airport/C83, accessed on May 13, 2010

BAAQMD 2010b- Bay Area Air Quality Management District / B. Cabral (TN 58077). Preliminary Determination of Compliance, dated 8/10. Submitted to CEC on 8/18/2010.

BBID 2009a- Byron Bethany Irrigation District / R. Gilmore (TN 54252) Letter Regarding District Background, dated 11/23/2009. Submitted to CEC on 11/24/2009.

BBID 2010a- Byron Bethany Irrigation District / R. Gilmore (TN 55780) Email regarding district facilities, dated 3/5/2010. Submitted to CEC on 3/8/2010.

CCC 2005- Contra Costa County General Plan (2005-2020), January 2005, http://www.co.contra-costa.ca.us/depart/cd/current/advance/GeneralPlan/CCCGeneralPlan.pdf

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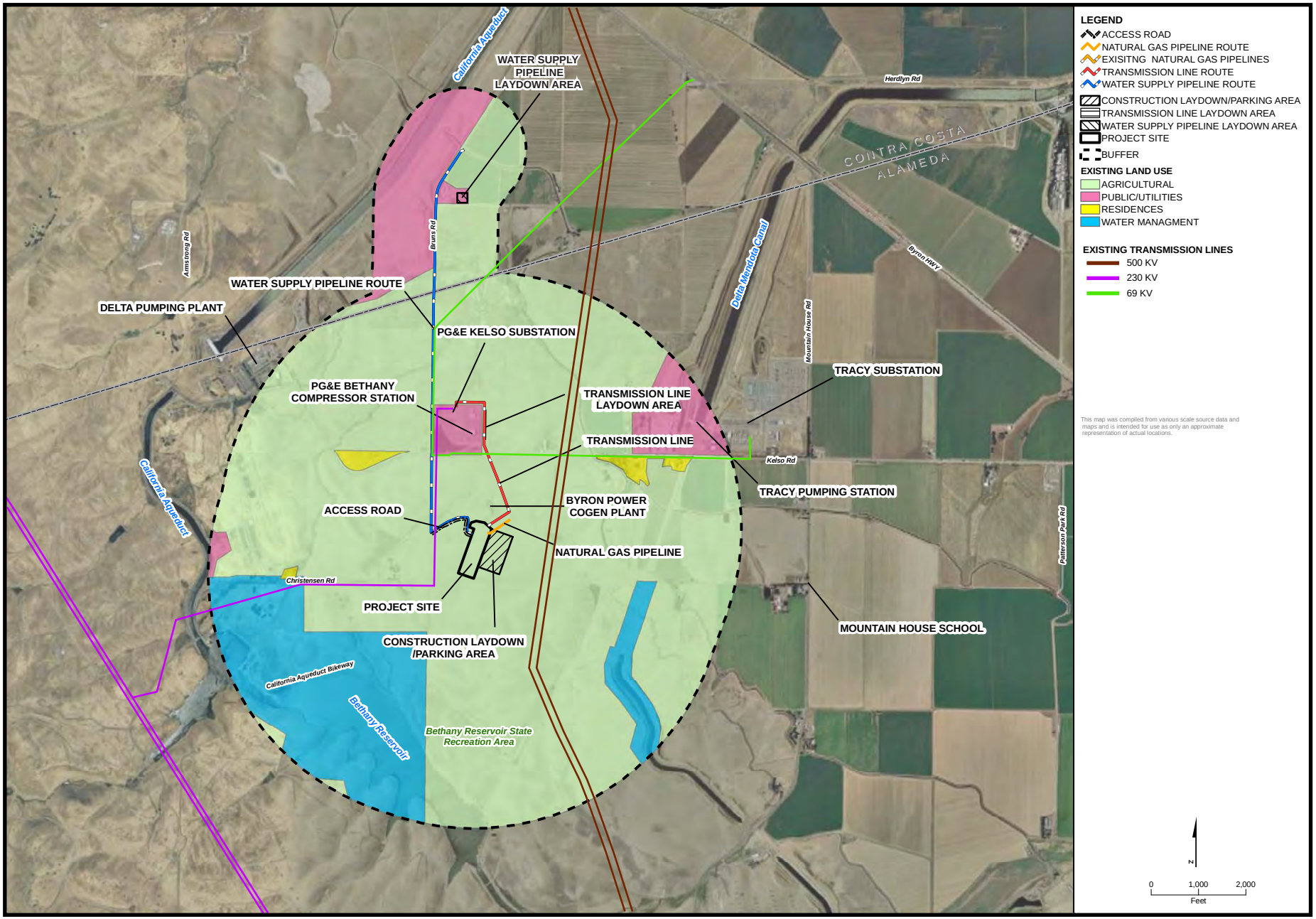
LAND USE - FIGURE 1

Mariposa Energy Project - Existing Land Use



LAND USE

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Supplement B Additional Laydown Area anlaysis

LAND USE - FIGURE 2

Mariposa Energy Project - Byron Airport Compatibility Map

LAND USE

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data & Contra Costa County Airport Land Use Compatibility Plan, Figure 4B Compatibility Map

LAND USE - FIGURE 3

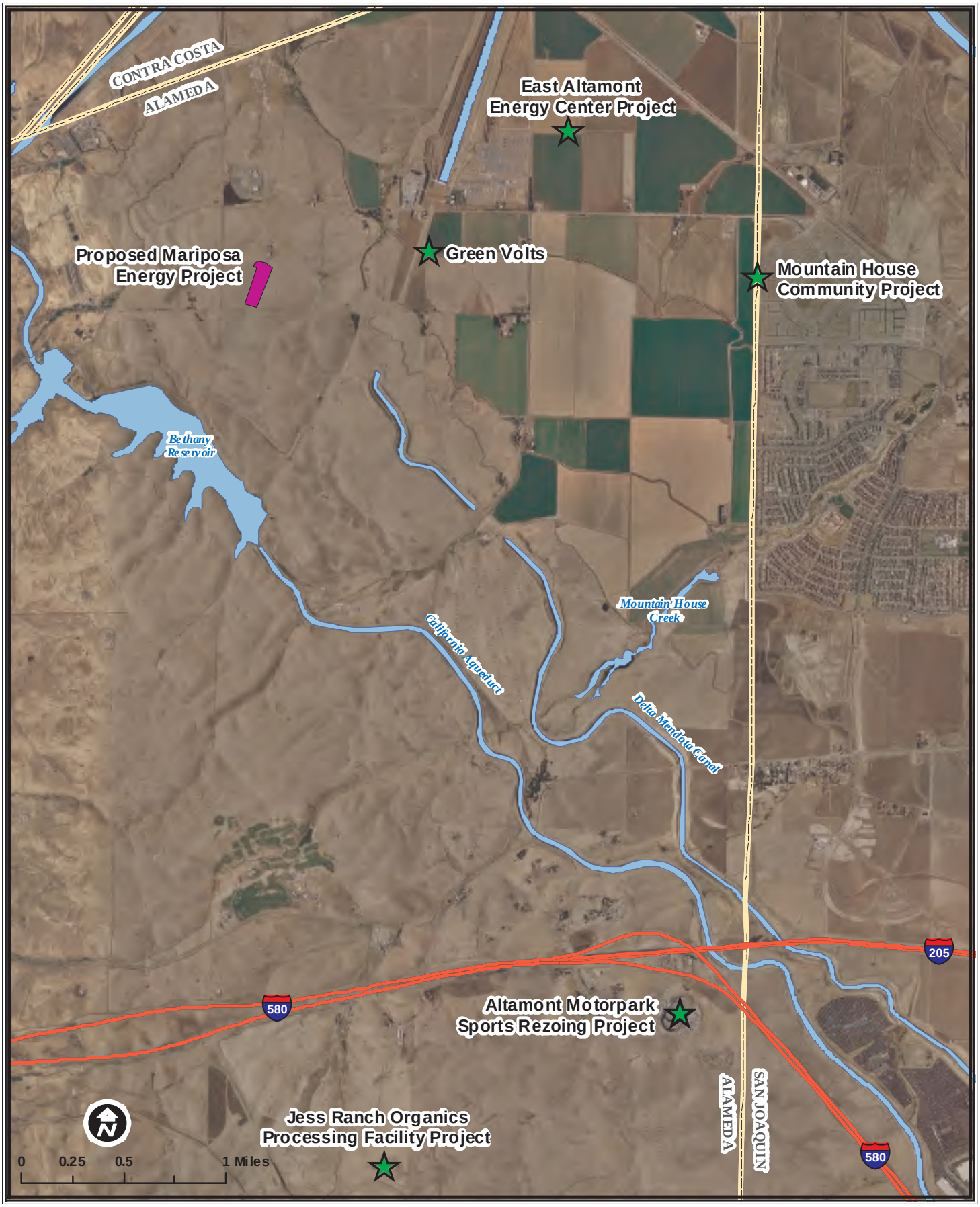
Mariposa Energy Project - Pump Station, Turnout and Water supply Pipeline Laydown Area Locations

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Data Responses, sets 1A & 1B Response to Data Requests 1 - 68, AFC Figure DR30-1

LAND USE- FIGURE 4

Mariposa Energy Project - Cumulative Land Use Projects



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: ESRI Imagery & California Energy Commission

NOISE AND VIBRATION

Revised Testimony of Shahab Khoshmashrab

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

The Mariposa Energy Project (MEP), if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people within the affected area, directly, indirectly, or cumulatively. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment, that would avoid any significant adverse impacts.

INTRODUCTION

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 noise receptors[1] all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The ground-borne 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 MEP, 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 (LORS). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

NOISE Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal:	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
U.S. Environmental Protection Agency (USEPA)	Assists state and local government entities in development of state and local LORS for noise

[1] 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)

Applicable Law	Description
State:	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local:	
Alameda County General Plan, Policy 289	Provides quantitative compatibility goals and policy
Alameda County Municipal Code, Title 6, Chapter 6.60	Includes quantitative limits on allowable noise for various receptor land uses

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration, (OSHA) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4**, immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation.

Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code Section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence

of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (dBA).

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated occupational noise exposure regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

Alameda County General Plan

The Alameda County General Plan consists of three General Plans, one for each geographical area. Policies governing physical development within the area that includes the project site are in the East County General Plan Environmental Safety Element portion of the Alameda County General Plan. The East County General Plan Environmental Safety Element (Alameda County, 2002) requires noise studies as part of development review for projects located in areas exposed to high noise levels and in areas adjacent to existing residential or other sensitive land uses. Policy 289 of this code sets forth noise limits and requires appropriate mitigation for new noise sensitive developments in areas projected to exceed 60 dBA L_{dn}. (L_{dn} represents the average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.) An L_{dn} level of 60 dBA is equivalent to a L_{eq} level of 54 dBA. Ambient noise levels are best represented by the L_{eq} scale, the energy average A-weighted noise level.

Alameda County Municipal Code

Alameda County Code, Title 6, Chapter 6.60 Noise Nuisance, establishes noise standards for residential and commercial areas as shown in **NOISE Table 2**. The Alameda County Code establishes a daytime (7 a.m. to 10 p.m.) limit of 50 dBA and a nighttime (10 p.m. to 7 a.m.) limit of 45 dBA. Both limits are in terms of hourly L_{50}, the sound level exceeded for 30 minutes in any hour. Construction activities between the hours of 7 a.m. and 7 p.m., Monday through Friday, and between 8 a.m. and 5 p.m. on weekends are exempt from these standards (Alameda County 2009).

NOISE Table 2
Alameda County Noise Standards

Cumulative Number of Minutes in Any 1-hour Period	Designation	Residential and Noise Sensitive Uses Exterior Noise Limits, dBA	
		Daytime 7 a.m. – 10 p.m.	Nighttime 10 p.m. – 7 a.m.
30	L_{50}	50	45

The MEP's noise level must not exceed 50 dBA L_{50} during the daytime and 45 dBA L_{50} during the nighttime.

SETTING

The project site is in unincorporated eastern Alameda County, California. The proposed project site is directly south-southwest of the existing 6.5-megawatt Byron Power Cogeneration Plant. The larger site parcel, referred to as the Lee Property, contains remnants of prior wind turbine development that has been removed except for minor debris. Wind energy installations are still active in the general area, as the Altamont Pass Wind Farm is approximately 1 mile southwest of the project area. Uses closer to the project site include grazing, power generation, water management facilities, and recreation areas. Grazing occurs on most of the land within a mile radius of the project site. The Pacific Gas and Electric Company Kelso Substation and Bethany Compressor Station are located directly north of the project site (MEP 2009a, AFC § 5.7.2.1).

The closest sensitive noise receptors include a few isolated residences, the closest of which is approximately 3,300 feet to the northwest from the center of the project site, labeled M2. The second closest residence is approximately 3,600 feet to the northeast (M1) (MEP 2009a, AFC § 5.7.2.1) (see **Noise Figure 1**).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA's guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
2. exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;
3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item 3, above, to the analysis of this and other projects, has concluded that a potential for a significant noise impact may exist where the noise of the project plus the background exceeds the background by more than 5 dBA at the nearest sensitive noise receptor.

Staff has concluded that an increase in background noise levels up to and including 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however,

is typically significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level;[2]
2. the duration and frequency of the noise;
3. the number of people affected; and
4. the land use designation of the affected receptor sites.
5. public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[3] activities is limited to daytime hours.
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations.

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (MEP 2009a, AFC § 5.7.2.2; Tables 5.7-3, 5.7-4, 5.7-5). This survey was performed from Thursday, March 25 through Friday, March 26, 2009, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following two locations, shown in **Noise Figure 1**:

1. Location M1: Near the residence located approximately 3,600 feet northeast of the project site. This location was monitored continuously from 3:00 p.m. on March 25 through 4:00 p.m. on March 26, 2009.
2. Location M2: In the pasture of the residence located approximately 3,300 feet northwest of the project site. This location was monitored continuously from 4:00 p.m. on March 25 through 4:00 p.m. on March 26, 2009.

.[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

[3] Noise that draws legitimate complaint.

The noise environment in the vicinity of the project site is dominated by industrial-related facilities and natural sounds.

NOISE Table 3 summarizes the ambient noise measurements (MEP 2009a, AFC § 5.7.2.2; Tables 5.7-3, 5.7-4, 5.7-5).

NOISE Table 3
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA	
	Average During Daytime Hours[1] L_{eq}	Nighttime Hours[2] L_{90}
M1, Residence Approximately 3,600 Feet Northeast of the Project Site	53	46
M2, Residence Approximately 3,300 Feet Northwest of the Project Site	48	43

Source: MEP 2009a, AFC § 5.7.2.2; Tables 5.7-3, 5.7-4
[1.] Staff calculation of average of the daytime hours (7 a.m. to 10 p.m.)
[2.] Staff calculations of average of the four quietest consecutive hours of the nighttime (see NOISE APPENDIX A)

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and normal long-term operation of the project.

Construction Impacts and Mitigation

Construction noise is usually a temporary phenomenon. Construction of the MEP is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities, approximately 14 months (MEP 2009a, AFC § 2.3.15).

Compliance with LORS

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 highest construction-related noise levels (demolition, site cleaning, excavation, and cleanup) are anticipated to range between approximately 51 to 52 dBA at the above residential receptors. They are summarized here in **NOISE Table 4**.

NOISE Table 4: Predicted Construction-Related Noise Levels

Receptor	Highest Construction Noise Level (dBA) [1]	Measured Existing Ambient, Average Daytime L_{eq} (dBA) [2]	Project Plus Ambient	Change
M1	51	53	55	+2
M2	52	48	53	+5

Sources: [1] MEP 2009a, AFC Table 5.7-7 and staff calculations
[2] NOISE Table 3, above

The Alameda County Code Title 6, Chapter 6.60 Noise Nuisance allows construction activities only between the hours of 7 a.m. and 7 p.m. Mondays through Fridays, and

between 8 a.m. and 5 p.m. on weekends. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Therefore, the noise impacts of the MEP construction activities would comply with the noise LORS.

CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. As seen in **NOISE Table 4**, the loudest construction activities will likely increase the existing ambient noise levels at the project's closest residential receptors by 2-5 dBA; staff considers this increase to be create a less-than-significant impact. Also, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding construction noise.

Therefore, the noise impacts of the MEP construction activities would be less than significant.

Linear Facilities

Construction activities related to linear facilities would include the construction of a 0.7-mile-long electric transmission line, an approximately 580-foot-long natural gas pipeline, a new water pump station, and a 1.8-mile-long water pipeline. Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, noisy construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6**.

Vibration (Pile Driving)

The only construction operation likely to produce vibration that could be perceived off site would be pile driving. The applicant does not anticipate that pile driving would be needed for the project. Thus, construction vibration would not create an impact at the project's noise sensitive receptors.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (MEP 2009a, AFC § 5.7.3.2.3). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise source of the project would be the turbine generators, exhaust stacks, fuel gas compressor, electric transformer, and various pumps and fans. The overall noise generated by these various noise sources would be based on the configuration of the sources, the number and power rating of the equipment, and any noise-reducing measures incorporated.

Staff compares the projected project noise with applicable LORS, in this case the Alameda County LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

As with any typical large-scaled simple cycle power plant project, the MEP's noise mitigation measures expected to be incorporated in the project design would include:

- gas turbine acoustical enclosures;
- exhaust stack silencing;
- gas turbine inlet air silencing; and
- fuel gas compressor enclosures

In addition, the project would avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (MEP 2009a, AFC § 5.7.3.3.4).

Compliance with LORS

Policy 289 of the East County General Plan Environmental Safety Element (Alameda County 2002) requires appropriate mitigation for new noise sensitive developments in areas projected to exceed 60 dBA L_{dn}. An L_{dn} level of 60 dBA is equivalent to a L_{eq} level of 54 dBA.

The Alameda County Code Title 6, Chapter 6.60, Noise, establishes noise standards for residential and commercial areas as shown in **NOISE Table 2**. The Alameda County Code establishes a daytime (7 a.m. to 10 p.m.) limit of 50 dBA and a nighttime (10 p.m. to 7 a.m.) limit of 45 dBA. Both limits are in terms of hourly L_{50}, the sound level exceeded for 30 minutes in any hour.

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (MEP 2009a, AFC § 5.7.3.3.3). The applicant has predicted operational noise levels; they are summarized in **NOISE Table 5** below.

NOISE Table 5: Predicted Operational Noise Levels at all Identified Sensitive Residential Receptors and LORS

Receptor/ Distance to Project Site	Operational Noise Level (dBA) [1]	Most Stringent Applicable LORS Limit L_{50}	Project in Excess of LORS
M1/3,600 Feet	43	45	0
M2/3,300 Feet	43	45	0

Sources: [1] MEP 2009a, AFC § 5.7.3.3.3

As seen in **NOISE Table 5**, project operational noise level would be lower than the LORS strictest limit of 45 dBA L_{50} for nighttime at the noise-sensitive receptors. Therefore, project operation complies with the noise LORS.

Project operational noise level of 43 dBA at the noise-sensitive receptors is also lower than the LORS limit of 60 dBA L_{dn}, or 54 dBA L_{eq}, as required by the above referenced East County General Plan Environmental Safety Element.

To ensure compliance, staff proposes Condition of Certification **NOISE-4**. This condition states that if the project's noise levels alone exceed the predicted project noise levels at the project's noise-sensitive receptors, mitigation measures must be implemented to bring the noise levels into compliance with these limits. Also to ensure compliance, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process requiring the applicant to resolve any complaints caused by operational noise.

With implementation of the following conditions of certification, noise due to the operation of the MEP would be in compliance with the applicable LORS.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady, continuous, broadband noise source, unlike the intermittent sounds that make up most of the noise environment. Power plant noise therefore contributes to, and becomes a part of, background noise levels, or the sound heard when most intermittent noises stop. Where power plant noise is audible, it tends to define the background noise level. For this reason, staff typically compares projected power plant noise to existing ambient background (L_{90}) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be applied to the project to either reduce or remove that impact.

In most cases, a power plant can be expected to operate around the clock for much of the year. Nighttime operation of the MEP, although rare, may occur. For residential receptors, thus, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise levels to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts on residential receptors can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors.

The applicant has predicted operational noise levels; they are summarized here in **NOISE Table 6**.

NOISE Table 6: Predicted Operational Noise Levels at all Identified Sensitive Residential Receptors and CEQA

Receptor/Distance	Operational Noise Level (dBA) [1]	Ambient Nighttime Hours L_{90} [2]	Project Plus Ambient	Change
M1	43	46	48	+2
M2	43	43	46	+3

Sources: [1] Watson 2009a, AFC Table 5.12-11
[2] NOISE Table 3, above

Combining the ambient noise level of 46 dBA L_{90} (**NOISE Table 6**, above) with the project noise level of 43 dBA at M1 results in 48 dBA L_{90}, 2 dBA above the ambient. As described above (in **Method and Threshold for Determining Significance**), staff always regards an increase of up to 5 dBA as a less-than-significant impact. Therefore, staff considers the above noise impact at M1 to be less than significant.

Combining the ambient noise level of 43 dBA L_{90} (**NOISE Table 6**) with the project noise level of 43 dBA at M2 results in 46 dBA L_{90}, 3 dBA above the ambient. Staff considers this impact to be less than significant.

Staff proposes Condition of Certification **NOISE-4** to ensure that the noise levels due to project operation would not exceed the above levels in **NOISE Table 6**, second column.

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (MEP 2009a, AFC § 5.7.3.3.4). To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**, which would require mitigation measures, if necessary, to ensure the project would not create tonal noises.

Linear Facilities

All water pipes and gas pipes would be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of the project consist of a high-speed gas turbine, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Gas turbine generator facilities using the GE LM6000 machine have not resulted in ground-borne or airborne vibration impacts. Based on experience with

numerous previous projects employing similar equipment, staff agrees with the applicant that ground-borne vibration from the MEP would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. However, none of the project equipment is likely to produce noticeable low frequency noise beyond the project site boundaries. This makes it highly unlikely that the MEP would cause perceptible airborne vibration effects at any offsite noise-sensitive receptor.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (MEP 2009a, AFC § 5.7.3.3.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**. For further discussion of proposed worker safety conditions of certification, please see the **Worker Safety and Fire Protection** section of this document.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but do not need to provide as much detail as the discussion of impacts solely attributable to the project.

The Green Volts Solar Field, a 2-MW utility-scale solar farm would be located approximately one mile from the MEP site. The Green Volts Solar Field would utilize concentrating photovoltaic (PV) technology, which is not a significant source of noise since there are no mechanical components associated with the PV technology.

The East Altamont Energy Center (EAEC), a 1,100-MW power plant project would be located approximately 1.5 miles northeast of the MEP site. Actual construction plans for this facility are unknown. One of the EAEC's noise-related conditions of certification requires the project to comply with a 43 dBA limit at 3,200 feet. EAEC is approximately 4,900 feet from MEP's closest receptor, M1, and geometric spreading from 3,200 to 4,900 feet is anticipated to result in a 4 dBA reduction. This results in an EAEC contribution of 39 dBA at M1. This level, when combined with the MEP's noise level of 43 dBA at M1 (see **NOISE Table 3**) and then added to the nighttime existing ambient noise level of 46 L_{90} at M1 (see **NOISE Table 6**), results in 48 dBA L_{90}; 2 dBA above the ambient. Staff considers this increase to be less than significant.

Therefore, the project's cumulative noise impact is considered to be less than significant.

Additionally, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding noise throughout the life of the project.

FACILITY CLOSURE

All operational noise from the project would cease when the MEP closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated - that is, noisy work could be performed during daytime hours with machinery and equipment that are properly equipped with mufflers. Any noise LORS in existence at that time would apply. Unless modified, applicable conditions of certification included in the Energy Commission decision would also apply.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received the following comments on aspects of the MEP related to noise and vibration:

DOUGLAS AND SYLVIA LITTLE

Comment: What will be the difference in noise if the project is built?

> **Response:** Staff has reviewed the existing and proposed noise levels in the area and determined that the existing ambient nighttime noise level is between 43 to 46 dBA $L_{90.}$ For residential receptors staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common.
>
> As described above (in **Method and Threshold for Determining Significance**), staff regards an increase of up to 5 dBA as a less-than-significant impact. **Noise Table 6** shows the increase in the nighttime ambient noise levels at the nearest residential receptors to be 2–3 dBA; an unnoticeable to barely noticeable increase. Therefore, staff considers the above noise impact to be less than significant.

CONCLUSIONS

Staff concludes that the MEP, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant direct or cumulative adverse noise impacts on people within the project area, directly, indirectly, or cumulatively.

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC NOTIFICATION PROCESS

NOISE-1 Prior to the demolition of the existing structures at the project site, the project owner shall notify all residents and business owners within one mile of the project site boundaries and within ½-mile of the linear facilities, by mail or by other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours a day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during construction where it is visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: At least 15 days prior to the start of demolition, the project owner shall transmit to the compliance project manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the demolition, construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- conduct an investigation to determine the source of noise in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant stating that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM, that documents the resolution of the complaint. If mitigation is required to resolve the complaint, and the complaint is not resolved within a three-day period, the

project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is performed and complete.

EMPLOYEE NOISE CONTROL PROGRAM

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of demolition, the project owner shall submit the noise control program to the CPM. The project owner shall make the program available to Cal-OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone, during the four quietest consecutive hours of the nighttime, to exceed an average of 43 dBA measured at or near monitoring locations M1 (approximately 3,600 feet northeast of the project site) and M2 (approximately 3,300 feet northwest of the project site) (as shown in **Noise Figure 1**).

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 90% or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring locations M1 and M2, or at a closer location acceptable to the CPM.

   Additionally, this survey shall include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

   The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

B. If the results from the noise survey indicate that the power plant noise at the affected receptor sites exceeds the above value during the above specified period(s) of time, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 90% or greater of rated capacity. Within 15 days after completing the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

OCCUPATIONAL NOISE SURVEY

NOISE-5 Following the project's attainment of a sustained output of 90% or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures to be employed in order to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times delineated below, unless the CPM in consultation with Alameda County authorizes longer hours:

Mondays through Fridays:	7 a.m. to 7 p.m.
Weekends:	8 a.m. to 5 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to demolition, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Mariposa Energy Project
(09-AFC-3)

NOISE COMPLAINT LOG NUMBER _____

Complainant's name and address:

Phone number: _____

Date complaint received: _____
Time complaint received: _____

Nature of noise complaint:

Definition of problem after investigation by plant personnel:

Date complainant first contacted: _____

Initial noise levels at 3 feet from noise source _____ dBA Date: _____

Initial noise levels at complainant's property: _____ dBA Date: _____

Final noise levels at 3 feet from noise source: _____ dBA Date: _____

Final noise levels at complainant's property: _____ dBA Date: _____

Description of corrective measures taken:

Complainant's signature: _____ Date: _____

Approximate installed cost of corrective measures: $ _____
Date installation completed: _____
Date first letter sent to complainant: _____ (copy attached)
Date final letter sent to complainant: _____ (copy attached)

This information is certified to be correct:

Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

Alameda County 2002 – East County General Plan, Environmental Health and Safety Element.

Alameda County 2009 – Alameda County Municipal Code, Title 6, Chapter 6.60 Noise Nuisance.

Eaton, Stuart, 2000. Construction Noise. Engineering Section Report, Worker's Compensation Board of BC, Vancouver, BC, Canada. p 8.

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Kessler, FM and PD Schomer. 1980. Pile Driver Noise Control. Inter-Noise 80 Proceedings, Volume I, pp. 321-324. Miami, FL, pp. 8-10.

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NCT (Noise Control Technologies). Pile Shields for Pile Drivers & Vibratory Hammers. Miami, FL. www.noisecontroltechnologies.com

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Yap, KT. 1987. Control of Pile Driving Noise. Inter-Noise 87 Proceedings, Volume I, pp. 167-170. Beijing, China, September 15-17.

NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **NOISE Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **NOISE Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

NOISE Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (often used for an existing or pre-project noise condition for comparison study).
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by 5 decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

NOISE Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980			

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise.

One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.

With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

1. Except under special conditions, a change in sound level of one dB cannot be perceived.

2. Outside of the laboratory, a three dB change is considered a barely noticeable difference.
3. A change in level of at least five dB is required before any noticeable change in community response would be expected.
4. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

NOISE Table A3
Addition of Decibel Values

When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB. Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

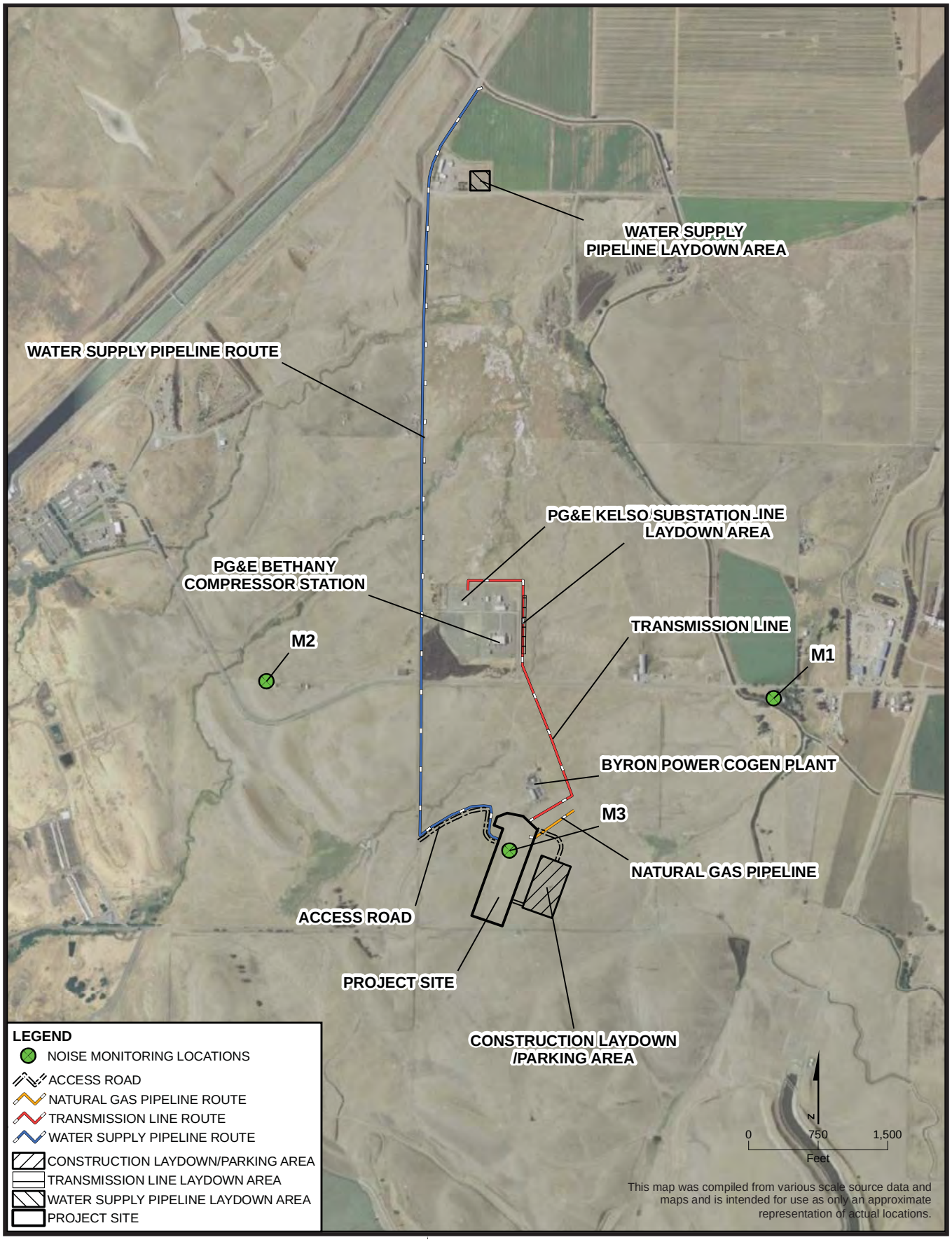
OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

NOISE Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.

NOISE AND VIBRATION - FIGURE 1
Mariposa Energy Project - Noise Monitoring Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC Figure 5.7-1

PUBLIC HEALTH

Revised Testimony of Obed Odoemelam, Ph.D.

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY AND CONCLUSIONS

Staff has analyzed the potential public health risks from the toxic air pollutants associated with construction and operation of the proposed Mariposa Energy Project and does not expect that there would be any significant adverse cancer or short- or long-term health effects. The toxic pollutants (noncriteria pollutants) considered in this analysis are pollutants for which there are no established air quality standards. The potential for significant public health impacts from emission of the other group of pollutants for which there are specific air quality standards (criteria pollutants) is discussed in the **Air Quality** section with particular regard to those for which existing area levels exceed their respective air quality standards.

INTRODUCTION

The purpose of this **Public Health** analysis is to determine if toxic emissions from the proposed Mariposa Energy Project (MEP) would have the potential to cause significant adverse public health impacts or violate standards for public health protection in the area around the project. Toxic pollutants (or noncriteria pollutants) are pollutants for which there are no specific air quality standards. The other pollutants for which there are such air quality standards are known as criteria pollutants. If potentially significant health impacts are identified for the noncriteria pollutants considered in this analysis, staff would evaluate mitigation measures to reduce such impacts to less-than-significant levels.

The discussion in the **Air Quality** section mainly focuses on the potential for exposure above the applicable standards and the regulatory measures necessary to mitigate such exposures with particular emphasis on carbon monoxide, ozone, and particulate matter for which existing area levels exceed their respective air quality standards. The impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section while the health and safety impacts from electric and magnetic fields are addressed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams are discussed in the **Soils and Water Resources** section. Facility releases in the form of hazardous and non-hazardous wastes are addressed in the **Waste Management** section.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

PUBLIC HEALTH TABLE 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (42 U.S. Code section 7412)	Requires new sources which emit more than ten 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 (MACT).
State	
California Health and Safety Code sections 39650 et seq.	These sections mandate the California Air Resources Board (CARB) and the Department of Health Services to establish safe exposure limits for toxic air pollutants and identify pertinent best available control technologies. They also require that the new source review rule for each air pollution control district include regulations that require new or modified procedures for controlling the emission of toxic air contaminants.
California Health and Safety Code section 41700	This section 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."
California Code of Regulations, Title 22, section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system re-circulating water to minimize the growth of Legionella and other micro-organisms.
Local	
Bay Area Air Quality Management District (BAAQMD) Regulation 2, Rule 5.	Requires safe exposure limits for Toxic Air Pollutants (TACs), use of best Available Control Technology (BACT) and New Sources Review (NSR).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section describes staff's method of analyzing the potential health impacts of toxic pollutants together with the criteria used to determine their significance.

METHOD OF ANALYSIS

The toxic emissions addressed in this **Public Health** section are those to which the public could be exposed during project construction and routine operation. If such toxic contaminants are released into the air or water, people may come in contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

The ambient air quality standards for the criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, are set to ensure the safety of everyone including those with heightened sensitivity to the effects of environmental pollution in general. Since noncriteria pollutants do not have such standards, a process known as a health risk assessment is used to determine if people might be exposed to them at unhealthy levels. The risk assessment procedure consists of the following steps:

- Identification of the types and amounts of hazardous substances that a source could emit into the environment;
- Estimation of worst-case concentrations of project emissions into the environment using dispersion modeling;
- Estimation of the amounts of pollutants to which people could be exposed through inhalation, ingestion, and dermal contact; and
- Characterization of the potential health risks by comparing worst-case exposures to safety standards based on known health effects.

For MEP and other sources, a screening-level risk assessment is initially performed using simplified assumptions intentionally biased toward protecting public health. That is, an analysis is designed that overestimates public health impacts from exposure to the emissions. In reality, it is likely that the actual risks from the project would be much lower than the risks estimated by the screening-level assessment. This overestimation is accomplished by identifying conditions that would lead to the highest, or worst-case risks, and then assuming them in the study. The process involves the following:

- using the highest levels of pollutants that could be emitted from the source;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer models which predict the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be highest;
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses); and
- assuming that an individual's exposure to cancer-causing agents would occur over a 70-year lifetime.

A screening-level risk assessment would, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances, which could present a health hazard from non-inhalation pathways of exposure (see California Air Pollution Control Officers Association (CAPCOA) 1993, Table III-5). When these substances are present in facility emissions, the screening-level analysis is conducted to include the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (CAPCOA 1993, p. III-19).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature, and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that result from long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately

from 10 to 100% of a lifetime (from seven to seventy years). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project 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 (CAPCOA 1993, p. III-36). This means that such exposure limits would serve to protect such sensitive individuals as infants, school pupils, the aged, and people suffering from illnesses or diseases, which make them more susceptible to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effects reported in the medical and toxicological literature, and include specific margins of safety, which address the uncertainties associated with inconclusive scientific and technical information available at the time of standard setting. They are, therefore, intended to provide a reasonable degree of protection against hazards that research has not yet identified. Each margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant exposures that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection can be expected if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety is assumed to exist between the predicted exposure and the estimated threshold 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 conformance with CAPCOA guidelines, the health risk assessment assumes that the effects of the individual substances are additive for a given organ system (CAPCOA 1993, p. III-37). In those cases where the actions may be synergistic (that is where the effects are greater than the sum), this approach may underestimate the health impact in question.

For carcinogenic substances, the health assessment considers the risk of developing cancer and conservatively includes the previously noted assumption that the individual would be continuously exposed 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 terms of chances per million of developing cancer and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (known as “potency factor”, and established by the California Office of Environmental Health Hazard Assessment), and the length of the exposure period. Cancer risks for individual carcinogens are added together to yield the total cancer risk from the source being considered. The conservative nature of the screening assumptions used means that actual cancer risks are likely to be considerably lower than those estimated.

The screening-level analysis is performed to assess worst-case public health risks associated with the proposed project. If the screening analysis were to predict a risk of no significance, no further analysis would be necessary. However, if the risk were to be

above the significance level, further analysis, using more realistic site-specific assumptions would be performed to obtain a more accurate estimate of the public health risk in question.

SIGNIFICANCE CRITERIA

Commission staff assesses the health effects of exposure to toxic emissions by first considering the impacts on the individual exposed at the highest possible levels. This individual is the person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above. If the potential risk to this individual is below established levels of significance, staff would consider the potential risk as also less than significant anywhere else in the project area. As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The potential significance of project health impacts is determined separately for each of the three categories of health effects.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a “hazard index” for the exposure being considered. A hazard index is a ratio obtained by comparing exposure from facility emissions to the reference (safe) exposure level for the toxicant. A ratio of less than one would signify a worst-case exposure below the safe level. The hazard indices for all toxic substances with the same types of health effect are added together to yield a total hazard index for the source being evaluated. This total hazard index is calculated separately for acute and chronic effects. A total hazard index of less than one indicates that the cumulative worst-case exposure would be within safe levels. Under these conditions, health protection would be assumed even for sensitive members of the population. In such a case, staff would assume that there would be no significant noncancer public health impacts from project operations.

Cancer Risk

Staff relies upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986 (Health & Safety Code, §§ 25249.5 et seq.) for guidance in establishing the level of significance for its assessed cancer risks. Title 22, California Code of Regulations, section 12703(b) states in this regard, 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 risk level is equivalent to a cancer risk of ten in one million, or $10x10^{-6}$. An important distinction from the provisions in Proposition 65 is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals from the source in question. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than with Proposition 65.

As noted earlier, the initial risk analysis for a project is normally performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. When a screening analysis shows the cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk

estimate. If facility risk, based on refined assumptions, were to exceed the significance level of ten in one million, staff would require appropriate measures to reduce risk to less than significant. If, after all risk reduction measures have been considered, a refined analysis still identifies a cancer risk of greater than ten in one million, staff would deem such risk to be significant, and would not recommend project approval.

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Features of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emission plume from a facility may affect elevated areas before lower terrain areas, because of a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influences population density and, therefore, the number of individuals potentially exposed to the project's emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

According to the information from the applicant, Mariposa Energy LLC, (MEP 2009a pp. 2-1, 5.1-1 and 5.1-2), the proposed project site is a 10-acre parcel within a 158-acre parcel known as the Lee Property in the northeastern corner of unincorporated Alameda County. The site is zoned for large-parcel agriculture but is also used for power generation facilities and related transmission lines. The 6.5-megawatt Byron Power Cogeneration plant for example, is directly to the north (MEP 2009a, pp. 5.6-1 through 5.6-14 and 5.7-4). The applicant provided specific information identifying the sensitive receptor locations within a six-mile radius of the site. Sensitive receptor locations are those housing sensitive individuals such as the elderly, school pupils and individuals with respiratory diseases who, as previously noted, are usually more sensitive to the effects of environmental pollutants than the general public. In this and most cases, these locations include schools pre-schools, daycare centers, schools, nursing homes, medical centers, and hospitals. The nearest residence is approximately 0.6 miles northeast of the site on Kelso Road with the nearest sensitive receptor (the Mountain House School) approximately 1.4 miles to the east (MEP 2009a p. 5.9-1).

According to census figures from 2000, minority groups constitute only 33%, of the total population within a six-mile radius of the project site meaning that there would not be the type of minority-related disproportionate pollutant exposure that could raise environmental justice concerns.

As discussed by the applicant, (MEP 2009a, p. 5.9-1), the available studies have shown the health status of the population around the project site to be similar to that of other residents of the Greater Bay Area or California in general, showing that there are no increases in disease rates that could be reliably linked to exposure to airborne toxics emissions from area or regional sources. However, the area's air quality management district is continuing with studies and programs to minimize the potential for areas with higher toxic emission levels.

The Mountain House community, located within San Joaquin County is approximately 2.5 miles to the east of the project site is a 16,000-home, planned community (MEP 2009a, pp 5.6-11 and 5.6-15). Staff considers it important to specifically assess the potential for health impacts within the community from exposure to the pollutants from MEP construction or operation.

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced and localized exposure may increase.

The proposed project site is in an area whose climate is strongly influenced by the large-scale warming and sinking of the air in the semi-permanent subtropical high-pressure center over the Pacific Ocean. This high-pressure system blocks out most mid-latitude storms except in the winter when most of the area's 14.3 inches of rainfall occurs. The yearly maximum summer temperature varies from the mid-50s to the low-90s while the winter temperature varies from the mid-30s to the high 50s (MEP 2009a, p. 5.1-2).

When the area's winds are of low speeds, the atmosphere has a limited capacity to disperse the area's air contaminants from the points of generation to other locations. Strong atmospheric temperature inversions would then occur especially in the late mornings and early afternoons. These inversions severely limit vertical air mixing and result in the buildup of air pollutants by restricting their movement from the ground level to the upper atmosphere out of the air basin.

Atmospheric stability is a measure of the turbulence that influences such pollutant dispersion. Mixing heights (the height above ground level below which the air is well mixed and in which pollutants can be effectively dispersed) are lower during the morning hours because of temperature inversions, which are followed by temperature increases in the warmer afternoons. Staff's **Air Quality** section presents a more detailed discussion of the area's meteorology as related to pollutant dispersion.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). By examining average toxic concentrations from representative air monitoring sites in California with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual is about 1 in 3, or 330,000 in one million.

Based on the levels of toxic air contaminants measured within the BAAQMD Ambient Air Toxics Monitoring Network, an air toxics-related background cancer risk of 143 in one million was calculated for the Bay Area for 2003 (BAAQMD 2003). The pollutants, 1, 3-butadiene and benzene, emitted primarily from mobile sources, were the two

highest contributors to this risk and together accounted for over half of the total. Formaldehyde (which is emitted directly from vehicles and other combustion sources, such as the proposed energy project) was identified along with carbon tetrachloride and hexavalent chromium as the other major contributors.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxic pollutants and associated cancer risks during the past few years. However, 2005 data from BAAQMD's Community Air Risk Evaluation Program identified diesel particulate matter as responsible for approximately 80% of this air toxics-related background cancer risk, pointing to the significance of the state's and air districts existing diesel particulate reduction program in the Bay Area and California in general (BAAQMD 2006). The noted toxic 143 in one million pollutant-related background risk estimate for 2003 can be compared with the normal background lifetime cancer risk (from all cancer causes) of one in three, or 330,000 in one million, as will be noted later. The potential risk from the proposed project and similar sources should best be assessed in the context of their potential addition to these background risk levels.

The criteria pollutant-related air quality for the project area is assessed in the **Air Quality** section by adding the existing basin-wide levels (as measured at area monitoring stations), to the project-related levels, and comparing the resulting levels with the applicable air quality standards. Public health protection would be ensured only through specific technical and administrative measures that ensure below-standard exposures when the project is operating. It is such a combination of measures that is addressed in the **Air Quality** section.

IMPACTS

POTENTIAL IMPACTS OF PROJECT'S NONCRITERIA POLLUTANTS

The health impacts of the noncriteria pollutants of specific concern in this analysis can be assessed separately as construction-phase impacts and operational-phase impacts.

Construction Phase Impacts

Possible construction-phase health impacts, as noted by the applicant (MEP 2009a, pp. 5.1-10 and 5.1-11and Appendix 5.1A), are those from human exposure to the windblown dust from site excavation grading, and emissions from construction-related diesel-fueled equipment. The dust-related impacts may result from exposure to the dust itself as PM10, or PM 2.5, or exposure to any toxic contaminants that might be adsorbed on to the dust particles. As more fully discussed in the **Waste Management** section, results of the applicant's site contamination assessments (MEP 2009a, pp. 5.14-1 and 5.14-2 and Appendix 5.14A) showed that there are no contaminated spots that would pose a health danger during construction.

The applicant has specified the mitigation measures necessary to minimize construction-related fugitive dust as required by BAAQMD Regulation 6 (MEP 2009a,

pp. 5.1-30 and 5.1-31). Such dust-related impacts could result from dust inhalation as PM10, or PM 2.5 whose emissions would be minimized by implementing the related conditions of certification in the **Air Quality** section.

The exhaust from diesel-fueled construction and other equipment has been established as a potent human carcinogen. Thus, construction-related emission levels could be regarded as possibly adding to the carcinogenic risk of specific concern in this analysis. The applicant has presented these types of emission sources in Appendix 5.14A J for the 14-month construction period. Staff considers the recommended control measures specified in **Air Quality** conditions of certifications (AQ-SC3 and AQ-SC4) as adequate to minimize this construction-related cancer risk in the project area.

Operational Impacts

The main health risk from the proposed project's operations would be associated with emissions from its four gas-fired combustion turbine generators and the diesel-fired fire pump. **Public Health Table 2** lists the project's toxic emissions and shows how each could contribute to the risk estimated from the health risk analysis. For example, the first row shows that oral exposure to acetaldehyde would not be of concern but, if inhaled, may have cancer and chronic (long-term) noncancer health effects, but not acute (short-term) effects.

As noted in a publication by the South Coast Air Quality Management District (SCAQMD 2000, p. 6), one property that distinguishes the air toxics of concern in this analysis from the criteria pollutants is that the impacts from air toxics tend to be highest in close proximity to the source and quickly drop off with distance. This means that the levels of MEP's air toxics would be highest in the immediate area and decrease rapidly with distance. One purpose of this analysis, as previously noted, is to determine whether or not such exposures would be at levels of possible health significance as established using existing assessment methods.

The applicant's estimates of the project's potential contribution to the area's carcinogenic and non-carcinogenic pollutants were obtained from a screening-level health risk assessment conducted according to procedures specified in the 1993 CAPCOA guidelines. The results from this assessment (summarized in staff's **Public Health Table 3**) were provided to staff along with documentation of the assumptions used (MEP 2009a, pp.5.9-2 through 5.9-12 and Appendix 5.9A). This documentation included:

- pollutants considered;
- emission levels assumed for the pollutants involved;
- dispersion modeling used to estimate potential exposure levels;
- exposure pathways considered;
- the cancer risk estimation process;
- hazard index calculation; and
- characterization of project-related risk estimates.

Staff has found these assumptions to be acceptable for use in this analysis and has validated the applicant's findings with regard to the numerical public health risk estimates expressed either in terms of the hazard index for each non-carcinogenic pollutant, or a cancer risk for estimated levels of the carcinogenic pollutants. These analyses were conducted to establish the maximum potential for acute and chronic effects on body systems such as the liver, central nervous system, the immune system, kidneys, the reproductive system, the skin and the respiratory system.

PUBLIC HEALTH TABLE 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Non-cancer	Inhalation Cancer	Non-cancer (Chronic)	Non-cancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
1,3-Butadiene			✔	✔	
Cadmium		✔	✔	✔	
Chromium			✔	✔	
Copper				✔	✔
Ethylbenzene				✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead	✔	✔	✔	✔	
Mercury		✔		✔	✔
Naphthalene		✔		✔	
Nickel			✔	✔	✔
Polynuclear Aromatic Hydrocarbons (PAHs)	✔	✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔
Zinc				✔	

Source: Prepared by staff using reference exposure levels and cancer unit risks from CAPCOA Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines, October 1993, SRP 1998.

As shown in **Public Health Table 3**, the chronic hazard index for the maximally exposed individual is 0.00088 while the maximum hazard index for acute effects is 0.070. These values are well below staff's significance criterion of 1.0, suggesting that the pollutants in question are unlikely to pose a significant risk of chronic or acute noncancer health effects anywhere in the project area including the Mountain House community.

Staff specifically considered the potential for aviation-related impacts from short-term human pollutant exposure during any normal aircraft flight over the plume from the proposed project stack. Staff regards the acute hazard index of 0.07 for MEP's toxic

pollutants with immediate-onset effects as suggesting a potential lack of effects within the short term overflight period. Staff also assessed the potential for the obstruction hazard to area aircraft (from the physical presence of the project's structures potentially intruding into the navigable space) as a potentially significant issue. The structures of potential significance in this regard are the proposed stack, and project's transmission lines. As reflected in the **Transmission Line Safety and Nuisance** section of staff's analysis, the Federal Aviation Administration (FAA) assesses the aviation hazards from these structures before issuing the related permit for operation. The applicant has filed for the required FAA permit for all these structures and received a no-hazard determination (MEP 2009a, Appendix 5.12B). Therefore, staff does consider the issue of aviation-related hazards as a significant issue for MEP.

PUBLIC HEALTH TABLE 3
Operational Hazard/Risk

Type of Hazard/Risk	**Hazard Index/Risk**	Significance Level	Significant?
Acute Noncancer	0.070	1.0	No
Chronic Noncancer	0.00088	1.0	No
Individual Cancer	0.77×10^{-6}	10.0×10^{-6}	No

Staff's summary of information from Mariposa Energy Project 2009a pp. 5.9-2 through 5.9-10 and Appendix 5.9A.

The cancer risk to the maximally exposed individual from normal project operation is shown as 0.77 in one million, which is well below staff's significance criterion of 10 in one million for this screening-level assessment. Thus, project-related cancer risk from routine operations would be less than significant for all individuals in the project area.

The conservatism in these assessments is reflected in the noted fact that (a) the individual considered is assumed to be exposed at the highest possible levels to all the carcinogenic pollutants from the project for a 70-year lifetime, (b) all the carcinogens are assumed to be equally potent in humans and experimental animals, even when their cancer-inducing abilities have not been established in humans, and (c) humans are assumed to be as susceptible as the most sensitive experimental animal, despite knowledge that cancer potencies often differ between humans and experimental animals. Only a relatively few of the many environmental chemicals identified so far as capable of inducing cancer in animals have been shown to also cause cancer in humans.

CUMULATIVE IMPACTS

The applicant assessed the cumulative impacts from the proposed MEP and other significant pollutant sources within a six-mile radius as a way of estimating the cumulative impacts of emissions from identifiable pollutant sources in the immediate project vicinity (MEP 2009a, pp. 5.9-10 and 5.9-11). MEP and the existing or proposed area sources could thus be seen as contributing to the existing background levels thereby adding to the normal background cancer and noncancer impacts. The present approach to regulating such carcinogenic and non-carcinogenic additions is to ensure that they are maintained within insignificant levels from any new source. Such cumulative impacts are best assessed in terms of their potential for cancer and noncancer health impacts.

As previously noted, the maximum impact locations for the proposed MEP and similar sources would be the spot where pollutant concentrations would theoretically be highest. Even at this location, staff does not expect any significant MEP-related changes in the lifetime risk to any person including the individual within the Mountain House community, given the calculated incremental cancer risk of only 0.77 in one million, which staff regards as not potentially contributing significantly to the previously noted average lifetime individual cancer risk of 330,000 in one million.

The worst-case long-term noncancer health impact from the project (represented as a chronic hazard index of 0.00088) is well below staff's significance level of 1.0 at the location of maximum impact suggesting an insignificant contribution to the incidence of the area's noncancer health symptoms from cumulative toxic exposures. The cumulative impacts from emission of the criteria pollutants are addressed in the **Air Quality** section. As discussed in that section, compliance with the respective health-protective air quality standards is achieved through the use of the most effective pollution technology and ensuring corresponding emission reduction to minimize the overall effects of emissions from project operations.

COMPLIANCE WITH LORS

The toxic pollutant-related cancer and noncancer risks from the MEP operation reflect the effectiveness of control measures (including an oxidation catalyst which reduces hazardous air pollutant emissions) proposed by the applicant. Since these risk estimates are much below the significance levels in the applicable LORS, staff concludes that the related operational plan would comply with these LORS.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Raymond Pietrorazio (TN 57389)

Comment: In a June 23, 2010 letter to the Energy Commission, Mr. Raymond Pietrorazio of Middlebury Connecticut provided information in support of his request that the Energy Commission withhold certification of the proposed MEP until the Federal Aviation Administration Aviation releases the results of its commissioned study on the impacts of plumes from major industrial sources on aviation safety.

> **Response**: As discussed in this analysis, staff's evaluation of the available information does not regard the proposed project as posing a significant aviation risk from its physical presence or aircraft occupant exposure to emitted pollutants. Staff would therefore recommend against any aviation safety-related certification delays in the absence of other significant impacts from construction or operation.

Joan Jess (59XXX)

Comment: In a December 8, 2010 letter to the Energy Commission, Ms. Joan Bess of Byron, California expressed misgivings about the adequacy of staff's concern over the potential impacts of the project's emissions on the health and safety of the existing and original Mountain House farming community especially among senior citizens, children,

and racial minorities that are sensitive to the impacts of pollution in general. Similar concerns were expressed on the same issue by several concerned speakers at the Commission's November 29, 2010, project workshop.

> **Response**: As discussed in this analysis, staff's assessment of the potential impacts in the entire project area was conducted in a way that considers the biological impacts of environmental pollution on the most sensitive segments of the Mountain House community and other locations. Thus, Staff is confident that the applicant has proposed the most effective control methods for the MEP. Furthermore, the area's Air Quality Management District would not issue a permit for the proposed and similar projects without first establishing the effectiveness of the proposed pollution control approach.

CALIFORNIA PILOTS ASSOCIATION (ANDY WILSON)

Comment: Staff continues to ignore pilots, passengers and aircraft flying in and near both Mariposa Energy and East Altamont power plants. CALPILOTS requests Byron Airport be informed of any Hazardous Materials release occurs considering pilots and passengers and aircraft will potentially be flying between two power plants which increases the risk of a hazardous release.

> **Response:** Staff specifically considered the potential for aviation-related impacts from short-term human pollutant exposure during any normal aircraft flight over the plume from the proposed project stack. Staff regards the acute hazard index of 0.07 for MEP's toxic pollutants with immediate-onset effects as suggesting a potential lack of effects within the short term overflight period. Because the exposure to emitted pollutants is short term, the impacts would be less than significant and well below federal, state and local standards.

CONCLUSIONS AND RECOMMENDATIONS

Staff has determined that the toxic air emissions from the construction and operation of the proposed natural gas-burning Mariposa Energy Project are at levels that do not require mitigation beyond the specific emission control measures noted above. The identified emissions would be at levels that would not produce health effects in any individual in the project area including the Mountain House community of specific concern to staff. As previously noted, the potential for health impacts is assessed by considering the biological impacts in the most sensitive individuals such as asthmatics, children, and the elderly. Since the potential impacts would be at insignificant levels in all the areas around the project, there would be no environmental justice issues when the project is operating. The conditions for ensuring compliance with all applicable air quality standards are specified in the **Air Quality** section for the area's criteria pollutants for which there are basin wide control programs by the area's Air Quality Management District.

PROPOSED CONDITION OF CERTIFICATION

Staff recommends approval of the proposed project with respect to the health impacts of concern in this analysis and proposes no conditions of certification.

REFERENCES

Bay Area Air Quality Management District (BAAQMD) 2006. Community Air Risk Evaluation Program, Phase I. Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area. BAAQMD, 939 Ellis Street, San Francisco, CA 94109.

Bay Area Air Quality Management District (BAAQMD), 2003. Status Report: Toxic Air Contaminant Control Program. BAAQMD, 939 Ellis Street, San Francisco CA 94109.

CARB (California Air Resources Board) 1996. California Toxic Emissions Factors (CATEF) Database for Natural Gas-Fired Combustion Turbine Cogeneration, 1996.

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California Air Pollution Control Officers Association (CAPCOA) 1993. CAPCOA Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines. Prepared by the Toxics Committee. October.

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MEP 2009a. Application for certification (09-AFC-3) for the Mariposa Energy Project Volumes I and II. Submitted to the California Energy Commission on June 15, 2009.

Scientific Review Panel on Toxic Air Contaminants (SRP) 1998. Findings of the Scientific Review Panel on the Report on Diesel Exhaust as adopted at the Panel’s April 22, 1998 Meeting.

South Coast Air Quality Management District (SCAQMD) 2000. An Air Toxics Control Plan for the Next Ten Years. March 2000. South Coast Air Quality Management District publication, 2002.

SOCIOECONOMICS

Revised Testimony of Kristin Ford

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

Staff concludes that construction and operation of the Mariposa Energy Project (MEP) would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, and parks. Staff also concludes that the project would not induce substantial growth or concentration of population, substantial increases in demand for housing or public services, or displace a large number of people.

INTRODUCTION

Staff's socioeconomics impact analysis evaluates the project's induced changes on existing population and employment patterns, and community services. Staff discusses the estimated impacts of the construction and operation of the MEP Application for Certification (AFC) on local communities, community resources, and public services, and provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

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.

SETTING

The project site is in northeastern Alameda County, in an unincorporated area designated for Large Parcel Agriculture by the East County Area Plan. The proposed project site is located about seven miles northwest of Tracy, seven miles east of Livermore, six miles south of Byron, and 2.5 miles west of the community of Mountain

House in San Joaquin County. The facility would be located southeast of the intersection of Bruns Road and Kelso Road on a ten acre portion of a 158-acre parcel immediately south of the PG&E Bethany Compressor Station and 230-kilovolt Kelso Substation (MEP 2009a, p. 1-1).

Alameda County is one of the nine bay area counties; Contra Costa, Solano, Marin, Napa, San Francisco, Santa Clara, and Sonoma counties comprise the other eight. The proposed project would be located in a densely populated region with a large skilled workforce within commuting distance of the project. Sacramento and San Joaquin counties are proximate to Alameda County; both counties have a large skilled workforce within commuting distance of the project.

DEMOGRAPHIC SCREENING

Staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site. The demographic screening process is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses National* (Council on Environmental Quality, 1998). The screening process relies on Year 2000 U.S. Census data to determine levels of minority and below-poverty-level populations.

The Mountain House community, which is located approximately 2.5 miles east of the proposed project site, began occupancy in 2003 after the conclusion of the 2000 federal census. Detailed demographic data from the U.S. Census for the current population is not available. The information below regarding minority populations and below-poverty-level populations from the 2000 U.S. Census does not include the Mountain House community (MHCSD 2008). As stated on the 2010 U.S. Census website, (http://www.census.gov/population/www/cen2010/glance/index.html), the 2010 U.S. Census information will be provided to the public beginning in February 2011 and ending in June of 2013.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, 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 is identified when the minority population of the potentially affected area is greater than 50% or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis. For the MEP project, the 200 Census shows that the total population within the six-mile radius of the proposed site is 2,164 persons, with a minority population of 706 persons, or about 33% of the total population. (See **Socioeconomics Figure 1**).

A survey was taken by the Mountain House Community Services District in 2008 to determine which areas of the planning process were the greatest concerns among the residents (MHCSD 2010b). The survey results provided the following demographics;

total population estimate to be approximately 9,930 persons; and included; 47 percent White/Caucasian, 30 percent Asian, 8 percent Hispanic, 7 percent African American, 5 percent Other and 3 percent Pacific Islander.

Below-Poverty-Level Populations

Staff also identified the below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site. Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below-poverty-level population within a six-mile radius of the MEP consists of approximately 14% of the total population in that area or approximately 277 people.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The socioeconomic resource areas evaluated by staff are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines and shown in **Socioeconomics Table 2**. Staff's assessment of impacts on population, housing, emergency medical services, police protection, schools, and parks and recreation, are based on professional judgments, input from local and state agencies, and the industry-accepted two-hour commute range for construction workers. Typically, substantial long-term relocation due to employment of people from regions outside the study area would have the potential to result in significant adverse socioeconomic impacts. Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **Reliability Worker Safety and Fire Protection** and **Water Resources** sections of this document.

Socioeconomics Table 2
CEQA Environmental Checklist Form

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING — Would the project:				
A. Induce substantial population growth in a new area, either directly or indirectly.				X
B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
C. Displace substantial numbers of people, necessitating construction of replacement housing elsewhere?				X
PUBLIC SERVICES —Would the project:				
Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public				

services: Emergency medical services Police protection Schools Parks Other public facilities				X X X X X
RECREATION—Would the project:				
Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X X

DIRECT/INDIRECT IMPACTS AND MITIGATION

Induce Substantial Population Growth

For the purpose of this analysis, staff defines “induce substantial population growth” as workers permanently moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines “local workforce” as the Oakland-Fremont-Hayward Metropolitan Division (MD) (Alameda and Contra Costa Counties.). A metropolitan division is a subset of an MSA having a single core with a population of 2.5 million or more. A metropolitan statistical area (MSA) must contain at least one urban area of 10,000 or more population. Each MSA must have at least one urbanized area of 50,000 or more inhabitants. A MSA is a relatively freestanding metropolitan area (MA) typically surrounded by non-metropolitan counties. As reported by the Department of Finance (DOF), the three most populated cities within Alameda County are Oakland, Fremont, and Hayward; the cities closest to the project are Pleasanton and Livermore, within Alameda County and Tracy, which is in San Joaquin County. All these cities are within 1.5 hours commuting time of the project.

Socioeconomics Table 3 shows the historical and projected populations for Alameda, San Joaquin, and Contra Costa counties.

Socioeconomics Table 3
Historical and Projected Populations

Area	2000 Population	2010 Population	2020 Population
Alameda County	1,443,939	1,550133	1,663,481
San Joaquin County	563,598	741,417	965,094
Contra Costa County	948,816	1,075,931	1,237,544
Source: DOF:Demographic Research Unit			

Socioeconomics Tables 4 and 5 show that the total labor by skill for the Alameda/Contra Costa County MD and/or the San Joaquin MSA would be more than adequate to provide construction labor for the proposed project.

Socioeconomics Table 4
Total Labor by Skill in the Oakland-Fremont-Hayward MD Average for 2016

Trade	Oakland-Fremont-Hayward MD	Maximum # of Workers for Project Construction by Craft
Boilermakers	280	8
Carpenters	17,230	41
Electricians	4,640	24
Welders	2,260	11
Laborers	14,390	8
Pipefitter	4,210	33
Millwrights	500	6
Teamsters	NA	6
Ironworkers	600	19
Operating Engineers	4,130	4
Source: EDD Labor Market Information; Occupational Employment Projections 2006-2016.		

The applicant estimates that construction would begin in April 2011 and proceed for 14 months, ending in June of 2012. Pre-operational testing of the power plant would begin in January 2012, and full-scale commercial operation is contractually obligated to commence by July 1, 2012. As shown in Table 5.10-8 in the AFC, the number of workers would range from a total of 39 workers in the first month to a total of 177 in the fourteenth. The average number of workers onsite for the 14-month period would be approximately 90 (MEP 2009a, p. 2-31).

The project would require eight full-time employees. The workers are expected to commute to the project site from the surrounding communities in Alameda, San Joaquin and Contra Costa counties. Given the large labor force within two hours commuting time of the project, staff does not expect potential employees to relocate to the immediate project area.

Staff concludes that the construction and operation workforces would not induce substantial growth or concentration of population and the MEP would not encourage people to permanently move into the area. The MEP would have no direct or indirect impact on substantial population growth.

Housing Supply

As of January 1, 2008, existing housing in Alameda County consisted of the following; 343,355 single-family homes, 219,609 multiple-family dwellings, and 7,655 mobile home units. Contra Costa County consisted of 296,649 single-family homes, 93,227 multiple-family dwellings and 7,623 mobile home units. San Joaquin County consisted of 176,067 single-family homes, 41,541 multiple-family dwellings and 9,731 mobile home units (MEP 2009a, p. 5.10-3).

There are approximately 175 hotels/motels with 17,780 rooms in Alameda County to accommodate workers who may choose to commute to the project site on a workweek basis. In addition to the available hotel/motel accommodations, there are approximately 40 recreational vehicle parks within 15 miles of the project site (MEP 2009a, p. 5.10-17).

Because of the large labor force within commuting distance of the project, staff expects the majority of construction workers would commute to the project daily from their existing residences. No new housing construction would be required.

Housing vacancy rates for Alameda, San Joaquin and Contra Costa counties for the period of 2000-2008 consist of 3.0%, 3.98% in 2000 to 3.94% in 2008, and 2.96%, respectively. Housing supply in the three above mentioned counties is limited in comparison to the federal standard vacancy rate of 5% (MEP 2009a, p. 5.10-4).

The applicant expects all eight full-time employees would be hired within commuting distance of the project. Give the labor force in Alameda County and surrounding counties with commuting distance of the project, staff does not expect employees would relocated to the immediate project area. Staff concludes that the construction and operation workforce would not have a significant adverse impact on housing within the immediate project area and the regional areas of Alameda, San Joaquin and Contra Costa counties.

Displace Existing Housing and Substantial Numbers of People

The proposed ten acre project site is located in unincorporated eastern Alameda County. The facility would be located southeast of the intersection of Bruns Road and Kelso Road within a 158-parcel known as the Lee Property. South of the proposed project, there is a Pacific Gas and Electric (PG&E) Bethany Compressor Station and a 230-kV Keslo substation. The 6.5-MW Byron Power Cogen Plant currently occupies two acres of the 158-acre parcel; the rest of the parcel is non-irrigated grazing land. Previous wind turbine development was on the proposed site and the southern portion of the parcel (MEP 2009a, p. 2-1).

The Alameda County General Plan includes various Area Plans covering the unincorporated county. The proposed project is located within the East County Area Plan (ECAP). Because the ECAP is a General Plan-level document, it is the primary planning document applicable to the project site. The ECAP land use diagram designated the project site as Large Parcel Agriculture. The ECAP's Open Space Diagram indicates that the project site is also located within the Wind Resource Area, which covers the northeastern section of the county and encourages development of wind energy operations. ECAP land use designations for parcels located within 1 mile of the project site include: Large Parcel Agriculture, Major Public, Parklands, and Water Management. The project site is currently zoned for agricultural uses (A District) (MEP 2009a, p. 5.6-2).

The project would be located in an unincorporated area designated for Large Parcel Agriculture by the East County Area Plan. The area is used for non-irrigated grazing land; a former wind turbine development was located on portions of the project site. Staff does not anticipate the proposed project would displace any people or necessitate construction of replacement housing elsewhere (MEP 2009a, p. 5.6-11).

Result in Substantial Physical Impacts to Government Facilities

As discussed under the subject headings below, the MEP would not cause significant impacts to service ratios, response times, or other performance objectives relating to

emergency medical services, law enforcement, or schools. Fire protection, including the applicant proposed onsite Fire Protection and Prevention Plan is analyzed in the **Worker Safety and Fire Protection** section of this document.

Emergency Medical Services

As stated in the AFC and verified by staff (www.co.alameda.ca.us/fire), Alameda County Fire Department (ACFD) firefighters would be the first responders to any hazmat emergencies. Alameda County has three hazardous materials response teams based at Stations 4, 12, and 20. The closest responding team to MEP would be Station 20, located at 7000 East Avenue in Livermore, 16 miles from MEP. This team consists of nine personnel—two trained to a specialist level, six technicians, and a battalion chief. All equipment and personal are trained at a Level A/Type I level (MEP 2009a, p. 5.10-12).

The response time from Station 20 to the site is about 25 minutes. Stations 4, 12, and 20 all have firefighters who are also trained paramedics. The stations all have advanced life support gear. All ambulance services in the county are handled by American Medical Response (MEP 2009a, p. 5.10-12).

ACFD's mutual aid agreement with Tracy Fire Department (TFD) also includes assistance with hazmat incidents. The nearest TFD station with hazmat capabilities is Station 98. The response time from Station 98 is 12 minutes. Station 96 is located at 301 West Grant Line Road and is 8.9 miles from the MEP site. Response time from Station 96 is 19 minutes (MEP 2009a, p. 5.10-12).

As discussed in AFC Section 2.0, **Project Description**, Section 5.16, **Worker Health and Safety**, and Section 5.5, **Hazardous Materials**, the MEP would be designed to meet all applicable standards to reduce the risk of an accidental hazardous materials release and operate in a manner that complies with safety standards and practices to provide a safe workplace for plant personnel.

The applicant's proposed safety procedures and employee training would minimize potential unsafe work conditions and the need for outside emergency medical response. Staff concludes that the emergency medical services provided the by Alameda County Fire Department, Tracy Fire Department and American Medical Response would be adequate during construction and operation. The project would not necessitate the construction of new or physically altered government facilities.

Law Enforcement

The MEP proposed project site is located within the jurisdiction of the Alameda County Sheriff's Office (ACSO) (http://www.alamedacountysheriff.org). The primary responding station to the site is the Tri-Valley Station located at 100 Civic Plaza in Dublin, approximately 26 miles from MEP. The Tri-Valley Station has 17 full time uniformed officers. Average response time to the site is between ten and fifteen minutes. The ACSO has mutual aid agreements with law enforcement agencies within the surrounding counties (MEP 2009a, p. 5.10-11).

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation and the management of hazardous material spill incidents. The nearest CHP office is located approximately nine miles (www.chp.ca.gov) from the project site in Tracy, California.

In comparison to residential or commercial developments, power plants do not attract large numbers of people and thus require little in the way of law enforcement. Because of this factor and the proposed onsite safety and security measures, staff concludes that the existing law enforcement resources would be adequate to provide services to the MEP during construction and operation. Staff concludes that the MEP would not result in the need for new or physically altered governmental facilities.

Education

The MEP site is located within the Mountain House Elementary School District (Mountain House ESD) and the Tracy Unified School District (Tracy USD). Mountain House ESD for the 2008-2009 school year had a total enrollment of 42; Tracy USD had a total enrollment of 17,342 (California Department of Education, Educational Demographics Unit). Mountain House ESD is not currently considered to be overcrowded. The Tracy USD is considered to be overcrowded. Both school districts are located within San Joaquin County (MEP 2009a, p. 5.10-11).

During construction, staff expects the labor force would commute daily from the region. Due to the commuting habits of construction workers and the costs of housing relocation, staff does not expect construction workers to relocate their families to the area. Staff does not expect a significant adverse impact to the schools from construction of the proposed project.

A total of eight workers are needed to operate the MEP. Assuming all eight operational employees would reside within Alameda County or San Joaquin County, with the average family size of 2.74 persons per household for Alameda County and 3.06 persons for San Joaquin, there would be an addition of six to eight children within these two school districts. Given the 25 schools within these school districts, staff does not expect a significant adverse impact from the possible addition of six to eight school children (MEP 2009a, p. 5.10-21).

As noted in **Socioeconomics Table 1**, Section 17620 of the Education Code states "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". Commercial development within the Mountain House ESD (2009) is charged a one-time assessment fee of $0.36 per square foot of principal building area. The Mountain ESD students attend high school at Tracy USD and therefore split the revenue with Tracy USD. The split is 75% of the fee to Mountain House ESD and 25% of the fee to Tracy USD. The 7,280 square feet of occupied structure would create approximately $2,621 in impact fees (MEP 2009a, p. 5.10-21). Staff is proposing **Condition of Certification SOCIO-1** to ensure payment of fees to these districts.

Given the small number of students who potentially could relocate to schools within the Mountain House ESD and Tracy USD, staff does not expect the construction or operation of the project to have a significant adverse impact on schools.

Increase the Use of Existing Recreation Facilities

The East Bay Regional Park District operates 65 parks, covering over 100,000 acres in its two-county jurisdiction, with more than 1,150 miles of trails. Park amenities include camping, hiking/riding trails, bicycle trails, historic parks, nature studies, preserves/refuges, gardens, archaeological sites, swimming/fishing, and naturalist programs (http://www.ebparks.org/parks).

Given the labor force and two hour commuting time within the Alameda, San Joaquin and Contra Costa counties, staff does not expect employees to relocate to the immediate project area. Staff concludes that there are a number and variety of parks within the regional project area and does not expect the construction or operation workforce to have a significant adverse impact on parks or necessitate construction of new parks in the area.

CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when its effects are cumulatively considerable; that is, when the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [*Public Resources Code* Section 21083; *California Code of Regulations*, Title 14, Sections 15064(h); 15065 (c); 15130; and 15355]. Mitigation requires taking feasible measures to avoid or substantially reduce the impacts.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally. That increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, parks and recreation, law enforcement, and medical services.

As shown in **Socioeconomics Table 5,** the total construction labor force by Metropolitan Service Area (MSA) / Metropolitan District (MD) for the region is more than sufficient to accommodate the labor needs for construction of power generation facilities and other large industrial projects. Because of the robust local and regional construction labor force, staff does not expect an influx of non-local workers and their dependents to the project area. Staff does not expect any significant and adverse impacts on housing, schools, parks and recreation, law enforcement, and emergency services. Staff does not expect construction or operation of the MEP to contribute to any significant adverse cumulative socioeconomic impacts.

Socioeconomics Table 5
Occupational Employment Projections by MSA/MD

Construction and Extraction Occupations for Selected MSA/MD	Average Annual Employment for 2006	Average Annual Employment for 2016
Vallejo-Fairfield MSA	14,070	11,200
Sacramento-Arden Arcade-Roseville MSA	74,290	81,940
Oakland-Fremont-Hayward MD	80,120	84,380
Stockton MSA	15,870	16,550
TOTALS	**184,350**	**194,070**
Source: EDD 2009 Projections of Employment by Industry and Occupation		

NOTEWORTHY PUBLIC BENEFITS

Noteworthy public benefits include the direct, indirect, and induced impacts of a proposed power plant. For example, the dollars spent on or resulting from the construction and operation of the MEP would have a ripple effect on the local economy. This ripple effect is measured by an input-output economic model. The model relies on a series of multipliers to provide estimates of the number of times each dollar of input or direct spending cycles through the economy in terms of indirect and induced output, or additional spending, personal income, and employment. The typical input-output model used by economists and the one used for this analysis by the applicant is the IMPLAN model. IMPLAN multipliers indicate the ratio of direct impacts to indirect and induced impacts. Staff reviewed the results of the IMPLAN model and found them to be reasonable considering data provided by the applicant as well as data obtained by staff from governmental agencies, trade associations, and public interest research groups.

MEP owners would employ workers and purchase supplies and services for the life of the project. Employees would use salaries and wages to purchase goods and services from other businesses. Those businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local and regional economy. This effect of indirect (jobs, sales, and income generated) and induced (employees' spending for local goods and services) spending continues with subsequent rounds of additional spending, which is gradually diminished through savings, taxes, and expenditures made outside the area.

For purposes of this analysis, direct impacts were said to exist if the project resulted in permanent jobs and wages; indirect impacts, if jobs, wages, and sales resulted from project construction; induced impacts, from the spending of wages and salaries on food, housing, and other consumer goods, which in turn creates jobs. Indirect and induced economic impacts from construction would take place over 14 months, from April of 2011 to July of 2012. Indirect and induced economic impacts from the operation would begin in July of 2012. All indirect and induced operation impacts would result from annual operations and maintenance expenditures. All construction and operation impacts would take place within Alameda County. The economic benefits of the proposed project, as required by Energy Commission regulation, are shown from the input-output economic model IMPLAN, is shown below in **Socioeconomics Table 6**.

Table 6, MEP Economic Benefits (2008) dollars	
Fiscal Benefits	
Estimated annual property taxes	$2.44 million to $2.6 million
State and local sales taxes: Construction	$1,203,570 annually
State and local sales taxes: Operation	$159,900 annually
School Impact Fees	$2,621
Non-Fiscal Benefits	
Total capital costs	$230-$245 million
Construction payroll	$16.3 million
Operations payroll	$830,000 annually
Construction materials and supplies	$185 million
Operations and maintenance supplies	$1.64 million
Direct, Indirect, and Induced Benefits	
Estimated Direct Employment	
Construction	177
Operation	8
Estimated Indirect Employment	
Construction Jobs	142
Construction Income	$6,108,200
Operation Jobs	5
Operation Income	$290,470
Estimated Induced Income	
Construction Jobs	87
Construction Income	$3,894,700
Operation Jobs	7
Operation Income	$289,390
Source: 5.10 Socioeconomics, MEP, AFC	

PROPERTY TAX

The Board of Equalization (BOE) has jurisdiction over the valuation of a power-generating facility for tax purposes, if the power plant produces 50 megawatts (MW) or greater. For a power-generating facility producing less than 50 MW, the county has jurisdiction over the valuation. The MEP would be a 200 MW power generating facility, therefore, BOE is responsible for assessing property value. The property tax rate is set by the Alameda County Assessor's office. The rate for the current property, which is under the Williamson Act, would be 1.0614% for the most recent fiscal year (FY 2008-09). Under the Williamson Act contract, the Lee Property is currently assessed at $17.5 per acre.

Assuming a capital cost of $230 to 245 million and a minimum property tax rate similar to that currently prevailing on the property under the Williamson Act, the MEP would generate between $2.44 and 2.6 million in property taxes annually. The increase in property taxes resulting from the MEP project would be about 1% of County's property tax revenues (MEP 2009a, p. 5.10-21).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Comments: The following individuals from Mountain House, Rajesh Dighe, Kishor M. Bhatt and Jon Rubin, provided staff with comments on the Socioeconomics section of the Staff Assessment (SA), including a paper entitled; The Effect of Power Plants on

Local Housing Values and Rents, Lucas W, Davis, May 2010, received from on October 7, 2010.

Response: The paper, "The Effect of Power Plants on Local Housing Values and Rents" used restricted census microdata to examine housing values and rents for neighborhoods in the United States where power plants were opened during the 1990's. Compared to the neighborhoods with similar housing and demographic characteristics, the paper found neighborhoods within two miles of plants experienced 3-7 percent decreases in housing values rents with evidence of larger decreases within one mile and for large capacity plants.

Energy Commission staff, in its review and licensing of gas-fired power plants, has on occasion received public input regarding concerns over power plant siting and property values. Claims of diminished property value through decreased marketability are based on the reported concern about hazards to human health and safety; and increased noise, traffic, and visual impacts associated with living in proximity to unwanted land uses such as power plants, freeways, high voltage transmission lines, landfills, and hazardous waste sites. As a result of public concern, Energy Commission staff researched the literature on proximity impacts analysis for property values, including, "A Primer on Proximity Impact Research: Residential Property Values Near High-Voltage Transmission Lines" (Kinnard and Dickey, 1995), as a comprehensive study on this topic, the 2003 Electric Power Research Institute (EPRI) study, "Transmission Lines and Property Values: State of the Science, and the *Analysis of Property Value Impacts of the Crockett Cogeneration Project, Appendix X, Crockett Cogeneration Project, 1992.*

Based upon the above studies, staff concludes that the project would not generate effects that would significantly impact property values. Moreover, even in areas where there would be potentially significant impacts in other issue areas (e.g., visual resources) coupled with other line and/or property characteristics that would contribute to property values impacts, the numerous studies discussed above conclude that these effects are usually smaller than anticipated and essentially impossible to generally quantify. This is due to the individuality of properties/neighborhoods, differences in personal preferences of individual buyers/sellers, and the weight of other factors that contribute to a person's decision to purchase a property. The studies have generally concluded that over time, any adverse property value impacts diminish and within five years the change is negligible most likely due to increased screening as trees and shrubbery grow and/or diminished sensitivity to the line proximity in the absence of adverse publicity. As a result, any changes in property values would not be a substantial decrease and this impact is considered to be less than significant.

Rajesh Dighe, Social Economic Effects of Mariposa Power Plant on Mountain House, dated Nov. 22, 2010

Comment: The Mountain House community is still recovering from foreclosure and economic downturn.

Response: As stated above in above subsection, "Property Tax", assuming a capital cost of $230 to 245 million and a minimum property tax rate similar to that currently

prevailing on the property under the Williamson Act, the MEP would generate between $2.44 and 2.6 million in property taxes annually. The increase in property taxes resulting from the MEP project would be about 1% of County's property tax revenues (MEP 2009a, p. 5.10-21). The property taxes would be collected by Alameda County; therefore, the disbursement would be at the county level. The County of Alameda's Office of Assessor's 2010-2011 annual report states that for every dollar of property tax that is collected, 41 cents goes to schools, 18 cents goes to the cities, 14 cents goes to redevelopment, 13 cents goes to special districts and 15 cents goes to the County (http://www.acgov.org/assessor/annual_report.pdf).

Kishor M Bhatt, Comments/Questions about the proposed Mariposa Power Plant Workshop, dated December 7, 2010

Comment: the Mountain House residents would appreciate a bigger emphasis on economic and social impacts of the plant. Mountain House residents pay high utility bills and property taxes to pay for the development costs of a new community. The communities hope is that Mountain House develops in to a city with 40-50k residents, with the new residents to share the cost of the utilities and taxes. Mr. Bhatt's concern is if the power plant is built, Mountain House may never develop into the city planned, and the current residents will continue to pay the big taxes and utilities. Mr. Bhatt asks staff to consider the cost of house/rent price decline and future non-development.

Response: Staff' analysis shows there would be public benefits from the MEP including employment and income for the project area and region.

Jass Singh, Issues and Serious Concerns with Mariposa Power Plant, dated December 8, 2010

Comment: The jobs created by Mariposa Energy, LLC would be very little as compared to the loss of taxes to San Joaquin County. Mr. Singh further states that San Joaquin County with the additional $5 million in property tax revenue could create additional jobs far more than what Mariposa Energy LLC would. Mr. Singh requests the CEC to conduct the study that racial minorities of San Joaquin County and Mountain House are not impacted and affected by air pollution generated by Mariposa Energy LLC.

Response: Mr. Singh's comment is noted. Staff's analysis shows that there would be public benefits from the MEP including employment and income for the project area and region. Please refer to the Air Quality section to address this comment

Comment: The CEC should conduct a study of the impact of air pollution generated by MEP on racial minorities in San Joaquin County

Response: As stated above, staff's analysis showed no significant adverse impact on environmental justice populations. Please refer to the Air Quality section for additional information and analysis of air quality impacts.

CONCLUSIONS

Estimated gross public benefits from the MEP include employment and income for the project area and region. Staff concludes that construction and operation of the MEP would not cause significant direct, indirect or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, emergency services and parks.

Staff concludes that the MEP would not induce substantial growth or concentration of population; induce substantial increase in demand for housing or public services; or displace a large number of people.

PROPOSED CONDITIONS OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school facility development fee as required by Education Code Section 17620.

Verification: At least 30 days prior to the start of project construction, the project owner shall provide to the Compliance Project Manager (CPM) proof of payment of the statutory development fee. The payment shall be provided to the Mountain House Elementary School District (75%)/Tracy Unified School District (25%).

REFERENCES

2010 U.S. Census, 2010 Census Data Products: United States, http://www.census.gov/population/www/cen2010/glance/index.html

Alameda County Fire Department, www.co.alameda.ca.us/fire

Alameda County Sheriff's Office, http://www.alamedacountysheriff.org

California Department of Education, Data and Statistics, Student Demographics, School Year: 2008-09. http://www.cde.ca.gov/ds/

California Highway Patrol, www.chp.ca.gov

County of Alameda, Office of the Assessor, Alameda County 2010-2011 Annual Report, Ron Thomsen, Assessor, http://www.acgov.org/assessor/annual_report.pdf).

East Bay Regional Park District, http://www.ebparks.org/parks

JR 2010a – Jon Rubin (TN 59174). Concerns about items not in the Staff Assessment, dated 12/6/2010. Submitted to CEC on12/6/2010.

LD 2010a – Lucas Davis (TN 58732). The Effect of Power Plants on Local Housing Values and Rents, dated 5/2010. Submitted to CEC on 10/7/10.

MEP 2009a - Mariposa Energy LLC / B. Buchynsky (TN 51974). Application for Certification for Mariposa Energy Project, dated 6/15/2009. Submitted to CEC on 6/15/2009.

MHCSD 2008 - Mountain House Community Services District - Municipal Services Review and Sphere Of Influence Update Report, dated June 2008.

MHCSD 2010b - Mountain House Community Services District (TN 59187). 2009 Mountain House Community Survey Analytic Summary, dated 5/2010 Submitted to CEC on 12/7/2010

RD 2010f - Rajesh Dighe (TN 59044) Social Economic Effects on Mariposa Power Plant on the Mountain House Community, date 11/22/2010. Submitted to CEC on 11/23/21010

RD 2010g – Rajesh Dighe (TN 59130). Comments on the Mariposa Staff Assessment, dated 12/4/2010. Submitted to CEC on 12/6/2010.

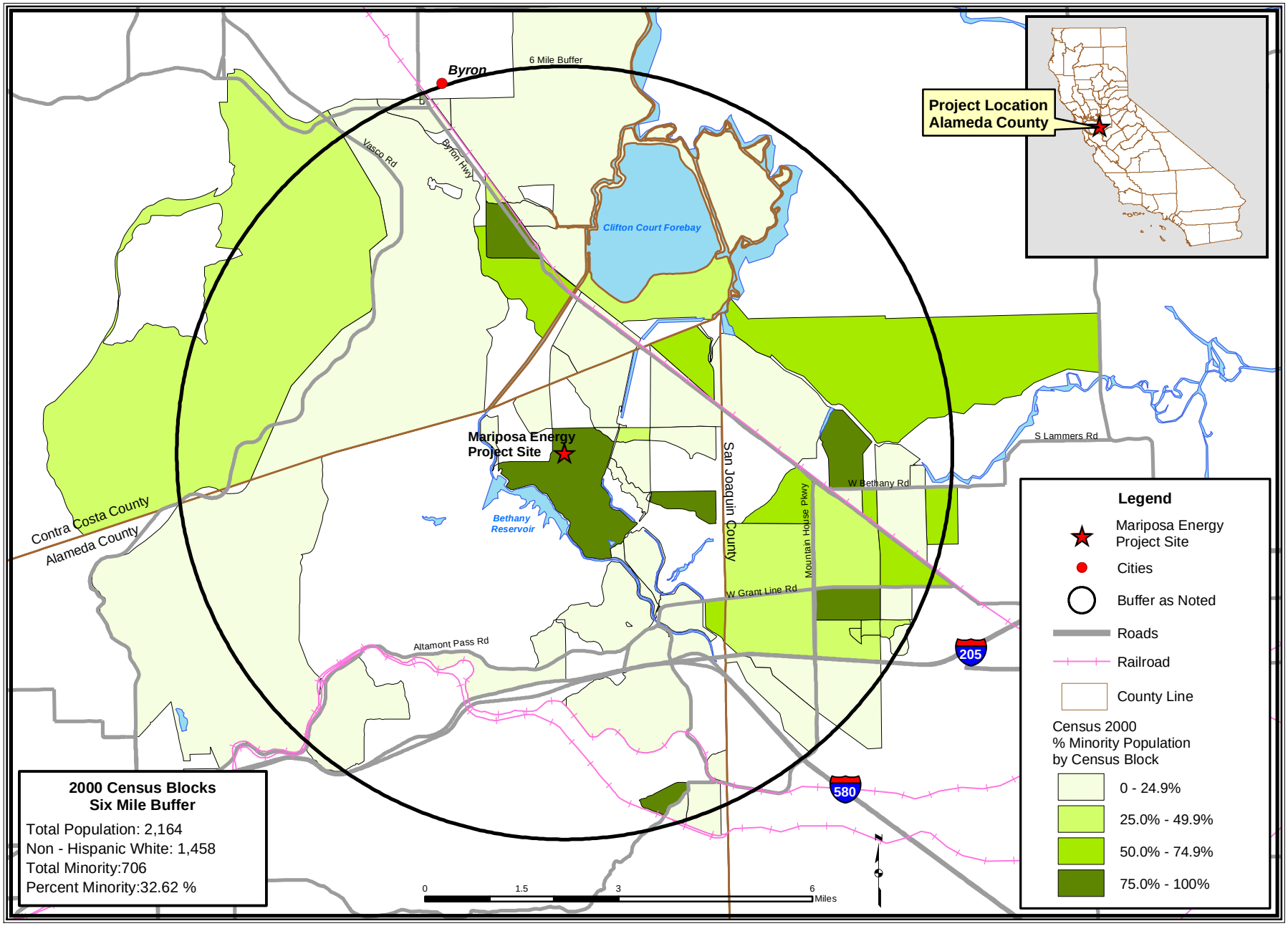
State of California, Employment Development Department (EDD) 2009. Labor Market Information, Occupational Employment Projections 2006-2016 Vallejo-Fairfield, Sacramento-Arden Arcade-Roseville, Oakland-Fremont-Hayward, and Stockton Metropolitan Statistical Areas.

State of California, Department of Finance, Demographic Research Unit 2009. Table 2:E5 City/County Housing and population estimates 1/01/2009.

U. S. Environmental Protection Agency (EPA), Office of Federal Activities. 1998. Final Guidelines for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance.

SOCIOECONOMICS - FIGURE 1

Mariposa Energy Project - Census 2000 Minority Population by Census Block - Six Mile Buffer



SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMETAL PROTECTION DIVISION

SOURCE: California Energy Commission Statewide Power Plant Maps 2010 - Census 2000 PL 94-171 Data - Matrix PL2

SOIL AND WATER RESOURCES

Revised Testimony of Mark Lindley, PE, Rachel Cancienne, EIT, and Paul Marshall

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

This section of the Staff Assessment (SA) analyzes the potential effects on soil and water resources that would occur by construction and operation of the proposed Mariposa Energy Project (MEP). Based on its assessment of the proposed MEP, staff concludes the following:

- Implementation of Best Management Practices (BMPs) during MEP construction and operation in accordance with an effective Storm Water Pollution Prevention Plan (SWPPP) and a Drainage, Erosion and Sedimentation Control Plan (DESCP) would avoid significant adverse effects that could be caused by transport of sediments or contaminants from the MEP site and associated linear facilities by wind or water erosion.
- Stormwater runoff from the 10-acre site would not cause significant impacts with the implementation of the stormwater runoff swales and extended detention basin.
- The project's proposed freshwater supply offset by implementation of a water conservation program would result in no net increase in freshwater use in the region, and the project would not cause an impact on current or future users of the water supply.
- With the inclusion of facility-specific water conservation measures, the proposed use of a freshwater supply would be consistent with state water policy found in State Water Resources Control Board (SWRCB) Resolution 75-58, and the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water policy because recycled water supplies are not economically feasible or environmentally desirable alternative due to the distance between the project site and potential recycled water suppliers.
- Consistent with the 2003 IEPR, Mariposa Energy, LLC has proposed the use of a zero liquid discharge (ZLD) system to manage wastewater at the MEP facility.
- Mariposa Energy, LLC has proposed the use of an alternative cooling technology which is environmentally desirable and economically feasible to help meet the requirements of the 2003 IEPR and SWRCB Resolution 75-58.
- The proposed project would be constructed to comply with 100-year flood requirements and would not exacerbate flood conditions in the vicinity of the project.

Staff concludes that MEP would not result in any unmitigated project-specific or cumulative significant adverse impacts to soil or water resources and would comply with all applicable laws, ordinances, regulations and standards (LORS) if all of the recommended conditions of certification are adopted by the Commission and implemented by Mariposa Energy, LLC (Mariposa).

The Mariposa applicant has submitted a request to the U.S. Army Corps of Engineers (USACE) requesting a jurisdictional determination of Waters of the U.S. for several ephemeral streams and drainage areas that cross the proposed alignment of the project linears. The USACE has not yet responded with their determination. Staff will incorporate this determination into the Supplemental Staff Assessment if the USACE makes a determination after the SA has been published.

INTRODUCTION

This section of the Staff Assessment (SA) presents an analysis of the potential impacts to soil and water resources from the construction and operation of the proposed MEP facility. This analysis specifically focuses on the potential for MEP to:

- cause accelerated wind or water erosion and sedimentation;
- exacerbate flood conditions in the vicinity of the project;
- adversely affect surface or groundwater supplies;
- degrade surface or groundwater quality; and
- comply with all applicable LORS and State policies.

Where the potential for impacts is identified, staff proposes mitigation measures to reduce the significance of the impact and, as appropriate, recommends conditions of certification to ensure that any impacts are less than significant and the project complies with all applicable LORS and state policies.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Soil and Water Resources Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

FEDERAL	
Clean Water Act/Water Pollution Control Act. P.L. 92- 500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); NPDES (CWA, Section 402)	The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. This includes regulation of storm water discharges during construction and operation of a facility normally addressed through a general National Pollutant Discharge Elimination System (NPDES) permit.
CWA Section 401	Section 401 of the CWA requires that any activity that may result in a discharge into a water body must be certified by the Regional Water Quality Control Board (RWQCB)
Resource Conservation and Recovery Act (RCRA) (40 CFR Part 260, et seq.)	RCRA seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
STATE	
California Constitution, Article X, Section 2	The State Constitution requires that the water resources of the state be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.

Porter Cologne Water Quality Control Act (PCWQCA) (Water Code §13000 et seq.)	PCWQCA requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. These standards are typically applied to the proposed project through the Waste Discharge Requirements (WDR) permit. These regulations require that the RWQCB issue Waste Discharge Requirements specifying conditions regarding the construction, operation, monitoring and closure of waste disposal sites, including injection wells and evaporation ponds for waste disposal. WDRs are updated periodically to reflect changing technology standards and conditions.
SWRCB Res. 2009-0011 (Recycled Water Policy)	This policy supports and promotes the use of recycled water as a means to achieve sustainable local water supplies and reduction of greenhouse gases. This policy encourages the beneficial use of recycled water over disposal of recycled water. This policy states the following recycled water use goals: "Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (AF/y) by 2020 and by at least two million AF/y by 2030; Increase the use of stormwater over use in 2007 by at least 500,000 AF/y by 2020 and by at least one million AF/y by 2030; Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020; and Included in these goals is the substitution of as much recycled water for potable water as possible by 2030."
Recycling Act of 1991 (Water Code § 13575 et esq.)	The Water Recycling Act of 1991 encourages the use of recycled water for certain uses and establishes standards for the development and implementation of recycled water programs.
Energy Commission Integrated Energy Policy Report (IEPR) 2003	Consistent with State Water Resources Control Board Policy 75-58 and the Warren–Alquist Act, the Energy Commission will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be "environmentally undesirable" or "economically unsound". "Additionally, the Energy Commission will require zero liquid discharge technologies unless such technologies are shown to be "environmentally undesirable" or "economically unsound".
State Water Resources Control Board (SWRCB) Policies: Resolution 75-58 & Resolution 88-63	The principal policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically unsound. Resolution 75-58 defines fresh inland waters as those "which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife". Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must not exceed 3,000 mg/L in order to be considered suitable, or potentially suitable, for municipal or domestic water supply.
LOCAL	
Alameda County Grading Ordinance (Alameda County Code (ACC), Chapter 15.36)	Chapter 15.36 regulates grading on private property within unincorporated areas of the county without permit. The Grading Ordinance seeks to avoid pollution of watercourses caused by runoff and to ensure that the intended use of the site is consistent with the county general plan.

Alameda County Stormwater Management and Discharge Control Ordinance (Alameda County Code (ACC), Chapter 13.08)	The purpose of Chapter 13.08 is to reduce the pollution of and enhance water quality in county receiving waters and the San Francisco Bay.
Contra Costa County General Plan	The General Plan implements standards for erosion control and provides requirements for erosion and sediment control plans in the county. It also encourages flood control and drainage guidelines for developing areas.
Contra Costa County Code	The County Code provides requirements for drainage plans and grading slope restrictions.
Contra Costa County, Division 1010, Drainage Ordinance	Contra Costa County Code Division 1010 conveys requirements for drainage construction including drainage permit.

SETTING

REGIONAL SETTING

Climate

The proposed MEP site has an arid to semiarid climate. Average annual rainfall at the MEP site is approximately 12.2 inches. Most of the precipitation in the area of the proposed site occurs between November and April, while the summer months are typically dry. **Soil and Water Resources Table 2** provides average historical rainfall from the nearby Tracy Pumping Plant weather station.

Soil and Water Resources Table 2
Average Rainfall near the Proposed Project Site (1955-2007)

Precipitation	Annual	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Average	12.20	0.62	1.60	1.93	2.62	2.15	1.59	0.84	0.41	0.11	0.03	0.06	0.24

Source: MEP 2009a

Surface Waters

The proposed MEP site would be located in the San Joaquin River Basin, about 10 miles south of the Sacramento-San Joaquin Delta. In addition to many sloughs, major waterways near the site include: the San Joaquin, Mokelumne, Stanislaus, Tuolumne, and Merced rivers. Runoff from the Sierra Nevada range supplies water to the major reservoirs of the San Joaquin Basin which eventually drain into the Delta.

The proposed MEP site would be located adjacent to primary water supply canals which import fresh surface water to the San Joaquin Basin via the State Water Project (SWP) and the Central Valley Project (CVP). The California Aqueduct (SWP) is adjacent to the proposed MEP site. The Delta-Mendota Canal is less than 0.5 miles northeast of the proposed MEP site (MEP 2009a). These larger canals carry fresh water from the Sacramento and San Joaquin Rivers to a vast network of canals for both agricultural irrigation and industrial uses across the state.

Surface water runoff from the undeveloped project location flows overland and converges within man-made ditches. The site runoff eventually discharges into Italian Slough, located about 3.5 miles north of the proposed MEP site.

Groundwater

The proposed location for the MEP site is in the Central Valley aquifer system, which consists of post-Eocene continental rocks and deposits and contains most of the fresh water in the valley. Underlying the continental deposits are tertiary marine sediments that contain mostly saline water, except in certain areas where an influx of fresh water has flushed out the saline water.

The aquifer system in the San Joaquin Valley generally consists of an upper and a lower aquifer, separated by a thick clay layer (the Corcoran Clay member of the Tulare). These clay zones function as impermeable aquitards that restrict vertical and lateral movement of groundwater. The Corcoran Clay is silty, diatomaceous clay with low permeability and is one of the largest confining bodies in the region, underlying an area of approximately 5,000 square miles.

The Corcoran Clay is a competent barrier between the upper and the lower aquifers in the southern sections of the San Joaquin Valley; however, it becomes increasingly thin as it extends north toward the proposed MEP site. Where the Corcoran Clay disappears, the lower aquifer is no longer isolated from the upper aquifer. The regional groundwater flow can be affected by numerous lenses of fine-grained materials that are distributed throughout the aquifer, potentially leading to variably-sized perched water tables and areas of decreased permeability (MEP 2009a).

PROJECT, SITE, AND VICINITY DESCRIPTION

The proposed MEP facility would be located 5.5 miles southeast of Byron, CA on a 10-acre portion of a 158-acre parcel, known as the Lee Property in the northeast corner of Alameda County. This property is south of the Pacific Gas and Electric Company's (PG&E) Bethany Compressor Station and Kelso Substation. The Lee Property was formerly the site of a windmill farm. The MEP facility would be built between two small hills on the parcel.

The construction laydown area for proposed facility would be approximately 9.2 acres and would be adjacent to the east side of the project site. Additional laydown areas would be needed for the construction of linears (water supply pipeline, transmission line, and natural gas pipeline) for the proposed facility. The proposed water supply pipeline and laydown areas would extend north into Contra Costa County.

Water Supply

Byron-Bethany Irrigation District (BBID) would supply raw surface water for process water, safety showers, fire protection, service water, and domestic water for the MEP site via Canal 45. A new 10 inch-diameter, 1.8 mile-long water supply pipeline would be built along the east side of Bruns Road from Canal 45 to the proposed project site. The pipeline would traverse the BBID property from the pump station to the BBID headquarters facility in Contra Costa County and travel south within the right-of-ways of

both Contra Costa and Alameda Counties and just outside the edge of Bruns Road pavement before following the MEP site access road to the proposed project site in Alameda County. Additional facilities to complement the new pipeline would include a concrete turnout structure and a small pump station at the canal bank, redundant vertical turbine pumps, pipe manifold and valving, pad-mounted transformer, and an electrical cabinet with instrumentation.

The raw surface water supplier, BBID, is a public agency operating under the California Water Code. BBID is a multi-county special district encompassing approximately 30,000 acres, with lands in Alameda, Contra Costa and San Joaquin Counties and is the jurisdictional water purveyor in the area (CEC, 2003). The source of BBID's water supply for MEP would be pre-1914 water rights that were established by the Byron-Bethany Irrigation Company and acquired with the formation of BBID in 1921 (pers. Comm. Rick Gilmore). BBID's original point of diversion on Italian Slough was destroyed by the California Department of Water Resources (DWR) for the construction of the Harvey O. Banks Pumping Plant. To compensate BBID, DWR granted BBID the use of the Banks Pumping Plant Intake Channel as a replacement point of diversion. Accordingly, BBID diverts water under its pre-1914 water right at its facilities located on the Banks Pumping Plant Intake Channel (BBID, 2010e).

Construction Water Supply

Prior to completion of the new water supply pipeline, water would be obtained from BBID Canal 45 via pumping into tanker trucks (CH2M 2010b). The water would be trucked about 1.3 miles to the proposed MEP site where it would be used for dust suppression, concrete washout, soil compaction, and hydrostatic testing. Approximately 2,500 gallons of water per day (gpd) would be required during the construction period.

Project Water Supply

Mariposa acknowledges that MEP would use a maximum of 187 acre-feet (AF) of fresh water per year for process water (CH2M 2009f). This volume represents the applicant engineering analysis of MEP's potential water usage associated with the maximum permitted operating schedule. Maximum use is based upon the continuous maximum permitted operation (4,000 hours per year with 300 startup and shutdown events) at the statistical average annual temperature at the project site (59°F). Mariposa asserts a more realistic operating scenario would be 600 operating hours per year with 200 startup and shutdown events. In this case, MEP would use 34.8 AF per year (MEP 2009a).

Soil and Water Table 3
Water Consumption

WATER SERVICE/ USE	Average Use[1] (gpm)	Average Annual Use[2] (AFY)	Peak Annual Use[3] (AFY)
Construction			
Daily Construction Requirements	2,500 (gpd)	-	-
Total Plant Makeup Water Usage Requirements			
Domestic Purposes: eye-wash stations, safety showers, drinking water, and sanitary facilities	0.33	0.05	0.26
Plant Processes: combustion turbine water injection for nitrogen oxides (NOx) control and combustion turbine compressor section wash water	159.0	26.3	130.2
Plant Process: Inlet air cooling for PC SPRINT combustion turbine generator (CTG)	77.0	8.5	56.7
TOTAL Plant Use	236.0	34.8	186.9
Zero Liquid Discharge – return flow to raw water storage tank	-1.4	-2.3	-2.3
Service Water/Fire Protection	-	-	-

Notes:
AFY = acre-feet per year; gpm = gallons per minute; gpd = gallons per day
[1]Average use based on average annual temperature of 59°F
[2]600 hours per year with 200 startup and shutdown events (8.7 AFY) at 59°F
[3]4,000 hours per year with 300 startup and shutdown events (13.0 AFY) at 59°F

Water Conservation

MEP has proposed a voluntary water conservation program designed to conserve a volume of raw water equal to the volume consumed by MEP for all construction and process requirements. The water conservation program could ensure that MEP would not result in a net increase in raw water consumption within BBID. The proposed plan includes an annual contribution per acre-foot of freshwater consumed to fund BBID's water conservation efforts. The contribution rate per acre-foot would be based on the actual costs to conserve one acre-foot of water. MEP's voluntary plan includes an annual contribution rate of up to $1,000 per acre feet consumed (rate based on the Marsh Landing Condition of Certification **SOIL&WATER-4,** CEC, 2010y) to fund BBID's water conservation efforts. The proposed plan includes one of three options to conserve water (CH2M, 2010ae):

1. A voluntary annual payment to BBID per acre foot of process water consumed to fund a water conservation program to implement water conservation measures designed to save an equal amount of water.
2. Voluntarily pay BBID an amount necessary to fund a one-time capital investment that is reasonably expected to result in water conservation that would offset the plant's maximum annual raw water usage of 187 acre-feet.
3. A combination of options 1 and 2 based upon recorded water usage.

The applicant has also volunteered to contribute $15,000 to BBID water conservation efforts to offset water used during construction (CH2M, 2010ae).

Water Use and Quality

Most of the water supplied to MEP (99.8 percent) would be used for various plant processes. The incoming supply water from BBID Canal 45 would be treated by a truck or skid-mounted ion exchange (IX) system, which would include: cation resin vessels, strong base anion resin vessels, and mixed bed ion exchanger vessel(s). All demineralizer equipment would have offsite regeneration; therefore, there would be no demineralizer waste stream. Once treated, the water would be stored in a 380,000-gallon demineralized water storage tank (adequate for 27.5 hours of plant use) and be of suitable quality for the MEP turbines (see **Soil and Water Resources Table 4**). The demineralized water would be used for the water injection into the combustion zone of the turbine for nitrogen oxides (NO_x) control and the online water wash of the combustion turbine compressor (MEP 2009a). Additionally, during average operating conditions, approximately 77.0 gallons per minute (gpm) would be used for inlet air cooling in compressors of MEP's four PC Sprint (SPRay INTercooling) combustion turbine generator (CTG) (see **Soil and Water Resources Table 3**).

Soil and Water Resources Table 4
LM6000 Demineralized Water Purity Requirements

Parameter	Units	Value
Total Solids	Ppm	5.0
Total Dissolved Solids	Ppm	3.0
Silica as Silicon dioxide (SiO2)	Ppm	0.1
Conductivity	micromhos/cm	< 0.1 @ 25°C
pH	Standard Units	6.5 - 7.5
Chloride	mg/L	0.5
Sulfate	mg/L	0.5
mg/L = milligrams per liter; ppm = parts per million Source: MEP 2009a		

The remaining 0.2 percent (0.332 gallons per minute) of incoming fresh water from Canal 45 would be used for domestic purposes such as eye-wash stations, safety showers, drinking water, and sanitary facilities. Mariposa states that the BBID raw water would be filtered through both a 500-micron bag filter and a 5-micron cartridge filter, and would then be injected with sodium hypochlorite for disinfection. The treated water would then be fed to a 1,000-gallon polyethylene chlorine contact tank providing a minimum 120 minute contact time. Sodium hypochlorite would be used to provide disinfection and prevent biofouling in the potable water system (MEP 2009a).

A combined service water/fire protection 520,000-gallon water storage tank would store raw supply water from BBID. Untreated supply water from BBID would be used for general (nonpotable) needs such as landscaping, chiller fill and make-up, fire protection, and hose bibs (equipment and surface washdown).

Wastewater Collection, Treatment, Discharge and Disposal

The proposed MEP facility would have a zero liquid discharge (ZLD) system. The primary wastewater collection system would collect process wastewater and stormwater

runoff from all plant equipment process contact areas. This water would be routed through sumps and an oil/water separator before treatment through an activated carbon filtration ZLD system. The truck-mounted ZLD system would include a walnut shell activated carbon vessel followed by a surge tank and 5 micron bag filters and pH adjustment if necessary. The treated ZLD reclaimed water (approximately 1.48 gpm in the winter and 1.29 gpm in the summer or approximately 2.3 AFY) would then be recycled to the raw water storage tank for plant process water usage.

The secondary wastewater collection system would collect sanitary wastewater from sinks, toilets, showers, and other sanitary facilities, and route the wastewater to an onsite septic tank prior to transport by a licensed sanitary waste management contractor to an offsite disposal facility. Mariposa estimates that the onsite septic system would receive approximately 478 gallons per day (MEP 2009a and CH2M 2009f).

General plant drains would collect containment area washdown, sample drain water, and facility equipment drainage. Water from these areas would be collected in a system of floor drains, hub drains, sumps, and piping and routed through an oil/water separator prior to ZLD treatment.

The non-oily oil/water separator effluent stream would pass through the truck-mounted ZLD treatment system before being sent to the 50,000-gallon wastewater tank and eventually recycled back to the 520,000-gallon raw water storage tank. Any oily waste collected in the oil/water separator would be transferred to 55-gallon drums and hauled offsite for proper disposal.

Wastewater from infrequent combustion turbine water washes and from the fuel filtration skid(s) would be collected in holding tanks or sumps. MEP would generate between 667 to 3,583 gallons of wastewater per month during turbine washing. The high value is based on the maximum permitted operating scenario (4,000 hours per year plus 300 start and stop cycles). Wastewater would be trucked offsite for disposal at an approved wastewater disposal facility, based on operating or regulatory compliance requirements (CH2M 2010b). MEP turbine wash water may require disposal at a Class I landfill (Kettleman Hills). Final disposal location determinations will be made for MEP based on waste profile analyses performed following wastewater generation during MEP operations.

Stormwater Runoff, Proposed Treatment, and Discharge

Since the proposed project site is undeveloped, existing conditions include no active stormwater management system. Stormwater generally seeps into the ground via percolation or sheet flows north into ephemeral drainages that converge into a single man-made linear channel. The channel eventually discharges into Italian Slough, located 3.5 miles north (downstream) of the project site.

The proposed project would utilize constructed swales (grass-lined ditches) to route upstream (off-site) stormwater runoff around the east and west sides of the site to prevent contamination. The proposed developed-site runoff would be managed with a series of inlets and storm drain pipes that would convey runoff to an onsite extended detention basin at the north end of the project site. The extended detention basin would

be sized to capture the volume of runoff from a 100-year storm event. The detention basin would release the site stormwater runoff over a minimum 48-hour period into the constructed swale proposed along the western perimeter of the site. The swale would continue to flow in the northerly direction and join with flows from the eastern perimeter of the site. The combined ditch flow would pass through a proposed 36-inch diameter culvert and daylight north of the access road.

Areas with potential oil water contamination would be sited within containment to prevent mixing of oily water with stormwater flowing to the extended detention basin. Impervious areas on the proposed site would be limited to paved loop and equipment access roads and the equipment to operate the plant. Forty-four percent of the MEP site would have impervious surfaces for equipment siting and roads. Runoff would increase between pre- and post-development due to the proposed impervious structures and shortened drainage basin time of concentration on the proposed developed site; however, the extended detention basin outfall discharge rates would not be greater than pre-development site stormwater discharge rates (see **Soil and Water Resources Table 5**) (MEP 2009a).

Soil and Water Resources Table 5
Pre- and Post-development Runoff for the MEP Site

Source	Area (acres)	Peak Runoff (cfs) 2-year Event	Peak Runoff (cfs) 100-year Event
Pre-Development (Zone CM-5)	8.65	0.58	7.05
Post-Development Uncontrolled[a] (Zone S-1&2)	8.12[b]	5.4	17.8
Post-Development Discharge Rate[c]	8.65	0.58	6.58

cfs = cubic feet per second
[a]Post-development runoff rate to the extended detention basin
[b]Post-develoment acreage is shown less than pre-development because the detention pond surface acreage is not considered in the hydrologic routing model.
[c]Post-development Discharge from extended detention basin to natural drainage.
Source: MEP 2009a

Soil Resources

The soils at the proposed MEP site vary from finer soils formed in residuum to coarser soils formed in alluvium. They are medium to fine-grained with textures ranging from fine sandy loam to clay with moderately well drainage in the upland rolling portions of the project area to moderately well and somewhat poorly drained in the more level areas of the proposed project site (CH2M 2009c). The site has 0 to 30 percent slopes and existing vegetation in the form of pasture grasses. The erosion potential of these soils in the proposed construction and laydown areas would vary based on soil moisture and compaction, as well as the size of the soil particles; however, the sloping nature of the property suggests the soils would have a high water erosion potential and moderate wind erosion potential. However, since the proposed project area was previously the site of a wind turbine development and has buried natural gas pipe lines that run through the area, it is possible that soil conditions may vary slightly from those listed in the USDA-NRCS soil survey.

The proposed linear route areas and construction laydown location overlay clay loams and fine sandy loams with 0 to 15 percent slopes. These soils may have a moderate to

high potential for shrinking and swelling due to their clay content. These soils may not be suitable as a bearing surface for structures and pipelines. Additionally, these soils may not be suitable for backfilling in areas where post-construction soil movements could adversely affect linear features.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides a discussion of the potential direct, indirect, and cumulative impacts to soil and water resources that may result from construction, operation, and maintenance of the proposed MEP facility. While all projects would likely have impacts, the goal is to limit any adverse impacts to a less than significant or acceptable level, or when feasible, prevent any adverse impacts. Staff's analysis of potential impacts consists of a brief description of the potential impact, an analysis of the relevant facts, and application of the threshold criteria for significance to the facts. Mitigation measures may be necessary to reduce potentially significant impacts to a less than significant level. If mitigation is warranted, staff provides a summary of Mariposa's proposed mitigation and a discussion of the adequacy of the proposed mitigation. Where necessary, staff presents additional or alternative mitigation measures or recommends specific conditions of certification related to a potential impact and any required mitigation measures.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff evaluated the potential impacts to soil and water resources including the effects of construction and operation activities that could result in erosion of soils, the deposition of sediments into surface waters or the contamination of either groundwater or surface water. Staff also evaluated the potential of the project's proposed water use to cause a significant depletion or degradation of local and regional water resources.
To evaluate potential significant impacts to soil or water resources, staff assessed:

- If construction or operation would lead to accelerated wind or water erosion and sedimentation.
- If the project would exacerbate flood conditions in the vicinity of the project.
- If the project's water use would cause a substantial, or potentially substantial, adverse change in the quantity or quality of groundwater or surface water.
- If project construction or operation would lead to degradation of surface or groundwater quality.
- If the project would comply with all applicable LORS.

These criteria are based on the California Environmental Quality Act (CEQA) Guidelines and performance standards. The threshold of significance for project impacts is based on the ability of the project to be built and operated without violating applicable erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards. The federal, state, and local LORS and policies presented in **Soil and Water Resources Table 1** represent the applicable standards used for the MEP analysis. These LORS support a comprehensive regulatory system, with adopted standards and established practices designed to prevent or minimize adverse impacts

to soil and water resources. For those impacts that exceed standards or result in a significant adverse impact, conditions of certification may be necessary to ensure compliance with standards or reduce the impacts to a less than significant level.

Staff's analysis, determination of potential impacts, and evaluation of appropriate mitigation measures relies on estimates and information provided by Mariposa regarding the construction and operation of MEP. Applicable scientific, technical, and LORS/policy-related literature and expert opinion were also consulted in the development of staff's analysis.

DIRECT/INDIRECT IMPACTS AND MITIGATION

This direct and indirect impact and mitigation discussion is subdivided into impacts related to construction and those related to operation. For each potential impact evaluation, staff briefly describes the potential effect and applies the threshold criteria for significance to its analysis of the project. If mitigation is warranted, staff provides a summary of Mariposa's proposed mitigation and a discussion of the adequacy of the proposed mitigation. In the absence of Mariposa's proposed mitigation or if mitigation proposed by Mariposa is inadequate, staff mitigation measures are recommended. Staff also provides specific conditions of certification related to a potential impact and the required mitigation measures.

Construction Impacts and Mitigation

Construction of MEP would include soil excavation, grading, installation of utility connections (linears) and the use of water, primarily for dust suppression. Potential impacts to soils related to increased erosion or release of hazardous materials are possible during construction. "Low threat discharges" from hydrostatic testing could also result in minor water quality impacts. Potential stormwater impacts could result if increased runoff flow rates and volume discharges from the site were to increase flooding downstream. Water quality could be impacted by discharge of eroded sediments from the site, discharge of hazardous materials released during construction, or migration of any existing hazardous materials present in the subsurface soil and groundwater. Project water demand during construction could affect groundwater or surface water resources. Potential construction related impacts to soil, stormwater, and water quality or quantity, including the applicant's proposed mitigation measures and staff's proposed mitigation measures are discussed below.

Erosion Control and Stormwater Management

Construction activities for managing erosion and stormwater must be addressed to avoid potential adverse impacts to water quality and soil resources. Accelerated wind and water-induced erosion may result from earth-moving activities associated with construction of the proposed project. Alteration of the soil structure leaves soil particles vulnerable to detachment and removal by wind or water. Soil erosion can cause the loss of topsoil and can increase the sediment load in surface receiving waters downstream of areas affected by construction activity. Increasing the amount of impervious surfaces would increase the amount of runoff and peak discharges. Runoff from stormwater can also convey contaminants to soil, groundwater, and surface water if hazardous materials and waste are not properly stored, handled, and disposed.

Construction activity would increase short-term soil erosion. With the implementation of Best Management Practices (BMPs) including stabilizing construction entrances, applying water for dust suppression, placement of silt fencing, berms, and revegetation as needed, erosion would be reduced to less than significant and water quality would not be adversely affected by runoff from the site.

Finished grade slopes would drain into one of two constructed swales routing upgradient stormwater around the site. To reestablish grass vegetation, finished grade slopes and swales would be hydroseeded with a native grass mixture, and mulched to keep seeds in place and to moderate soil moisture and temperature until the seeds germinate and grow. Controlled watering would be applied if seasonal rainfall is not sufficient. The entire area would be regularly monitored for signs of erosion; areas would be re-vegetated as necessary to maintain adequate soil protection (CH2M 2009f). Staff agrees that vegetating disturbed soil soon after construction is an effective stabilization measures for controlling erosion.

Staff recommends two conditions, **SOIL&WATER-1** and **SOIL&WATER-2,** which address mitigation measures designed to reduce any soil erosion and stormwater construction impacts to less than significant levels.

Condition of Certification **SOIL&WATER-1** would require the project owner to comply with all of the requirements of the General NPDES Permit for Discharges of Storm Water Associated with Construction Activity, including the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP) for Construction.

To qualify for the NPDES statewide General Permit for Storm Water Discharges Associated with Construction Activity (General Construction Permit), prior to construction Mariposa would be required to develop a Construction SWPPP to prevent the offsite migration of sediment and other pollutants, and to reduce the effects of runoff from the laydown sites and linears to offsite areas. Successful implementation of the SWPPP would ensure that construction impacts to soil resources are mitigated to a less-than-significant level. SWPPP procedures include submitting a Notice of Intent (NOI) to the State Water Resources Control Board (SWRCB) and developing the SWPPP prior to the start of construction activities. The construction SWPPP would also be submitted to both the Alameda County Flood Control and Water Conservation District and Contra Costa County Grading Division for review.

Condition of Certification **SOIL&WATER-2** requires the project owner to obtain Compliance Project Manager (CPM) approval for a site-specific final DESCP that addresses all project elements. Compliance with the requirements of this condition would reduce potential soil erosion and stormwater quality impacts to less than significant for the construction phase of the project.

Temporary Erosion Control Measures

During construction of the MEP project, activities such as grading could potentially destroy habitat and increase rates of erosion during construction. Additionally, construction materials could contaminate runoff or groundwater if not properly stored

and used. Mariposa would implement erosion and sediment control BMPs to follow the progress of grading and construction throughout the entire construction period (MEP 2009a).

Temporary erosion and sediment control measures would be implemented at the start of construction, and would be evaluated, inspected and maintained during construction. Mariposa proposes BMP measures to include silt fences, mulching, and revegetation. These measures would be removed from the site after the completion of construction or converted to permanent BMPs.

Disturbed areas would be stabilized with plastic covers, erosion control blankets, or mulch before rain events. In addition, linear sediment controls would be used along the toe of the slope, face of the slope and at the grade breaks of exposed slopes. Placement of linear sediment controls at grade breaks of exposed slopes would interrupt the length of the slope and reduce erosion by reducing runoff velocity.

Sediment barriers would be used to prevent water erosion by slowing runoff and trapping sediment. Sediment barriers include straw bales, sand bags, straw wattles, and silt fences. They would be placed downstream of disturbed areas, at the base of exposed slopes, and along streets and property lines below the disturbed area. Since the site would be constructed on rolling terrain, sediment barriers would also be placed along the entire site perimeter. Sediment barriers would be properly installed (staked and keyed), then removed or used as mulch after construction. Any soil stockpiles, including sediment barriers around the base of the stockpiles, would be stabilized and covered (MEP 2009a).

Non-active areas would be stabilized as soon as feasible after the cessation of construction activities and no later than 14 days after construction has ceased in that portion of the site. Staff believes these temporary erosion control measures, along with the specific locations where they would be used onsite, should be included in the final construction SWPPP and submitted to both the Alameda County Flood Control and Water Conservation District and Contra Costa County Grading Division prior to construction as specified in Condition of Certification **SOIL&WATER-1**.

Laydown Areas

Laydown areas are proposed during construction of the MEP site and its associated linears. Vehicle traffic and equipment staging associated with these areas would result in soil compaction. Soil compaction increases soil density by reducing soil pore space. This, in turn, exacerbates the ability of the soil to absorb precipitation and transmit gases for respiration of soil microfauna. Soil compaction can result in increased runoff, erosion, and sedimentation.

The project site laydown area would need to be graded prior to use; therefore, it would be covered with gravel to minimize soil erosion and allow for wet season use. Laydown areas associated with the linears would not require grading and would not utilize gravel covering. Heavy equipment in the laydown areas would be stored on dunnage (loose scrap material that provides ventilation) to protect it from ground moisture. Compaction beneath the laydown area would be mitigated by removing and stockpiling topsoil for

later reuse and by deep ripping the subsoil after removing construction materials and gravel covering. Given the limited area over which permanent compaction would occur, it is considered that this impact would be less than significant. It is also assumed that soil loss would be negligible from the laydown areas once it is revegetated.

The highest potential for soil loss would occur immediately following grading or during the period following the end of construction. Mariposa has described the existing condition of the proposed laydown area as vegetated with non-irrigated grazing grasses and stated that this area would be returned to its current condition (MEP 2009a). With the implementation of Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-2**, staff believes that potentially significant impacts caused by erosion or storm water discharge during MEP construction would be mitigated.

Linear Areas

Linear features associated with the proposed MEP facility include water, natural gas, and transmission lines. Associated construction activities include grading for all linear features and trench excavation for underground pipelines. Linear elements would be installed in 4-foot wide trenches using a 10-foot construction corridor. Overhead transmission lines would utilize poles with a 4-ft by 4-ft footprint. The linear areas would include soils with 3 to 15 percent slopes along both right-of-ways and agricultural areas (CH2M 2009f). Mariposa has submitted a request to the U.S. Army Corps of Engineers (USACE) requesting a jurisdictional determination of Waters of the U.S. for several ephemeral streams and drainage areas that cross the proposed alignment of the project linears, including the alternative water supply pipeline to the Mountain House Community Services District Wastewater Treatment Plant. The USACE has not yet responded with their determination.

Mitigation efforts associated with linear areas would be similar to those for the laydown areas and project site. Graded areas would be graveled immediately following completion and silt fences would be installed to prevent runoff out of the linear construction areas. Staff believes the implementation of **SOIL&WATER-1** and **SOIL&WATER-2** would mitigate construction impacts in the linear areas. Per **SOIL&WATER-1**, the construction SWPPP should be submitted to the Contra Costa County Grading Inspector for comment and review of impacts specifically related to the water supply pipeline (Swartz 2010).

Water Supply

The primary use of water for construction is dust control, soil compaction, concrete washout, and pipeline/tank hydrostatic testing. Mariposa's source of their construction water is from BBID Canal 45 (CH2M 2010b). Mariposa estimated the construction water use to be approximately 2,500 gallons per day which includes water for pipeline/tank hydrostatic testing. Assuming an anticipated construction period of eight to nine months, the total amount of water required for construction is between 600,000 and 675,000 gallons (1.8 to 2.1 acre-feet).

MEP has included a water conservation program that funds water conservation measures within BBID that would offset all freshwater used for construction. The proposed water conservation program includes a voluntary contribution of $15,000 to BBID to offset water

used for construction (CH2M, 2010ae). BBID's water conservation efforts include improvements to its irrigation ditches and pump station upgrades that will significantly reduce losses to seepage, evaporation and operational spills (BBID, 2010d). Based on the $1,000 per acre-foot water conservation funding mechanism established for the Marsh Landing Generating Station (CEC, 2010y), the proposed funding for construction water use should more than offset MEP's construction water requirements resulting in no net increase in freshwater use within BBID.

Staff recommends Condition of Certification **SOIL&WATER-4** that requires MEP to work with BBID (or secondarily, through Contra Costa Water District or Alameda Zone 9) to develop and implement a local water conservation program that would offset the use of fresh water for construction purposes.

Groundwater

During construction, the MEP site would not directly impact groundwater resources with the implementation of Condition of Certification **SOIL&WATER-1.** The construction SWPPP would provide specific guidelines for protecting groundwater resources should groundwater be encountered during construction. Excavation dewatering water would be contained in portable tanks and sampled prior to disposal offsite.

Wastewater and Sanitary Waste

During the construction period, Mariposa states that all sanitary waste would be collected in portable toilets (no discharge) supplied by a licensed contractor for collection and disposal at an appropriate receiving facility (MEP 2009a). Equipment wash water would also be collected and disposed of offsite; therefore, there would be no impacts from disposal of sanitary wastewater. Staff recommends, as part of Condition of Certification **SOIL&WATER-1,** that Mariposa handle the wastewater from hydrostatic testing similar to the handling of the equipment wash water. **SOIL&WATER-1** requires that the construction SWPPP include a description of the handling, storing and disposal of all construction wastewater to ensure potential impacts related to construction wastewater are mitigated.

Operational Impacts and Mitigation

Operation of MEP could lead to potential impacts to soil, stormwater runoff, water quality, water supply, and wastewater treatment. Soils may be potentially impacted through erosion or the release of hazardous materials used in the operation of MEP. Stormwater runoff from the MEP site could result in potential impacts if increased runoff flow rates and volumes discharged from the site increase downstream flooding. Water quality could be impacted by discharge of eroded sediments from the MEP site, or discharge of hazardous materials released during operation. Water supply for plant processes, cooling, fire protection and landscape irrigation could lead to potential quantity or quality impacts to regional groundwater or surface water resources. Potential impacts to soil, stormwater, water quality, water supply, and wastewater related to the operation of MEP, including the applicant's proposed mitigation measures and staff's proposed mitigation measures, are discussed below.

Stormwater

Since the existing conditions site includes no active stormwater management system, the proposed MEP site would control runoff such that discharge rates from the site would remain comparable to pre-construction rates. Existing runoff from the rolling hills of the proposed site is in the form of sheetflow to the north into ephemeral drainages that converge into a single constructed linear channel. The channel eventually discharges into Italian Slough (3.5 miles from the project site). When complete, the project site would be partially covered with impervious surfaces, which would increase runoff (compared to existing conditions) during moderate and large storm events. The proposed facility would manage stormwater runoff with a series of inlets and storm drain pipes that would convey the runoff to a proposed onsite extended detention basin located at the north end of the site (MEP 2009a).

The proposed extended detention basin would be sized to contain the facility site 100-year storm event and would release the volume over a minimum 48-hour period, such that the peak discharge rate is similar to that of the pre-construction condition. The extended detention basin would discharge into the proposed northeasterly-aligned constructed swale. The swale would transition through a 36" diameter culvert and discharge offsite to the north into the ephemeral drainage areas. Staff believes that with the implementation of Conditions of Certification **SOIL&WATER-2** and **SOIL&WATER-3**, operational impacts on drainage patterns would be less than significant. **SOIL&WATER-2** requires the project owner to identify results of stormwater BMP monitoring and maintenance activities and **SOIL&WATER-3** requires that Mariposa comply with all requirements of the General NPDES Permit for Discharges of Storm Water Associated with Industrial Activity.

Water Supply

Mariposa stated that the MEP facility would use an average of 34.8 acre-feet of fresh water per year provided that the facility runs a projected 600 total hours per year. Alternatively, should increased water be needed, the proposed plant would use a maximum of 187 acre-feet per year during 4,000 hours of operation. BBID confirmed that they have the ability and can meet the MEP facility demand (MEP 2009a). Mariposa proposes to obtain raw water from BBID via a proposed 10-inch-diameter, 1.8-mile-long water supply pipeline planned for construction in or along the east side of Bruns Road from existing Canal 45 south to the plant site.

Mariposa considered other water supply options. Mariposa performed an analysis for recycled water alternatives to determine the economic and environmental feasibility of constructing those pipelines. They determined that the closest recycled water sources were the Mountain House Community Services District (MHCSD) Wastewater Treatment Plant (WWTP) and the City of Tracy WWTP.

The MHCSD WWTP is approximately 5.5 miles away and, while future effluent from this facility will potentially be sufficient to meet MEP's needs, the current effluent is not enough to meet the priority recycled water use rights for the planned Mountain House golf course. MHCSD WWTP recycled water was also previously allocated to the proposed East Altamont Energy Center (CEC, 2003) should it be constructed. The City

of Tracy WWTP is 11.5 miles from the proposed site and has sufficient recycled water for potential use at MEP; however, the environmental impact and prohibitive cost associated with the pipeline discouraged this water supply source. See the **ALTERNATIVES** section for a complete analysis of these recycled water sources.

Operational use of freshwater would be offset through the implementation of MEP's proposed water conservation program. MEP would fund water conservation efforts within BBID (CH2M, 2010ae). BBID has in place current and future improvement plans including irrigation ditch lining or replacement with modern piping systems, as well as, pump station upgrades that will significantly reduce losses to seepage, evaporation and operational spills (BBID, 2010d). The implementation of these conservation efforts would offset MEP operational fresh water use ensuring that the project would not result in an increase in the diversions of freshwater supplied by the Sacramento-San Joaquin Delta.

Staff is recommending Condition of Certification **SOIL&WATER-4** to limit the MEP facility to maximum water use of 187 AFY. **SOIL&WATER-4** requires the project owner to install metering devices on all water supply pipelines and submit monthly water usage to confirm the site is in compliance with the annual water use limit. Condition of Certification **SOIL&WATER-4** also requires Mariposa to fund a local water conservation program implemented by BBID (or secondarily Contra Costa Water District or Alameda Zone 7) to offset MEP's use of freshwater from the Sacramento-San Joaquin Delta. MEP and BBID would need to identify specific projects that would be funded (in-part or wholly) by the water conservation funding contribution, would need to estimate the water savings resulting from the funded projects, and the costs per acre-foot to determine the appropriate contribution. Funding of current and future improvements within BBID as part of a water conservation program would offset water used by MEP during operations resulting in a no-net increase in fresh water consumption within BBID as a result of MEP.

Alternatively, if BBID cannot develop a verifiable, cost effective water conservation program, the water conservation funding could be paid to local water agencies including the Contra Costa Water District or Alameda Zone 7. These agencies are currently developing and implementing plans to meet the water conservation goals of SBx7-7, a statewide 20 percent reduction in urban per capita water use by 2020. Contra Costa Water District has indicated that it has existing conservation programs in place that result in real water conservation through cash for grass programs and rebates for water efficient washers and toilet replacement. Contra Costa Water District water conservation program has been achieving water conservation at a rate of $1,000 per acre-foot or less.

Wastewater and Sanitary Waste

Mariposa proposes two separate wastewater collections systems for the proposed MEP facility: one for industrial wastewater and one for sanitary wastewater. The industrial wastewater collection system would collect process wastewater and stormwater runoff from all of the plant equipment process areas and route it to sumps. The industrial wastewater would then flow to the onsite oil/water separator before treatment by the onsite, truck-mounted walnut shell activated carbon filtration ZLD system. The treated

ZLD reclaim water then would be recycled to the raw water storage tank for plant process water usage. Once the activated carbon is sufficiently used, a fresh supply would be implemented and the contents of the “used” truck would be hauled offsite to a licensed disposal facility. Oily waste from the oil/water separator would be contained in 55-gallon drums and hauled offsite for proper disposal.

Additionally, approximately 478 gallons of sanitary wastewater from toilets, sinks, and showers would be routed to an onsite septic tank. The sanitary wastewater would then be transported offsite by a licensed hauler to a licensed facility. Staff is proposing **SOIL&WATER-5,** which requires the project owner to submit proof of proper wastewater disposal, in accordance with waste discharge requirements of the Clean Water Act (CWA).

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts consist of impacts that may occur as a result of the proposed project in combination with impacts from other past, present and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant actions taking place over time.

Temporary and permanent disturbances associated with construction of the proposed project would cause accelerated wind- and water-induced erosion. However, staff has concluded that the implementation of proposed mitigation measures, the SWPPP and the DESCP would ensure that the project would not contribute significantly to cumulative erosion and sedimentation impacts.

The industrial wastewater and contact stormwater from the MEP site would be routed to an onsite holding tank and hauled offsite for disposal at a licensed facility. All sanitary waste water would be discharged into a septic tank then hauled offsite for disposal. Therefore, no wastewater-related cumulative impacts are expected. The stormwater discharge would be retained on site by the extended detention basin such that the outfall discharge rates would not be greater than pre-development conditions; therefore, MEP would not exacerbate flooding conditions in the area.

MEP has included a water conservation plan to offset all water use for construction and plant process requirements. The proposed water conservation plan would result in a no-net increase in freshwater consumption within BBID as a result of the construction and operation of MEP. As proposed, MEP would not increase freshwater diversions from the Delta.

COMPLIANCE WITH LORS

The Energy Commission’s power plant certification process requires staff to review each of the proposed project’s elements for compliance with LORS and state policies. Staff has reviewed the project elements and concludes that the proposed MEP project would comply with all applicable LORS addressing protection of water resources, storm water management, and erosion control, as well as drinking water, use of freshwater, and wastewater discharge requirements, as long as staff’s proposed conditions of certification are adopted and implemented. Summary discussions of project compliance with significant LORS and policies are provided below.

STORMWATER

Clean Water Act

Staff has determined that MEP would satisfy the requirements of the National Pollutant Discharge Elimination System (NPDES) permit with the adoption of Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-3**. These conditions require the development and implementation of a Stormwater Control Plan in conjunction with the construction Storm Water Pollution Prevention Plan (**SOIL&WATER-1**) and the industrial Storm Water Pollution Prevention Plan (**SOIL&WATER-3**).

PORTER-COLOGNE WATER QUALITY CONTROL ACT

Staff has concluded that MEP would satisfy the applicable requirements of the Porter-Cologne Water Quality Control Act and adequately protect the beneficial uses of waters of the state through implementation of federal, state, and local requirements for management of storm water discharges and pollution prevention and compliance with local grading and erosion control requirements, and compliance with local onsite wastewater treatment system (septic system) requirements.

SWRCB Policy 75-58 and Energy Commission—Integrated Energy Policy Report (IEPR)-Power Plant Water Use and Wastewater Discharge Policy

The California Energy Commission, under legislative mandate specified in the *2003 Integrated Energy Policy Report*, (policy) and State Water Resources Control Board Resolution 75-58, will approve the use of fresh water for cooling purposes by power plants it licenses only where alternative water supply sources and alternative cooling technologies are shown to be environmentally undesirable or economically unsound. The IEPR policy also requires the use of zero-liquid discharge (ZLD) technologies unless such technologies are shown to be “environmentally undesirable” or “economically unsound.”

MEP would utilize ZLD technologies. The primary wastewater collection system would collect process wastewater and stormwater runoff from all plant equipment process areas. The collected wastewater and stormwater would then be routed to sumps followed by the onsite oil/water separator before treatment by the activated carbon filtration ZLD system. The treated ZLD reclaim water would then be recycled to the raw water storage tank for plant process water usage.

Additionally, MEP proposes to use an alternative cooling technology to reduce the amount of water required for plant operation: an air-cooled radiator would reject heat from the combustion turbine inlet air chiller refrigeration system. Staff concurs with Mariposa that the use of an air cooled radiator is an economically sound practice that provides environmental benefits from significantly reduced water use.

Staff reviewed the East Altamont Energy Center (EAEC) (Docket No. 01-AFC-4), the Tesla Power Plant (Tesla PP) (Docket No. 01-AFC-21), and the GWF Tracy Combined Cycle Power Plant (GWF Tracy) (Docket No. 08-AFC-07) documents on the use and availability of recycled water supplies. These three facilities are planned in the vicinity of

MEP. In the case of the EAEC, the Commission accepted the judgment of BBID that sufficient supplies of fresh water would be available to meet all district needs, including EAEC, without the use of recycled water. The Commission also noted that it is to the benefit of all parties to find a cost effective manner of utilizing the increasing amounts of recycled water that would result from development in the district.

Staff reviewed the recycled water issues at EAEC, Tesla PP, and GWF Tracy and investigated the current recycled water availability since these applications were reviewed by the Energy Commission. As the **ALTERNATIVES** section suggests, there are limited recycled water resources in the area. The Mountain House Community Services District Waste Water Treatment Plant (MHCSD WWTP), in San Joaquin County, is the nearest potential source of recycled water for MEP (about 5.5 miles away) and is being built out in phases. The MHCSD WWTP is currently designed with a process daily flow of 3.0 million gallons per day (MGD); however, the average 2008 effluent was only 0.483 MGD. The total tertiary-treated water available from the MHCSD WWTP was 560 acre-feet. The City of Tracy WWTP plant has a much greater supply of recycled water; however, staff has concluded that the conveyance costs required for the11.5 mile-long pipeline would be an economically unsound alternative (see Alternatives section).

The fresh water used for construction and plant processes would be offset through the implementation of a voluntary water conservation program resulting in a no-net increase in fresh water use within BBID. Staff would consider the project to be in compliance with the intent of the Energy Commission water use policy with project implementation of facility-specific water conservation measures and development and implementation of a regional water conservation program that would conserve a volume of raw surface water equivalent to the volume used by the project for process requirements.

In addition, the Energy Commission's water policy also seeks to protect water resources from power plant wastewater discharges. To that end, the water policy specifies that the Energy Commission will require zero liquid discharge technologies (for management of power plant wastewaters) unless such technologies are shown to be 'environmentally undesirable' or 'economically unsound.' MEP proposes to use a zero liquid discharge system where sanitary waste would be handled with an onsite septic tank and all contact stormwater and plant industrial wastewater would be routed to an onsite storage tank. All tanks would be hauled offsite and properly disposed. Therefore, staff finds that the wastewater management would be in compliance with the intent of the water policy because it eliminates the significant portion of process wastewater discharge from the facility.

LOCAL LORS

Staff concludes that the implementation of Conditions of Certification **SOIL&WATER-1** and **SOIL&WATER-2**, MEP would satisfy the applicable requirements of all local LORS. The Construction SWPPP and DESCP should contain all information relative to grading and erosion control in order to prevent discharge and pollution to downstream drainages in Alameda and Contra Costa Counties.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any noteworthy benefits to soil or water resources that would be provided by the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

BBID, 2010e and 2010f
BBID provided several comments on the Staff Assessment related to water conservation in a letter to the Energy Commission and directly to the Staff Assessment in track changes. BBID's comments are summarized with Staff's responses below.

Comment: BBID clarified their pre-1914 water rights and its relationship to the State Water Project including its seniority and point of diversion.

> **Response:** Staff revised the Staff Assessment to reflect BBID's clarifications regarding their pre-1914 water right and its relationship to the State Water Project and its point of diversion.

Comment: BBID indicated that 2.1 acre-feet of water used for construction and a maximum of 187 AFY of water used for operations of MEP was insignificant and inconsequential in comparison to the quantities of water diverted by the State Water Project.

> **Response:** MEP revised their project description to include a water conservation program to offset all freshwater used by the project during construction and operations. This program eliminated any potential impact related to fresh water use by the project. However, 2.1 acre-feet and 187 AFY of water use during construction and operations cannot be considered insignificant. Staff does not analyze proposed projects in-comparison to the total water diverted by the State Water Project to determine levels of significance. .

Comment: BBID indicated that it has senior water rights to the State Water Project and use of water within BBID could not constitute an impact to SWP users because the SWP does not have a legal right to water diverted by BBID.

> **Response:** Staff revised the Staff Assessment to reflect MEP's water conservation program which results in no-net increase in fresh water use associated with the proposed project. Thus, other users could not be impacted by the proposed project. Staff has not provided any assessments of water rights and does not dispute BBID's senior pre-1914 water right. However, similar to other water rights holders, BBID's water right may be subject to limitations related to the Endangered Species Act to protect critically endangered aquatic species that depend upon the ecology of Sacramento-San Joaquin Delta for survival. As water supply allocations are further limited to enforce the Endangered Species Act, some users will undoubtedly be impacted. Other junior water rights holders are expected to see their allocations drop in the future.

Comment: BBID indicated that the diversion and use of water for power plants is not regulated by the Energy Commission. BBID indicated that any condition related to the diversion of water, a property right under California law, may be unconstitutional and a water conservation fee would be contrary to Proposition 26.

> **Response:** The CEC has broad authority over all aspects of power plants licensing under the Warren-Alquist Act. Under the Warren-Alquist Act, the Energy Commission is the regulating agency for power plants. The Energy Commission and State Water Resources Control Board have developed policies that govern the use of water by power plants in California. The Energy Commission takes into account local agency policies, regulations, and standards related to power plant development. However, the Energy Commission may impose additional requirements on applicants related to water use by power plants to protect local and neighboring water users.

Comment: BBID is making improvements to its operations to reduce seepage, evaporation, and operational spills. BBID plans to establish a water rate that includes a proportional water conservation fee.

> **Response:** MEP has developed a water conservation plan that allocates funding to BBID to support its efforts to implement water conservation measures within BBID. Further, Staff has included conditions that require MEP to work with BBID to fund and implement a water conservation program. MEP is required to work with BBID to estimate projected water conservation and costs for planned water conservation efforts to develop a cost on a per-acre foot basis. Staff has also provided MEP the option of working with other local agencies to implement a water conservation program if BBID cannot develop a cost effective program.

Robert Sarvey, Intervenor RS 2010e

Robert Sarvey provided comments on the Staff Assessment related to water use and the potential to use alternative technology to save significant quantities of water. Mr. Sarvey offered the following comments:

Comment: Staff's Assessment concluded that 186.9 afy of surface water for operations could result in a significant impact. 69 percent of the proposed water use is for NOx suppression. The project should consider the use of Dry Low NOx Combustors as an alternative technology.

The GE LM-6000-PF could reduce water consumption by up to 130.2 afy while also reducing NOx emissions by using Dry Low NOx combustors.
The GE LM-6000-PH also uses Dry Low NOx combustors limiting water use to SPRINT injection.

> **Response:** Following the Staff Assessment, MEP added a water conservation program to the proposed project. The water conservation program would offset all water used for plant processes including NOx suppression and limit the potential for significant impacts related to water supply. Mr. Sarvey's alternative technology suggestions related to Dry Low NOx Combustors in the proposed gas turbines are

discussed in more detail in the alternatives section. While Mr. Sarvey provides compelling arguments for water savings, Staff does not have adequate information to evaluate fuel consumption, reliability, and capital costs associated with these newer gas turbine models. In the absence of a significant unmitigated impact, Staff reviews the application defining the proposed project and weighs the pros and cons of various technology options in the **Alternatives** section.

CONCLUSIONS

Based on its assessment of the proposed Mariposa Energy Project (MEP), staff concludes the following:

- Implementation of Best Management Practices (BMPs) during MEP construction and operation in accordance with an effective Storm Water Pollution Prevention Plan (SWPPP) and a Drainage, Erosion and Sedimentation Control Plan (DESCP) would avoid significant adverse effects that could be caused by transport of sediments or contaminants from the MEP site and associated linear facilities by wind or water erosion.
- Stormwater runoff from the 10-acre site would not cause significant impacts with the implementation of the stormwater runoff swales and extended detention basin.
- The project's proposed fresh water supply offset by a water conservation program would result in no-net increase in freshwater use in the region and the project would not cause an impact on current or future users of the water supply.
- With the inclusion of facility-specific water conservation measures, the proposed use of a freshwater supply for inlet air cooling and other industrial uses would be consistent with state water policy found in State Water Resources Control Board (SWRCB) Resolution 75-58, and the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water policy because recycled water supplies would not be other economically feasible or environmentally desirable alternative due to the distance between the potential recycled water supplies and the project site.
- Consistent with IEPR, Mariposa Energy, LLC has proposed the use of a zero liquid discharge (ZLD) system to manage wastewater at the MEP facility.
- Mariposa Energy, LLC has proposed the use of an alternative cooling technology which is environmentally desirable and economically feasible to help meet the requirements of the 2003 IEPR and SWRCB Resolution 75-58.
- The proposed project would be constructed to comply with 100-year flood requirements and would not exacerbate flood conditions in the vicinity of the project.

Staff concludes that MEP would not result in any unmitigated project-specific or cumulative significant adverse impacts to soil or water resources and would comply with all applicable laws, ordinances, regulations and standards (LORS) if all of the recommended conditions of certification are adopted by the Commission and implemented by Mariposa Energy, LLC (Mariposa).

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: The project owner shall comply with the requirements of the General National Pollutant Discharge Elimination System (NPDES) permit for discharges of storm water associated with Mariposa Energy Project (MEP) construction activity. In order to comply, the project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the construction of the entire proposed project site, laydown areas, and linear areas.

Verification: At least 60 days before construction begins, the project owner shall submit a copy of the construction SWPPP to the Alameda County Flood Control and Water Conservation District and the Contra Costa County Grading Division for review. At least 30 days before construction begins, the project owner shall submit copies to the Compliance Project Manager (CPM) of all correspondence between the project owner and the Central Valley Regional Water Quality Control Board (RWQCB) regarding the General NPDES permit for the discharge of storm water associated with construction activities. This information shall include copies of the Notice of Intent and the Notice of Termination sent to the State Water Resources Control Board for the project construction.

SOIL&WATER-2: Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion, and Sedimentation Control Plan (DESCP) that ensures protection of water quality and soil resources of the project site and all linear facilities for both the construction and operation phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in offsite flooding potential, meet local requirements, and identify all monitoring and maintenance activities. Monitoring activities shall include routine measurement of the volume of accumulated sediment in the stormwater extended-detention basin. Maintenance activities must include removal of accumulated sediment from the extended-detention basin when an average depth of 0.5 feet of sediment has accumulated in the detention basin. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1**. The DESCP shall contain the following elements. All maps shall be presented at a legible scale no less than 1 inch = 200 feet.

- ***Vicinity Map*** – A map shall be provided indicating the location of all project elements with depictions of all significant geographic features to include watercourses, washes, irrigation and drainage canals, and sensitive areas.
- ***Site Delineation*** – The site and all project elements (linears and laydown areas) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.
- ***Watercourses and Critical Areas*** – The DESCP shall show the location of all nearby watercourses including washes, irrigation and drainage

canals, and drainage ditches, and shall indicate the proximity of those features to the construction site. Critical areas mapped by the USACE shall also be shown.

- ***Drainage*** – The DESCP shall include hydrologic calculations for onsite areas and offsite areas that drain to the site; include maps showing the drainage area boundaries and sizes in acres, topography and typical overland flow directions, and show all existing, interim, and proposed drainage infrastructure and their intended direction of flow. Provide hydraulic calculations to support the selection and sizing of the drainage network, retention facilities and best management practices (BMPs). Spot elevations shall be required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet in flat terrain or to the limits of the offsite drainage basins.
- ***Clearing and Grading*** – The plan shall provide a delineation of all areas to be cleared of vegetation. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, cut/fill depths or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography tying in proposed contours with existing topography shall be illustrated. The DESCP shall include a statement of the quantities of material excavated at the site, whether such excavations or fill is temporary or permanent, and the amount of such material to be imported or exported or a statement explaining that there would be no clearing and/or grading conducted for each element of the project. Areas of no disturbance or areas to be preserved shall be properly identified and delineated on the plan maps.
- ***Project Schedule*** – The DESCP shall identify on the topographic site map the location of the site-specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). Separate BMP implementation schedules shall be provided for each project element for each phase of construction.
- ***Best Management Practices*** – The DESCP shall show the location, timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during project element excavation and construction, during final grading/stabilization, and after construction. BMPs shall include measures designed to control dust and stabilize construction access roads and entrances. The maintenance schedule shall include post-construction maintenance of treatment-control BMPs applied to disturbed areas following construction.
- ***Erosion Control Drawings*** – The erosion-control drawings and narrative shall be designed, stamped, and sealed by a professional engineer, a Certified Professional in Erosion and Sediment Control (CPESC), or a Certified Professional in Storm Water Quality (CPSWQ).

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP to Alameda County for review and comment. A

copy shall be submitted to the CPM no later than 60 days prior to the start of site mobilization for review and approval. The CPM shall consider comments received from Alameda County. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage-, erosion- and sediment-control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of stormwater BMP monitoring and maintenance activities.

SOIL&WATER-3: The project owner shall comply with the requirements of the General NPDES permit for discharges of storm water associated with industrial activity. The project owner shall develop and implement a Storm Water Pollution Prevention Plan (SWPPP) for the operation of the site. The project owner shall ensure that only stormwater is discharged onto the site. The project owner shall comply with the requirements of the general NPDES permit for discharges of storm water associated with industrial activity.

Verification: At least 30 days prior to commercial operation, the project owner shall submit the MEP operational SWPPP to the CPM. Within 10 days of its mailing or receipt, the project owner shall submit to the CPM any correspondence between the project owner and the RWQCB about the general NPDES permit for discharge of storm water associated with industrial activity. This information shall include a copy of the notice of intent sent by the project owner to the State Water Resources Control Board. A letter from the RWQCB indicating that there is no requirement for a general NPDES permit for discharges of storm water associated with industrial activity would satisfy this condition.

SOIL&WATER-4: Water used for project operation for process, sanitary, and landscape irrigation purposes shall exclusively be raw surface water from Byron-Bethany Irrigation District (BBID). Pumping or purchasing groundwater is prohibited. Water use shall not exceed the annual water-use limit of 187 acre-feet per year. The project owner shall monitor and record the total water used on a monthly basis. For calculating the annual water use, the term “year” will correspond to the date established for the annual compliance report (ACR) submittal.

Prior to using raw surface water for process needs, the project owner shall install and maintain metering devices as part of the water supply and distribution systems to monitor and record, in gallons per day, the total volume(s) of water supplied to MEP from BBID. Those metering devices shall be operational for the life of the project.

For the first year of operation, the project owner shall prepare an annual Water Use Summary, which will include the monthly range and monthly average of daily raw surface water usage in gallons per day, and total water used by the project on a monthly and annual basis in acre-feet. For subsequent years, the annual Water Use Summary shall also include the yearly range and yearly average water use by the project. The annual Water Use Summary shall be submitted to the CPM as part of the ACR.

The project owner shall work with BBID to implement a water conservation program to offset water used during construction and for plant process requirements. To fund the implementation of the water conservation program, the project owner shall either: (1) contribute to BBID's water conservation program to implement new water conservation measures on a per acre foot basis of BBID freshwater consumed annually (potable water for personnel consumption, eyewash stations, showers, and sanitary needs not included), (2) contribute to BBID an amount necessary to fund a one-time capital investment that is reasonably expected to result in water conservation that will offset the project's maximum annual raw water usage of 187 acre-feet, or (3) subject to approval by the CPM, implement a combination of the two previous options based on recorded annual water usage. A payment of $15,000 shall be made to BBID to offset water used for construction and to fund the creation of the water conservation program.

BBID shall have the first priority to develop a water conservation program including the methods for conservation, verification of the volume of water conserved, and the water conservation costs (per acre-foot) to be charged to MEP. The Contra Costa Water District or Alameda Zone 9 shall have a second priority to develop an acceptable water conservation program including methods, verification, and costs. The water conservation program(s) shall be provided to the CPM for review and approval. Contributions to a water conservation program are not required for use of recycled water during construction or operation.

Verification: At least 60 days prior to commercial operation of MEP, the project owner shall submit to the CPM evidence that metering devices have been installed and are operational on the water supply and distribution systems. When the metering devices are serviced, tested and calibrated, the project owner shall provide a report summarizing these activities in the next annual compliance report. The project owner, in the annual compliance report, shall provide a Water Use Summary that states the source and quantity of raw surface water used on a monthly basis and on an annual basis in units of acre-feet. Prior annual water use including yearly range and yearly average shall be reported in subsequent annual compliance reports (ACR).

At least 30 days prior to construction, the project owner shall submit the water conservation program(s) by the selected local water agency(s) to the CPM for review and approval. The water conservation program shall include:

a. Identification of the methods intended to achieve water conservation, including how the total volume of water conserved in a given year will be measured or estimated.
b. Verification that the water conservation methods that have been funded by MEP have been implemented and that the intended water conservation has been achieved.
c. Water Conservation Fees required on a per acre foot basis shall be calculated based on the estimated costs to implement, maintain, and monitor the water

conservation efforts. For longer return period projects, water conservation fees may be aggregated to support financing or matched by other sources.

d. Reporting to the Project Owner and the CEC on an annual basis to demonstrate that the water conservation program has resulted in a conservation of water equal to or greater than the total water use at MEP from the previous year. For longer return period projects involving a one-time capital investment, water conservation shall be allocated based on the portion of funding provided by MEP.

The project owner shall provide proof that the initial contribution to the water conservation program was paid to a CPM-approved water conservation program prior to site operations. Annual use payments shall be determined based upon the approved rate on per acre-foot of fresh water reported annually in the ACR. Annual use payments to a water conservation program, confirmed by the CPM, shall be made no later than 60 days following CPM approval of the ACR. The project owner shall provide data and a report to the CPM describing the water conservation program with estimates of the annual "calculated" water saved in acre-feet in the subsequent ACR.

Payments for longer return period capital improvements should be accounted for using standard engineering economic analysis. Water use at MEP should also be tracked in an annual water use account. Once a long return period project is implemented and water conservation begins, water conservation should also be tracked on an annual basis. Conserved water from MEP funded projects should be deducted from the MEP water use account on an annual basis. Payment history, project funding, and MEP water use and conservation accounting shall be documented in the ACR.

SOIL&WATER-5: The project owner shall not discharge wastewater, other than non-contact stormwater, and shall provide evidence that industrial wastewater and contact stormwater are being disposed of at an appropriately licensed facility.

Verification: The project owner shall provide evidence to the CPM of proper industrial wastewater disposal, via a licensed hauler to an appropriately licensed facility, in the annual compliance report.

REFERENCES

BBID 2009a - Byron Bethany Irrigation District / R. Gilmore (TN 54252) Letter Regarding District Background, dated 11/23/2009. Submitted to CEC on 11/24/2009.

BBID 2010a - Byron Bethany Irrigation District / R. Gilmore (TN 55780) Email regarding district facilities, dated 3/5/2010. Submitted to CEC on 3/8/2010.

BBID 2010b - Byron Bethany Irrigation District (TN 58128) BBID Recycled Water Policy - October 2001. Submitted to CEC on 8/23/2010.

BBID 2010c - Byron Bethany Irrigation District (TN 58129) BBID Recycled Water Feasibility Study - Draft Dated July 2001. Submitted to CEC on 8/23/2010.

BBID 2010d - Byron Bethany Irrigation District (TN 58718) Clarification of water supply with Byron Bethany Irrigation District, dated 10/6/10. Submitted to CEC on 10/6/2010.

BBID 2010e - Byron Bethany Irrigation District (TN 59069) Mariposa Energy Project, Comments on Proposed Soil & Water Resources Testimony, dated 11/28/10. Submitted to CEC on 11/28/2010.

BBID 2010f - Byron Bethany Irrigation District (TN 59077) BBID Comments on MEP Soils and Water Resources Staff Assessment. Submitted to CEC on 11/29/2010.

CEC 2003- CEC Commission Decision: East Altamont Energy Center. Docket No. 01-AFC-4.

CEC 2010q - California Energy Commission/V Geronimo (TN: 58011) Record of Conversation with Contra Costa Water District. re: water conservation. August 6, 2010

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CEC 2010y – California Energy Commission Commission Decision: Marsh Landing Generating Station. Docket 08-AFC-03. August 2010.

CH2M 2009f- CH2M Hill / D. Urry (TN 54287). Data response Sets 1A and 1B, dated 11/30/2009. Submitted to CEC on 11/30/2009.

CH2M 2010b- CH2M Hill / D. Urry (TN 55375). Data response Sets 1C dated 2/12/2010 Submitted to CEC on 2/12/2010.

CH2M 2010d- CH2M Hill / D. Urry (TN 55797). Applicant's Supplement B Additional Laydown Area Analysis, dated 3/5/2010 Submitted to CEC on 3/8/2010.

CH2M 2010x - CH2M Hill / D. Urry (TN 59083). Mariposa Energy Center (09-AFC-03) Applicants Comments on the CEC Staff, dated 11/24/10. Submitted to CEC on 11/30/2010.

CH2M 2010ab - CH2M Hill / D. Urry (TN 59119). Project Description Update for Proposed Water Supply & Natural Gas Pipeline, dated 12/1/10. Submitted to CEC on 12/2/2010.

CH2M 2010ae - CH2M Hill / D. Urry (TN 59197). Project Description Update for Proposed Water Conservation, dated 12/9/10. Submitted to CEC on 12/9/2010.

MEP 2009a- Mariposa Energy LLC / B. Buchynsky (TN 51974). Application for Certification for Mariposa Energy Project, dated 6/15/2009. Submitted to CEC on 6/15/2009.

PMFC 2010- Review of 2009 Ocean Salmon Fisheries. Pacific Management Fisheries Council. February 2010.

Reclamation 2005- U.S. Bureau of Reclamation, Long Term Renewal Contract Between the United States and Byron-Bethany Irrigation District, Signed July 25, 2005.

Swartz 2010- Contra Costa County (CCC) / David Swartz, CCC Public Works Department. Pers. comm. 05/03/2010.

RS 2010e - Robert Sarvey (TN 59213). Mariposa comments on Staff Assessment, dated 12/9/2010. Submitted to CEC on 12/10/2010

SWRCB 2010 – Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem. Prepared pursuant to the Sacramento-San Joaquin Delta Reform Act of 2009. 8/3/2010.

TRAFFIC AND TRANSPORTATION

Revised Testimony of Andrea Koch, Shaelyn Strattan, and William Walters

This section is revised from the Staff Assessment published
on November 8, 2010

SUMMARY OF CONCLUSIONS

Energy Commission staff has analyzed the information provided in the Application for Certification (AFC) and acquired from other sources to determine the potential for the Mariposa Energy Project (MEP) to have significant adverse traffic and transportation-related impacts. Staff has also assessed the potential for mitigation proposed by the applicant and conditions developed by staff to reduce any potential impacts to a less than significant level, as well as the feasibility and enforceability of those proposed mitigations and recommended conditions of approval.

As currently proposed, the Mariposa Energy Project (MEP) could result in significant impacts to the traffic and transportation system serving the project site and surrounding community.

- The MEP could significantly degrade existing peak hour levels-of-service (LOS) at the intersection of West Grant Line Road and Midway Road, resulting in increased delays for vehicles. However, Condition of Certification **TRANS-3** would reduce these impacts to a less than significant level.
- The MEP could significantly impact aviation safety under certain weather and overflight conditions during plant operations. The exhaust emitted from the MEP's four stacks would create high-velocity thermal plumes, potentially causing aircraft flying directly overhead to experience turbulence severe enough to threaten aircraft control. However, Conditions of Certification **TRANS-7** and **TRANS-8** would reduce these impacts to a less than significant level.
- With full implementation of Conditions of Certification **TRANS-1** through **TRANS-8**, the MEP would comply or be consistent with all applicable transportation-related federal, state, and local laws, ordinances, regulations, and standards (LORS).

INTRODUCTION

In compliance with California Environmental Quality Act (CEQA) and Energy Commission requirements, this analysis identifies the MEP's potential impacts to the surrounding transportation systems and proposes mitigation measures (conditions of certification) that would avoid or lessen these impacts. It also addresses the project's consistency with applicable federal, state, and local transportation-related laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation that apply to this project.

TRAFFIC AND TRANSPORTATION Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Code of Federal Regulations (CFR) Title 49, Subtitle B: Sections 171-177 and 350-399	Requires proper handling and storage of hazardous materials during transportation.
CFR Title14 Aeronautics and Space, Part 77 - Objects Affecting Navigable Airspace (14 CFR 77)	These regulations establish standards for determining physical obstructions to navigable airspace; set noticing and hearing requirements; provide for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace; and oversee the development of antenna farm areas.
State	
California Vehicle Code (CVC): Div. 2, Chap. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14; Div. 14.1, Chap. 1 & 2; Div. 14.3; Div. 14.7; Div. 14.8; & Div. 15	Includes regulations pertaining to: licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.
California Streets and Highway Code (S&HC): Div.1, Chap. 3; Div. 2, Chap. 5.5 and 6	Includes regulations for the care and protection of State and County highways and provisions for the issuance of written permits.
California Health and Safety Code: Section 25160 et seq.	Pertains to operators of vehicles transporting hazardous materials; promotes safe transportation of hazardous materials.
Local	
San Joaquin Council of Governments (SJCOG) 2007 Regional Transportation Plan	Establishes the vision for the region's future transportation system. Objectives include: supporting the continued maintenance and preservation of the existing transportation system; and requiring mitigation measures for land uses which significantly impact the Congestion Management Program network.
San Joaquin County Municipal Code, Title 10: Division 2, Chapter 4	Establishes truck routes and maximum weight limits for commercial vehicles.
City of Tracy Municipal Code Title 3: Sections 3.08.290,.300, and .310	Establishes designated truck routes and route restrictions for overweight vehicles and loads.
Mountain House Community Services District – Transportation Permit Requirements	Requires a permit for oversized or overweight vehicles (as designated by CVC Division 15) to travel through Mountain House.
Contra Costa County Airport Land Use Compatibility Plan (CCC-ALUCP), Policies: 4.3.4 FAA Notification; 4.3.6 Other Flight Hazards; 6.7.4 and 6.5.4 Height Limitations; 6.9.3 Hazards to Flight	Provides requirements for: protection of airspace; FAA notification for objects that may exceed a Federal Aviation Regulation (FAR) Part 77 conical surface (and intrude into airspace); definition of the airport influence area to encompass the FAR Part 77 conical surface; Airport Land Use Commission (ALUC) review for any proposed object taller than 100 feet in Compatibility Zone 'D'; and prohibition of land uses which would cause flight hazards.
Contra Costa County General Plan Transportation and Circulation Element: Section 5.10 Airports and Heliports, especially Policies 5-70 and 5-72	Provides goals and policies for local and regional transportation and incorporates Contra Costa County Airport Land Use Commission (CCC-ALUC) plans and policies. Includes requirements for lighting, marking, and noticing temporary structures (such as construction cranes and antennae) which would penetrate any adopted height limit surface for airports (Policy 5-70). Prohibits any use which would adversely affect safe air navigation within a safety zone (Policy 5-72).
Contra Costa County General Plan Growth Management Element: Table 4-1, Figure 4-2	Provides level of service (LOS) standards for roads within Contra Costa County.

Contra Costa County Municipal Code: Title 10, Public Works	Provides requirements for permits in the right-of-way, including those for encroachment, use, restoration, repairs, utilities, vehicle movement, pole and transmission line clearances, visible devices, material storage setbacks, construction, and safeguard requirements.
Alameda County East County Area General Plan, Transportation Systems Element Policies 180, 190, 193, 207; Alameda County Code, Chapter 15.44 Cumulative Traffic Impact Mitigation Fees and Chapter 15.48 Tri-Valley Transportation Development Fee for traffic mitigation	Policies 180 and 207 and Chapters 15.44 and 15.48 require “fair share" traffic impact mitigation fees. Policy 190 requires transportation demand management for new development. Policy 193 requires preparation of Deficiency Plans for new development that directly causes level of service (LOS) to exceed LOS D on major arterial segments and LOS E on Congestion Management Program (CMP) designated roadways (e.g., Interstate Highway 580).
Alameda County East County Area General Plan, Land Use Element Policy 150 and Program 64	Requires Alameda County to work with Contra Costa County to ensure that land uses approved in Alameda County within the Byron Airport’s referral area are compatible with the airport’s operations. States that Alameda County shall refer all major development and plans within the Byron Airport referral area to the Contra Costa County Airport Land Use Commission (CCC-ALUCP) for review. Requires the County to consider appropriate measures to minimize or eliminate potential adverse effects of development on airport operations or avigation. States that if a proposed project, including any mitigation measures, is determined to create a hazard to avigation or an adverse impact on airport operations, the County shall not approve the project.
Alameda County Congestion Management Agency’s 2009 Congestion Management Program (Note: The Alameda County Congestion Management Agency is now part of the Alameda County Transportation Commission.)	For roads within the Congestion Management Program network, establishes an LOS standard of E, except where F was the LOS originally measured, in which case the standard is LOS F.
Alameda County Municipal Code, Title 10 Vehicles and Traffic: Chapter 10.04 County Highway Traffic Regulations; Chapter 10.08 State Highway Traffic Regulations; Chapter 10.16 Oversize Trucks	Prohibits storage of vehicles on County and State streets; requires oversize trucks needing terminal access from the federal highway system to obtain destination and route approval from the County.
Alameda County Municipal Code, Title 17 Zoning: Chapter 17.52 General Requirements	Provides requirements pertaining to parking spaces, driveway access, and loading areas.

PROJECT DESCRIPTION

The proposed MEP is a natural gas-fired, simple-cycle, nominal 200-megawatt (MW) peaking power plant facility. As a peaking power plant, the MEP would operate only during periods of high electrical demand when the Pacific Gas and Electric Company (PG&E) needs an additional power supply. If approved, the MEP would be constructed in approximately 14-15 months.

SETTING

The proposed 10-acre MEP site is located in an unincorporated area in the northeastern corner of Alameda County, near Contra Costa County to the north and San Joaquin County to the east. The MEP site is approximately:

- 6 miles south of Byron
- 2.7 miles southeast of Contra Costa County's Byron Airport
- 2 miles west of the San Joaquin County boundary
- 2.5 miles west of the community of Mountain House
- 7.4 miles northwest of the town of Tracy

The project site is located southeast of the intersection of Bruns Road and Kelso Road, about 2 miles southwest of the Byron Highway and 3.5 miles north of Interstates 580 and 205. It is located less than a mile south of the Pacific Gas and Electric Company (PG&E) Bethany Compressor Station and the Kelso Substation. Direct access to the MEP site is from Bruns Road onto an existing 1,100 foot-long easement. This easement provides shared access with the existing 6.5-megawatt (MW) Byron Power Cogeneration Plant, which occupies 2 acres of the 158-acre parcel on which MEP is located and was not approved through the Energy Commission's siting process.

Regional site access to the proposed project site from the north is via Byron Highway, while regional access from the south is via I-580 from the West Grant Line Road Interchange and via I-205 from the Mountain House Parkway Interchange. Local roads for accessing the proposed project site are Bruns Road, Kelso Road, Mountain House Road, Mountain House Parkway, and West Grant Line Road. (See **Traffic and Transportation Figure 1 - Regional Transportation Setting**, **Traffic and Transportation Figure 2A - Local Transportation Setting South of the Project Site**, and **Traffic and Transportation Figure 2B - Local Transportation Setting North of the Project Site**.)

CRITICAL ROADS AND FREEWAYS

The following roadways are located near the proposed MEP and may be impacted by construction and operations traffic.

Interstate 205 (I-205)

Interstate 205 (I-205) is a freeway located approximately 3.5 miles south of the MEP site. It runs east-west for about 13 miles between I-580 to the west and I-5 to the east. East of the project site in San Joaquin County near Tracy, I-205 is a four-lane divided freeway. It changes into a six-lane divided freeway in Alameda County near Midway Road, about 3.5 miles southeast of the MEP site.

Interstate 580 (I-580)

Interstate 580 (I-580) merges with I-205 about 3.5 miles south of the MEP site. I-580 is a major inter-regional freeway route between the San Francisco Bay Area and the Central Valley, linking the cities of Dublin, Livermore, and Pleasanton. It extends from its easternmost point at I-5 in San Joaquin County to its western terminus in San Rafael,

just north of San Francisco. From its eastern terminus to its connection with I-205 in Alameda County, I-580 is four lanes. It then widens and continues west through Alameda County as an eight-lane freeway.

Byron Highway

Byron Highway is an arterial located about 2 miles northeast of the MEP site. It extends southeast from its intersection at Marsh Creek Road/Camino Diablo in Contra Costa County to the city of Tracy in San Joaquin County. Byron Highway has multiple names and road classifications which vary as the road crosses through different counties. In Contra Costa County, it is called J4 and classified as an arterial; in Alameda County, it is called Byron-Bethany Road and has no road classification; and in San Joaquin County, it is called West Byron Road and has two road classifications: major County road in unincorporated San Joaquin County and rural highway in the City of Tracy.

Bruns Road

Bruns Road is a north-south road lying along the western border of the MEP property and intersecting with Byron Highway to the north. An easement off of Bruns Road would provide the entrance, and therefore the direct access, to the project site.

Kelso Road

Kelso Road is just north of and adjacent to the proposed MEP site. Kelso Road runs east-west between the Delta Pumping Plant and Great Valley Parkway near West Byron Road (Byron Highway).

Mountain House Road

Mountain House Road runs north-south and is a local two-lane road in the vicinity of the MEP. It begins at Byron Bethany Road (Byron Highway) to the north and ends with West Grant Line Road near I-580 to the south. The City of Tracy 2005 General Plan classifies the roadway as a two-lane rural highway.

West Grant Line Road

West Grant Line Road is a two-lane rural roadway in the vicinity of the MEP site. It runs primarily east-west, beginning south of I-580, extending over I-580 in a northerly direction, and eventually heading east and ending at West Byron Road. West Grant Line Road is used by some commuters to bypass congestion on I-205 between I-580 and West Byron Road.

Level of Service

Level of Service (LOS) is a generally accepted measure used by traffic engineers and planners to describe and quantify the traffic congestion level on a particular roadway or intersection in terms of speed, travel time, and delay. 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 and

[1] The *Highway Capacity Manual* (HCM) is the most widely used resource for traffic analysis. The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. The current edition was published in 2000.

intersections. These levels of service range from LOS A, the best and smoothest operating conditions, to LOS F, the worst, most congested operating conditions. A more detailed description of LOS is found in **Traffic and Transportation Appendix A.**

Level of service (LOS) standards for the various roadways and intersections in the vicinity of the MEP are established by and under the jurisdiction of several different agencies. Staff used these LOS standards to evaluate potential MEP-generated traffic impacts. The following is a list of the applicable LOS standards:

- Contra Costa County – General Plan, Growth Management Element

  For semi-rural areas within Contra Costa County, a high **LOS C** is the lowest acceptable level of service (CCC 2005).

- Alameda County Congestion Management Agency – Congestion Management Program

  For roadways within the Congestion Management Program network (which includes State highways), the Level of Service standard is **LOS E**, **except where F was the LOS originally measured**. **Where LOS F already exists, LOS F is the standard** (ACCMA 2009).

- Alameda County – East County Area Plan

  For roadways within the Congestion Management Program network, new development in Alameda County shall be phased to coincide with roadway improvements so that affected roadways do not exceed **LOS E** within unincorporated areas. If LOS E is exceeded, Deficiency Plans for affected roadways shall be prepared in conjunction with the CMA (Congestion Management Agency).

  New development in Alameda County shall be phased to coincide with roadway improvements so that traffic volumes on intercity arterials significantly affected by a development project do not exceed **LOS D** on major arterial segments within unincorporated areas (AC 2000, Policy 193, p. 52).

OTHER TRANSPORTATION SYSTEMS

Freight Rail

Union Pacific (UP) has rail switching and terminal services in the City of Tracy, approximately 7 miles from the MEP site. There are no at-grade railway crossings in the vicinity of the MEP.

Passenger Rail

The Altamont Commuter Express (ACE) provides commuter train service between Stockton and San Jose, with connections to Amtrak and Caltrain into the Bay Area. The ACE stop closest to the proposed MEP site is in Tracy, where Mountain House residents would likely access the train. The ACE provides 3 round-trip peak hour trains and 1 mid-day train (ACE 2010; MHCSD 2010).

Bus Service

Tri Delta Transit provides bus service centered in East Contra Costa County, mainly between the cities of Antioch, Pittsburg, Brentwood, Oakley, Bay Point, Discovery Bay and Concord. It also provides commuter bus service between Wickland Elementary School in Mountain House and the Dublin/Pleasanton BART station on Monday through Friday during peak commute hours (MHCSD 2010; TDT 2010).

The San Joaquin Regional Transit District (SJRTD) provides 11 Interregional Subscription buses to the Bay Area. In the vicinity of the proposed MEP site, the bus stops in Tracy (MHCSD 2010; SJRTD 2010).

Carpool Facilities

There are several park-and-ride lots in Tracy in the vicinity of the proposed MEP. They are located at the intersections of: I-205, Grant Line Road, and Naglee Road; I-205 and MacArthur Drive exit; and 6th Street and Central Avenue (CC 2010).

Bicycle and Pedestrian Facilities

The Alameda Countywide Bicycle Plan (ACBP) and the Countywide Pedestrian Plan (CPP) do not include planned bikeways or pedestrian pathways within the vicinity of the MEP. The nearby roadways are generally not conducive to bicycle and pedestrian activity; they have gravel or dirt shoulders, are overgrown, and provide uneven footing. There are no crosswalks within the vicinity of the project.

However, there is some minor pedestrian and bicycle activity in the area. The California Aqueduct Bikeway is a bicycle and pedestrian path located a little over a mile south from the proposed MEP. It stretches approximately 70 miles from the Bethany Reservoir State Recreation area near the project site to the San Luis Reservoir (Ostertag 2001, p. 104). Also, east of the MEP, West Byron Road between the Alameda County line and Tracy is a proposed Class III bike lane (meaning that it would provide continuity to the local bikeway system, connecting discontinuous bikeway segments while sharing the right-of-way with motor vehicles) (SJCPW 2002, Figure 5).

Airports

The Byron Airport is a small public facility owned by Contra Costa County and used for general aircraft operations, flight training, skydiving, and ultralight and glider operations. Approximately 100 aircraft are based at the Byron Airport and the airport hosts about 140 aircraft operations daily (CCCALUC 2009a). Two groups, the Northern California Soaring Association (gliders) and Bay Area Skydiving, are based at the airport (CCCBOS 2010a). The proposed MEP site is located at the northeast corner of Alameda County, approximately 2.7 miles southeast of the Byron Airport (CH2M 2009f; see Traffic & Transportation Figure 1).

The Byron Airport has two runways arranged in a westward facing ‘V’ shape. See **Traffic and Transportation Figure 3**. Runway 12-30 (running northwest-southeast) is the airport’s primary runway (used for approximately 80 percent of aircraft operations) and is a non-precision runway. It is 4,500 feet long and 100 feet wide (BA 2005). There

are plans to upgrade Runway 12-30 to a precision runway[2] and extend the southeast end of the runway by 1,500 feet, for a total runway length of 6,000 feet, (BA 2005; CCCALUC 2000). The MEP site is located about 1 mile southwest of the runway's approach centerline and within 0.65 mile of the closest approach boundary.

Runway 5-23 (running southwest-northeast) is the Byron Airport's cross-wind runway, used mainly in the late spring and early summer when there are usually strong winds from the southwest. It has a visual flight path approach[3] (AIRNAV 2010a; BA 2005). The runway is 3,000 feet long and 75 feet wide. There are future plans to extend the northeast end of this runway by 900 feet for a total runway length of 3,900 feet (BA 2005). The MEP site is located about 1.5 miles from the approach centerline to this runway.

Operations Patterns

Due to prevailing westerly wind patterns, aircraft arriving and departing Byron Airport typically use Runways 30 and 23 (BA 2005). The traffic patterns for Runway 5/23 and Runway 12/30 are to the southeast and northeast, respectively (FAA 2010b). The standard traffic pattern altitude is 1,000 feet above ground level (AGL) (BA 2005, CCCALUCP 2000, p. 6-3).

Airspace

The Byron Airport has no air traffic control (ATC) tower (CCCALUC 2009b) and lies beneath Class E airspace. This airspace extends for a 5-mile radius around the Airport, from 700 feet AGL up to 18,000 feet above mean sea level (AMSL) (BA 2005). In Class E airspace, aircraft conducting instrument flights are required to be in contact with air traffic control (ATC), which in this case is provided by the Northern California Terminal Radar Approach Control (TRACON), or NORCAL. However, aircraft operating under visual flight rules[4] (VFR) are not required to be in radio communication with any ATC facility, and their flight paths need not conform to published instrument approach or departure patterns when operating within the Byron Airport airspace. Under VFR rules, aircraft are generally allowed to enter the standard pattern from any direction, provided it does not interfere with other aircraft or violate local noise abatement restrictions.

The proposed MEP location lies within Class G airspace, which is not controlled by a nearby air traffic control tower or any other air traffic facility. This airspace extends from the surface of the ground to the base of the overlying Class E airspace which begins at 700 feet AGL. Class G airspace is governed by Visual Flight Rules (VFR), described in the previous paragraph (FAA 2008). According to FAA regulations, aircraft must maintain an altitude of at least 500 feet AGL above any person, vessel, vehicle, or structure in sparsely populated areas. There are existing transmission towers near the proposed MEP site, standing 305 feet above mean sea level (AMSL) (CH2M 2010l;

[2] Both non-precision and precision approach procedures use navigational instruments and information allowing pilots to land in reduced visibility. A non-precision approach uses only lateral information (runway markings) for navigation, while a precision runway uses both lateral and vertical guidance for instrument approaches.

[3] A runway with a visual flight path approach is used by pilots flying under visual flight rules (VFR). A VFR pilot is expected to "see and avoid" obstacles and other aircraft and is not generally assigned routes and altitudes by air traffic control. Because a VFR pilot relies on sight instead of instruments for navigation, VFR flight may only occur during favorable weather conditions.

[4] Visual Flight Rules (VFR) identify conditions under which a pilot may fly without positive control from an air traffic control facility and can "see and be seen" by other pilots.

FAA 2010). Therefore, all aircraft, including ultralights and gliders, must maintain an altitude at or above 805 AMSL (680 feet AGL) when flying over or in the immediate vicinity of these structures. As a result of the towers' proximity to the site, it is likely that aircraft would continue to maintain that altitude when flying over the project site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document for evaluating environmental impacts are based on the CEQA Guidelines, the CEQA Environmental Checklist for Transportation/Traffic, and applicable LORS used by other governmental agencies. Specifically, staff analyzed whether the proposed project would result in the following:

1. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on roads, or congestion at intersections);
2. Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit;
3. Conflict with an applicable congestion management program, including, but not limited to, level of service standards (LOS) and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
4. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);
5. Result in inadequate emergency access;
6. Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities;
7. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
8. Produce a thermal plume in an area where flight paths are expected to occur below 1,000 feet from the ground[5]; or
9. Have individual environmental effects which, when considered with other impacts from the same project or in conjunction with impacts from other closely related past, present, and reasonably foreseeable future projects, are considerable, compound, or increase other environmental impacts.

[5] The FAA recommends that pilots avoid overflight of plume-generating industrial sites below 1,000 feet AGL (FAA 2006).

DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impacts of the proposed MEP on the traffic and transportation system are discussed in this section and based on an analysis comparing pre-MEP and post-MEP conditions. Staff evaluated the MEP's impacts for two separate future scenarios: peak construction period (when construction activity and employment would be maximized) and first year of full operation.

Traffic during the decommissioning period would likely be similar to traffic volumes experienced during construction, depending on the duration and extent of decommissioning, including dismantling of facilities and/or site remediation. Therefore, this analysis did not specifically examine traffic and transportation impacts from decommissioning.

Study Locations

Staff reviewed the following roadways, freeways, and intersections near the proposed MEP site:

Roadways:

- Byron Highway[6] (in Contra Costa County between North Bruns Way and Bruns Road)
- Bruns Road (in Alameda County between Kelso Road and Christensen Road)
- Mountain House Road (in Alameda County between Byron Bethany Road and West Grant Line Road)
- Kelso Road (mostly in Alameda County and partially in San Joaquin County and between Bruns Road and Great Valley Parkway)
- West Grant Line Road (at the Alameda/San Joaquin County Line)

Freeways:

- I-580 Eastbound (EB) and Westbound (WB) between:
  - North Flynn Road and West Grant Line Road
  - West Grant Line Road and Midway Road
  - Midway Road and Mountain House Parkway
- I-205 EB and WB (between Midway Road and Mountain House Parkway)

Intersections[7]:

- West Grant Line Road/I-580 EB ramps
- West Grant Line Road/I-580 WB ramps
- West Grant Line Road/Midway Road

[6] This segment of the Byron Highway is in Contra Costa County and is therefore also known as J4.

[7] Due to lack of traffic data for the area, only these intersections were studied. Turning movement counts were derived from existing studies (CH2M 2009c).

Construction Impacts and Mitigation

Analysis of MEP construction impacts focuses on the peak construction period, which would generate the most vehicle trips and result in the worst-case scenario for traffic impacts.

Construction Workforce Traffic

The MEP construction workforce would commute daily from locations relatively near the project within Alameda, San Joaquin, and Contra Costa Counties. The following is a breakdown of the approximate percentage of worker traffic traveling on each route to the MEP site:

- 10% via Byron Highway (originating from Contra Costa County)
- 30% via I-580 East (originating from Alameda County/San Francisco Bay Area)
- 20% via I-580 West (originating from San Joaquin County/Central Valley)
- 30% via I-205 West (originating from San Joaquin County/Central Valley)
- 10% via West Grant Line Road (originating from Tracy and beyond)

The workforce would likely peak in size with a maximum of 177 construction workers per day during Month 7. Energy Commission staff assumes that 10% of these workers would ride as passengers in other construction workers' vehicles. The estimate of 10 percent is based on the rural nature of the project area and surroundings and reflects a relatively low rate of carpooling (CEC 2010o). Based on this assumption, about 18 construction workers would carpool as passengers in other vehicles, and 159 workers would drive their own vehicles, resulting in 318 one-way daily vehicle trips during peak construction. Half of these trips would occur during the morning peak hours and half during the evening peak hours, which are workers' arrival and departure times, respectively. Refer to **Traffic and Transportation Table 2** later in this section, which shows estimated daily and peak hour worker trips during peak construction.

Truck Traffic

Peak construction of the MEP would generate approximately 36 daily one-way truck trips (comprised of 18 arrival trips and 18 departure trips). Of these 36 daily one-way truck trips, about 4 one-way trips (2 arrival and 2 departure trips) would occur during the morning peak hours, and another 4 one-way trips would take place during the evening peak hours.

For this traffic analysis, truck trips were converted to passenger car equivalent (PCE) trips at a ratio of 1.5 passenger cars for each truck (see AFC, 2009, pg. 5.12-15). Using this conversion, the MEP would generate approximately 54 one-way PCE truck trips per day. Of these trips, 12 one-way PCE truck trips would occur during peak hours, with 6 one-way PCE trips in the morning and 6 one-way PCE trips in the evening. Refer to **Traffic and Transportation Table 2** later in this section**,** which shows estimated daily and peak hour truck trips during peak construction.

A total of 26 oversized or heavy loads would be delivered during project construction (including both peak and off-peak construction periods). About 16 of these oversized or

heavy loads would likely be shipped via rail to Tracy and then transferred to trucks for transportation from Tracy to the MEP site. The remaining 10 loads would be transported to the MEP site entirely by truck.

The primary truck route would be via Byron Highway to Bruns Road into the project site or construction lay-down area. This is in accordance with Alameda County's recommendation that Byron Highway and Bruns Road be used as much as possible, as stated in the AFC. The proposed truck route appears to be consistent with all relevant jurisdictions' regulations. To further ensure that the truck routes used comply with limitations set by local jurisdictions and Caltrans, staff has included Condition of Certification **TRANS-1** to require the applicant to obtain any necessary permits from Caltrans and any relevant local jurisdictions, including the Counties of Alameda, Contra Costa, and San Joaquin, the City of Tracy, and the Mountain House Community Services District.

Oversized or overweight trucks with unlicensed drivers could be hazardous to the general public and/or damage roadways. To mitigate this hazard, Condition of Certification **TRANS-1** also requires that the project owner comply with local jurisdictions' and Caltrans' limits on vehicle sizes, weights, and driver licensing regulations. However, even properly sized and licensed trucks could damage roadways; for this reason, Condition of Certification **TRANS-2** is included, which requires that the project owner restore all roads damaged by construction activities.

Total Construction Traffic

The total workforce and truck trips generated during peak construction month would be 372 daily one-way trips (318 worker trips added to 54 PCE truck trips). Approximately 330 of these one-way trips would occur during peak hours: 165 during the morning peak and 165 during the evening peak. (Peak hour trips include all 330 one-way worker trips and 12 one-way PCE truck trips.) See **Traffic and Transportation Table 2** which is shown below. This table summarizes all peak construction traffic generated by the MEP, including construction worker trips and delivery/haul truck trips.

Traffic and Transportation Table 2
One-Way Trips Generated by Peak Construction

Vehicle Type	Daily Trips	AM Peak Hour Trips	PM Peak Hour Trips
Construction Workers 18 Carpooling Workers[a] 159 Drivers[b]	 Not Applicable 318	 Not Applicable 159	 Not Applicable 159
Delivery/Haul Trucks (PCE)[c]	54	6	6
Total	372	165	165

Note: The applicant estimates that peak construction would occur during Month 7 of the construction period. Assuming that construction begins in accordance with the applicant's proposed schedule, Month 7 of the construction period would occur during the year 2011.

[a] This is the number of peak construction workers expected to commute as passengers in other workers' vehicles.

[b] This is the number of peak construction workers who would drive their own vehicles. Some of these drivers would accommodate carpooling workers in their vehicles.

[c] PCE= Passenger Car Equivalent of trucks. PCE was calculated using a ratio of 1.5 passenger cars for each truck, consistent with guidelines in the Highway Capacity Manual 2000.

As discussed previously in the "Study Locations" section, staff analyzed the proposed MEP's potential traffic impacts by evaluating roadway segments, freeway segments,

and intersections in the vicinity of the project site. Staff compared existing traffic volumes and levels-of-service (LOS) to traffic volumes and LOS projected after addition of MEP construction workforce and truck traffic.

Traffic and Transportation Tables 3 and 4, below, compare pre-construction and peak construction morning and evening peak hour traffic volumes and LOS on study freeway segments. **Traffic and Transportation Table 3** summarizes this information for morning (AM) peak hour trips, while **Traffic and Transportation Table 4** summarizes this information for evening (PM) peak hour trips. Pre-construction and peak construction LOS would remain the same, with the exception of I-205 WB between Midway Road and Mountain House Parkway during the AM peak hour, which would change from LOS C to LOS D. The LOS standard for all freeway segments is LOS E. All study freeway segments currently operate at LOS E or better and are projected to continue to do so during peak construction.

Traffic and Transportation Table 3
Freeways: AM Peak Hour Trips and LOS during Peak Construction

Freeway Segment	**PM Peak Hour Volume and LOS**			**LOS Standard**
	Existing (Year 2009)	**MEP-Added Trips**	**Peak Construction (Year 2011)**[1]	
I-580 EB, North Flynn Road and West Grant Line Road	1282 **LOS A**	48	1330 **LOS A**	**LOS E**[2]
I-580 WB, North Flynn Road and West Grant Line Road	7854 **LOS E**	0	7854 **LOS E**	**LOS E**[2]
I-580 EB, West Grant Line Road and Midway Road	1273 **LOS A**	0	1273 **LOS A**	**LOS E**[2]
I-580 WB, West Grant Line Road and Midway Road	7800 **LOS D**	80	7880 **LOS D**	**LOS E**[2]
I-580 EB, Midway Road and Mountain House Parkway	312 **LOS A**	0	312 **LOS A**	**LOS E**[2]
I-580 WB, Midway Road and Mountain House Parkway	3011 **LOS D**	32	3043 **LOS D**	**LOS E**[2]
I-205 EB, Midway Road and Mountain House Parkway	3035 **LOS B**	0	3035 **LOS B**	**LOS E**[2]
I-205 WB, Midway Road and Mountain House Parkway	4449 **LOS C**	48	4497 **LOS D**	**LOS E**[2]

Note: The applicant estimates that peak construction would occur during Month 7 of the construction period. Assuming that construction begins in accordance with the applicant's proposed schedule, Month 7 of the construction period would occur during the year 2011.

[1] The traffic volume figures for Peak Construction (Year 2011) assume that all traffic volume increases result from construction-generated traffic and do not include an existing natural background increase in traffic. Due to economic conditions, it is assumed that background growth in traffic will not occur between now and 2011.

[2] This LOS standard for roadways within the Congestion Management Program network (including State highways) is from: the Alameda County Congestion Management Agency's Congestion Management Program; and the Alameda County East Area Plan.

Traffic and Transportation Table 4
Freeways: PM Peak Hour Trips and LOS during Peak Construction

Freeway Segment	PM Peak Hour Volume and LOS			LOS Standard
	Existing (Year 2009)	MEP-Added Trips	Peak Construction (Year 2011)[1]	
I-580 EB, North Flynn Road and West Grant Line Road	6961 **LOS D**	0	6961 **LOS D**	**LOS E[2]**
I-580 WB, North Flynn Road and West Grant Line Road	3615 **LOS B**	48	3663 **LOS B**	**LOS E[2]**
I-580 EB, West Grant Line Road and Midway Road	6912 **LOS D**	80	6992 **LOS D**	**LOS E[2]**
I-580 WB, West Grant Line Road and Midway Road	3590 **LOS B**	0	3590 **LOS B**	**LOS E[2]**
I-580 EB, Midway Road and Mountain House Parkway	2843 **LOS C**	32	2875 **LOS C**	**LOS E[2]**
I-580 WB, Midway Road and Mountain House Parkway	1081 **LOS A**	0	1081 **LOS A**	**LOS E[2]**
I-205 EB, Midway Road and Mountain House Parkway	4488 **LOS D**	48	4536 **LOS D**	**LOS E[2]**
I-205 WB, Midway Road and Mountain House Parkway	3178 **LOS B**	0	3178 **LOS B**	**LOS E[2]**

Note: The applicant estimates that peak construction would occur during Month 7 of the construction period. Assuming that construction begins in accordance with the applicant's proposed schedule, Month 7 of the construction period would occur during the year 2011.

[1] The traffic volume figures for Peak Construction (Year 2011) assume that all traffic volume increases result from construction-generated traffic and do not include an existing natural background increase in traffic. Due to economic conditions, it is assumed that background growth in traffic will not occur between now and 2011.

[3] This LOS standard for roadways within the Congestion Management Program network (including State highways) is from: the Alameda County Congestion Management Agency's Congestion Management Program; and the Alameda County East Area Plan.

Traffic and Transportation Table 5, below, compares pre-construction and peak construction annual average daily traffic (AADT) and LOS on study roadway segments. Although traffic volumes and therefore AADT would increase during peak construction, projections show that peak construction LOS is not expected to differ from pre-construction LOS. The LOS standards for the study roadways range from LOS C to D. All study roadways would perform at the LOS standard or better during peak construction.

Traffic and Transportation Table 5
Roadways: Traffic Volumes and LOS during Peak Construction

Roadways	Boundaries of Segment	Existing AADT[1] (Year 2009)	LOS	MEP-Added Trips	Peak Construction AADT[1] (Year 2011)	LOS	LOS Standard
Byron Highway	North Bruns Way and Bruns Road	13,261	**C**	38	13,299	**C**	**High LOS C[2]**
Bruns Road	Kelso Road and Christensen Road	286	**B**	372[5]	622	**B**	**LOS D[4]**
Mountain House Road	Byron Bethany Road and West Grant Line Road	3,366	**B**	336	3,702	**B**	**LOS D[3]**
Kelso Road	Bruns Road and North Great Valley Parkway	663	**B**	336	999	**B**	**LOS D[4]**
West Grant Line Road	At the Alameda/San Joaquin County Line	8,365	**C**	38	8,403	**C**	**LOS D[3]**

1 AADT stands for Annual Average Daily Traffic. These AADT figures include traffic traveling in both directions.
2 This LOS standard for roads in semi-rural areas is from the Contra Costa County General Plan Growth Management Element.
3 This LOS standard for arterials is from the Alameda County East Area Plan.
4 This is not an arterial and therefore has no formal LOS standard. However, for the purposes of this analysis, staff is applying the Alameda County East Area Plan's LOS D standard for arterials to this roadway as a threshold for traffic impacts.
5 This is a correction to the number in the AFC. See Reference CH2M 2010m.

Traffic and Transportation Table 6, below, compares pre-construction and peak construction delay and LOS at study intersections during the evening peak hour. Peak construction is projected to increase delay at all intersections, especially for the West Grant Line Road/Midway Road intersection. However, LOS would remain the same, except for the West Grant Line Road/I-580 EB intersection, which would change from LOS A to LOS B. The LOS standard for all intersections is LOS D. The only intersection that would not meet this standard during peak construction would be the West Grant Line Road/Midway Road intersection, which would operate at LOS F. This intersection already operates at LOS F pre-construction, and peak construction would worsen the intersection's conditions, increasing delay by almost 25 seconds. This would cause a significant impact to traffic; therefore, staff has incorporated **TRANS-3,** which requires the project owner to mitigate LOS impacts through methods such as staggering worker arrival and departure times, requiring off-peak arrivals and departures, and/or coordinating park-and-ride busing for workers. **TRANS-3** also requires the project owner to provide incentives for carpooling.

Traffic and Transportation Table 6
Peak Hour Delay and LOS on Study Intersections during Peak Construction

Study Intersection	Year 2009		Year 2011 with MEP		LOS Standard
	PM Peak		PM Peak		
	Delay	LOS	Delay	LOS	
West Grant Line Road/I-580 EB Ramps[1]	9.6	**A**	10.9	**B**	**LOS D[4]**
West Grant Line Road/I-580 WB Ramps[2]	10.0	**B**	10.4	**B**	**LOS D[4]**
West Grant Line Road/Midway Road[3]	91.3	**F**	116.0	**F**	**LOS D**

Note: These figures are based on turning movement counts from the Altamont Motorsports Park Rezoning Draft Environmental Impact Report (Impact Sciences, 2008).
These are the only intersections in the vicinity of the MEP for which turning movements are available. Furthermore, availability was restricted to PM peak hour counts.
[1] Controlling approach: southbound on West Grant Line Road
[2] Controlling approach: westbound on I-580 Ramp
[3] Controlling approach: northbound on Midway Road
[4] This intersection is subject to the LOS standard for both the road and the highway. In this case, the road standard of LOS D is more restrictive and will therefore be used as the threshold.

Peak construction traffic could also cause deterioration of pavement surfaces. **TRANS-2** would require the project owner to restore all public roads, easements, and rights-of-way that were damaged by project-related traffic or construction activities. Furthermore, the use of oversized vehicles during construction could create a hazard to the public by limiting motorists' views, obstructing lane space, and increasing roadway traffic during project construction. **TRANS-3** would mitigate these impacts. It would require, as part of the Traffic Control Plan (TCP): an approved Heavy Hauling Plan (HHP) to ensure that the project owner complies with vehicle size and weight limitations imposed by Caltrans and relevant local jurisdictions; plans for proper vehicle construction routes; timing of heavy equipment and building material deliveries; street and/or lane closure details; and placement of signing, lighting, and other traffic control devices. Staff is also requiring implementation of **TRANS-4** to require the applicant to obtain all the necessary encroachment permits for construction work and activities within road rights-of-way.

Linear Facilities

The proposed MEP includes construction of a 1.8 mile-long water pipeline. Pipeline construction would begin at the proposed pump-station at the northwest corner of the Byron Bethany Irrigation District (BBID) property and would be located to the east of the Bruns Road right-of-way until it reaches the BBID facility. From that point, the pipeline would be located within the northbound travel lane of Bruns Road, terminating at the MEP site.

Because pipeline construction would require cutting open the roadway along Bruns Road, Energy Commission staff is requiring Condition of Certification **TRANS-2** which requires the project owner to restore the roadway to at least its original condition after construction. Pipeline construction could also cause significant traffic impacts to Bruns Road during closure of the northbound travel lane. To mitigate this impact, staff is

requiring Condition of Certification **TRANS-3** which requires a traffic control plan to address temporary traffic congestion resulting from closure of one lane of travel. Staff is also requiring **TRANS-4** to require the applicant to obtain all the necessary encroachment permits for construction and lane closure.

Other linear facilities that would be part of the proposed MEP include: 0.7 mile of electrical transmission lines running north from the MEP switchyard over Kelso Road and connecting to the Kelso Substation; and a 580 foot-long natural gas line connecting to an existing PG&E gas line within the MEP site. Construction of the electrical transmission line over the Kelso Road right-of-way would cause traffic impacts to Kelso Road. As reflected earlier in this analysis, staff is requiring Condition of Certification **TRANS-3** to mitigate these impacts and address temporary road closure during construction. Staff is also requiring **TRANS-4** to require the applicant to obtain any necessary encroachment permits.

Construction Workforce Parking and Lay-down Area

MEP construction would require vehicle parking and lay-down areas for materials delivery and storage. These temporary facilities would include:

- A 9.2-acre worker parking and lay-down area along the eastern side of the project site;
- A 1-acre water supply pipeline worker parking and lay-down area located at the Byron Bethany Irrigation District (BBID) headquarters facility on Bruns Road (approximately 1.3 miles north of the project site);
- A 0.6-acre laydown area along the transmission line route adjacent to the PG&E Kelso Substation and Bethany Compressor Station.

Staff confirmed that the 9.2-acre temporary on-site parking and lay-down area would adequately accommodate construction parking and materials delivery and storage. On average, for every parked vehicle, a parking lot must have 350 square feet of space, which includes both the actual parking space and room for circulation. During peak construction, approximately 159 construction workers would drive and need parking on-site. Using the standard of 350 square feet of space needed for every parking space, approximately 1.28 acres would be needed to provide a parking space for every construction worker vehicle. Because the main parking and lay-down area is 9.2 acres, there would be sufficient room remaining for truck deliveries and materials storage. Alameda County's parking requirement of 1 space for every 2 employees (AC 2009c) would be met and exceeded. The 1-acre pipeline worker parking/lay-down area and 0.6-acre transmission line lay-down area would probably be adequate for the lower volume of materials and workers needed for these activities.

To ensure that the applicant would provide adequate space for construction parking and lay-down, staff has included Condition of Certification **TRANS-3**, which would require the applicant to prepare and submit a parking and staging plan. This would ensure that all construction-related vehicle parking and lay-down would occur in the designated areas and would not impact the availability of parking in the project area, create roadway hazards, or result in adverse impacts to LOS. **TRANS-3** would also ensure that the MEP complies with the Alameda County Municipal Code, Chapter 10.04 County

Highway Traffic Regulations and Chapter 10.08 State Highway Traffic Regulations. These chapters of the Alameda County Code prohibit storage of vehicles on County and State streets.

Hazardous Materials

Over the course of construction, one or two truck deliveries of hazardous materials would be required. These materials may include gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. Improper transportation of hazardous materials could prove a danger to the general public; therefore, Condition of Certification **TRANS-5** requires the owner to secure permits and licenses for the transport of hazardous materials and comply with all applicable regulations.

The applicant's proposed routes for hazardous materials delivery are generally the same as for regular truck deliveries. From I-580 and/or I-205, the proposed route is northwest along Byron Bethany Road and south along Bruns Road. From Contra Costa County, the route is southeast on Byron Bethany Road and south on Bruns Road. Hazardous materials from Stockton would travel west along Highway 4, then southeast along Byron Highway and south along Bruns Road. The applicant selected these routes to avoid residential and sensitive receptor locations (CH2M 2009c). These routes do appear to avoid sensitive receptor locations, such as schools and daycare facilities.

Delivery of materials could be hazardous to the public if a spill were to occur. The likelihood of an accident-caused spill would be lower during low traffic periods, and if a spill were to occur during these hours, fewer commuters would be exposed. Therefore, staff recommends Condition of Certification **TRANS-5** to ensure that all deliveries of hazardous materials would occur outside of normal commute hours. **TRANS-5** would also require that the project owner obtain all the proper permits and/or licenses from Caltrans and the Counties of Alameda, San Joaquin, and Contra Costa for transporting hazardous materials.

For more information, see the **HAZARDOUS MATERIALS MANAGEMENT** section of this Supplemental Staff Assessment (SSA).

Airport

During construction, tall equipment, such as cranes and derricks, would be in use on the project site. The Contra Costa County Airport Land Use Compatibility Plan (CCC-ALUCP) states that objects less than 100 feet in height generally pose no threat to aviation activities (CCCALUC 2000, Policies 6.7.4 and 6.5.4). There is no equipment planned for use in MEP construction that would exceed 100 feet in height. Also, the heights of construction equipment would be less than those triggering the need for the applicant to file FAA Form 7460-1, Notice of Proposed Construction or Alteration (FAA 2010c). Therefore, the construction phase of the MEP would not cause any significant impacts to aircraft or public health and safety.

Aircraft Communications

Walkie-talkies and other communications equipment planned for use during construction would not interfere with frequencies used for aviation communication. MEP

communications equipment would typically operate in the 20-50 or 148-174 megahertz ranges, which do not coincide with the communication frequencies used by aircraft in the vicinity, which are 114-117, 123, 203, and 374 megahertz (AirNav 2010; CH2M 2010n). Therefore, the proposed MEP is consistent with Policy 4.3.6c of the Contra Costa County Airport Land Use Plan, which prohibits land uses that may be sources of electrical interference with aircraft communications or navigation. See also the **LAND USE** section of this SSA, particularly Condition of Certification **LAND-4**, which prohibits the applicant from using radiofrequencies used by the Byron Airport and other nearby airports.

MEP Construction Impacts Conclusion

With implementation of the conditions of certification discussed above, construction of the MEP would result in less than significant impacts to the traffic and transportation system in the vicinity of the project. All construction-related trips and activities would comply with applicable LORS, and LOS would not be significantly impacted.

Operational Impacts and Mitigation

Workforce Traffic

The MEP would begin commercial operation in July 2012 and employ up to 8 full-time staff members. The facility would be staffed 7 days a week by 5 operating technicians working rotating 12-hour shifts. The remaining 3 employees would work standard 8-hour days, 5 days a week, with additional coverage as required. A maximum of 4 employees (1 operating technician and 3 regular employees) would be on-site simultaneously.

Operations employees would commute from the Counties of Alameda, Contra Costa, and/or San Joaquin and would generate a maximum of 8 new vehicle trips during the morning peak hours and 8 new vehicle trips during the evening peak hours. The total increase in daily vehicle trips, 16 trips, is a minimal increase in traffic and would have a less than significant adverse impact on overall traffic counts, congestion, and LOS along any of the routes or roadway intersections workers would use to access the project site.

The Transportation Systems Element of the Alameda County East County Area Plan and Chapters 15.44 and 15.48 of the Alameda County Code require fair share traffic impact fees for new development; Condition of Certification **TRANS-6** requires that the applicant pay these as necessary.

Truck Traffic and Hazardous Materials Delivery

Based on proposed permitted operations of 4,000 hours per year, a 6,500-gallon tanker truck would deliver aqueous ammonia to the site approximately 2 to 3 times per month for a maximum of 33 deliveries per year (and 66 one-way truck trips annually). However, because the MEP is a peaker plant and only expected to operate approximately 600 hours annually, the actual number of annual aqueous ammonia truck deliveries would probably be approximately 5 (for a total of 10 one-way truck trips annually). In addition, infrequent deliveries of small quantities of miscellaneous hazardous materials would be delivered to the site throughout the year (CH2M 2009c).

The total number of truck deliveries during project operations would be low and infrequent. Therefore, the number of truck deliveries would not cause a significant impact to traffic congestion or LOS.

The applicant's proposed routes for hazardous materials delivery are, from I-580 and/or I-205, northwest along Byron Bethany Road and south along Bruns Road, and from Contra Costa County, southeast on Byron Bethany Road and south on Bruns Road. From Stockton, the route would be west along Highway 4, then southeast along Byron Highway, and south along Bruns Road. The applicant selected these routes to avoid residential and sensitive receptor locations (CH2M 2009c). These routes do appear to avoid sensitive receptor locations, such as schools and daycare facilities. For more information, see the **HAZARDOUS MATERIALS MANAGEMENT** section of this Supplemental Staff Assessment (SSA).

The proposed truck routes appear to be consistent with all relevant jurisdictions' regulations. To further ensure that the truck routes used comply with limitations set by local jurisdictions and Caltrans, staff has included Condition of Certification **TRANS-1** to require the applicant to obtain any necessary permits from Caltrans and any relevant local jurisdictions, including the Counties of Alameda, Contra Costa, and San Joaquin.

Oversized or overweight trucks with unlicensed drivers could be hazardous to the general public and/or damage roadways. To mitigate this hazard, Condition of Certification **TRANS-1** also requires that the project owner comply with local jurisdictions' and Caltrans' limits on vehicle sizes and weights and driver licensing regulations.

Delivery of materials like aqueous ammonia could be hazardous to the public if a spill were to occur. The likelihood of an accident-caused spill would be lower during low traffic periods, and if a spill were to occur during these hours, fewer commuters would be exposed. Therefore, staff recommends Condition of Certification **TRANS-5** to ensure that all deliveries of hazardous materials would occur outside of normal commute hours. **TRANS-5** would also require that the project owner obtain all the proper permits and/or licenses from Caltrans and the Counties of Alameda, San Joaquin, and Contra Costa for transporting hazardous materials.

For a more detailed discussion on the handling and disposal of hazardous substances, see the **HAZARDOUS MATERIALS MANAGEMENT** section of this SSA.

Parking

The MEP would employ a total of 8 operations staff. Each day, a maximum of 4 employees would be on-site simultaneously. Alameda County requires 1 space for every 2 employees on-site during the largest work shift (AC 2009c), which would mean that the MEP would need to include 2 designated parking spaces for a work shift of 4 operations employees. According to Figure 2.3-1 in the AFC, the MEP would meet and exceed this requirement by providing 10 employee parking spaces. To ensure that the project owner would provide the required parking, staff has proposed Condition of Certification **TRANS-3**, which requires the applicant to provide a parking plan for both operations and construction to demonstrate compliance with Alameda County LORS.

Emergency Access

Staff believes that both regional and local emergency access to the MEP site is adequate. Regionally, emergency vehicles could access the site from I-580, I-280, and the Byron Highway. The most direct access would be from the Byron Highway directly onto Bruns Road and into the project site. Regarding local access, several County roads built to County standards provide access to the project site. To further ensure adequate emergency access, staff has included in Condition of Certification **TRANS-3** a requirement that the Traffic Control Plan demonstrate and ensure sufficient access.

On-site circulation of emergency vehicles would be subject to site plan review by the Alameda County Fire Department per conditions of certification in the **WORKER SAFETY AND FIRE PROTECTION** section of this Supplemental Staff Assessment (SSA).

Airport Operations and Hazards

Structure Height and Navigable Airspace

The MEP's four exhaust stacks and eight transmission poles do not encroach into navigable airspace and are therefore not hazardous to aircraft. The exhaust stacks are each 80 feet AGL in height and the transmission poles are 84 or 95 feet AGL, below the Federal Aviation Administration's (FAA's) thresholds triggering the need for the applicant to file FAA Form 7460-1, Notice of Proposed Construction or Alteration (FAA 2010c). Regardless, the applicant has filed the form as a precaution, and the FAA has issued a Determination of No Hazard to Air Navigation for each of the project's exhaust stacks and transmission poles (CH2M 2009f). Therefore, the MEP's structure heights are consistent with CFR Title14 Aeronautics and Space, Part 77 - Objects Affecting Navigable Airspace (14 CFR 77). The project is also consistent with Policies 6.7.4 and 6.5.4 in the Contra Costa County Airport Land Use Plan; these policies state that objects up to 100 feet in height in Compatibility Zone 'D' generally do not pose a threat to aviation safety (CCCALUC 2000).

Aircraft Communications

The MEP's proposed 230 kilovolt transmission line would not interfere with aircraft communications. See the **TRANSMISSION LINE SAFETY & NUISANCE** section of this SSA for more information.

Thermal Plumes

The proposed MEP is a gas-fired peaker power plant that would emit high velocity thermal plumes from four 80-foot high exhaust stacks during operation. High velocity thermal plumes can pose a threat to aviation safety. The FAA formally acknowledged plume hazards by amending the Aeronautical Information Publication to establish thermal plumes as flight hazards and recommend that pilots avoid overflight and fly upwind of facilities producing thermal plumes (CPA 2010a; FAA 2010a). Aircraft flying through plumes can experience significant air disturbances, such as turbulence and vertical shear.

Energy Commission staff uses a 4.3 meters per second (m/s) vertical velocity threshold[8] for determining whether a plume may pose a hazard to aircraft.[9] This velocity generally defines the point at which general aviation aircraft would begin to experience more than light turbulence. Exhaust plumes with high vertical velocities may damage aircraft airframes or cause turbulence resulting in loss of aircraft control and maneuverability (DOT 2009a; FAA 2006).

Staff calculated plume vertical velocities at different heights above the MEP's stacks, using environmental conditions which would produce the worst-case, highest velocity plumes. (See **Appendix TT-1**.) These environmental conditions include calm winds, cool weather, and full-load operation of the MEP. The MEP, a peaker plant projected to operate for about 600 hours annually (but permitted for up to 4,000 hours annually), would only operate at full-load when electrical demand is high. This usually occurs when the use of air conditioning is greatest, typically during the summer. During the summer, temperatures are warmer and winds in the area are greater, and neither of these conditions contributes to a worst-case vertical plume velocity. However, while plume velocities may be reduced during spring and summer operation, the potential hazard to aircraft is not eliminated.

From these calculations, staff determined that when the outside (ambient) temperature is 46 degrees Fahrenheit, the plume vertical velocity for a single plume would be 4.3 m/s or higher up to a height of 780 feet above ground level (AGL). At this same temperature, the combined plume vertical velocity for all four exhaust stacks would be 4.3 m/s or higher up to a height of 1,230 feet AGL. It should be noted that although these are the altitudes at which the *average* plume vertical velocity would be 4.3 m/s or greater, parts of the plume could have up to twice the average velocity at these altitudes. Aircraft encountering a vertical plume velocity of less than 4.3 m/s would generally experience the upper limits of light turbulence, which is generally acceptable for safety. However, if these aircraft overfly an individual plume at altitudes below 780 feet AGL, overfly the combined plumes at altitudes below 1,230 AGL, or experience higher instantaneous velocities, they could be subject to greater turbulence and possibly threats to aircraft control and stability.

Aircraft generally enter or depart the Byron Airport traffic pattern at or above 1,000 feet AGL (BA 2005, CCCALUCP 2000, p. 6-3). However, as noted earlier in this section, this is an uncontrolled airport. Aircraft operated under VFR may fly as low as 500 feet above the tallest structure in the area and may join the traffic pattern at any location that does not interfere with other traffic in the airspace (FAA 2010). Ultralights and gliders often fly within Class G airspace. Near the Byron Airport, Class G airspace extends from the surface of the ground to an altitude of 700 feet AGL (at the base of the overlying Class E airspace) (FAA 2008; BA 2005). Gliders typically have traffic pattern entry points

[8] This is based on staff's review of a 2004 safety circular (AC 139-05(0)), prepared by the Australian Government Civil Aviation Safety Authority, that noted "aviation authorities have established that an exhaust plume with a vertical velocity in excess of 4.3 meters per second (m/s) may cause damage to an aircraft airframe or upset an aircraft when flying at low levels" (CASA 2004). In their safety study on thermal plumes the FAA noted that they "do not necessarily approve/disapprove or warrant the data contained in the CASA AC 139-05." The safety team accepted "the information and data contained in AC 139-05 as a valid representation of hazardous exhaust velocities" (FAA 2006).

[9] In addition to the exhaust stacks, the MEP's chiller radiator would also emit a plume. However, this plume would be low velocity and significantly below the 4.3 m/s threshold for aviation impacts. (See Appendix TT-1 for more information.) Therefore, staff conducted no further analysis of this plume.

ranging from 600 to 1,000 feet AGL (FAA 1993). As for ultralights, the FAA recommends they enter pattern altitudes at 500 feet below the standard airport pattern altitude – as low as 500 feet AGL at the Byron Airport (FAA 1993).

As evidenced in the radar flight tracking data submitted by the applicant (see Traffic and Transportation Figures 4A and 4B), aircraft do fly over and around the proposed project site at or below 1,000 feet AGL. Aircraft equipped with transponders only infrequently overfly the proposed location of the MEP (CH2M 2010n). Of all aircraft equipped with transponders and operating within five nautical miles of the Byron Airport during the study periods in late 2009 and early 2010, only 2.5 percent flew within 0.5 mile of the proposed MEP location. However, this data did not include aircraft without transponders, such as aircraft operating under VFR and without a flight plan or operating outside of Class B and Class C airspace. Aircraft such as ultralights and power parachutes are unlikely to have transponders and less likely to follow standard traffic patterns. However, the site is not within or immediately adjacent to any published approach/departure patterns or the traffic pattern for the airport. Even allowing for drift and expansion of the potentially affected area due to merged plumes, the area of potential hazard would not encroach on any established approach/departure or traffic pattern. In addition, the number of aircraft traversing the site is relatively low, even when compared to traffic in the surrounding area. The airspace above and immediately surrounding the project site is not an established student pilot training area or designated jump site, and does not show extensive use by ultralights or gliders. The elevation of the terrain east of the project site rises sharply and there are transmission lines and other structures that discourage low altitude flight in the project vicinity. There are also no noise or other restrictions that would force pilots to overfly the project site in order to execute approach or departure procedures, or enter the pattern.

It is reasonable to require projects to avoid introducing a potential aviation safety hazard into an airport's airspace that would require a change in air traffic patterns or impede local flight operations in such a way as to substantially curtail or preclude continued airport operation[10]. However, outside the controlled or local operational areas of an airport, it becomes the pilot's responsibility to see and avoid (or accommodate) potential hazards to flight. The project site is 2.7 miles and, as noted above, outside published traffic patterns.

High velocity plumes do present a potentially significant hazard to aircraft. An aircraft accident resulting from inadvertent overflight and loss of control could also result in a health and safety concern for those in the aircraft and on the ground. However, the availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public. In addition, Condition of Certification **TRANS-7** would require lighting of the exhaust stacks, consistent with FAA requirements, alerting pilots to the presence of the facility and reducing the potential for inadvertent overflight of the facility and exposure to high-velocity thermal plumes. Condition of Certification **TRANS-8** would provide a means to advise pilots of the

[11] This policy makes no reference to potential hazards from thermal plumes. Staff evaluates potential aviation impacts from the MEP's thermal plumes elsewhere in this document and concludes that impacts, after implementation of proposed conditions of certification, would be less than significant.

potential hazard to flight associated with the project-generated exhaust plumes and the need to avoid overflight of the facility below 1,500 feet AGL. These measures would include requests for the issuance of a Notice to Airmen (NOTAM); amendment of the Airport/Facility Directory; revision of the San Francisco Sectional Chart; and addition of a new remark to the Automated Surface Observing System (ASOS). With these mitigations, impacts to aviation would be less than significant.

Staff found no evidence that large concentrations of birds would be attracted to the plume and pose collision threats to planes. (For more information, see the **BIOLOGICAL RESOURCES** section of this SSA.) The project would not cause or contribute to any other potential hazards to aviation operation or safety.

MEP Operation Impacts Conclusion

With implementation of the conditions of certification discussed above, impacts to ground transportation and aviation resulting from the operation of the MEP would be less than significant.

COMPLIANCE WITH LORS

Traffic and Transportation Table 7 provides a general description of applicable laws, ordinances, and regulations (LORS) applicable to the MEP and pertaining to traffic and transportation.

TRAFFIC AND TRANSPORTATION Table 7
Project Compliance with Adopted Traffic and Transportation LORS

Applicable Law	Description	Consistency
Federal		
Code of Federal Regulations (CFR) Title 49, Subtitle B: Sections 171-177 and 350-399	These regulations govern the transport of hazardous materials.	**Consistent.** The applicant indicated in the AFC that the project will comply with these regulations. Also, **TRANS-5** requires compliance.
CFR Title14 Aeronautics and Space, Part 77 - Objects Affecting Navigable Airspace (14 CFR 77)	These regulations establish standards for determining physical obstructions to navigable airspace; set noticing and hearing requirements; provide for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace; and oversee the development of antenna farm areas.	**Consistent.** The FAA issued a "Determination of No Hazard to Air Navigation" for each of the project's power plant exhaust stacks and transmission line poles.
State		
California Vehicle Code (CVC): Div. 2, Chap. 2.5; Div. 6, Chap. 7; Div. 13, Chap. 5; Div. 14; Div. 14.1, Chap. 1 & 2; Div. 14.3; Div. 14.7; Div. 14.8; & Div. 15	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials (e.g. California Highway Patrol).	**Consistent.** The applicant indicated in the AFC that the project will comply with these regulations. Also, **TRANS-1** and **TRANS-5** require compliance.
California Streets and Highways Code (S&HC): Div.1, Chap. 3; Div. 2, Chap. 5.5 and 6	Includes regulations for the care and protection of State and County highways, including provisions for the issuance of encroachment permits.	**Consistent.** The applicant indicated in the AFC that the project will comply with these regulations. Also, **TRANS-1**, **TRANS-4**, and **TRANS-2** require compliance.
California Health and Safety Code:	Pertains to operators of vehicles	**Consistent.**

Section 25160 et seq.	transporting hazardous materials; promotes safe transportation of hazardous materials.	The applicant indicated in the AFC that the project will comply with these regulations. Also, **TRANS-1** and **TRANS-5** require compliance.
Local		
San Joaquin Council of Governments (SJCOG) 2007 Regional Transportation Plan	Establishes the vision for the region's future transportation system. Objectives include: supporting the continued maintenance and preservation of the existing transportation system; and requiring mitigation measures for land uses which significantly impact the Congestion Management Program network.	**Consistent.** The project would not cause any degradation or significant impacts to the ground transportation network with the implementation of **TRANS-4**, **TRANS-2**, and **TRANS-3**.
San Joaquin County Municipal Code, Title 10: Division 2, Chapter 4	Establishes truck routes and maximum weight limits for commercial vehicles.	**Consistent.** Implementation of **TRANS-1** would ensure consistency.
City of Tracy Municipal Code Title 3: Sections 3.08.290,.300, and .310	Establishes designated truck routes and route restrictions for overweight vehicles and loads.	**Consistent.** Implementation of **TRANS-1** would ensure consistency.
Mountain House Community Services District – Transportation Permit Requirements	Requires a permit for oversized or overweight vehicles (as designated by CVC Division 15) to travel through Mountain House.	**Consistent.** Implementation of **TRANS-1** would ensure consistency.
Contra Costa County Airport Land Use Compatibility Plan (CCC-ALUCP) Policies: 4.3.4 FAA Notification; 4.3.6 Other Flight Hazards; 6.7.4 and 6.5.4 Height Limitations; 6.9.3 Hazards to Flight	Provides requirements for: protection of airspace; FAA notification for objects that may exceed a Federal Aviation Regulation (FAR) Part 77 conical surface (and intrude into airspace); definition of the airport influence area to encompass the FAR Part 77 conical surface; Airport Land Use Commission (ALUC) review for any proposed object taller than 100 feet in Compatibility Zone 'D'; and prohibition of land uses which would cause flight hazards.	Policy 4.3.4 FAA Notification **Consistent:** The applicant notified the FAA of the proposed construction by filing FAA Form 7460-1, Notice of Proposed Construction or Alteration, even though the project height is below the threshold requiring FAA notification. The FAA has issued a Determination of No Hazard to Air Navigation for each of the project's exhaust stacks and transmission poles (CH2M 2009f). Policy 4.3.6 Other Flight Hazards[11] **Consistent:** The MEP would not cause visual, electronic, or bird strike hazards to aircraft in flight. • There would be no glare or distracting lights which could be mistaken for airport lights. • The MEP would not generate dust, steam, or smoke which may impair pilot visibility. (See the **VISUAL RESOURCES** and **AIR QUALITY** sections of this SSA for more information.) • Communications equipment and transmission lines would not interfere with aircraft communications or navigation. (See the **TRANSMISSION LINE SAFETY & NUISANCE** section of this SSA for more information on transmission lines.) • The MEP would not attract birds which could be hazardous to aircraft.

[11] This policy makes no reference to potential hazards from thermal plumes. Staff evaluates potential aviation impacts from the MEP's thermal plumes elsewhere in this document and concludes that impacts, after implementation of proposed conditions of certification, would be less than significant.

		(See the **BIOLOGICAL RESOURCES** section of this SSA for more information.) Policies 6.7.4 and 6.5.4 Height Limitations **Consistent:** The tallest parts of the MEP (the transmission poles and stacks) are less than 100 feet tall. Policy 6.9.3 Hazards to Flight[12] **Consistent:** The MEP would not attract birds or create a visual or electronic hazard to flight.
Contra Costa County General Plan Transportation and Circulation Element: Section 5.10 Airports and Heliports, Policies 5-70 and 5-72	Provides goals and policies for local and regional transportation and incorporates Contra Costa County Airport Land Use Commission (CCC-ALUC) plans and policies. Includes requirements for lighting, marking, and noticing temporary structures (such as construction cranes and antennae) which would penetrate any adopted height limit surface for airports (Policy 5-70). Prohibits any use which would adversely affect safe air navigation within a safety zone (Policy 5-72).	**Consistent.** Construction cranes would not penetrate any adopted height limit surface, and the MEP is not proposed for construction within a safety zone.
Contra Costa County General Plan Growth Management Element: Table 4-1, Figure 4-2	Provides level of service (LOS) standards for roads within Contra Costa County.	**Consistent.** The project would not degrade Level of Service (LOS) in Contra Costa County below the applicable LOS standards.
Contra Costa County Municipal Code: Title 10, Public Works	Provides requirements for permits in the right-of-way, including those for encroachment, use, restoration, repairs, utilities, vehicle movement, pole and transmission line clearances, visible devices, material storage setbacks, construction, and safeguard requirements.	**Consistent.** Implementation of **TRANS-4** would ensure consistency.
Alameda County East County Area General Plan, Transportation Systems Element Policies 180, 190, 193, 207; Alameda County Code, Chapter 15.44 Cumulative Traffic Impact Mitigation Fees and Chapter 15.48 Tri-Valley Transportation Development Fee for traffic mitigation.	Policies 180 and 207 and Chapters 15.44 and 15.48 require “fair share" traffic impact mitigation fees. Policy 190 requires transportation demand management for new development. Policy 193 requires preparation of Deficiency Plans for new development that directly causes level of service (LOS) to exceed LOS D on major arterial segments and LOS E on Congestion Management Program (CMP) designated roadways (e.g., Interstate Highway 580).	Policies 180 and 207, Chapters 15.44 and 15.48 **Consistent: TRANS-6** requires payment of any necessary transportation fees. Policy 190 **Consistent: TRANS-3** requires transportation demand management during construction through means such as staggering construction workers’ work schedules and/or scheduling work trips to occur during off-peak hours. Policy 193 **Consistent:** The MEP would not cause LOS to degrade to unacceptable levels. The only location at which LOS would be substandard is the intersection of

[12] This policy makes no reference to potential hazards from thermal plumes. Staff evaluates potential aviation impacts from the MEP’s thermal plumes elsewhere in this document and concludes that impacts, after implementation of proposed conditions of certification, would be less than significant.

		West Grant Line Road and Midway Road, where existing, pre-project LOS is F. Without mitigation, construction of the MEP would further degrade this intersection to an even less functional LOS F; therefore, staff is requiring **TRANS-3** (described above) to mitigate construction traffic impacts. Although the intersection would continue to operate at LOS F with mitigations, project construction's contribution to this LOS would be less than significant.
Alameda County East County Area General Plan, Land Use Element Policy 150 and Program 64	Requires Alameda County to work with Contra Costa County to ensure that land uses approved in Alameda County within the Byron Airport's referral area are compatible with the airport's operations. States that Alameda County shall refer all major development and plans within the Byron Airport referral area to the Contra Costa County Airport Land Use Commission (CCC-ALUC) for review. Requires Alameda County to consider appropriate measures to minimize or eliminate potential adverse effects of development on airport operations or avigation. States that if a proposed project, including any mitigation measures, is determined to create a hazard to avigation or an adverse impact on airport operations, Alameda County shall not approve the project.	**Consistent.** Staff requested comments from the Contra Costa County ALUC regarding the compatibility of the MEP with the Contra Costa County's Airport Land Use Compatibility Plan (ALUCP), consistent with Policy 150 and Program 64. The Contra Costa County ALUC made a finding of inconsistency on October 14, 2010. However, staff analysis does not concur with this finding, concluding that **TRANS-7** and **TRANS-8**, which alert pilots to avoid overflight of the plume, are sufficient to allow pilots to avoid potential hazards. This is especially true as normal use of the Byron Airport would not require aircraft to fly over the MEP (even with future expansion of the runways). Tracking data shows that few aircraft actually overfly the proposed project site, and these aircraft could reasonably take another course to avoid the plant. See the **Airport Operations and Hazards** section earlier in this document for more information.
Alameda County Congestion Management Agency's 2009 Congestion Management Program (Note: The Alameda County Congestion Management Agency is now part of the Alameda County Transportation Commission.)	For roads within the Congestion Management Program network, establishes an LOS standard of E, except where F was the LOS originally measured, in which case the standard is LOS F.	**Consistent.** The project does not degrade LOS on the Congestion Management Program Network below LOS E.
Alameda County Municipal Code, Title 10 Vehicles and Traffic: Chapter 10.04 County Highway Traffic Regulations; Chapter 10.08 State Highway Traffic Regulations; Chapter 10.16 Oversize Trucks.	Prohibits storage of vehicles on County and State streets; requires oversize trucks needing terminal access from the federal highway system to obtain destination and route approval from the County.	**Consistent.** The applicant indicated in the AFC that the project will comply with these regulations. Implementation of **TRANS-1** and **TRANS-3** would ensure consistency.
Alameda County Municipal Code, Title 17 Zoning: Chapter 17.52 General Requirements	Provides requirements pertaining to parking spaces, driveway access, and loading areas.	**Consistent.** Implementation of **TRANS-4 and TRANS-3** would ensure consistency.

CUMULATIVE IMPACTS

A project may result in a significant adverse cumulative impact when its effects are cumulatively considerable. *Cumulatively considerable* means that the incremental effects of an individual project are significant when viewed in connection with the effects of (1) past projects; (2) other current projects; and (3) probable future projects (California Code Regulation, Title 14, section 15130).

Traffic Impacts

To complete this Cumulative Impacts analysis, staff reviewed known past, current, and probable future projects in the vicinity of the proposed MEP project, which staff defined as northeastern Alameda, southeastern Contra Costa, and western San Joaquin Counties. The location of these projects with respect to the MEP is presented in **Traffic and Transportation Figure 5**. **Traffic and Transportation Table 8** (below) lists these known projects, their trip generation, and their statuses (on hold, under review, approved, built).

Traffic and Transportation Table 8
Development Considered in the Cumulative Condition

Project	County	Distance from Project Site	Traffic and Transportation Characteristics	Status of Project
Altamont Motorsports Park Rezone	Alameda	4 miles to the southeast	Permits operation levels of up to 8,000 people	**On Hold**. Draft EIR released but not made final. Project not approved.
East Altamont Energy Center	Alameda	1.5 miles to the northeast	Would generate: 512 daily one-way trips during the average construction period; 900 daily one-way trips during peak construction; and commute trips for 40 full-time employees during operation.	**Approved** but not built. The CEC granted an extension ending on August 19, 2011 for the start of construction. Construction depends on the applicant obtaining a power purchase agreement (CEC 2008).
GreenVolts Solar Field	Alameda	0.8 mile to the northeast	Unknown, but expected to generate a minimal amount of traffic during a brief construction period.	**Approved** but not built. Project still active and currently being redesigned. Additional environmental analysis may be required.
Marsh Landing Generating Station	Contra Costa	18 miles to the northwest	Most project traffic would use SR-4, SR-160, and Wilbur Avenue. Would generate 437 daily one-way trips during the average construction period; 914 daily one-way trips during peak construction; commute trips for 16 full-time employees; and 4 one-way truck deliveries per week.	**Approved**
Oakley Generating Station	Contra Costa	17 miles to the north	Most project traffic would use SR-4, SR-160, Wilbur Avenue, and Bridgehead Road. Would generate 1004 daily one-way trips during the peak construction period; commute trips for a rotating staff of 22 (not all of whom will be there at once).	**Under Review** Staff report has not yet been published.

Project	County	Distance from Project Site	Traffic and Transportation Characteristics	Status of Project
Willow Pass Generating Station	Contra Costa	19 miles to the northwest	Project traffic would use SR-4 and Willow Pass Road. Would generate: 506 daily one-way trips during the peak construction period; 40 daily one-way trips for operations employees; and 40 daily one-way trips for trucks during operations.	**Under Review** Staff report has not yet been published.
Gateway Generating Station	Contra Costa	18 miles to the northwest	Unknown number of operation-related trips, but it is negligible.	**Built**
Mountain House Community	San Joaquin	2.5 miles to the east	Mountain House is a master-planned community that currently has approximately 6,000 residents. At build-out around 2021, it is expected to have approximately 44,000 residents (MHCSD 2010). These residents generate trips along the Byron Highway, Mountain House Road, and I-205 and I-580 in the vicinity of the proposed MEP's location.	**Approved** Under construction.
GWF Tracy Combined Cycle Power Plant Project (Expansion of the existing GWF Tracy Peaker Project)	San Joaquin	8 miles to the southeast	Construction traffic would access the site regionally via: I-5 from the north and south; I-580 from the west and southeast; and I-205 from the north, which connects with I-580 and I-5. Peak construction would generate approximately 1,388 average daily trips and 416 trips during each peak hour period (morning and evening).	**Approved**
Lodi Energy Center Power Plant Project	San Joaquin	25 miles to the north	Would generate 558 daily one-way trips during peak construction.	**Approved**

Traffic trips generated by the construction and/or operation of nearby projects could combine with traffic generated by the MEP to result in cumulative impacts to traffic level-of-service (LOS). Staff finds that the only projects listed in Traffic and Transportation Table 8 above that could potentially cause cumulative impacts to traffic LOS, due to their location, when combined with the MEP project are: the Altamont Motorsports Park Rezone; East Altamont Energy Center; GreenVolts Solar Field; the Mountain House Community; and the GWF Tracy Combined Cycle Power Plant Project. These projects are located in such a way that any vehicle trips they generate would share the transportation network with trips generated by the MEP. For example, access to these projects would be from I-580, I-205, the Byron Highway, and/or local roads like West Grant Line Road. All of the other listed projects are too far away from the MEP to share the same transportation network; therefore, they would not combine with the MEP project to cause cumulative impacts to LOS.

For each of the nearby projects that has the potential to create cumulative traffic impacts when combined with the MEP, staff conducted further analysis, summarized below. The analysis only examines cumulative impacts during MEP construction, as this

is when traffic impacts could occur. MEP-generated operations trips would be negligible because a maximum of 4 employees would be on-site simultaneously; therefore, cumulative impacts to traffic during operations would be less than significant.

Altamont Motorsports Park Rezone

The Altamont Motorsports Park is located 4 miles to the southeast of the proposed MEP's location immediately to the south of the Interstate 580/Interstate 205 interchange. The Altamont Motorsports Park operated under a Conditional Use Permit from Alameda County that expired in 2006. In 2008, a Draft EIR was prepared for renewal of the permit, which included an expansion of event attendees to up to 8,000 people (AMS 2008). Currently, the project is on hold, and the raceway is closed (SFG 2009). It is unlikely that the permit renewal would be approved before construction of the MEP. Therefore, staff is reasonably certain that the Altamont Motorsports Park Rezone would not combine with the MEP project to create cumulative impacts during MEP construction.

East Altamont Energy Center

The East Altamont Energy Center would be located approximately 1.75 miles to the northeast of the MEP and bordered by Byron-Bethany Road to the north, Kelso Road to the south, and Mountain House Road to the west. The CEC has licensed the plant and granted an extension ending on August 19, 2011 for the start of construction. The purpose of the extension was to allow the applicant additional time to secure a power purchase agreement from PG&E, which is a prerequisite for project construction (CEC 2008). At this time, the East Altamont Energy Center has no power purchase agreement, so the future of the project is unknown. Construction appears unlikely at this point.

Assuming the East Altamont Energy Center applicants obtain a power purchase agreement before the extension ends, the construction period would be 22-24 months and would overlap with that of the MEP. During the average construction period, the East Altamont project would generate 512 daily one-way trips, and during peak construction, the project would generate approximately 900 daily one-way trips. The construction trips generated by the East Altamont Energy Center and the proposed MEP would combine to create a noticeable increase in traffic, especially at the Grant Line Road interchange on I-580. This would be a significant impact. To mitigate this impact, staff has proposed **TRANS-3**, which requires reduction of MEP construction traffic impacts through methods such as staggered work hours, off-peak arrivals and departures, and/or a park-and-ride busing program. **TRANS-3** also requires the project owner to provide carpool incentives for construction employees.

GreenVolts Solar Field

The proposed GreenVolts Solar Field is located southwest of the intersection of Kelso Road and Mountain House Road 0.8 mile to the northeast of the proposed MEP. The initial proposal for the solar facility involved a short construction period and a minimal amount of traffic during both construction and operation. Andrew Young of the Alameda County Planning Department stated that the project is currently being revised, but that it is expected to generate similar levels of traffic as the previously proposed project (CEC 2010s). If construction of both the GreenVolts project and the MEP were to occur at the

same time, there may be some cumulative traffic impacts, but staff expects that it would be less than significant, especially with implementation of **TRANS-3** to mitigate the impacts of MEP construction trips.

Mountain House Community

The Mountain House Community is located approximately 2.5 miles to the east of the proposed MEP. Mountain House is a master-planned community that currently has approximately 6,000 residents. At build-out around 2021, it is expected to have approximately 44,000 residents (MHCSD 2010). These residents generate trips along the Byron Highway, Mountain House Road, and I-205 and I-580 in the vicinity of the proposed MEP's location.

The Mountain House Community Services District (MHCSD) expects construction activities to be ongoing during the timeframe of MEP construction, although many of the specifics are unknown about which particular projects the developer will propose and build during this timeframe. The MHCSD expects approximately 50-100 homes per year to be constructed over the next several years, in accordance with past construction trends (CEC 2010p). Construction-generated trips could combine with MEP construction trips to result in cumulative traffic impacts. With implementation of **TRANS-3** to mitigate the impacts of MEP construction trips, cumulative impacts would be less than significant.

GWF Tracy Combined Cycle Power Plant Project

The GWF Tracy Combined Cycle Power Plant Project is located approximately 8 miles southeast of the MEP, just off of West Schulte Road near Tracy. The project, an expansion of an existing peaker plant, was approved in March 2010. Energy Commission staff expects construction to begin on November 1, 2010 and proceed for approximately 22 months. Peak construction would take place during Month 17 of construction (around April 2012) and generate approximately 1,388 average daily trips and 416 trips during each peak hour period (morning and evening). Construction traffic would access the site regionally via: I-5 from the north and south; I-580 from the west and southeast; and I-205 from the north, which connects with I-580 and I-5.

The construction schedules of GWF Tracy and the MEP would probably overlap, although their peak construction periods would not. Together with the MEP, cumulative impacts could result, especially on parts of I-205 that already have poor LOS during peak hours. With implementation of **TRANS-3** to reduce MEP construction traffic impacts, cumulative impacts would be less than significant.

In conclusion, construction traffic from several projects in the vicinity of the MEP's location could combine with the MEP's construction traffic to create cumulative traffic impacts. However, with implementation of **TRANS-3**, cumulative traffic impacts would be less than significant.

Aviation Impacts

Staff also evaluated whether any of the above projects could combine with the proposed MEP to create cumulative impacts to aviation. Two of these projects, the East Altamont Energy Center and the GWF Tracy Combined Cycle Power Plant Project, would emit

thermal plumes. The GWF Tracy project is too far southeast of the Byron Airport to impact aviation. However, the East Altamont Energy Center is approximately 0.5 mile northeast of the centerline of the instrument approach to the Byron Airport and approximately 3 miles southeast of the Byron Airport[13]. As discussed earlier, it appears unlikely that the East Altamont Energy Center will be constructed; however, it is still a possibility. Staff concludes that even if the East Altamont Energy Center were to proceed, effects of the project would not combine with the MEP to result in significant cumulative impacts to aviation, as aircraft would be able to avoid overflight of both facilities. While operation of both facilities would result in a cumulative loss of unimpeded navigable airspace, neither facility is within the Byron Airport traffic pattern or approach and departure patterns, nor would the need for pilots to avoid one or both facilities prevent normal use and operations at the Byron Airport. See **Traffic and Transportation Figure 3** for a depiction of the East Altamont Energy Center's proposed location in relation to the Byron Airport and the proposed MEP.

Another future foreseeable project that staff evaluated in the Cumulative Impacts analysis is the planned extension of the Byron Airport runways. According to the Byron Airport Master Plan, the southeast end of Runway 12-30 will be extended by 1,500 feet for a total runway length of 6,000 feet. Runway 5-23 will be extended northeastward by 900 feet for a total runway length of 3,900 feet (BA 2005). Although extension of Runway 12-30 would shift the traffic pattern farther south and closer to the MEP, the new traffic pattern resulting from the extension would not force overflight of the project. Therefore, siting of the MEP at the proposed location would not significantly impact the proposed runway expansion, increase impacts to aircraft using the Byron Airport, or result in changes to airport operations. See **Traffic and Transportation Figure 3** for a depiction of the planned runway extensions.

Properties within two miles of the proposed project include existing wind turbine towers, power generation towers, power plant facilities, and poles. The AFC identifies 500-kV towers on properties adjacent to the proposed MEP site with heights exceeding 165 feet. (See AFC Figure 5.12-6, Relative Structure Heights.) The actual height of the MEP (not including the plumes) would be significantly lower than these surrounding structures; the exhaust stacks would be 80 feet AGL and the transmission poles would be either 84 or 95 feet AGL. Therefore, the height of the project's physical structures would not result in significant cumulative impacts to aviation.

Decommissioning

Decommissioning would not likely occur for at least 40 years and is not expected to result in adverse cumulative traffic and transportation impacts. Generated trips would likely be similar to the trips generated by construction, depending on the duration and extent of decommissioning, including dismantling of facilities and/or site remediation. Any cumulative impacts could be mitigated by staggering construction employees' work schedules or scheduling commute trips for off-peak hours to ensure acceptable LOS levels. Decommissioning would not cause any cumulative impacts to aviation.

[13] These distances were calculated using the scale on **Traffic and Transportation Figure 3**.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any traffic- or transportation-related benefits associated with the MEP.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received the following comments on aspects of the MEP related to traffic and transportation:

KEITH FREITAS, DIRECTOR OF AIRPORTS, CONTRA COSTA COUNTY

September 28, 2009 (CCCALUC 2009a)

Keith Freitas, Director of Airports for Contra Costa County, requested more information on possible hazards to aviation from exhaust plumes.

Comment: The proposed power plant is located approximately 2.7 miles southeast of the Byron Airport, just a few hundred feet from the main precision instrument runway corridor (Runway 30). Would the proposed location be hazardous to aircraft on an instrument landing, including if they slightly deviated from the prescribed corridor?

> **Response:** Aircraft on an instrument landing would not usually pass over the MEP site. The proposed MEP is located about 1 mile from the approach centerline of Runway 30 and about 0.65 mile from the closest runway approach boundary (Figure DR52-1, CH2M 2009f). Aircraft using instrument flight rules while approaching Runway 30 would normally pass about 1 mile northeast of the MEP. Slight deviations from the prescribed corridor would not cause the pilot to overfly the MEP.

Comment: The power plant site is also near the downwind leg of both Runways 5 and 23. It appears the site would also be adjacent to the 45 degree entry into the traffic pattern of Runways 5 and 23. Would flying at 1000 feet near or over the proposed location pose a hazard to aircraft in flight?

> **Response:** At or below 1,230 feet AGL, an aircraft overflying the project exhaust stacks could encounter a combined plume with an average vertical velocity of 4.3 m/s, with instantaneous velocities possibly up to twice as high. See the **Airport Operations and Hazards** section of this document for further discussion.
>
> Aircraft within the traffic pattern on a downwind leg for Runway 5/23 would not pass over the MEP site. Aircraft may join the traffic pattern at any location that does not interfere with other traffic in the airspace (FAA 2010). The Airport Facility Directory (AF/D) gives a right traffic pattern for Runway 5 and a left traffic pattern for Runway 23, meaning that Runway 5/23 traffic patterns are south of the runway (FAA 2010b). The FAA, through FAA Advisory Circular AC 90-66A, recommends that entry to the downwind leg of the traffic pattern at non-towered airports such as Byron be at a 45 degree angle abeam the midpoint of the runway (FAA 1993). The proposed MEP is located 2.7 miles southeast of the Byron Airport, about midway between the 45 degree entries to both Runway 5 and Runway 23. Therefore, the recommended entry into the Runway 5/23 traffic pattern does not pass over the MEP.

Typical fixed-wing aircraft using Runway 5/23 would usually fly at altitudes higher than 1,000 feet near the MEP site. The FAA recommends that aircraft approaching non-towered airports (such as the Byron Airport) approach at an altitude above traffic pattern altitude (1,000 feet for the Byron Airport), descending to pattern altitude only after they have entered the pattern (FAA 1993). (AC 90-66A recommends 1,500 AGL as the pattern altitude for large and turbine-powered aircraft.)

If pilots were to deviate from airport traffic patterns and FAA-recommended procedures, they could possibly pass over the MEP, and might do so at altitudes of 1,000 feet AGL or below. Ultralights and gliders would be more likely to approach the Byron Airport or join the traffic pattern at lower altitudes; according to AC 90-66A, glider traffic patterns typically have entry points ranging from 600 to 1,000 feet AGL, and ultralight vehicles' pattern altitudes should be 500 feet below the standard pattern altitude established for the airport (FAA 1993). Once again, standard procedures would make it unlikely that these aircraft would overfly the project site. However, for aircraft deviating from these guidelines, gliders, ultralights, and other small, low-flying aircraft would be most vulnerable to hazards from the plume.

Comment: The power plant site would be under the "Right 45" for aircraft departing Runway 12. This is specifically significant because it is the preferred departure runway for the skydiving company jump planes based on the airfield. Would flying near or over the proposed location pose a hazard to aircraft in flight?

Response: This is a non-standard departure procedure that has not been published by the Byron Airport. All records staff viewed prescribed a left-hand or straight-out departure pattern for Runway 12 (FAA 1993; FAA 2010b; AIRNAV 2010a). Aircraft flying this non-standard departure route could experience hazards if their departure path traversed the MEP site. However, the availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public. Staff has included conditions of certification **TRANS-7** and **TRANS-8** to provide adequate advisories and reduce the chances of aircraft overflying the plume.

GARY CATHEY, AERONAUTICS DIVISION CHIEF, STATE OFCALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

October 14, 2009 (DOT 2009a)

Gary Cathey, Chief of the Caltrans Division of Aeronautics, made the following comments to the Contra Costa County Airport Land Use Commission via Lashun Cross, Senior Planner.

Comment: The California Public Utilities Code, Section 21659, prohibits the construction of structures that may be considered hazardous to aircraft operating in navigable airspace, as defined in Title 14 of the Code of Federal Regulations, Federal Aviation Regulation (FAR), Part 77, Subpart C. In part, FAR Part 77.13(a)(1) through (4) requires sponsors to submit a Notice of Proposed Construction (Form 7460-1) to the

Federal Aviation Administration (FAA). It is important to note that the FAA aeronautical study process does not formally evaluate the effects that thermal plumes have upon overflying aircraft; it evaluates only the height of the structure(s) themselves.

> **Response:** The applicant has filed Form 7460-1 for the power plant exhaust stacks and transmission line poles. In July and October 2009, the FAA issued a Determination of No Hazard to Air Navigation for the exhaust stacks and transmission poles (CH2M 2009f).
>
> Staff has evaluated the potential impacts of thermal plumes earlier in this document in the **Airport Operations and Hazards** section.

Comment: We recommend that an objective, scientifically based approach be used to thoroughly analyze the aerodynamic effects that this particular proposed power plant would have upon aircraft approaching or departing the traffic pattern at Byron Airport. Parameters should include, but not be limited to: type, weight, altitude, and speed of aircraft; temperature, velocity, and moisture content of the thermal plume(s) and surrounding air; height and shape of the emitting stacks, etc.

> **Response:** The applicant provided this information in "Staff Queries, Set 1" (CH2M 2010l). Staff has considered this information in conjunction with the **Airport Operations and Hazards** analysis earlier in this document. However, as noted earlier, the MEP site is outside all established traffic patterns and established arrival/departure routes, and the availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public. Staff has included conditions of certification **TRANS-7** and **TRANS-8** to provide such advisories and reduce the chances of pilots accidentally overflying the plume.

CONTRA COSTA COUNTY AIRPORT LAND USE COMMISSION

November 30, 2009 (CCCALUC 2009b)

David E. Durant, Chair of the Contra Costa County Land Use Commission, submitted a letter outlining the Commission's questions and concerns regarding the proposed MEP. He noted that the Commission's review of projects is guided by the 2000 Contra Costa County Airport Land Use Compatibility Plan (CLUP), and that the Commission could not come to any determinations regarding safety issues, project compatibility with the Plan, or mitigation measures without further information. The Commission's preliminary comments follow.

Comment: The public testimony and documents submitted by the public indicated that a power plant exhaust plume could cause, under certain conditions, turbulence for an aircraft overflying the plume, could allegedly lead to temporary loss of control of an aircraft, could allegedly lead to loss of power or shutdown of an aircraft engine, and/or could allegedly lead to an accident. Five incidents of aircraft being affected by plumes from five different sources were relayed to us.

Response: Staff acknowledges that aircraft overflying a plume could be subject to these hazards. However, as noted earlier, the MEP site is outside all established traffic patterns and established arrival/departure routes, and the availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public. Staff has included conditions of certification **TRANS-7** and **TRANS-8** to provide such advisories and reduce the chances of aircraft accidentally overflying the plume. See the **Airport Operations and Hazards** analysis earlier in this document for more information.

Comment: The Director of Contra Costa County Airports, Keith Freitas, indicated that the Byron Airport hosts a wide variety of aircraft and aviation activities. These include: jets, heavy and light propeller aircraft, helicopters, sail planes (e.g. gliders), ultralights, and sky jumpers. He noted that these aircraft fly at different speeds and different altitudes around the airport, and that these aircraft often deviate significantly from the flight patterns published in the CLUP. The Airport Director also noted that there is a large amount of student training that is conducted at Byron, a large portion of which is done by students based at other airports. The Byron Airport does not have a control tower, which provides students from other areas with an opportunity to practice radio skills in an uncontrolled airspace.

Response: Staff appreciates this information. Staff considered the variety of different planes and pilots using the airport in the **Airport Operations and Hazards** analysis earlier in this document.

Comment: One of the ALUC Commissioners noted that the varieties of aircraft also have different weights and different amounts of wing loading (weight per wing area). Aircraft with the least amount of weight and wing loading, such as ultralights and gliders, are suspected of being more prone to turbulence issues than heavy fixed-wing aircraft.

Response: Staff appreciates this information and considered it in the **Airport Operations and Hazards** analysis earlier in this document.

Comment: Occupants of ultralight aircraft and sky jumpers do not have the benefit of performing their flight activities in enclosed cabins, and may be more susceptible to the heat and combustion gas of an exhaust plume than occupants of jets, propeller aircraft, helicopters, and sail planes. Also, the wings of most ultralight aircraft are made of polymer materials, not metal, and because of this might deform when exposed to elevated temperatures. Information and analysis about the impact of heat and combustible gases on the ultralight aircraft, the sky jumpers, the propeller aircraft, helicopters, and sail planes was requested.

Response: See the **Airport Operations and Hazards** analysis. It is the pilot's responsibility to see and avoid potential hazards to flight. **TRANS-7** and **TRANS-8** would notify pilots of the location of the potential hazard and advise them that overflight of the exhaust stacks below 1,500 feet AGL should be avoided.

Comment: In the past, agencies responsible for waterways and power lines in the central part of Contra Costa County (about 20 miles northwest of the proposed

Mariposa site) have hired helicopters to perform low-altitude inspections (200 feet to 400 feet) of waterways and power lines near the proposed project site. Such agencies typically do not inform the Airport Land Use Commission or the Airport Director of their inspection activities beforehand, and the Airport Director usually only finds out about them through noise complaints made by local residents after the inspections have occurred.

> **Response: TRANS-7** and **TRANS-8** would alert these helicopters to the presence of the MEP and the need to avoid direct overflight.

Comment: Information Request #1- From the hearing, it appears that one or more of the four characteristics of a power plant plume may be causing the aircraft turbulence issues that have been observed: (1) upward draft velocity of the plume, (2) horizontal temperature gradients in the horizontal flight path of an aircraft through the plume, (3) swirling motion of the plume (e.g., eddies, vortices), and (4) oxygen depletion and/or excess CO2 that can affect the chemical reaction in the internal combustion engines. The Airport Land Use Commission would like to know which of these characteristics, or other characteristics of which they are not aware, are most relevant to assessing aircraft turbulence issues. The Airport Land Use Commission requests that Energy Commission staff consult with the Caltrans Division of Aeronautics on this request.

> **Response:** Staff concludes from the available data that the upward draft velocity of the plume is the most important factor when evaluating the potential for turbulence.

Comment: Information Request #2- We would like the CEC to perform a calm-wind analysis of the amount of aircraft turbulence that the plume at the Mariposa plant would likely cause at the following elevations of aircraft overflight: 1200 feet, 1000 feet, 800 feet, 600 feet, and 400 feet. The analysis should provide one or more parameters at each altitude that may be used to assess the potential for turbulence. We would also like to know if the plumes from the four stacks will remain distinct or merge together at some altitude, and if so, the estimated value of that altitude, as well as the likely impact of any merged plume.

> **Response:** See **Appendix TT-1: Plume Velocity Analysis** by Will Walters for projected vertical plume velocities that would be experienced at different heights. The analysis provides information for both single and merged plumes. Staff considers 4.3 m/s to be the threshold for creation of hazardous turbulence. The likely impact of any merged plume is discussed in the **Airport Operations and Hazards** section earlier in this document.

Comment: Information Request #3- In order for us to validate the CEC's methodology for plume analysis, we would like the CEC to perform the same type of plume analysis for the power plant on which Mr. Cathey performed his overflight tests. With this, we will be able to correlate Mr. Cathey's test data with the parameters from the analysis. Please contact Mr. Cathey for the details about the power plant involved in his tests. Both the previous requests may be satisfied at the temperature conditions of Mr. Cathey's tests.

Response: Performing a plume analysis for the power plant on which Mr. Cathey performed his overflight tests is unnecessary; implementation of **TRANS-7** and **TRANS-8**, which alert pilots to avoid overflight of the plume, are sufficient to allow pilots to avoid potential hazards, and therefore, further study is unnecessary. This is especially true because aircraft are not forced to fly over the MEP (even with future expansion of the runways). Tracking data shows that few aircraft actually overfly the proposed project site, and these aircraft could reasonably take another course to avoid the plant.

See the **Airport Operations and Hazards** section earlier in this document for more information.

Comment: Information Request #4- We request that the CEC repeat Information Request #1 with a wind of 12 knots. Approximately 54 percent of the time, "calm" winds of less than 8 knots from all directions prevail at the Byron Airport. Approximately 23 percent of the time, there is wind from the southwest that blows in a range of 8 to 16 knots (average of 12 knots). This wind may have the potential to blow the power plant plume toward the instrument approach of Byron's main Runway 30. We would like to know how far the plume is shifted at each of the test altitudes. While ultralights and gliders will likely use the shorter cross-wind runway (Runway 23) under this wind condition, larger aircraft will likely use the longer runway (Runway 30) because of its length.

Response: Wind would not cause the plume to affect the runways. See Staff Queries, Set 1- Addenda to CEC Staff Data Request 52, (CH2M 2010l), especially page 38 (response to SQ7), Attachment DR 52-6 (Plume Velocity Assessment) and Attachment DR 52-7 (Computational Fluid Dynamics Turbine Exhaust Velocity Characterization). Staff has reviewed these studies for accuracy.

Comment: Information Request #5- We believe that Byron Airport is heavily accessed by pilots that are not based there and who in all likelihood will not be particularly familiar with the Byron Airport's surrounding infrastructure. We would request development of clear scientific data regarding how one would effectively provide meaningful notice to pilots and other fliers regarding potential hazards of flying at less than 1000 feet above the stacks such as those proposed here. We believe that it is the proponent/applicant's obligation to demonstrate how pilots unfamiliar with the surrounding infrastructure can be adequately notified of gases, plumes, and their likely impact, so as to minimize potential harm to the public.

Response: Staff appreciates this information. Condition of Certification **TRANS-8 (Pilot Notification and Awareness)** would provide meaningful notice to transient pilots.

Comment: Information Request #6- To assess potential impacts on ultralights and skydivers, we would like to know the locations of the average 120°F and average 200°F isotherms of the plume as a function of altitude, up to at least 6,000 feet if these isotherms extend beyond that altitude. A calm wind assumption and an ambient ground-level temperature of 80°F may be used. A simple two-dimensional plot of the right and left horizontal extents of each isotherm on the X-axis and altitude on the Y-axis is

sufficient. This information will help us, the CEC, and the Contra Costa County Airport Director to develop mitigation measures based on pilot notification.

Response: See Staff Queries, Set 1- Addenda to CEC Staff Data Request 52, (CH2M 2010l), especially page 46 (response to SQ9), Attachment DR 52-6 (Plume Velocity Assessment) and Attachment DR 52-7 (Computational Fluid Dynamics Turbine Exhaust Velocity Characterization).

Comment: In addition to safety issues, we look at building heights, visual hazards, and bird strike hazards in making compatibility determinations. There do not appear to be any height hazards with the project. As to possible visual hazards, the area around the Byron Airport is known to have Tule fog during the winter (mid-November to the start of March). Since Tule fog is a ground-level radiation cooling effect, it appears that the power plant plume would dissipate the Tule fog in the area around the site. However, it is not known whether the Tule fog would provide further cooling of the plume in addition to that assumed by the applicant's vapor-condensation analysis, and whether the plume would draw water content from the Tule fog which, when added with the water content in the plume, would condense at a higher altitude of the plume, and whether such condensation would create a visual obstruction for aircraft. We request the CEC's and the applicant's opinion regarding this dynamic and whether there would be any visual impact and whether it would be hazardous. We also request confirmation that there will not be an added effect with water content with the Tule fog or extra cooling effect, and that the applicant's vapor-condensation analysis is suitable for Tule fog conditions. If that analysis is not suitable, we request a modified analysis.

Response: Due to the proposed MEP's technology, it would not release significant amounts of moisture into the air and would therefore not exacerbate tule fog. The MEP uses an air cooled condenser for the chiller. It would not emit publicly visible water vapor plumes. See the **VISUAL RESOURCES** section of this SSA for more information.

Comment: Information Request #7- As to potential bird strike hazards, the area around the Byron Airport appears to have significant bird populations, including endangered species, waterfowl, and birds of prey. The congregation of birds around airports, particularly approach and departure paths, has the potential to increase bird strikes with aircraft. Would birds be diverted away from the power plant plume (repelled by the plume's heat or effluent content) and would such a diversion concentrate birds near the main runway approach path to the Byron Airport? Would birds of prey try to ride the rising plume at its cooler edges as part of their hunting activities? Would the plume kill smaller birds, upon which birds of prey would feed upon?

Response: See the **BIOLOGICAL RESOURCES** section of this SSA for more information. Staff concludes that the plume would not concentrate birds near the Byron Airport.

Comment: Information Request #8- To help us evaluate potential mitigation measures for this particular power plant, what equipment could be added to cool and/or spread out the plume to reduce temperature and turbulence to overflying aircraft? Would widening

the stacks and increasing their heights reduce upward draft velocity? Can a small, variably-controlled amount of water be sprayed at the top of the stack to visually mark the first 200 to 400 feet of the plume?

> **Response:** According to the applicant, this is not feasible, as all methods would either lead to wider and taller stacks, increased air pollution, or increased water use. See Staff Queries, Set 1- Addenda to CEC Staff Data Request 52, (CH2M 2010l), page 56, for the response to SQ11.

Comment: There are no other sites within the County for an airport replacing the Byron Airport. Because of their slower speed and lack of Mode C radios (and lack of a motive power in the case of gliders), ultralights and gliders are effectively barred from operating at all airports other than Byron Airport in the central San Francisco Bay Area. Thus, it is expected that Byron will continue to serve these aircraft in the foreseeable future, and such aircraft will likely grow in number. We would ask that the Commission obtain new studies, or evaluate existing studies, to evaluate the impact of these kinds of facilities (and, in particular, the impact of the gases and plumes they generate) on the particularly vulnerable users of facilities similar to Byron Airport, including ultralight aircraft and sky jumpers, to meaningfully assess the impact on public health and safety.

> **Response:** As noted earlier, the MEP site is outside all established traffic patterns and established arrival/departure routes, and the availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public. See conditions of certification **TRANS-7** and **TRANS-8**, which notify pilots to avoid overflight of the plume and therefore these impacts. Also, see the **Airport Operations and Hazards** analysis earlier in this document. Regardless of the aircraft type, it is the responsibility of the pilot to adapt flight activities to local conditions.

Comment: Operations have been increasing at the Byron Airport. The main runway at Byron is currently 4,500 feet in length, with planned extension to 6,000 feet toward the southeast in the future. This extension would move the existing flight patterns approximately 1,000 feet to the south, toward the proposed Mariposa project site.

> **Response:** This extension would not force aircraft to fly over the MEP site. See the discussion in the “Cumulative Impacts” section of this document for more information.

October 14, 2010 (CCCALUC 2010a)

Comment: With all the information provided at the ALUC public hearings, public testimony, printed documents and technical and anecdotal evidence included, in light of the expansion plans of the Byron Airport, the ALUC was unable to reconcile the difference between the modeling data presented by the applicant and the experiential evidence regarding plume impact on aircraft operation and pilot safety…There was no scientific field testing data involving actual aircraft encounters with plumes proposed to be generated by the MEP, no evidence proving safety in actual pilot and aircraft encounters with such plumes at relevant heights and with relevant aircraft, and no

modeling data tied to actual aircraft measurements. The ALUC was unable to conclude that the evidence was compelling that the potential mitigations would sufficiently reduce the risk to aviation safety to support a finding of compatibility. The Contra Costa County ALUC therefore believes that the Mariposa Energy Project has not sufficiently proven that this use, in this location, would not have an impact on air safety in light of the airport expansion plans.

Response: It would be difficult to correlate pilot "experiential" evidence with the modeling data submitted by the applicant. Power plants, plume characteristics, aircraft, and flight circumstances vary, making a correlation difficult, if not impossible. However, Energy Commission staff concludes that **TRANS-7** and **TRANS-8**, which alert pilots to avoid overflight of the plume, are sufficient to allow pilots to avoid potential hazards. This is especially true because aircraft are not forced to fly over the MEP (even with future expansion of the runways). Tracking data shows that few aircraft actually overfly the proposed project site, and these aircraft could reasonably take another course to avoid the plant.

See the **Airport Operations and Hazards** section earlier in this document for more information.

HAL YEAGER, VICE-CHAIR OF THE CONTRA COSTA COUNTY AIRPORT LAND USE COMMISSION

December 14, 2009 (HY 2009a)

Hal Yeager, Vice-Chair of the Contra Costa County Airport Land Use Commission, provided comments independently from the Commission to follow up on a few points.

Comment: For the Commission's Information Requests #2 and #4, it would be helpful to provide an analysis not only for the type of plane used by Mr. Cathey (as per Information Request #3), but also for a helicopter, a sail plane (glider), and an ultralight (trike type). (This additional analysis does not have to be done for Information Request #3.)

Response: See the previous responses to these information requests. Further analysis is unnecessary because conditions of certification **TRANS-7** and **TRANS-8** would notify pilots to avoid overflight of the plume, thus avoiding the potential hazard.

Comment: With regard to the Commission's Information Request #6, the applicant presented information at our November 5, 2009 meeting indicating that the temperature of the plume cooled to the ambient temperature at an elevation of 1,000 feet. This relatively rapid cooling suggests that one major cooling component might be radiation cooling through the emission of infrared radiation. Such radiation, if present, could be absorbed by the polymer material used in the wings of most ultralight aircraft. I think it would be helpful to us if your technical staff could explain to us what mechanisms are involved in cooling the plume (radiation cooling, convective and diffusive mixing of ambient air, etc.) and the amount of energy/power dissipated by each mechanism. If your technical staff can also make an assessment as to the potential impact on the polymer wings of ultralights, that would be helpful.

Response: Implementation of conditions of certification **TRANS-7** and **TRANS-8** would alert pilots to avoid overflight of the plume, so there is no need to examine the potential effects of radiation on the polymer wings of ultralights.

Comment: With regard to our Information Request #6, has your technical staff ever looked at a plume using an infrared imaging camera or night vision camera? If so, photographs of relevant plumes would be helpful.

Response: Staff does not believe this would contribute any additional useful information.

Comment: With regard to the Commission's Information Request #7, at power plants similar to Mariposa that the CEC has permitted, has there been any observation of elevated levels of dead birds around such power plants, of birds of prey circling around such power plants, or of any type of unusual bird activity around such power plants? Has the CEC ever actively sought such information?

Response: Staff is not aware of any such observations or whether the Energy Commission has ever actively sought such information. Staff does not expect the plume to attract large concentrations of birds. See the **BIOLOGICAL RESOURCES** section of this SSA for more information.

Comment: With regard to the Commission's Information Request #7, I found a YouTube video of birds circling a power plant plume in Anchorage, Alaska. I have identified the power plant as the #2 power plant of Anchorage Municipal Light and Power and located an article called "Those Big Black Birds…Ravens in the City", which might explain the activity shown in the video. The article alleges that ravens fly into Anchorage in the morning, feed at the dump and local fast food restaurants, and then play in the plume at Power Plant #2 in the afternoon and evening. The article references Alaska State Biologist, Rick Sinnott.

Ravens are relatively large birds, and large congregations in the air could pose a bird strike hazard. While there are no fast food restaurants in the Byron area, the Altamont Landfill is located approximately 3 miles to the west of the Mariposa project site.

It would be helpful if the CEC technical staff could (1) contact Mr. Sinnott to authenticate the above activity, (2) make an assessment of the raven population in the Altamont area, and (3) ask Mr. Sinnott and/or other biologists if the ravens in the Altamont area would be able to detect or find the plume and if they would be tempted to play in it. With regard to the latter, Mr. Sinnott may be able to tell us the distances between the dump, fast food restaurants, and the #2 power plant in Anchorage, and we may be able to compare these distances to the distance between the Altamont Landfill and the Mariposa site.

Response: See the **BIOLOGICAL RESOURCES** section of this SSA, specifically the discussion under "Thermal Plumes". The conditions at the Anchorage project site and at the proposed Mariposa Energy Project site differ, and the MEP is not expected to attract ravens. Energy Commission staff communicated with Alaska Department of Fish and Game staff in making this determination.

Comment: It appears that the Byron Airport is one of the very few public use airports that allow ultralight operations. When the County built the Byron Airport, it took over a private airpark for ultralights and sail planes (gliders), and the County promised that those operations could continue at the public use airport.

> **Response:** These operations would still be allowed and would not be significantly impacted by the MEP. Staff has seen no evidence that ultralights and gliders routinely use the airspace over the proposed MEP site.

BYRON MUNICIPAL ADVISORY COUNCIL

January 7, 2010 (BMAC 2010a)

Linnea Juarez, Chairperson of the Byron Municipal Advisory Committee, wrote to express the Committee's position on the proposed MEP.

Comment: The BMAC was satisfied that the project will not be a detriment to Byron Airport Operations.

> **Response:** Staff appreciates the feedback.

RAYMOND PIETRORAZIO

June 23, 2010 (RP 2010b)

Raymond Pietrorazio is an advocate for aviation safety who had the following comments.

Comment: On February 23, 2010, I met with Federal Aviation Administration (FAA) officials at their headquarters in Washington, DC to discuss the issue of air emissions (plumes) from industrial sources with respect to their effects on aviation. FAA officials distributed a document called *AOSC (Airport Obstruction Standards Committee) Exhaust Plumes Initiative*, which announced the FAA's initiation of a study evaluating the safety implications of exhaust plumes on aircraft. Results from this comprehensive study are expected to be available by the fall of 2010.

I believe that the CEC should withhold issuance of certification of any industrial plant having major air emissions and sited in the vicinity of a public use airport until the FAA releases the AOSC Exhaust Plume Initiative findings, which would allow CEC to incorporate and reflect those findings in its decisions.

> **Response:** The Energy Commission may only review proposed projects in accordance with laws, ordinances, and regulations in effect, and information available, at the time of review. To staff's knowledge, results of this study are not yet available.

CONTRA COSTA COUNTY PLANNING COMMISSION

April 6, 2010 (CCCPC 2010a)

Donald Snyder, Chairman of the Contra Costa County Planning Commission, wrote a letter to the Contra Costa County Board of Supervisors outlining the Commission's reasons for voting to support the proposed MEP. He recommended that the Board of

Supervisors also write a letter in support of the project. His comment related to traffic and transportation follows:

Comment: There do not appear to be any significant impacts on either the current or potential future operations of the Byron Airport. The project is sited away from the approaches to the airport and would not adversely impact flight operations.

Response: Staff appreciates the feedback.

CONTRA COSTA COUNTY BOARD OF SUPERVISORS

April 13, 2010 (CCCBOS 2010a)

John Gioia, Chair of the Contra Costa County Board of Supervisors, provided information requests from the Board of Supervisors, as shown below.

Comment: We request evidence that the project will not interfere with air navigation and will not pose a hazard to aeronautical activities due to its close proximity to the main precision instrument runway (Runway 30) nor hinder future instrument approach upgrades to any runway.

Response: See the **Airport Operations and Hazards** section of this SSA and the response to the Contra Costa County ALUC's comments.

Comment: We request evidence that the project will not pose a hazard to aeronautical activities due to its close proximity to the established Byron Airport traffic pattern, both to the downwind leg and 45 degree pattern entrance for Runways 5 and 23 and the departure path for Runway 12.

Response: See the **Airport Operations and Hazards** section of this SSA and the response to the Contra Costa County ALUC's comments.

Comment: We request evidence that the project will not pose a hazard to any of the various aeronautical activities at Byron Airport that include vintage military jet aircraft, corporate jet aircraft, single and twin piston aircraft, light sport aircraft, motorized parasail, ultra-light, and skydiving.

Response: See the **Airport Operations and Hazards** section of this SSA and the response to the Contra Costa County ALUC's comments.

Comment: We request evidence that the project meets all standards set forth in the Byron Airport Master Plan.

Response: Staff reviewed the Byron Airport Master Plan and found no conflicts with the proposed Mariposa Energy Project.

October 4, 2010 (CCCBOS 2010b)

John Gioia, Chair of the Contra Costa County Board of Supervisors, provided follow-up comments from the Board, as shown below.

Comment: After receiving additional information from the project applicant, County staff, and the public, the County is now satisfied that the proposed project is compatible with the County's General Plan and the Byron Airport Master Plan. We have reviewed and acknowledged the FAA's Determinations of No Hazard to Air Navigation for the project as well as the 2006 FAA study on plume safety that indicates "power plant

exhaust plumes do not present an immediate or critical increase in human mental or physical workload". The report further indicates that "the likelihood of an accident or incident caused by an overflight of an exhaust plume is acceptable small". We also understand that the FAA may be releasing additional information about plume safety in the future and look forward to understanding how the new information will inform decisions.

> **Response:** Staff appreciates this information. See the **Airport Operations and Hazards** section of this SSA for staff's complete analysis.

Comment: We recognize that the project is located in Alameda County, and, therefore, beyond the jurisdiction of Contra Costa County. We respect and defer to Alameda County's determination. However, given the location of the Byron Airport in Contra Costa County and the various queries from Contra Costa stakeholders, we believe our review and evaluation of the project's impact on our County and its assets was prudent.

> **Response:** All impacts related to the proposed project have been evaluated, regardless of location.

CALIFORNIA PILOTS ASSOCIATION

July 25, 2010 (CPA 2010a)

Comment: Carol Ford, Vice-President of Region III of the California Pilots Association, submitted a draft of the FAA's proposed revisions to the FAA Aeronautical Information Manual (AIM). These revisions alert pilots to hazards from plumes and direct them to fly upwind of possible thermal plumes when feasible. She also submitted accounts of turbulence experienced by pilots due to the plume emitted by the Blythe Power Plant's cooling towers.

> **Response:** Staff appreciates the information.

December 9, 2010 (CPA 2010c)

Andy Wilson submitted a letter on behalf of the California Pilots Association.

Comment: CALPILOTS objects to the Mariposa Energy Project and the East Altamont Energy Center because of the visible and invisible thermal plumes and plume emissions they would generate near the Byron Airport. The requirements of the proposed Mariposa Energy Project's Conditions of Certification **TRANS-7** and **TRANS-8** confirm a hazard to pilots, passengers, and aircraft. NOTAMs and lighting of the stacks to prevent overflight reduces usable airspace required for the diverse aircraft using the airport and are not acceptable mitigations.

> **Response:** See the **Airport Operations and Hazards** and the **Cumulative Impacts** sections of this SSA. Aircraft do not need to fly over either the Mariposa Energy Project or the East Altamont Energy Center in order to enter or fly within the traffic pattern of the Byron Airport. As noted earlier, the MEP site is outside all established traffic patterns and established arrival/departure routes, and the availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public.

Comment: The SA made no reference to or study of future demands and use of the Byron Airport (within the next 20 years) as compared to the future life expectancy of the Mariposa Energy Project (about 40 years). Staff should have considered future Byron Airport airspace requirements, control tower requirements, and additional instrument approaches or terminal instrument procedures.

Response: Staff cannot speculate on future airport activities beyond those described in the Byron Airport Master Plan, which provides guidance for improvement to the Byron Airport through 2023 and beyond. Staff did consider all information provided in the Byron Airport Master Plan, including future runway extensions.

Comment: Staff should show the distances between the Mariposa Energy Project and the Byron Airport and Byron Airport Runway 30[14]. Staff should also show the distances between the East Altamont Energy Center and the Byron Airport and Byron Airport Runway 30.

Response: The distances are:

- MEP and the Byron Airport: 2.7 miles (See the **Airports** section of this SSA.)
- MEP and Byron Airport Runway 30: The proposed MEP is 1 mile from Runway 30's approach centerline and about 0.65 mile from the closest approach boundary. (See the **Airports** section of this SSA.)
- East Altamont Energy Center and the Byron Airport: approximately 3 miles (estimated using the scale on **Traffic and Transportation Figure 3**)
- East Altamont Energy Center and Byron Airport Runway 30: approximately 0.5 mile (estimated using the scale on **Traffic and Transportation Figure 3**)

Staff has included the distance information for the East Altamont Energy Center in the **Cumulative Impacts** section of this SSA.

Comment: Both **TRANS-7** and **TRANS-8** are inadequate to mitigate the plume hazard and do nothing more than reduce usable airspace within the Byron Airport Influence Area. Pilots will be focusing on avoiding the plume hazard and not on seeing and avoiding other aircraft.

Response: The intent of Conditions of certification **TRANS-7** and **TRANS-8** is to mitigate the potential overflight hazard by providing pilots with sufficient information to exercise their responsibility to see and avoid (or accommodate) potential hazards in uncontrolled airspace.

Staff concludes that the MEP's impacts to aviation would be less than significant based on the reasons outlined in the **Airport Operations and Hazards** section of this SSA. It is reasonable to require projects to avoid introducing a potential aviation safety hazard into an airport's airspace that would require a change in air traffic patterns or impede local flight operations in such a way as to substantially curtail or preclude continued airport operation. However, the project site is 2.7 miles from the airport and outside all established traffic patterns and arrival/departure routes. The

[14] Staff assumed that when Mr. Wilson referred to "Byron Airport Runway 30", he meant the approach centerline of the runway.

availability of unrestricted airspace in the project vicinity provides ample opportunity for a pilot to see and avoid overflight of the site, provided advisories of the site location and potential hazard are available to the flying public. Conditions of certification **TRANS-7** and **TRANS-8** would provide this information. Regardless of the aircraft type, it is the responsibility of the pilot to adapt flight activities to local conditions.

ALAMEDA COUNTY COMMUNITY DEVELOPMENT AGENCY

September 17, 2010 (AC 2010g)

Comment: Chris Bazar, Director of the Alameda County Community Development Agency, stated in a letter that County staff believes that the proposed MEP is consistent with the Alameda County General Plan, including policies applicable to the Byron Airport. County staff understands that the Contra Costa County Airport Land Use Commission (CCC-ALUC) is considering making a determination of compatibility with its Airport Land Use Compatibility Plan. It is the opinion of Alameda County Planning staff that the CCC-ALUC lacks jurisdiction over this project, as the project is located within Alameda County, not Contra Costa, and an ALUC's jurisdiction does not extend beyond its county's boundaries.

Response: Staff appreciates the information. The Energy Commission has ultimate jurisdiction over the project, but has considered the input of both the Contra Costa County Airport Land Use Commission and the Alameda County Community Development Agency.

APPLICANT

November 29, 2010 Workshop – Oral Comments

Comment: The applicant's attorney stated their concern that Condition of Certification **TRANS-4**, which requires the project owner to obtain encroachment permits from local jurisdictions, might give these local jurisdictions authority to refuse to issue the permits, halting the project's progress.

Response: Staff understands that these encroachment permits would be obtained through a ministerial process; therefore, if the project owner complies with local jurisdictions' regulations and requirements, the owner should be able to obtain the permits.

RAJESH DIGHE

November 29, 2010 Workshop – Oral Comments

December 4, 2010 – Written Comments (RD 2010g)

Comment: The Byron Airport is a non-towered airport, so telling pilots that they need to "see and avoid" the plant is hazardous.

Response: It is not the Energy Commission that is telling pilots to "see and avoid." The FAA is very specific in its requirement that, outside the controlled or local operational areas of an airport, it becomes the pilot's responsibility to see and avoid (or accommodate) potential hazards to flight. Staff concludes that the MEP's impacts

to aviation would be less than significant based on the reasons outlined in the **Airport Operations and Hazards** section of this SSA.

Comment: Traffic and Transportation Figures 4A and **4B** need to show flight paths of ultralights and gliders.

Response: This is not possible; we can only obtain data from aircraft with transponders. See the **Airport Operations and Hazards** section of this SSA. However, staff has no evidence that gliders or ultralights commonly fly over the MEP site, and there is sufficient unrestricted airspace in the vicinity for gliders and ultralights to avoid overflight of the MEP site.

DOUGLAS AND SYLVIA LITTLE

December 8, 2010 (DSL 2010a)

Comment: We are very concerned about the health and safety of our family (which includes children) living on Kelso Road. What if delivery trucks start using Kelso Road and what about potential traffic hazards that would be experienced by our family?

Response: See the **Construction Impacts and Mitigation** and **Operational Impacts and Mitigation** sections of this document, specifically the **Truck Traffic** and **Truck Traffic and Hazardous Materials Delivery** sections. Delivery trucks would not use Kelso Road. Furthermore, deliveries during operation of the plant would be only occasional.

CONCLUSIONS AND RECOMMENDATIONS

Staff has analyzed the proposed MEP's impacts to the nearby traffic and transportation system. With implementation of the proposed conditions of certification below, the proposed MEP would comply with all applicable LORS related to traffic and transportation and would result in less than significant impacts to the traffic and transportation system.

1. Implementation of Condition of Certification **TRANS-1** would ensure compliance with applicable jurisdictions' limits on vehicle sizes and weights, driver licensing, and truck routes, and any other applicable limitations, and would require the project owner to obtain all necessary transportation permits.
3. Implementation of Condition of Certification **TRANS-2** would ensure that any public road, easement, or right-of-way damaged by project construction would be restored to its original condition.
4. Implementation of Condition of Certification **TRANS-3** would require development and implementation of a traffic control plan to reduce construction traffic impacts to LOS and to ensure sufficient parking and emergency access to the site.
5. Implementation of Condition of Certification **TRANS-4** would require obtainment of the necessary encroachment permits from applicable jurisdictions.
6. Implementation of Condition of Certification **TRANS-5** would require obtainment of the necessary permits and licenses for transporting hazardous material and require that all hazardous material deliveries occur outside of normal commute hours.

7. Implementation of Condition of Certification **TRANS-6** would require payment of any necessary traffic and transportation fees to Alameda County.
8. The project would not result in a change to civilian air traffic patterns in the project vicinity. However, Condition of Certification **TRANS-7** would require lighting of the exhaust stacks, consistent with FAA requirements, reducing the potential for inadvertent overflight of the facility and exposure to high-velocity thermal plumes to a less than significant level.
9. Condition of Certification **TRANS-8** would provide a means to advise pilots of the potential hazard to flight associated with the project-generated exhaust plumes and the need to avoid overflight of the facility below 1,500 feet AGL. Implementation of this condition of certification would reduce aviation risk to a less than significant level.
10. The project itself would not have a cumulatively considerable impact on ground transportation or general aviation in the project area.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 Roadway Use Permits and Regulations

The project owner shall comply with limitations imposed by Caltrans District 4 and other relevant jurisdictions, including the City of Tracy, the Mountain House community, and the counties of Alameda, San Joaquin, and Contra Costa, on vehicle sizes and weights, driver licensing, and truck routes. In addition, the project owner or its contractor shall obtain necessary transportation permits from Caltrans and all relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports (MCRs), the project owner shall report permits received during that reporting period. In addition, the project owner shall retain copies of permits and supporting documentation on-site for Compliance Project Manager (CPM) inspection if requested.

TRANS- 2 Restoration of All Public Roads, Easements, and Rights-of-Ways

The project owner shall restore all public roads, easements, and rights-of-way that have been damaged due to project-related construction activities. The restoration shall be completed in a timely manner to the road's original or near original condition.

Prior to the start of site mobilization, the project owner shall notify the relevant jurisdictions, including the Counties of Alameda, Contra Costa, and San Joaquin, the City of Tracy, and Caltrans District 4, of the proposed schedule for project construction. The purpose of this notification is to request that these jurisdictions consider postponement of any planned public right-of-way repair or improvement activities in areas affected by project construction until construction is completed, and to coordinate any concurrent construction-related activities that cannot be postponed.

Verification: Prior to the start of site mobilization, the project owner shall photograph or videotape all affected public roads, easements, right-of-way segment(s),

and/or intersections and shall provide the CPM, the affected local jurisdiction(s), and Caltrans District 4 (if applicable) with a copy of these images.

Within 60 calendar days of completion of construction, the project owner shall meet with the CPM, the affected local jurisdiction(s), and Caltrans District 4 (if applicable) to identify sections of public right-of-way to be repaired. At that time, the project owner shall establish a schedule for completion and approval of the repairs. Following completion of any public right-of-way repairs, the project owner shall provide to the CPM letters signed by the affected local jurisdiction(s) and Caltrans District 4 stating their satisfaction with the repairs.

TRANS-3 Traffic Control Plan, Heavy Hauling Plan, and Parking/Staging Plan

Prior to the start of construction of the MEP, the project owner shall prepare a Traffic Control Plan (TCP) for the MEP's construction and operations traffic. The TCP shall address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes.

The project owner shall consult with the Caltrans District 4 office and the applicable local jurisdictions in the preparation and implementation of the Traffic Control Plan (TCP). (Applicable local jurisdictions include the Counties of Alameda, Contra Costa, and San Joaquin, as well as the City of Tracy and the Mountain House Community Services District.) The project owner shall submit the proposed TCP to the Caltrans District 4 office and to the affected local jurisdictions in sufficient time for review and comment, and to the Energy Commission Compliance Project Manager (CPM) for review and approval prior to the proposed start of construction and implementation of the plan. The Traffic Control Plan (TCP) shall include:

- A work schedule designed to ensure that the project does not significantly impact LOS on the local and regional transportation network in the project's vicinity. The project owner shall use one or more of the following measures to reduce impacts to LOS: staggered work shifts, off-peak work schedules (arriving or departing from about 6:30 pm - 6:00 am and from about 9:00 am - 3:30 pm), and/or a park-and-ride program for construction employees.
- Provisions for an incentive program, such as employer-sponsored commuter checks, to encourage construction workers to carpool and/or use van or bus service.
- A project schedule to ensure that the construction-related activities associated with the MEP project and other cumulative projects are coordinated with Caltrans District 4 and the relevant local jurisdictions. This would ensure that construction-related traffic and activities would not impact transportation facilities and existing traffic levels within the project area;
- Timing of heavy equipment and building material delivery to the sites, which shall occur during off-peak traffic hours;

- Provisions for redirection of construction traffic with a flag person as necessary to ensure traffic safety and minimize interruptions to non-construction related traffic flow.
- Provisions for ensuring traffic safety during implementation of Condition of Certification **BIO-10** in the **BIOLOGICAL RESOURCES** section of this SSA. For example, include:
  - traffic control methods and/or scheduling to ensure safety of the biological monitors and to prevent collisions and traffic back-ups caused by slow-moving surveying vehicles;
  - details on whether or not construction traffic will be rerouted during the wet season as described under **BIO-10 ii)**, and if so, details of methods that will be used to redirect construction traffic.
- Placement of necessary signage, lighting, and traffic control devices at the project construction site and lay-down areas;
- Routes to the project site to be used by construction worker vehicles and truck traffic, including trucks carrying hazardous materials. Routes shall avoid use of the West Grant Line and Midway Road intersection during peak hours, as this intersection already operates at LOS F during PM peak hours;
- A heavy-haul plan addressing the transport and delivery of heavy and oversized loads requiring permits from the California Department of Transportation (Caltrans), other state or federal agencies, and/or the affected local jurisdictions;
- Timing of construction-related trips, with trips scheduled for off-peak hours if possible;
- Location and details of construction along affected roadways at night, where permitted;
- Temporary closure of travel lanes or disruptions to street segments and intersections during construction activities;
- Traffic diversion plans (in coordination with Alameda County, San Joaquin County, Contra Costa County, and the City of Tracy) to ensure access during temporary lane/road closures;
- Access to residential and/or commercial property located near construction work and truck traffic routes;
- Insurance of access for emergency vehicles to the project site;
- Advance notification to residents, businesses, emergency providers, and hospitals that would be affected when roads may be partially or completely closed;
- Identification of safety procedures for exiting and entering the site access gate;

- Parking/Staging Plan (PSP) for all phases of project construction and for project operation;
- The property owner and contractor(s) shall make available information on public transportation within the project vicinity and surrounding counties and cities to MEP construction and operations workforce.

Verification: At least 60 calendar days prior to the start of construction, including any grading or site remediation at the project site or its associated easements, the project owner shall submit the TCP to the applicable agencies for review and comment and to the CPM for review and approval. The project owner shall also provide the CPM with a copy of the transmittal letter to the agencies requesting review and comment.

At least 30 calendar days prior to the start of construction, the project owner shall provide copies of any comment letters received from the agencies, along with any changes to the proposed development plan, to the CPM for review and approval.

TRANS-4 Encroachment into Public Rights-of-Way

Prior to any ground disturbance, improvements, or obstruction of traffic within any public road, easement, or right-of-way, the project owner or its contractor(s) shall coordinate with all relevant jurisdictions, including the counties of Alameda and Contra Costa and Caltrans District 4, to obtain all required encroachment permits and comply with all applicable regulations.

Verification: At least 10 days prior to ground disturbance or interruption of traffic in or along any public road, easement, or right-of-way, the project owner shall provide copies of all permit(s), relevant to the affected location(s), received from Caltrans or any other affected jurisdiction/s to the CPM. In addition, the project owner shall retain copies of the issued/approved permit(s) and supporting documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

TRANS-5 Transportation of Hazardous Materials

The project owner shall obtain the necessary permits and/or licenses from the California Highway Patrol, Caltrans District 4, and any relevant local jurisdictions for the transportation of hazardous materials. The project owner shall ensure compliance with all applicable regulations and implementation of the proper procedures. In addition, the owner shall ensure that hazardous materials deliveries occur outside of normal commute hours.

Verification: In the Monthly Compliance Reports (MCRs), the owner shall provide copies of all permits/licenses obtained for the transportation of hazardous substances.

TRANS-6 Payment of Transportation Fees

Where applicable, the property owner shall pay traffic and transportation fees to Alameda County for development of the MEP. These fees may include but not be limited to the Tri-Valley transportation development fee and the cumulative traffic impact mitigation fee.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall submit plans for the proposed MEP to Alameda County, pay any necessary transportation-related fees, and provide documentation of exemption or payment to the

CPM. In addition, the project owner shall retain copies of this documentation in its compliance file for a minimum of 180 calendar days after the start of commercial operation.

TRANS-7 Obstruction Marking and Lighting

The project owner shall install obstruction marking and lighting on the exhaust stacks, consistent with FAA requirements, as expressed in the following documents:

- FAA Advisory Circular 70/7460-1K
- FAA Safety Alert for Operators (SAFO) 09007.

Permanent lighting consistent with all requirements shall be installed and activated within 5 days of completion of construction and prior to the start of plant operation. Lighting shall be operational 24 hours a day, 7 days a week for the life of project operation. Upgrades to the required lighting configurations, types, location, or duration shall be implemented consistent with any changes to FAA obstruction marking and lighting requirements.

Verification: At least 60 days prior to the start of construction, the project owner shall submit to the CPM for approval final design plans for the power plant exhaust stacks that depict the required air traffic obstruction marking and lighting.

Within 5 days of completion of exhaust stack construction and prior to the start of plant operation, the project owner shall install and activate permanent obstruction marking and lighting consistent with FAA requirements and shall inform the CPM in writing within 10 days of installation and activation. The lighting shall be inspected and approved by the CPM (or designated inspector) within 30 days of activation.

TRANS-8 Pilot Notification and Awareness

The project owner shall initiate the following actions to ensure pilots are aware of the project location and potential hazards to aviation:

- Submit a letter to the FAA requesting a Notice to Airmen (NOTAM) be issued advising pilots of the location of the MEP and recommending avoidance of overflight of the project site below 1,500 feet AGL. The letter should also request that the NOTAM be maintained in active status until all navigational charts and Airport Facility Directories (AFDs) have been updated.
- Submit a letter to the FAA requesting a power plant depiction symbol be placed at the MEP site location on the San Francisco Sectional Chart with a notice to “avoid overflight below 1,500 feet AGL”.
- Submit a request to and coordinate with the Byron Airport Manager to add a new remark to the Automated Surface Observing System (ASOS) identifying the location of the MEP and advising pilots to avoid direct overflight below 1,500 feet AGL as they approach or depart the airport.

- Request that TRACON (NORCAL) and/or the Oakland Air Traffic Control Center submit aerodrome remarks describing the location of the MEP plant and advising against direct overflight below 1,500 feet AGL to the:
  - FAA AeroNav Services, formerly the FAA National Aeronautical Charting Office (Airport/Facility Directory)
  - Jeppesen Sanderson Inc. (JeppGuide Airport Directory, Western Region)
  - Airguide Publications (Flight Guide, Western States)

Verification: Within 30 days following the start of construction, the project owner shall submit draft language for the letters of request to the FAA (including NORCAL TRACON) and Byron Airport to the CPM for review and approval.

At least 60 days prior to the start of operations, the project owner shall submit the required letters of request to the FAA and request that TRACON (NORCAL) submit aerodrome remarks to the listed agencies. The project owner shall submit copies of these requests to the CPM. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt.

If the project owner does not receive a response from any of the above agencies within 45 days of the request (or by 15 days prior to the start of operations) the project owner shall follow up with a letter to the respective agency/ies to confirm implementation of the request. A copy of any resulting correspondence shall be submitted to the CPM within 10 days of receipt.

The project owner shall contact the CPM within 72 hours if notified that any or all of the requested notices cannot be implemented.[15] Should this occur, the project owner shall appeal such a determination, consistent with any established appeal process and in consultation with the CPM. A final decision from the jurisdictional agency denying the request, as a result of the appeal process, shall release the project owner from any additional action related to that request and shall be deemed compliance with that portion of this condition of certification.

REFERENCES

AIRNAV 2010a – AirNav/83 (Byron Airport), http://www.airnav.com/airport/C83, accessed July 22, 2010.

AC 2000 – Alameda County East County Area Plan (Alameda County General Plan), revised November 2000, http://www.acgov.org/cda/planning/generalplans/documents/EastCountyAreaPlancombined.pdf

[15] The Energy Commission does not have the authority to compel issuance of a NOTAM or require the FAA or Byron Airport to publish the location of or remarks regarding the project in any aviation chart or guide, or add that information to the Byron Airport ASOS.

AC 2009a – Alameda County Code, Section 15.44, http://library.municode.com/HTML/16425/level2/T15_C15.44.html

AC 2009b – Alameda County Code, Section 15.48, http://library.municode.com/HTML/16425/level2/T15_C15.48.html

AC 2009c – Alameda County Code, Section 17.52.930, http://www.municode.com/content/23/16425/HTML/T17%20-%20Title%2017%20%20ZONING.html

AC 2010g – Alameda County / C Bazar (TN 58582). Mariposa Energy Project-Consistency with Alameda County General Plan. Dated 9/17/10. Submitted to CEC on 9/22/2010

ACCMA 2009 – Alameda County Congestion Management Agency, Congestion Management Program, 2009, http://www.accma.ca.gov/pages/HomeCongestionMgmt.aspx.

ACE 2010 – Altamont Commuter Express. http://www.acerail.com/Home.aspx, accessed on June 1, 2010.

AMS 2008 – Altamont Motorsports Park Rezoning Draft Environmental Impact Report. Prepared by Impact Sciences, Oakland, California, July 2008. http://www.acgov.org/cda/planning/ordinance/documents/Altamont_DEIR_Cover.pdf

BA 2005 – Byron Airport Master Plan. Prepared by Leigh Fisher Associates, Burlingame, California, June 2005. http://ca-contracostacounty.civicplus.com/static/depart/airport/06-05ByronAirportMasterPlan.pdf

BMAC 2010a – Byron Municipal Advisory Council / L. Juarrez (TN 55693) Support of Mariposa Energy Project, dated 1/7/2010. Submitted to CEC on 2/25/2010.

CC 2010 – Commute Connection. http://www.commuteconnection.com/park-ride.htm, accessed on June 1, 2010.

CCC 2005 – Contra Costa County General Plan (2005-2020), January 2005, http://www.co.contra-costa.ca.us/depart/cd/current/advance/GeneralPlan/CCCGeneralPlan.pdf.

CCCALUC 2000 – Contra Costa County Airport Land Use Compatibility Plan. Prepared by Shutt Moen Associates, Santa Rosa, California, adopted by Contra Costa County Airport Land Use Commission, December 13, 2000. http://www.co.contra-costa.ca.us/depart/cd/current/ALUCPlan/ALUCPlan.htm.

CCCALUC 2009a – Contra Costa County Airport Land Use Commission / K. Freitas (TN 53439). Email concerns about the Mariposa project impact to the Byron airport, dated 9/28/09. Submitted to CEC on 9/28/2009.

CCCALUC 2009b – Contra Costa County Airport Land Use Commission / D. Durant (TN 54288). Letter with concerns about the Mariposa project impact to the Byron airport. Submitted to CEC on 11/30/2009.

CCCBOS 2010a – Contra Costa County Board of Supervisors / J. Gioia (TN 56400). Board of Supervisors letter on Mariposa project, dated 4/13/10. Submitted to CEC on 4/26/2010.

CCCBOS 2010b – Contra Costa County Board of Supervisors / J. Gioia (TN 58754). Board of Supervisors letter on Mariposa project, dated 10/4/10. Submitted to CEC on 10/12/2010.

CCCPC 2010a – Contra Costa County Planning Commission / D. Snyder (TN 56441). Planning Commission letter on Mariposa project, dated 4/6/10. Submitted to CEC on 4/27/2010.

CEC 2008 – Power Plant Licensing Case/Compliance Proceedings for the East Altamont Energy Center. Compliance Notices: Order Approving the Extension of the Deadline for Commencement of Construction, posted August 18, 2008. http://www.energy.ca.gov/sitingcases/eastaltamont/compliance/index.html Accessed August 12, 2010.

CEC 2010o – CEC / A. Koch (TN 56998). Report of Conversation Between A. Koch and D. Urry regarding clarification of traffic data, dated 4/21/10. Submitted to CEC on 5/7/2010.

CEC 2010p – CEC / A. Koch (TN 57624). Report of Conversation Between A. Koch and A. Haya, MHCSD regarding Mountain House Community construction in the near future, dated 7/19/10. Submitted to CEC on 7/19/2010.

CEC 2010s – CEC / A. Koch (TN 58022). Report of Conversation Between A. Koch and A. Young, Alameda County Planning, about proposed Greenvolts project, dated 7/19/10. Submitted to CEC on 8/12/2010.

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CH2M 2009f – CH2M Hill / D. Urry (TN 54287). Data response Sets 1A and 1B, dated 11/30/2009. Submitted to CEC on 11/30/2009.

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CH2M 2010n – CH2M Hill / D. Urry (TN 57970). Staff Queries - Set 2 Responses to A. Koch Email, dated 8/2010. Submitted to CEC on 8/9/2010.

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CPA 2010c – California Pilots Association / A. Wilson (TN 59223). Comments on Staff Assessment, dated 12/9/2010. Submitted to CEC on 12/10/2010.

DOT 2009a – Department of Transportation / G. Cathey (TN 53640). Letter from Department of Transportation, Division of Aeronautics about Mariposa project, dated 10/14/2009. Submitted to CEC on 10/15/2009.

DSL 2010a – Douglas and Sylvia Little (TN 59210). Comments and Questions on the Mariposa project, dated 12/8/2010. Submitted to the CEC on 12/9/2010.

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APPENDIX TT-1: PLUME VELOCITY ANALYSIS

William Walters

INTRODUCTION

The following provides the assessment of the Mariposa Energy Project (MEP) gas turbine and air cooled condenser exhaust stack plume velocities. Staff completed calculations to determine the worst-case vertical plume velocities at different heights above the stacks based on the applicant's proposed facility design. Staff also reviewed two applicant sponsored plume velocity analyses for consistency with staff's analysis.

PROJECT DESCRIPTION

The proposed project includes four LM6000 gas turbines operating in simple cycle mode and a 32-cell air cooled condenser that rejects heat from the gas turbine inlet air chiller systems.

PLUME VELOCITY CALCULATION METHOD

Staff has selected a calculation approach from a technical paper (Best 2003) to estimate the worst-case plume vertical velocities for the MEP exhausts. The calculation approach, which is also known as the "Spillane approach", used by staff is limited to calm wind conditions, which are the worst-case wind conditions. The Spillane approach uses the following equations to determine vertical velocity for single stacks during dead calm wind (i.e. wind speed = 0) conditions:

(1) $(V*a)^3 = (V*a)_o^3 + 0.12*F_o*[(z-z_v)^2-(6.25D-z_v)^2]$

(2) $(V*a)_o = V_{exit}*D/2*(T_a/T_s)^{0.5}$

(3) $F_o = g*V_{exit}*D^2*(1-T_a/T_s)/4$

(4) $Z_v = 6.25D*[1-(T_a/T_s)^{0.5}]$

Where: V = vertical velocity (m/s), plume-average velocity
a = plume top-hat radius (m, increases at a linear rate of $a = 0.16*(z- z_v)$
F_o= initial stack buoyancy flux m^4/s^3
z = height above ground (m)
z_v= virtual source height (m)
V_{exit}= initial stack velocity (m/s)
D = stack diameter (m)
T_a= ambient temperature (K)
T_s= stack temperature (K)
g = acceleration of gravity (9.8 m/s^2)

Equation (1) is solved for V at any given height above ground that is above the momentum rise stage for single stacks (where z > 6.25D) and at the end of the plume

merged stage for multiple plumes. This solution provides the plume-average velocity for the area of the plume at a given height above ground; the peak plume velocity would be two times higher than the plume-average velocity predicted by this equation. As can be seen the stack buoyancy flux is a prominent part of Equation (1). The calm condition calculation basis clearly represents the worst-case conditions, and the vertical velocity will decrease substantially as wind speed increases.

For multiple stack plumes, where the stacks are equivalent, the multiple stack plume velocity during calm winds was calculated by staff in a simplified fashion, presented in the Best Paper as follows:

(5) $V_m = V_{sp} * N^{0.25}$

Where: V_m = multiple stack combined plume vertical velocity (m/s)
V_{sp} = single plume vertical velocity (m/s), calculated using Equation (1)
N = number of stacks

Staff notes that this simplified multiple stack plume velocity calculation method predicts somewhat lower velocity values than the full Spillane approach methodology as given in data results presented in the Best paper (Best 2003).

VERTICAL PLUME VELOCITY ANALYSIS

The calm wind condition vertical plume velocities were calculated for the MEP gas turbines and air cooled condenser. The ambient and exhaust conditions for the gas turbine and air cooled condenser, operating at full load, are provided below in **Plume Velocity Table 1**.

Plume Velocity Table 1
Gas Turbine and Air Cooled Condenser Exhaust Parameters

	Gas Turbine	Air Cooled Condenser
Ambient Case	**46°F**	**80°F**
Stack Height, ft (m)	79.5 (24.2)	30.9 (9.4)
Stack Diameter, ft (m)	12 (3.7)	18.0 (5.5) per cell
Stack Velocity, ft/s (m/s)	90.2 (27.5)	10.2 (3.1)
Exhaust Temperature, F (K)	840 (722)	102 (312)

Source: CH2M 2009f, where the exhaust temperature is based on staff's energy balance.

The conditions modeled are worst case or full load operating conditions. The plumes from these exhausts are not visible and cannot be easily avoided by pilots.

Using the Spillane calculation approach, the plume average velocity at different heights above ground was determined by staff for calm conditions. Staff's calculated plume average velocity values are provided in **Plume Velocity Table 2.** The gas turbine plume velocities are calculated for a single gas turbine exhaust, and based on the plume spread and stack separation of 47 meters, the worst case combined gas turbine exhaust (equivalent to two gas turbines using Equation 5 listed above). The combined air cooled condenser plume average velocity is calculated by combining the adjacent 32

cells per Equation 5. The values provided below assume that the multiple stack plumes have merged; however, the gas turbine plumes may not have fully merged at the lowest heights in this table.

Plume Velocity Table 2
Gas Turbine and Air Cooled Condenser Worst-Case Predicted Plume Velocities

	Gas Turbine Plume Velocity (m/s)		Air Cooled Condenser Plume Velocity (m/s)
Height (ft)	Single Turbine 46°F	Combined Turbines 46°F	Combined Air Cooled Condenser 80°F
300	6.67	7.93	3.41
400	5.72	6.80	3.11
500	5.16	6.14	2.89
600	4.77	5.68	2.72
700	4.48	5.33	2.58
800	4.25	5.06	2.47
900	4.06	4.83	2.37
1,000	3.91	4.64	2.29
1,100	3.77	4.48	2.21
1,200	3.65	4.34	2.15
1,300	3.54	4.21	2.09
1,400	3.45	4.10	2.04
1,500	3.36	4.00	1.99
1,600	3.29	3.91	1.95
1,700	3.22	3.83	1.91
1,800	3.15	3.75	1.87
1,900	3.09	3.68	1.84
2,000	3.04	3.61	1.81

Source: Staff calculations.

As explained in the Transportation and Traffic section a vertical velocity of 4.3 m/s has been determined as the critical velocity of concern to light aircraft. For the gas turbine cases, single gas turbine and maximum combined gas turbine, the heights at which the plume average velocity drops below 4.3 m/s are calculated to be approximately 780 feet and 1,230 feet, respectively for the 46°F operating case. The maximum plume average velocities for gas turbines decline slowly with increasing ambient temperature. For the air cooled condenser, the plume average velocity is never calculated to exceed 4.3 m/s for the 80°F operating case. The air cooled condenser heat load and vertical plume velocities would be even lower at reduced ambient temperatures.

The values listed above in **Plume Velocity Table 2** are plume average velocities across the area of the plume. The maximum plume velocity, based on a normal Gaussian distribution, is two times the plume average velocity as shown in the table.

APPLICANT PLUME VELOCITY ANALYSIS

The applicant provided a plume velocity modeling analysis conducted by Katestone Environmental as part of their data responses (CH2M 2009f and CH2M 2010l) and a computational fluid dynamics modeling analysis conducted by CH2M Hill (CH2M 2010l). Staff's review of these two analyses is focused on the calm winds or worst-case velocity conditions that are comparable to staff's analysis that assumes calm winds.

Katestone Environmental Plume Velocity Assessment

This analysis provides both a worst case plume average velocity assessment using The Air Pollution Model (TAPM) and a frequency assessment of plume average velocity heights for 4.3 m/s and 6.09 m/s for the gas turbines. The applicant's worst case height for a 4.3 meter plume average velocity for both a single gas turbine exhaust (689 feet) and combined gas turbine exhaust (1,309 feet) are very comparable to those determined by staff's worst-case calculation methods (1,280 feet).

Staff has found no specific technical flaws with Katestone Environmental's plume velocity modeling inputs and results, but would like to point out the following differences with staff's methodology approach and conclusions:

1) The Katestone analysis uses predictive meteorological data rather than actual meteorological data, and this meteorological data is based on hourly average conditions, so the frequency distribution results do not integrate the fluctuations of wind speed during the hour, particularly those during very low wind speed conditions. Staff considers the fact that only one or two minutes of calm wind is necessary for the plume average velocity to reach peak levels.
2) Staff's approach to this safety issue, in consideration of the potential consequences and evaluating with an associated appropriate abundance of caution, is based on worst-case conditions. Frequency analysis, beyond a 100 percent prediction of safe aircraft operations, is not considered by staff to be appropriate for this type of impact analysis.

The results of staff's worst case air cooled condenser plume velocity analysis agree with the Katestone Environmental analysis results that determined the air cooled condenser exhaust plume average velocity would not exceed 4.3 m/s at any height above the air cooled condenser.

CH2M Hill Computational Fluid Dynamics Turbine Exhaust Velocity Characterization

CH2M Hill completed a computational fluid dynamics (CFD) modeling analysis of the turbine exhausts using the ANSYS FLUENT (release 12.1) model. Staff completed a review of the model, the model inputs, and the results of this modeling analysis. A summary of staff's findings are as follows:

1. The particular model used seems to be appropriate for use for the purpose of vertical velocity determination[16].
2. The modeling inputs seem to be appropriate for the modeling of the Mariposa gas turbines.
3. The calm wind results of this modeling analysis provide plume average velocities that are comparable to the Katestone TAPM modeling analysis and staff's calculation analysis. Specifically, the results at 1,309 feet are nearly identical (4.5

[16] This finding is based on a review of the CFD model literature provided by the applicant and a review of the results both of which suggest that this model properly integrates the mechanic and thermal energy from the turbine stack exhausts; however, the information presented is not complete and staff does not have a copy of this model to review, so this finding is based on staff's interpretation of this incomplete information.

m/s for the ANSYS FLUENT CFD analysis, 4.3 m/s for the Katestone TAPM analysis, and 4.2 m/s for staff's calculation analysis) for all three analyses.

In summary, this CFD analysis confirms the general magnitude of the worst-case plume average velocity determined by staff during calm winds.

WIND SPEED AND TEMPERATURE STATISTICS

Plume Velocity Table 3 provides the hourly average wind speed and temperature statistics for the meteorological data provided by the applicant (MEP 2009a). Calm or very low wind speeds can also occur for shorter periods of time within each of the monitored average hourly conditions.

Plume Velocity Table 3
Wind Speed and Temperature Statistics for Patterson Pass

Wind Speed		Temperature	
≤ 1 m/s	10.9%	≤ 40F	2.7%
≤ 2 m/s	29.1%	≤ 50F	20.9%
≤ 3 m/s	42.7%	≤ 60F	50.8%

Source: Staff data reduction of applicant provided meteorological data (MEP 2009a).

Calm conditions/low wind speeds averaging an hour or longer are not the predominant wind condition in the site area (where hour-long calm winds only occur three percent of the time) but they do occur, and occur during lower temperature conditions that are somewhat more favorable to higher velocity conditions for the thermally buoyant gas turbine plumes.

CONCLUSIONS

The calculated worst case calm wind condition vertical plume average velocities from the Mariposa gas turbine are predicted to exceed 4.3 m/s at heights as much as approximately 1,200 feet above ground level. The applicant's two modeling analyses show comparable and somewhat higher heights where 4.3 m/s would be exceeded.

The air cooled condenser plume average velocity is not predicted to exceed 4.3 m/s at any height. The worst-case dead calm wind ambient conditions used in the velocity calculations will occur periodically during the plant's life.

The vertical velocity from the equipment exhaust at a given height above the stack decreases as wind speed increases. However, the plume average vertical velocities will remain relatively high, and would exceed 4.3 m/s above 500 feet about ground level, during calm or very low wind speed conditions. The peak plume average vertical velocity can remain over 4.3 m/s up to approximately 1,200 feet above ground during dead calm wind conditions. These low wind speed conditions lasting an hour or more occur relatively infrequently at the site location, approximately only 3 percent of the time at ground level, or about 5 hours on average each week. However, shorter periods of

dead calm winds, lasting long enough to increase the vertical plume average velocity height up to its peak height, can occur more often during hours with low average wind speeds.

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HIGHWAY CAPACITY MANUAL

The Highway Capacity Manual is prepared by the Transportation Research Board, Committee on Highway Capacity and Quality of Service. It represents a concentrated, multi-agency effort by the Transportation Research Board, the Federal Highway Administration, the American Association of Highway and Transportation Officials, and other traffic/transportation related agencies. It is the most widely used resource for traffic analysis. Several versions of the Highway Capacity Manual (HCM) have been published. The current edition was published in 2000. It contains concepts, guidelines, and computational procedures for computing the capacity and quality of service of various highway facilities, including freeways, signalized and unsignalized intersections, rural highways, and the effects of transit, pedestrians, and bicycles on the performance of these systems. Methods identified in the HCM were used during the analysis of potential traffic and transportation impacts for the proposed MEP project.

LEVEL OF SERVICE

The description and procedures for calculating capacity and level of service are found in the Highway Capacity Manual 2000. The Highway Capacity Manual 2000 represents the latest research on capacity and quality of service for transportation facilities.

Quality of service requires quantitative measures to characterize operational conditions within a traffic stream. Level of service (LOS) is 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.

Six levels of service are defined for each type of facility that has analysis procedures available. Letters designate each level, from A to F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions and the driver's perception of these conditions. Safety is not included in the measures that establish service levels. A general description of service levels for various types of facilities is shown in **Table A**.

Table A
Level of Service Description

Facility Type	Uninterrupted Flow	Interrupted Flow
	Freeways Multi-lane Highways Two-lane Highways Urban Streets	Signalized Intersections Unsignalized Intersections - Two-way Stop Control - All-way Stop Control
Level of Service		
A	Free-flow	Very low delay
B	Stable flow. Presence of other users noticeable.	Low delay
C	Stable flow. Comfort and convenience starts to decline.	Acceptable delay
D	High density stable flow	Tolerable delay
E	Unstable flow	Limit of acceptable delay
F	Forced or breakdown flow	Unacceptable delay

Source: Highway Capacity Manual 2000

Interrupted Flow

One of the more important elements limiting, and often interrupting, the flow of traffic on a highway is the intersection. Flow on an interrupted facility is usually dominated by points of fixed operation, such as traffic signals, stop, and yield signs. These all operate quite differently and have differing impacts on overall flow.

Signalized Intersections

The capacity of a highway is related primarily to the geometric characteristics of the facility, as well as to the composition of the traffic stream on the facility. Geometrics are a fixed, or non-varying, characteristic of a facility.

At the signalized intersection, an additional element is introduced into the concept of capacity: time allocation. A traffic signal essentially allocates time among conflicting traffic movements seeking use of the same physical space. The way in which time is allocated has a significant impact on the operation of the intersection and on the capacity of the intersection and its approaches.

Level of service for signalized intersections is defined in terms of control delay, which is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Specifically, level of service criteria for traffic signals is stated in terms of average control delay per vehicle, typically for a 15-minute analysis period. Delay is a complex measure and depends on a number of variables, including the quality of progression, the cycle length, the ratio of green time to cycle length and the volume to capacity ratio for the lane group.

For each intersection analyzed the average control delay per vehicle per approach is determined for the peak hour. A weighted average of control delay per vehicle is then

determined for the intersection. A level of service designation is given to the control delay to better describe the level of operation. Descriptions of levels of service for signalized intersections can be found in **Table B**.

The use of control delay, often referred to as signal delay, was introduced in the 1997 update to the Highway Capacity Manual. It represents a departure from previous updates. In the third edition of the Highway Capacity Manual, published in 1985 and the 1994 update to the third edition, delay only included stop delay. Thus, the level of service criteria listed in Table B differs from earlier criteria.

Table B
Description of Level of Service for Signalized Intersections

Level of Service	Description
A	Very low control delay, up to 10 seconds per vehicle. Movement forward (progression) is extremely favorable, and most vehicles arrive during the green phase. Many vehicles do not stop at all. Short cycle lengths may tend to contribute to low delay values.
B	Control delay greater than 10 and up to 20 seconds per vehicle. There is good progression or short cycle lengths or both. More vehicles stop causing higher levels of delay.
C	Control delay greater than 20 and up to 35 seconds per vehicle. Higher delays are caused by fair progression or longer cycle lengths or both. Individual cycle failures may begin to appear. Cycle failure occurs when a given green phase does not serve a waiting line of vehicles, and overflow occurs. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	Control delay greater than 35 and up to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volumes. Many vehicles stop, the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Control delay greater than 55 and up to 80 seconds per vehicle. The limit of acceptable delay. High delays usually indicate poor progression, long cycle lengths, and high volumes. Individual cycle failures are frequent.
F	Control delay in excess of 80 seconds per vehicle. Unacceptable to most drivers. Oversaturation, arrival flow rates exceed the capacity of the intersection. Many individual cycle failures. Poor progression and long cycle lengths may also be contributing factors to higher delay.

Source: Highway Capacity Manual 2000

Unsignalized Intersections

The current procedures on unsignalized intersections were first introduced in the 1997 update to the Highway Capacity Manual and represent a revision of the methodology published in the 1994 update to the 1985 Highway Capacity Manual. The revised procedures use control delay as a measure of effectiveness to determine level of service. Delay is a measure of driver discomfort, frustration, fuel consumption, and increased travel time. The delay experienced by a motorist is made up of a number of factors that relate to control, traffic and incidents. Total delay is the difference between the travel time actually experienced and the reference travel time that would result during base conditions (i.e., in the absence of traffic control, geometric delay, any incidents, and any other vehicles). Control delay is the increased time of travel for a vehicle approaching and passing through an unsignalized intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection.

Two-Way Stop Controlled Intersections

Two-way stop controlled intersections in which stop signs are used to assign the right-of-way, are the most prevalent type of intersection in the United States. At two-way stop-controlled intersections the stop-controlled approaches are referred as the minor street approaches and can be either public streets or private driveways. The approaches that are not controlled by stop signs are referred to as the major street approaches.

The capacity of movements subject to delay is determined using the "critical gap" method of capacity analysis. Expected average control delay based on movement volume and movement capacity is calculated. A level of service designation is given to the expected control delay for each minor movement. Level of service is not defined for the intersection as a whole. Control delay is the increased time of travel for a vehicle approaching and passing through an all-way stop-controlled intersection, compared with a free-flow vehicle if it were not required to slow or stop at the intersection. A description of levels of service for two-way stop-controlled intersections is found in **Table C**.

Table C
Description of Level of Service for Two-Way Stop Controlled Intersections

Level of Service	Description
A	Very low control delay less than 10 seconds per vehicle for each movement subject to delay.
B	Low control delay greater than 10 and up to 15 seconds per vehicle for each movement subject to delay.
C	Acceptable control delay greater than 15 and up to 25 seconds per vehicle for each movement subject to delay.
D	Tolerable control delay greater than 25 and up to 35 seconds per vehicle for each movement subject to delay.
E	Limit of acceptable control delay greater than 35 and up to 50 seconds per vehicle for each movement subject to delay.
F	Unacceptable control delay in excess of 50 seconds per vehicle for each movement subject to delay.

Source: Highway Capacity Manual 2000

REFERENCE

TRB 2000. Transportation Research Board, Highway Capacity Manual 2000; Washington, D.C.

TRAFFIC AND TRANSPORTATION APPENDIX B

MEASURES OF EFFECTIVENESS BY FACILITY TYPE

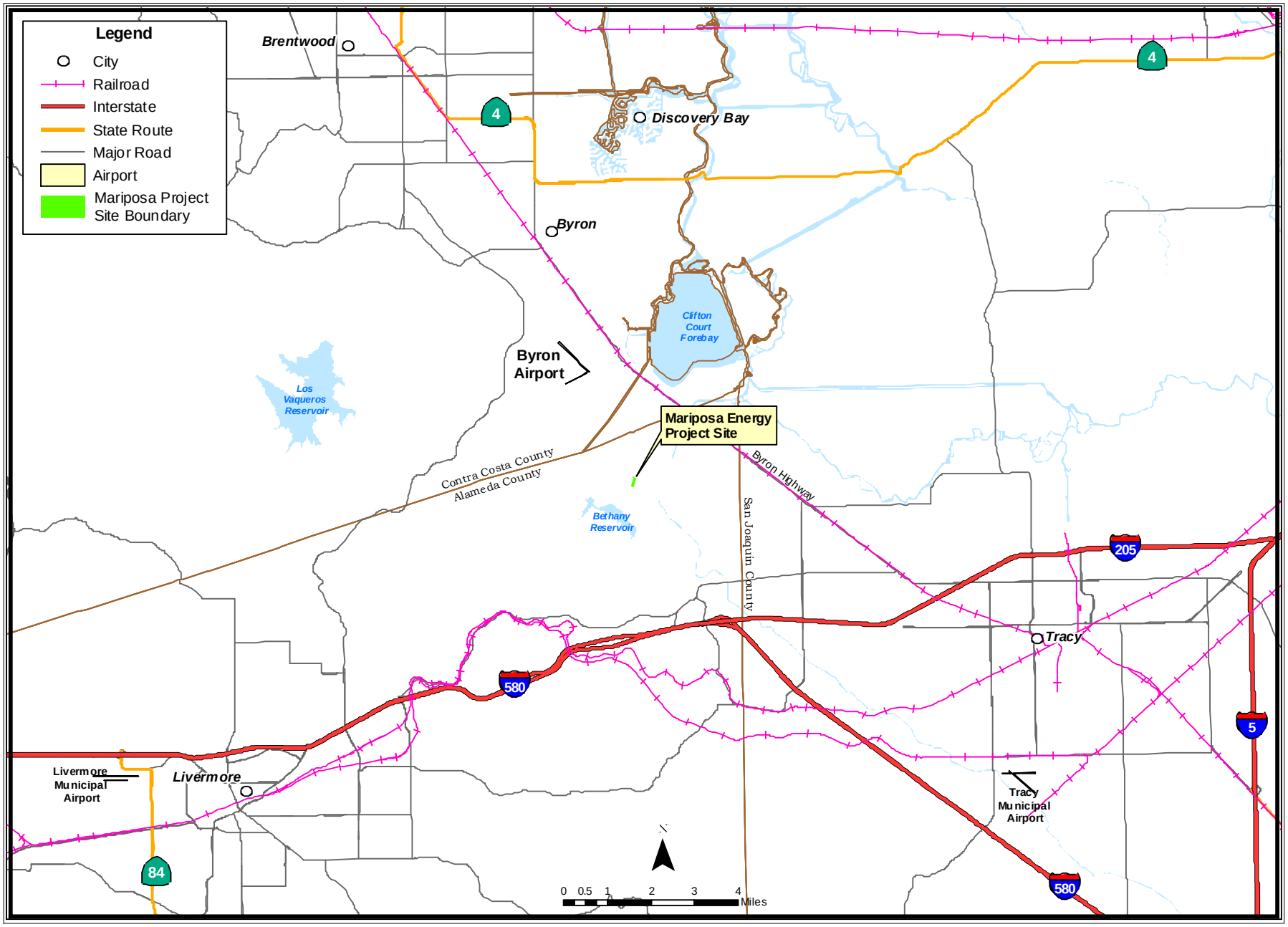
TYPE OF FACILITY	MEASURE OF EFFECTIVENESS (MOE)
Basic Freeway Segments	Density (pc/mi/ln)
Ramps	Density (pc/mi/ln)
Ramp Terminals	Delay (sec/veh)
Multi-Lane Highways	Density (pc/mi/ln)
Two-Lane Highways	Percent-Time-Following Average Travel Speed (mi/hr)
Signalized Intersections	Control Delay per Vehicle (sec/veh)
Unsignalized Intersections	Average Control Delay per Vehicle (sec/veh)
Urban Streets	Average Travel Speed (mi/hr)

REFERENCE

TRB 2000. Transportation Research Board, Highway Capacity Manual 2000; Washington, D.C.

TRAFFIC AND TRANSPORTATION - FIGURE 1

Mariposa Energy Project - Regional Transportation Setting

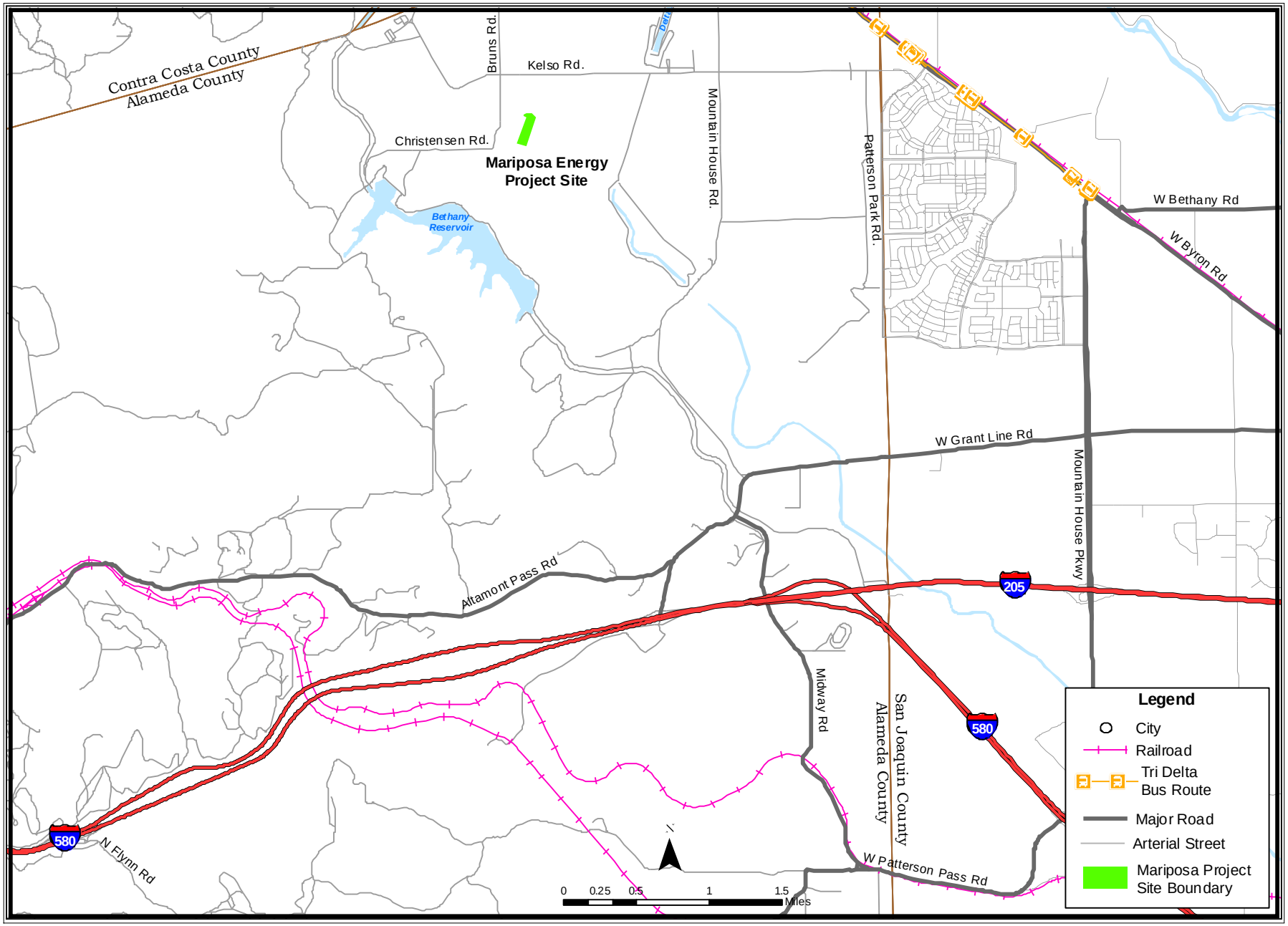


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 2A

Mariposa Energy Project - Local Transportation Setting South of the Project Site



TRAFFIC AND TRANSPORTATION

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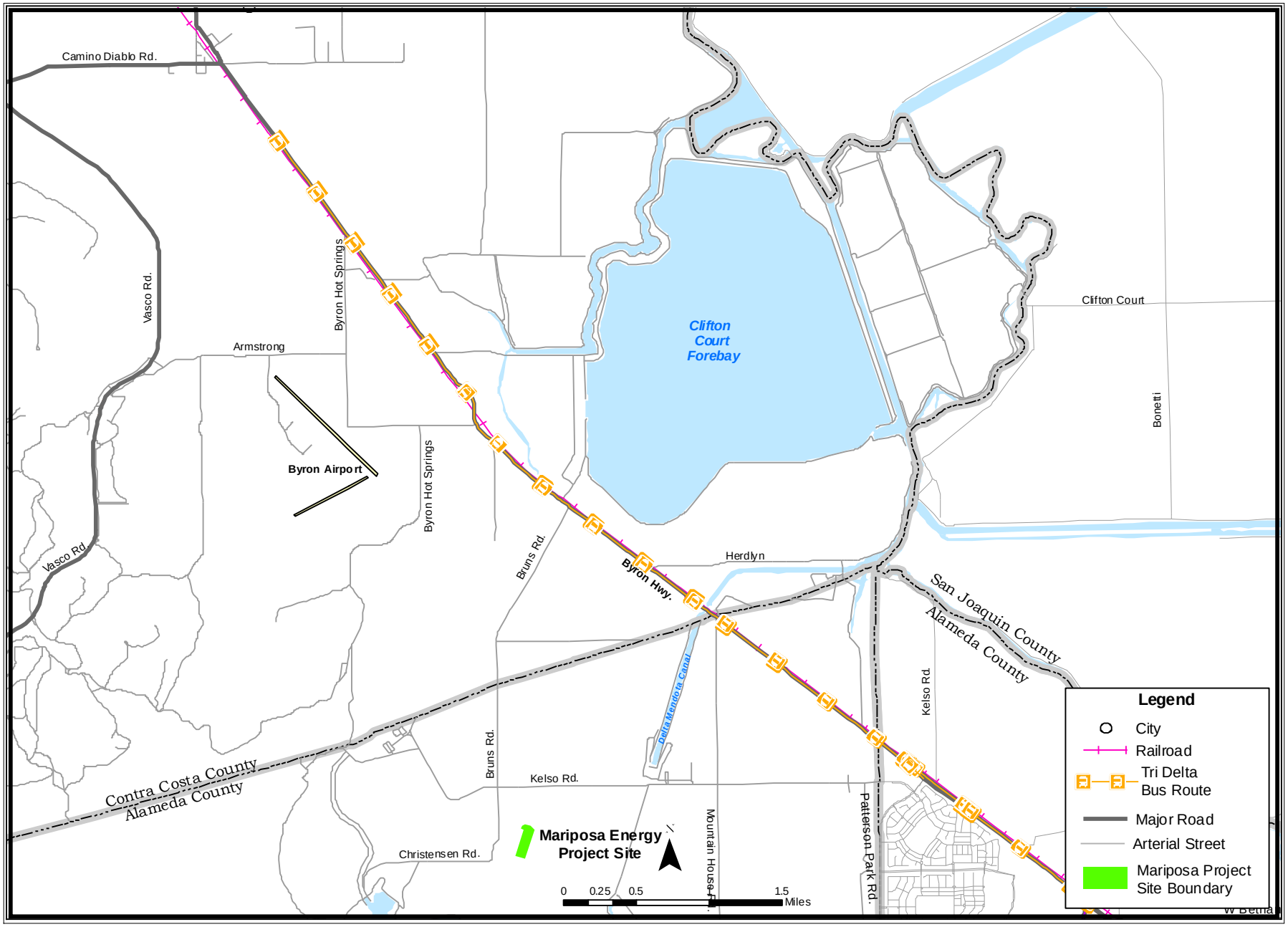
SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 2B

Mariposa Energy Project - Local Transportation Setting North of the Project Site



TRAFFIC AND TRANSPORTATION

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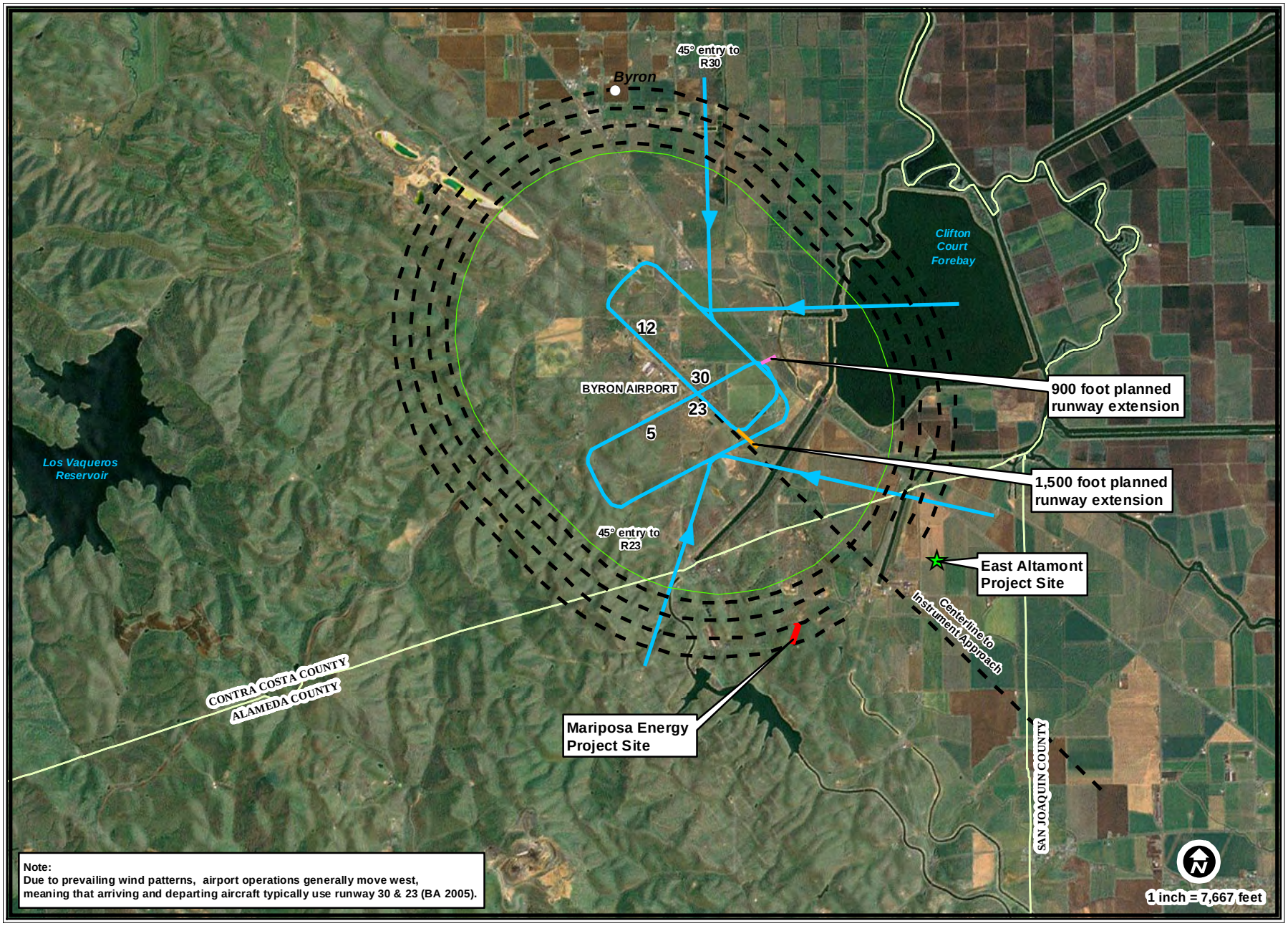
SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 3

Mariposa Energy Project - Byron Airport



TRAFFIC AND TRANSPORTATION

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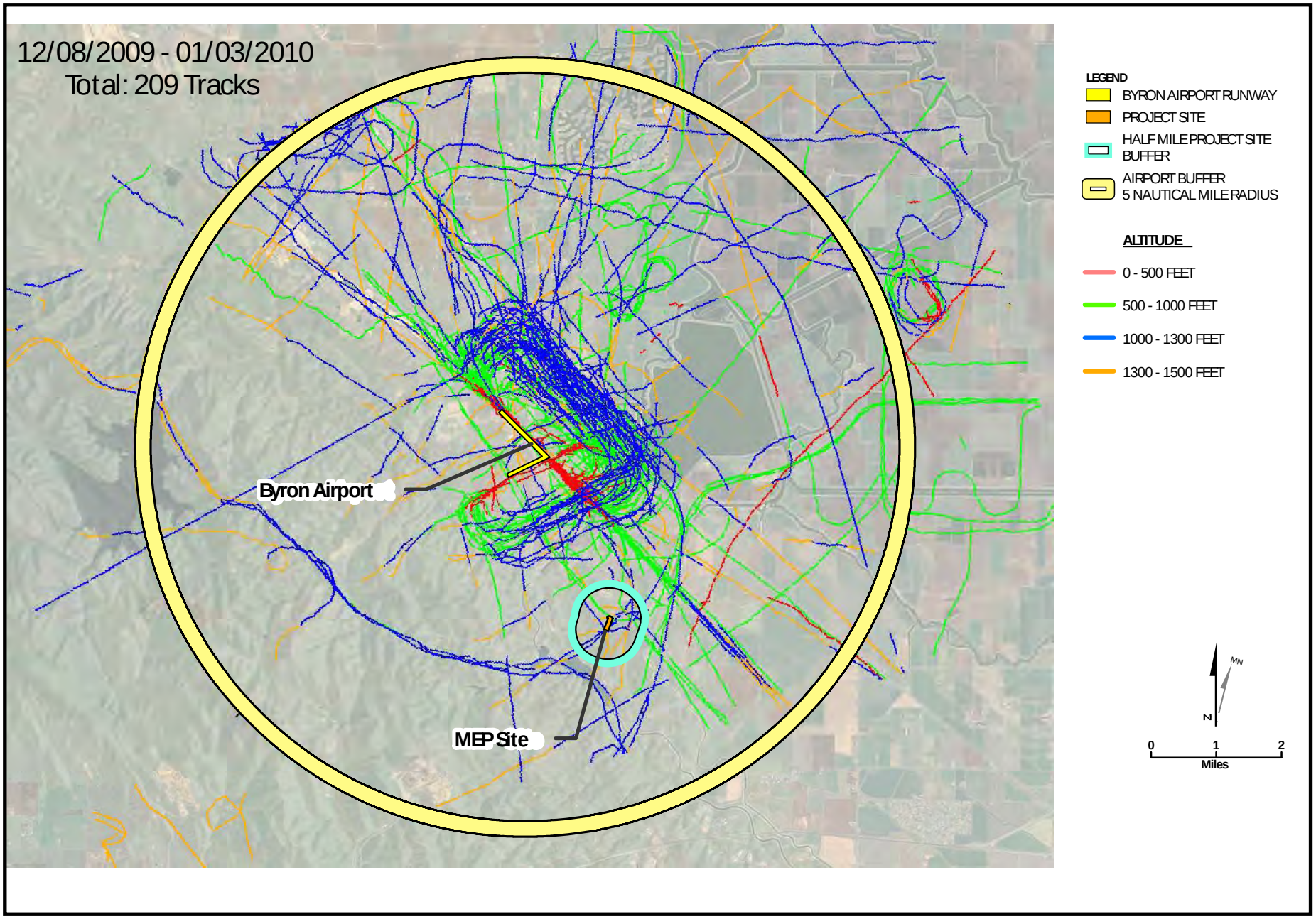
SOURCE: California Energy Commission - Tele Atlas Data

TRAFFIC AND TRANSPORTATION - FIGURE 4A

Mariposa Energy Project - Flight Tracks near the MEP from 12/8/2009 to 1/3/2010



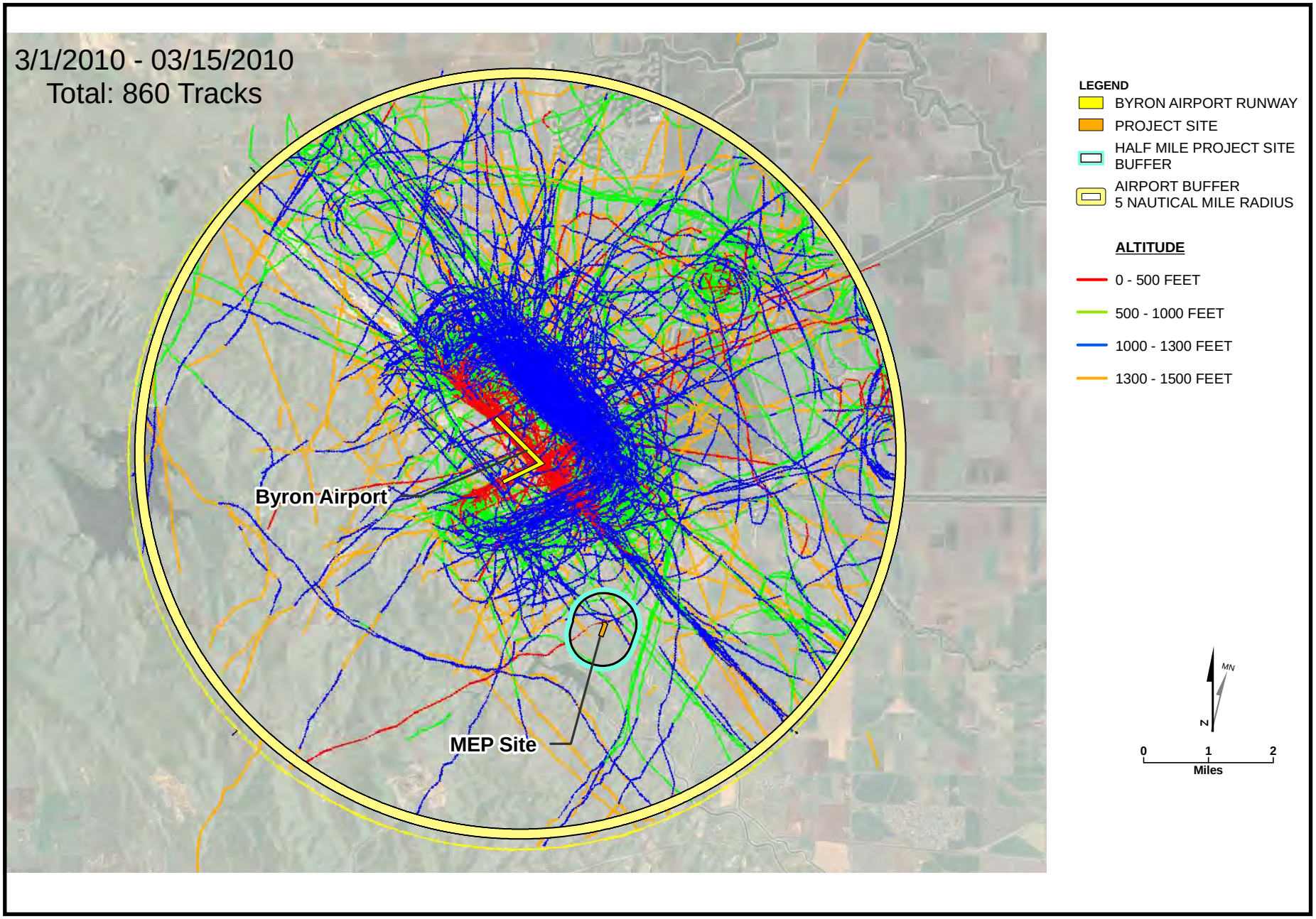
TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHILL

TRAFFIC AND TRANSPORTATION - FIGURE 4B

Mariposa Energy Project - Flight Tracks near the MEP from 3/1/2010 to 3/15/2010



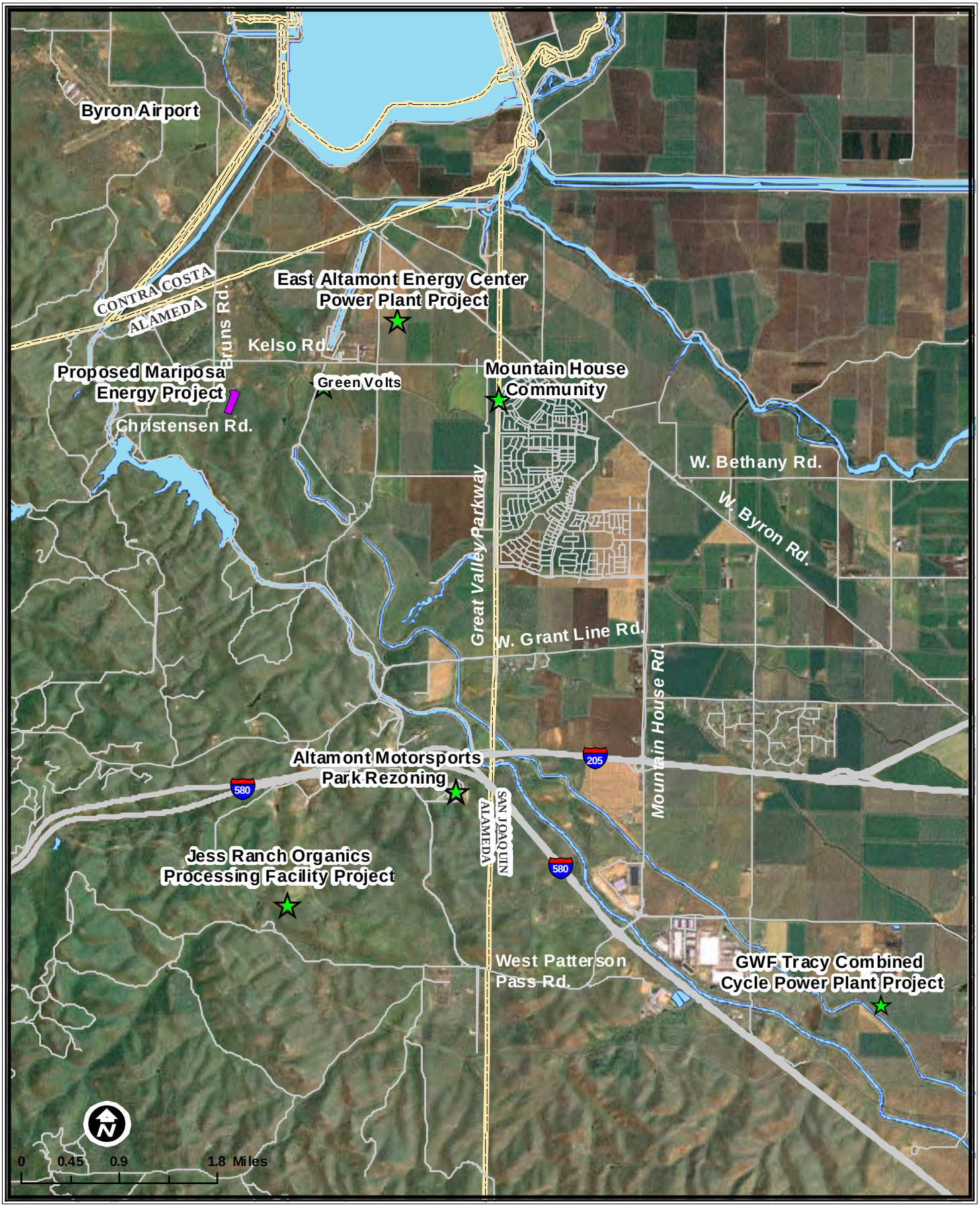
TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: CH2MHILL

TRAFFIC AND TRANSPORTATION- FIGURE 5

Mariposa Energy Project - Cumulative Impact Projects



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: ESRI Imagery & California Energy Commission

TRANSMISSION LINE SAFETY AND NUISANCE

Revised Testimony of Obed Odoemelam, Ph.D.

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

The California Energy Commission staff concludes that the transmission line proposed for the Mariposa Energy Project would not pose an aviation hazard according to the current Federal Aviation Administration criteria. In addition, compliance with the requirements outlined in the proposed conditions of certification would minimize the potential for nuisance and hazardous shocks, and maintain the generated fields to levels not associated with radio-frequency interference or audible noise. The proposed line's design and operational plan would be adequate to ensure that the generated electric and magnetic fields are managed to an extent the California Public Utilities Commission considers appropriate in light of the available health effects information. The proposed line would comply with all federal, state, and local laws, ordinances, regulations, and standards relating to transmission line safety and nuisance if staff's recommended conditions of certification are adopted and implemented.

INTRODUCTION

The purpose of this analysis is to assess the proposed Mariposa Energy Project's (MEP's) transmission line design and operational plan to determine whether the related field and non-field impacts would constitute a significant environmental hazard in the area around the route. All related health and safety laws, ordinances, regulations, and standards are currently aimed at minimizing such hazards. Staff's analysis focuses on the following issues taking into account both the physical presence of the lines and the physical interactions of their electric and magnetic fields:

- aviation safety,
- interference with radio-frequency communication,
- audible noise,
- fire hazards,
- hazardous shocks,
- nuisance shocks, and
- electric and magnetic field (EMF) exposure.

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of electric power lines. Staff's analysis examines the project's compliance with these requirements.

TRANSMISSION LINE SAFETY AND NUISANCE (TLSN) Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	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 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.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
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.
Audible Noise	
Local	
Alameda County Code Title 6.60	Establishes noise standards for residential and commercial areas
Alameda County General Plan. (East County Area Plan – Environmental Health and Safety)	Requires noise surveys for surveys proposed for existing residential or other sensitive areas.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
Title 8, California Code of Regulations (CCR) section 2700 et seq. "High Voltage Safety Orders"	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
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.
Electric and Magnetic Fields	
State	
CPUC GO-131-D, "Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California"	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.

Applicable LORS	Description
Industry Standards	
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 electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR sections 1250–1258, "Fire Prevention Standards for Electric Utilities"	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **Project Description** section, the proposed MEP would be located on a 10-acre portion of a 158-acre land parcel approximately 7 miles northwest of Tracy, 7 miles east of Livermore, 6 miles south of Byron and approximately 2.5 miles west of the Community of Mountain House in San Joaquin County. To the north are Pacific, Gas and Electric's (PG&E) Bethany Compressor Station and the 230-kilovolt (kV) Kelso Substation to which the project would be connected for power transmission to the PG&E electric power grid. This connection would be made via a new project switchyard using a 0.7-mile long single-circuit overhead line.

The proposed project line would run generally north from the project site, staying east of the PG&E compressor station until it turns west just north of the Kelso substation and into the connection points within the Kelso Substation. The PG&E would build, own and operate the interconnection-related terminal facilities within the fence line of the Kelso substation (MEP 2009a, AFC, section 3; CH2M 2009c, Data Response; CH2M 2010b, Data Response set 1c). The project's switchyard would be designed and built by the project owner according to PG&E's guidelines on safety and field management.

The area for MEP and related connecting line is zoned for large-parcel agriculture but is also used for power generation facilities and related transmission lines. The 6.5-megawatt Byron Power Cogeneration plant for example, is directly to the north (MEP 2009a, pp. 5.6-1 through 5.6-14 and 5.7-4). The absence of residences in the immediate vicinity means that there would not be the types of residential field exposure at the root of the health concern of recent years. The proposed site was chosen in part for its proximity to the noted Kelso Substation to which the project would be connected (MEP 2009a, p. 3-1).

PROJECT DESCRIPTION

The proposed project's line would consist of the following segments:

- The 0.7-mile overhead 230-kV line connecting the proposed project to the new on-site project switchyard from which there would be further connection to the PG&E power grid;
- Eight steel monopole support structures for the conductors with heights varying from 84 feet to 95 feet; and

- Project-related modifications at the existing Kelso Substation.

The proposed line would be owned, operated, and maintained by the applicant, Mariposa Energy LLC, according to PG&E guidelines that ensure line safety and efficiency together with reliability and maintainability. The applicant has provided the design and structural dimensions of the proposed line structures as related to safety, reliability, and field reduction efficiency (Figure 3.2-2).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry practices. These LORS and practices have been established to maintain impacts below levels of potential significance. Thus, if staff determines that the project would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace. The related requirements in **TLSN Table 1** establish the standards for assessing the potential for obstruction hazards within the navigable space and establish the criteria for determining when to notify the FAA about such hazards. As noted by the applicant (MEP 2009 a, p. 3-10), these regulations require FAA notification in cases of structures over 200 feet from the ground. Notification is also required if the structure is to be below 200 feet in height but would be located within the restricted airspace in the approaches to public or military airports. For airports with runways longer than 3,200 feet, the restricted space is defined by the FAA as an area extending 20,000 feet (3.98 miles) from the runway, with no obstructing structures for whom the ratio of distance from runway to height is greater than 100:1. For airports with runways of 3,200 feet or less, the restricted airspace would be an area that extends 10,000 feet from the runway. For heliports, the restricted space is an area extending 5,000 feet.

As noted by the applicant, the nearest airport to the MEP site is Byron Airport with runways that are 4,500 feet and 3,000 feet long. The project site is about 2.7 miles away at its nearest point and therefore falls within the restricted space for the airport necessitating FAA notification. Since the proposed line supports would be less than FAA's 200-foot limit in height in an area with other large transmission lines, an aviation hazard is not expected. However, the applicant has filed the required FAA notification (MEP 2009a, Appendix 5.12B). There are no heliports located within 5000 feet of the project lines and related facilities leading staff to conclude that the proposed lines would not pose an aviation hazard to both area helicopters and fixed-wing aircraft.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of 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. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends 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 interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts and related complaints is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The proposed line would be built and maintained according to PG&E practices that minimize surface irregularities and discontinuities. Moreover, the potential for such corona-related interference is usually of concern for lines of 345 kV and above, and not the 230-kV line proposed. The proposed low-corona designs are used for all PG&E lines of similar voltage rating to reduce surface-field strengths and the related potential for corona effects. Moreover, the lines would be located away from area residences making it unlikely that there would be complaints from radio-frequency interference. Staff does not recommend any related conditions of certification.

Audible Noise

The noise-reducing designs for low-intensity electric fields 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. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as proposed for MEP. Research by the Electric Power Research Institute (EPRI 1982) has validated this by showing the fair-weather audible noise from modern transmission lines to be generally indistinguishable from background noise at the edge of a right-of-way of 100 feet or more. Since the low-corona designs are also aimed at minimizing field strengths, 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 the **Noise and Vibration** section.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** 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.

Standard fire prevention and suppression measures for similar PG&E lines would be implemented for the proposed project line (MEP 2009a, p.3-10). The applicant's intention to ensure compliance with the clearance-related aspects of GO-95 would be an important part of this mitigation approach. Condition of Certification **TLSN-3** is recommended to ensure compliance with important aspects of the fire prevention measures.

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. 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.

The applicant's stated intention to implement the GO-95-related measures against direct contact with the energized line (MEP 2009a, p. 3-7) would serve to minimize the risk of hazardous shocks. Staff's recommended Condition of Certification **TLSN-1** would be adequate to ensure implementation of the necessary mitigation measures.

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.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures 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). For the proposed project lines, the project owner will be responsible in all cases for ensuring compliance with these grounding-related practices within the rights-of-way.

The potential for nuisance shocks around the proposed lines would be minimized through standard industry grounding practices (MEP 2009a, pp. 3-9 and 3-10). Staff recommends Condition of Certification **TLSN-4** to ensure such grounding for MEP.

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 the CPUC, other regulatory agencies, and staff has not established that such fields pose a significant health hazard to exposed humans. 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, as staff does, 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.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability, and maintainability.

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:

- Any exposure-related health risk to the individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- 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.

State

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines. It requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to

the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation and required by staff for all permitted lines. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since most new lines in California are currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, their fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Designing the proposed project lines according to existing PG&E field strength-reducing guidelines would constitute compliance with the CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The findings did not point to a need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project lines, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the lines. These types of exposures are short term and well understood as not significantly related to the health concern.

Industry's Approach to Reducing Field Exposures

The present focus is on the magnetic field because unlike electric fields, it can penetrate the soil, buildings, and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines is lower level, but long term. Scientists have not established which of these types of

exposures would be more biologically meaningful in the individual. Staff notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As with similar PG&E lines, specific field strength-reducing measures would be incorporated into the proposed lines to ensure the field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The field reduction measures to be applied include the following:

1. Increasing the distance between the conductors and the ground to an optimal level;
2. Reducing the spacing between the conductors to an optimal level;
3. Minimizing the current in the line; and
4. Arranging current flow to maximize the cancellation effects from interacting of conductor fields.

The strengths of the line's fields along the route would depend on the effectiveness of the field-reducing measures incorporated into their designs. These fields should be of the same intensity as PG&E lines of the same voltage and current-carrying capacity. The requirements in Condition of Certification **TLSN-2** for field strength measurements are intended to validate the applicant's assumed minimization efficiency.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or calculated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive or subtractive depending on prevailing conditions. Since the proposed project transmission lines would be designed and erected according to applicable field-reducing PG&E guidelines as currently required by the CPUC for effective field management, any contribution to cumulative area exposures should be at levels expected for PG&E lines of similar voltage and current-carrying capacity. It is this similarity in intensity that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contribution levels for the proposed 230-kV line designs would be assessed from the results of the field strength measurements specified in Condition of Certification **TLSN-2**.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on safe EMF management requires that any high-voltage line within a given area be designed to incorporate the field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is PG&E. Since the proposed project line would be designed according to the respective requirements of the LORS listed in **Table 1**, and operated and maintained according to current PG&E guidelines on line safety and field strength management, staff considers the proposed design and operational plan to be in compliance with the health and safety requirements of concern in this analysis. The actual contribution to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-2**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed MEP.

CONCLUSIONS

Since staff does not expect the proposed MEP transmission line to pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

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

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

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

Since the proposed project line would be operated to minimize the health, safety, and nuisance impacts of concern to staff and would be located within the existing plant's property boundaries without nearby residences, staff considers the proposed design, maintenance, and construction plan as complying with the applicable laws. With the conditions of certification proposed below, any such impacts would be less than significant.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct the proposed 230-kV transmission lines according to the requirements of California Public Utility Commission's GO-

95, GO-52, GO-131-D, Title 8, and Group 2, High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations, and PG&E's EMF-reduction guidelines.

Verification: At least 30 days before starting the construction of the transmission line or related structures and facilities, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the lines will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from each line at the points of maximum intensity along its route. The measurements shall be made after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed not later than six months after the start of operations.

Verification: The project owner shall file copies of the post-energization measurements with the CPM within 60 days after completion of the measurements.

TLSN-3 The project owner shall ensure that the rights-of-way of the proposed transmission lines are kept free of combustible material, as required under the provisions of section 4292 of the Public Resources Code and section 1250 of Title 14 of the California Code of Regulations.

Verification: During the first 5 years of plant operation, the project owner shall provide a summary of inspection results and any fire prevention activities carried out along the right-of-way of the line and provide such summaries in the Annual Compliance Report.

TLSN-4 The project owner shall ensure that all permanent metallic objects within the rights-of-way of the project-related lines is grounded according to industry standards.

Verification: At least 30 days before the lines is energized, the project owner shall transmit to the CPM a letter confirming compliance with this condition.

REFERENCES

MEP (Mariposa Energy LLC) 2009a. Application for Certification for the Mariposa Energy Project. Submitted to the California Energy Commission 0n 6-15-2009 .

(EPRI). Electric Power Research Institute. 1982. Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August 1998.

VISUAL RESOURCES

Revised Testimony of Mark R. Hamblin

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

The proposed Mariposa Energy Project would be consistent with applicable laws, ordinances, regulations, and standards pertaining to aesthetics, or preservation and protection of sensitive visual resources, and would not create a substantial adverse impact(s) under the California Environmental Quality Act pertaining to "Aesthetics" with the effective implementation of the conditions of certification proposed by the applicant and recommended by staff.

Staff concludes the incremental effect of the proposed Mariposa Energy Project combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis would not create a significant cumulative visual impact.

INTRODUCTION

In this section, staff discusses if the proposed project would be inconsistent with applicable laws, ordinances, regulations, and standards (LORS) pertaining to aesthetics or preservation and protection of sensitive visual resources, and if it would create a substantial adverse impact(s) under the California Environmental Quality Act (CEQA) pertaining to "Aesthetics."

PROJECT SITE AND VICINITY DESCRIPTION

The proposed project is to be constructed east of the Altamont Hills, approximately five miles south of Byron in the unincorporated area of Alameda County, California (**Visual Resources Figure 1** – Aerial View of Mariposa Energy Project Site and Vicinity).

Lands surrounding the 158 acre property (project site) where the proposed Mariposa Energy Project (MEP) would be located are visually characterized as rangeland, hilly, and as having cattle ranching operations, wind energy infrastructure, and Central Valley Project and State Water Project large-utility scale water and power conveyance projects (aqueducts, forebays, pumping and power stations).

The 158 acre project site where the proposed MEP is to be constructed consists of disturbed rangeland, a seasonal wetland area, and has a 6.5 megawatt (MW) cogeneration facility (Byron Power Cogen Plant) (**Visual Resources Figure 2** – Existing View of Project Site).

The hilly portion of the 158 acres is dotted with surface level concrete foundations and the remnants of wind turbines that have been removed from the site. Three high-voltage

transmission power lines cross the property (a single 230 kilovolt (kV) and two 500 kV power lines). The proposed MEP facility footprint would occupy an approximate 10 acre portion of the project site (applicant's leasehold) (**Visual Resources Figure 3** – Existing View of Facility Site On The Project Site).

The proposed project is a natural gas-fired, simple-cycle electric generating facility that would have four power blocks producing a total capacity of 200 megawatts (MWs). The project would use four GE LM6000 PC-Sprint Combustion Turbine Generators and an air-cooled condenser among its equipment (**Visual Resources Figure 4** – Mariposa Energy Project Architectural Rendering and **Visual Resources Figure 5** provides elevations of the Mariposa Energy Project).

Publicly Visible Project Structures

Visual Resources Table 1 provides a listing of proposed project's major buildings and structures and their dimensions, colors, materials, and finishes.

Visual Resources Table 1
MEP Dimensions, Colors, Materials and Finishes
Of Major Buildings and Structures

Structure	Height	Length	Width	Diameter	Color	Materials	Finish
Exhaust stack	80	***	***	12	Gray	metal	flat/untextured
Raw Water/fire water storage tank	45	***	***	45	light brown	metal	flat/untextured
Dematerialized water tank	40	***	***	40	light brown	metal	flat/untextured
Combustion turbine generator inlet air filter	34	32	37	***	light brown	metal	flat/untextured
Wastewater storage tank	25	***	***	25	light brown	metal	flat/untextured
Fuel gas compressors enclosure	25	52	98	***	gray	metal	flat/untextured
Warehouse and maintenance building	23	52	98	***	gray	metal	flat/untextured
Power distribution center	19	25	80	***	gray	metal	flat/untextured
Chiller air-cooled radiator	17	61	75	***	gray	metal	flat/untextured
Combustion turbine generator	15	57	14	***	gray	metal	flat/untextured
Control and administration building	14	28	78	***	gray	metal	flat/untextured
230 kV steel monopoles*	84-95	***	***	---	---	steel	---

Source: MEP2009a, pg. 5.13-31 and pg. 3-1*

APPLICANT PROPOSED VISUAL RELATED PROJECT DESIGN MEASURES

Glare

- None of the major project features will have surfaces that are highly reflective; the project will not be a source of daytime glare (MEP2009a, pg. 5.13-38).

Landscaping

- A Development Plan will include a detailed landscape plan that will respond to any County landscaping requirements as detailed in Alameda County's East County Area Plan (ECAP) Policy 114 (MEP2009a, pg. 5.13-32).

Lighting

- To reduce offsite lighting impacts, lighting at the facility will be restricted to areas required for safety, security, and operation. Exterior lights will be hooded, and lights will be directed onsite so that significant light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type will be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits will be provided, thus allowing these areas to remain unilluminated (dark) at most times, minimizing the amount of lighting potentially visible offsite (MEP2009a, pg. 5.13-32).
- High illumination areas not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting would not be highly visible offsite and would not produce offsite glare effects. The offsite visibility and potential glare of the lighting would be restricted by specification of non-glare fixtures and placement of lights to direct illumination into only those areas where it is needed (MEP2009a, pg. 5.13-36).
- During periods when nighttime construction activities take place, illumination that meets state and federal worker safety regulations will be required. To the extent possible, the nighttime construction lighting will be erected pointing toward the center of the site where activities are occurring and will be shielded. Task-specific lighting will be used to the extent practical while complying with worker safety regulations (MEP2009a, pg. 5.13-32).

Exterior Surface Treatment of Buildings and Structures

- The exteriors of all major project equipment will be treated with a neutral, earth tone finish, in colors ranging from gray to light brown. This combination of darker and lighter colors is intended to optimize its visual integration with the surrounding environment (MEP2009a, pg. 5.13-31).
- The neutral color and untextured treatment of the exterior materials would reduce any potential contrast with regard to color (MEP2009a, pg. 5.13-35).

Pipelines

- Pipelines will be underground facilities and will not be visible after completion of the construction phase (MEP2009a, pg. 5.13-32).

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Staff considers federal, state, and local laws, ordinances, regulations and standards (LORS) relevant to aesthetics, or protection and preservation of sensitive visual resources in land use planning documents; such as a Resource Management Plan, General Plan, Local Coastal Plan, and municipal code, applicable to the proposed project and surrounding area. **Land Use Table 2** provides a consistency analysis of applicable LORS relevant to the proposed project.

Visual Resources Table 2
Proposed Project's Consistency with LORS Applicable to Aesthetics, and Protection and Preservation of Sensitive Visual Resources

LORS		Consistency Determination	Basis for Consistency or Inconsistency	Proposed Condition of Certification
Source	**Policy and Strategy Descriptions**			
LOCAL				
County of Alameda General Plan	State planning law requires each city and county to prepare and adopt a comprehensive, long-term general plan for its physical development *(Government Code §65300 et.seq.)* The plan must include a statement of development policies and a diagram or diagrams and text setting forth objectives, principles, standards, and plan proposals *(Government Code §65302)*			
East County Area Plan (Revised by Initiative November 2000)	In November 2000, the Alameda County electorate approved the Save Agriculture and Open Space Lands Initiative (Measure D; effective date, December 22, 2000). The Initiative amended portions of the County General Plan, including the *East County Area Plan* (ECAP). This document incorporates the revisions called for by the Initiative. Policies, programs, tables and figures that have been added, revised, or enacted by the Initiative.			

Incompatible Uses - Policy 73	The County shall require buffers between those areas designated for agricultural use and new non-agricultural uses within agricultural areas or abutting parcels. The size, configuration and design of buffers shall be determined based on the characteristics of the project site and the intensity of the adjacent agricultural uses, and if applicable, the anticipated timing of future urbanization of adjacent agricultural land where such agricultural land is included in a phased growth plan. The buffer shall be located on the parcel for which a permit is sought and shall provide for the protection of the maximum amount of arable, pasture, and grazing land feasible.	Project would be consistent as proposed.	As shown on the ALTA/ACSM Land Title Survey prepared for the applicant of the Mariposa Energy Project, dated April 2009 (MEP2009a, Volume 2, June 2009), the project is to be constructed on an approximate 9.7 acre portion (leasehold) of a 158 acre project site. The location of the proposed leasehold on the 158 acre project site provides a buffer between nonagricultural use and grazing land on abutting parcels within the agricultural area.	
Visual Protection - Policy 108	To the extent possible, including by clustering if necessary, structures shall be located on that part of a parcel or on contiguous parcels in common ownership on or subsequent to the date this ordinance becomes effective, where the development is least visible to persons on public roads, trails, parks and other public viewpoints.	Project would be consistent as proposed.	Power plant structures would be constructed on the opposite (east) side of a hill fronting Bruns Road. The hill spans the southwest quarter of the project site. The hill has an approximate 100 foot elevation. The hill provides some visual buffering of the facility from Bruns Road. Major project structures are to be clustered on the 9.7 acre leasehold (see **Visual Resources Figure 6**).	
Viewsheds - Policy 112	The County shall require development to maximize views of the following prominent visual features: 2. Brushy Peak	Project would be consistent as proposed.	Brushy Peak's summits at 1,686 feet elevation. It is approximately 5.8 miles west of the project site. From the 158 acre property, Brushy Peak is not prominent in the view[1] (see **Visual Resources Figure 7 and Figure 11**).	

[1] The Visual Management System of the U.S. Forest Service uses distance zones. Distance zones are divisions of a particular landscape being viewed. The three distance zones are foreground, middleground, and background. Foreground – the limit of this zone is based upon distances at which details can be perceived. It will usually be limited to areas within 0.25 to 0.5 mile of the observer, but must be determined on a case-by-case basis as should any distance zoning. Middleground - this zone extends from foreground zone to 3 to 5 miles from the observer. Background – this zone extends from middleground to infinity. Beyond five miles texture is generally very weak or nonexistent (Bacon, Warren R. 1979).

Landscaping - Policy 114	The County shall require the use of landscaping in both rural and urban areas to enhance the scenic quality of the area and to screen undesirable views. Choice of plants should be based on compatibility with surrounding vegetation, drought-tolerance, and suitability to site conditions; and in rural areas, habitat value and fire retardance.	Project would be consistent as conditioned.	The applicant states in their Application for Certification (AFC) that a Development Plan will be provided that would include a detailed landscape plan that will respond to the County's landscaping requirements as detailed in Alameda County's East County Area Plan (ECAP) Policy 114, section 5.13.5.1 (MEP2009a, page 5.13-32).	Condition of Certification **VIS-6** requires landscaping and irrigation plan.
- Policy 115	In all cases appropriate building materials, landscaping and screening shall be required to minimize the visual impact of development. Development shall blend with and be subordinate to the environment and character of the area where located, so as to be as unobtrusive as possible and not detract from the natural, open space or visual qualities of the area. To the maximum extent practicable, all exterior lighting must be located, designed and shielded so as to confine direct rays to the parcel where the lighting is located.	Project would be consistent as conditioned.	The applicant has stated in their AFC that exteriors of all major project equipment will be treated with a neutral, earth tone finish, in colors ranging from gray to light brown. This combination of darker and lighter colors is intended to optimize its visual integration with the surrounding environment. (MEP2009a, page 5.13-31). To reduce offsite lighting impacts, lighting at the facility will be restricted to areas required for safety, security, and operation. Exterior lights will be hooded, and lights will be directed onsite so that significant light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type will be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits will be provided, thus allowing these areas to remain unilluminated (dark) at most times, minimizing the	Conditions of Certification **VIS-1, VIS-4** and **VIS-6** require surface treatment of project structures and buildings, exterior lighting management and landscaping.

			amount of lighting potentially visible offsite (MEP2009a, page 5.13-32). The applicant states in their AFC that a Development Plan will be provided that would include a detailed landscape plan that will respond to the County's landscaping requirements as detailed in Alameda County's ECAP Policy 114, (MEP2009a, page 5.13-32).	
Alteration of Landforms - Policy 116	To the maximum extent possible, development shall be located and designed to conform with rather than change natural landforms. The alteration of natural topography, vegetation, and other characteristics by grading, excavating, filling or other development activity shall be minimized. To the extent feasible, access roads shall be consolidated and located where they are least visible from public view points.	Project would be consistent as conditioned.	The project is to be constructed on the east side of an approximate 100 foot tall hill that spans the southwest quarter of the property. The project involves excavating into the hill. The hill provides some visual buffering of the MEP site from the public road. Temporary disturbed construction areas including the laydown area are to be restored to their original condition or better condition after project construction is completed. Excavated facility site slopes are to be vegetated to reduce erosion and run-off potential. The MEP site is to be accessed by an approximate 1,100-foot long access road that extends from an entrance on Bruns Road to the MEP leasehold. This portion of the access road already serves as the main access to the Byron Power Cogen Plant (see **Visual Resources – Figure 4 and Figure 6**).	Condition of Certification **VIS-2** requires surface restoration of areas affected by temporary construction activities.

Utilities - Policy 120	The County shall require that utility lines be placed underground whenever feasible. When located above ground, utility lines and supporting structures shall be sited to minimize their visual impact.	Project would be consistent as proposed.	Utility lines to serve the project site are to be underground (electricity, natural gas, water, etc.).	
Alameda County Code of Ordinances Title 17- Zoning	Includes a map or series of maps and text that provides for the division of the unincorporated territory of the county into parts, hereinafter designated as districts, within each of which the uses of land and buildings and the height and bulk of buildings and the open spaces about buildings are regulated as specified.			
Section 17.06.070 Yards	In order to secure minimum basic provision for light, air, privacy and safety from fire hazards, it is required that every building hereafter constructed shall be upon a building site of dimensions such as to provide for the yards specified for the district in which the lot is located, and the following sections shall apply and control. Every such yard shall be open and unobstructed from the ground upward. The yard requirements in an Agriculture (”A”) district are as follows, subject to the general provisions of Section 17.52.330: A. Depth of front yard: not less than thirty feet; B. Depth of rear yards: not less than ten feet; C. Width of side yards: not less than ten feet.	Project would be consistent as proposed.	The proposed MEP 9.7 acre facility site (leasehold) location on the 158 acre project site would meet the county’s yard requirement envelope.	
Section 17.06.080 Signs	No sign in an A district shall be illuminated...and no such sign shall have an area in excess of twenty-four (24) square feet, except in conformance with Sections 17.52.460 and 17.52.470 (Subdivision). In other respects, Section 17.52.020 shall control.	Project would be consistent as conditioned.	The AFC and supplements do not discuss the installation of publicly visible signs that identify the MEP.	Condition of Certification **VIS-5** requires that any publicly visible project-related signage be at a minimum.
Section 17.52.090 Height of Buildings - Exceptions	B. The building height limitations set forth in this title apply generally to structures, also, but shall not apply to chimneys, church spires, flag poles, or to mechanical appurtenances necessary and incidental to the permitted use of a building.	Project would be consistent as proposed.	Project elevations show four exhaust stacks at 80 feet in height, and eight new steel monopole structures ranging from 84 feet to 95 feet in height. **Visual Resources Figure 5** shows elevations of major structures. Staff concludes the project structures identified are similar to those identified by this county section as exempt from any height limitation.	

Section 17.52.440 - Fences, walls and hedges—Exceptions to height limitations.	The limitations on height specified in Section 17.52.430 shall not apply: A. Where a higher fence is required by any other ordinance of the county or by state or federal regulation; B. Where a higher fence is made a condition of approval of a conditional use or a variance pursuant to this title, provided that no such condition shall require or permit a fence having a height in excess of twelve (12) feet; C. To a fence around all or part of a tennis court, a playground or a swimming pool which is, at least in that portion which exceeds the applicable limitation, constructed of open wire or steel mesh capable of admitting not less than 90% light as measured by a reputable light meter; D. An open wire fence up to six feet high in an A district.	Project would be consistent as conditioned.	The AFC and supplements identify and show the installation of a perimeter fence. However, the height of the fence is not specified. According to the Energy Commission Hazardous Materials staff, the project owner shall prepare a site-specific security plan for the project's commissioning and operational phases. The project's Operation Security Plan includes a requirement for a permanent full perimeter fence or wall, at least eight (8) feet high. See the **HAZARDOUS MATERIALS** section of the Staff Assessment (SA) for further discussion.	Condition of Certification **HAZ-7** requires the project owner to implement site security measures that address physical site security and hazardous materials storage.

METHOD AND THRESHOLDS FOR DETERMINING ENVIRONMENTAL CONSEQUENCES

The California Environmental Quality Act defines a "significant effect on the environment" to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including... and objects of historic or aesthetic significance" (14 Cal Code Regs §15382).

The determination of significance under the California Environmental Quality Act (CEQA), as identified by the Energy Commission in this section, are based on scientific and factual data related to issues addressed in Appendix G of the CEQA Guidelines, performance standards, or thresholds identified by Energy Commission staff, and thresholds recommended by other public agencies or subject experts, as supported by substantial evidence (CCR2010).

"*Aesthetics*" issues (conditions) considered for impacts of significance for the CEQA analysis include the following:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

The above issues are discussed below under the headings: Scenic Vista, Scenic Resources, Visual Character or Quality, and Light or Glare.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

A. SCENIC VISTA

"Would the project have a substantial adverse effect on a scenic vista?"

The term "scenic vista" is not defined in CEQA. For the purpose of answering this question, staff has defined, "scenic vista" as the following:

- A panoramic view of a publicly recognized broad landscape feature of visual concern; such as the ocean, a bay, a mountain range, etc.
- A public view to a publicly recognized human-made or natural scenic feature of unusual importance, such as the Golden Gate Bridge in San Francisco.
- A public view from an actual designated view location; such as a Caltrans public vista point along a highway, or view overlook in a national or state forest or park.
- Scenic view locations designated in a federal, state or local government adopted land use planning related document (e.g., Resource Management Plan, General Plan, Local Coastal Plan, highway corridor plan) or cultural resources or historical preservation plan and survey.

Staff visited the proposed project site and vicinity in November 2009 and February 2010. Staff found no view to a publicly recognized broad landscape feature of visual concern that the proposed project would substantially adversely affect.

Staff found no public view towards a broadly recognized human-made or natural scenic feature of unusual importance in the vicinity of the project site that the proposed project would substantially adversely affect.

Staff found the proposed project would not substantially adversely affect a public vista point along a highway or view overlook in a national or state forest or park.

Staff found no scenic view locations designated in a federal, state or local government adopted land use related planning document or cultural resources document, or historical preservation plan and survey in the vicinity of the project site.

B. SCENIC RESOURCES

"Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

For the purpose of answering this question, staff has defined, "scenic resource" to include a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a

designated federal scenic byway or state scenic highway corridor; or a scenic resource identified in a federal, state or local government adopted land use related planning document, or cultural resources and historical preservation plan and survey.

Staff found no scenic resource on the project site or the vicinity. The proposed project would not substantially damage a scenic resource.

C. VISUAL CHARACTER OR QUALITY

"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

KEY OBSERVATION POINTS

Staff evaluated selected Key Observation Points[2]. A "Key Observation Point" (KOP) is selected to be representative of the most critical surface area visible (view) from a particular location where the proposed project would be visible to the public — for example; recreational and residential areas, travel routes, bodies of water, as well as scenic and historic locations. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent a primary viewer group(s) that would potentially be affected by the project (e.g., residents, trail and park users).

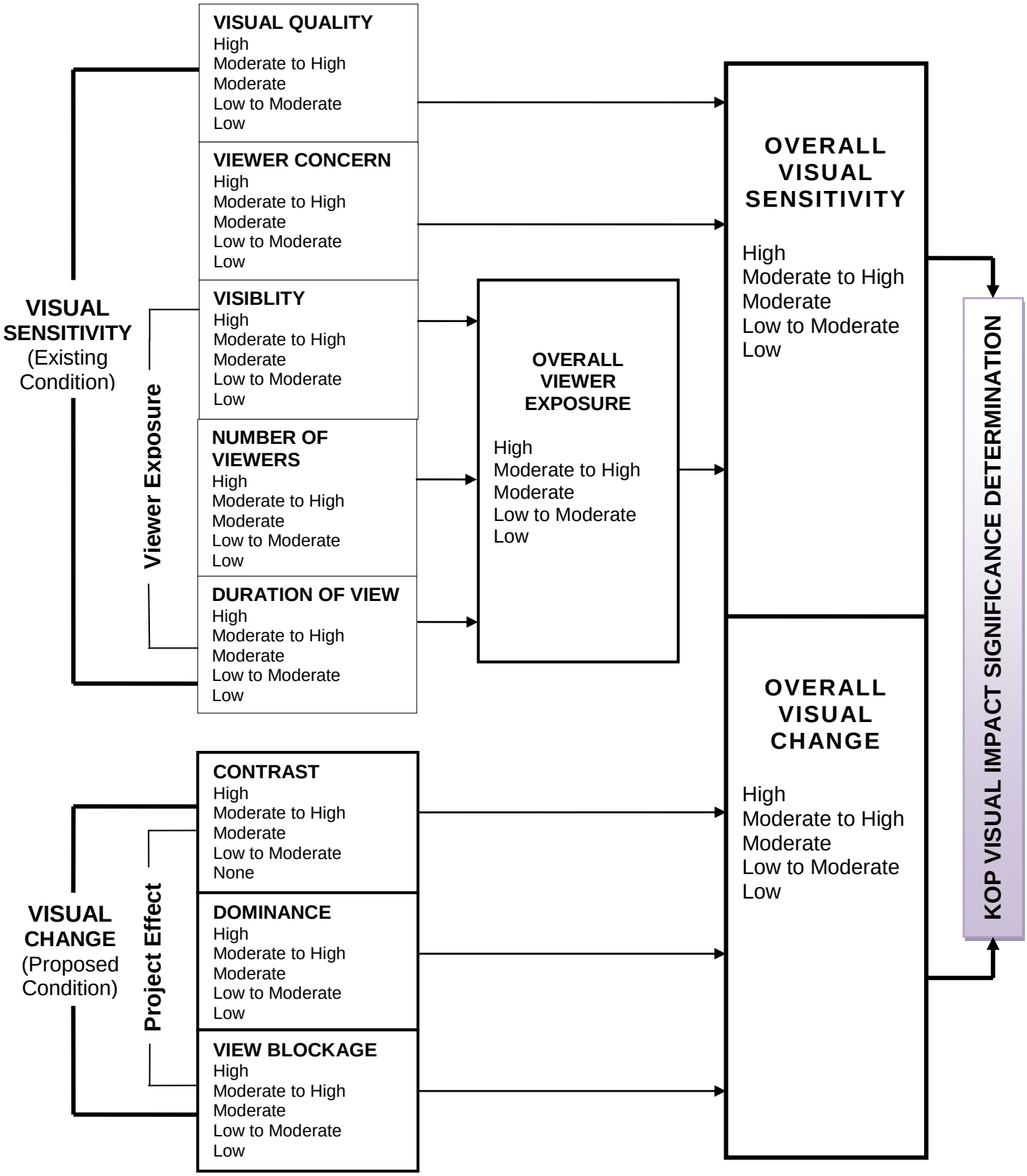
For each KOP, an applicant provides a photograph showing the existing physical environment (*existing condition*). The applicant also provides a photographic simulation of the proposed project or project feature in the existing physical environment (*proposed condition*). Photographic simulations are prepared showing the relative scale and extent of the project. The existing condition photographs and the proposed condition simulations have been provided at the end of this section; see **FIGURES**.

Energy Commission staff assesses a KOP using the eight factors shown in **Visual Resources Diagram 1** and explained in **Appendix VR-1** to determine if a potential visual related substantial adverse impact may be created by a proposed project or project feature from the KOP.

Visual Resources Figure 8 shows the locations of the selected KOPs evaluated for the proposed project.

[2] The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

VISUAL RESOURCES Diagram 1- Key Observation Point Evaluation



KOP 1 – Intersection of Bruns Road and Kelso Road

Visual Resources Figure 9 represents the existing view towards the proposed project site from the southbound lane of Bruns Road, south of the intersection of Bruns Road and Kelso Road, north-northwest of the facility location. **Visual Resources Figure 10** presents a photographic simulation of the proposed project's publicly visible structures after completion of construction.

The visual quality of this view is considered low to moderate. The landscape in the KOP field of view is characterized as open space/rangeland. Visually discordant man-made alterations to the view include the Byron Power Cogen Plant and numerous transmission towers and lines.

Viewer concern is considered low to moderate. The view is seen mostly by motorists who are traveling to Bethany Reservoir, but also by local residents and workers who may traveling to one of the few homes or workplaces in the local area.

Visibility of the project site is high. The KOP is the closest, least obstructed view of the project site from the public road. The annual average daily traffic trips on Bruns Road is 286 vehicles (see AFC Table 5.12-3) which is considered low. The duration of view by motorists from this KOP of the project site is considered moderate in length. The view of the project site is fleeting. Vehicles traveling south of the project site are increasingly obscured by a hill along the east side of the road while moving out of the viewer's field of vision at the same time.

The number of residential viewers at KOP 1 is zero. One residence and two places of work are within the immediate area.

Simulated project views show the degree of overall contrast of project elements within the existing setting will be moderate. Project elements will appear to some degree visually recede into a hill. Project elements will not be silhouetted against the sky.

Project elements would have a low to moderate dominance. They will be conspicuous, but subordinate in the total field of view.

Project elements would not block any recognized scenic vista, scenic resource, or aesthetically important feature from the KOP view.

KOP 2 – Kelso Road

Visual Resources Figure 11 represents the existing view towards the proposed project site from the westbound lane of Kelso Road north-northeast of the facility location (the approximate initial point of exposure to the project). **Visual Resources Figure 12** presents a photographic simulation of the proposed project's publicly visible structures after completion of construction. **Visual Resources Figure 13** presents landscape character photos showing the area around KOP 2.

The visual quality of this view is considered low to moderate. The hilly terrain provides a natural feature of some interest. Visually discordant man-made alterations include

multiple transmission lines, a water conveyance canal, and numerous wind turbines. These features combine to result in a view that lacks coherence.

Viewer concern is considered low. The view is seen by motorists and a limited number of residents. Motorists include individuals who work at the agricultural, energy production or water management facilities in the area. Motorists also include recreationists who are traveling to Bethany Reservoir, and local residents who may be using Kelso Road to get to Bruns Road to access Byron Highway to the north.

Viewer concern from residences is considered to be high. However, the scattering of residences near the project site appear to be set among clusters of mature trees that would likely obstruct most views to the project site. Views from residences are considered extended duration. The number of residential viewers is considered low.

Visibility of the project is considered low. The Byron Power Cogen Plant is not visible from this KOP location. The proposed project site is to the south of the cogen plant. The annual average daily traffic trips for Kelso Road is 663 vehicles (see AFC Table 5.12-3) which is considered low to moderate. The project site becomes increasingly visible as one travels westbound on Kelso Road before it passes out of the motorists' field of vision. The duration of view by motorists from this KOP of the project site is considered moderate in length.

Simulated project views show that the degree of overall contrast of project elements within the existing setting would be low. Project elements would appear partially behind hills. The neutral color treatment of the exterior materials of project elements would reduce any potential contrast with regard to color.

Project elements would have a low dominance.

Project elements would not block any recognized scenic vista, scenic resource, or aesthetically important feature from the KOP view.

KOP 3 – California Aqueduct Bikeway along Bethany Reservoir State Recreation Area

Visual Resources Figure 14 represents the existing view towards the proposed project site from the California Aqueduct Bikeway, along the north side of Bethany Reservoir, approximately ¾ mile south of the proposed MEP site. **Visual Resources Figure 15** presents a photographic simulation of the proposed project's publicly visible structures after completion of construction. **Visual Resources Figure 16** presents landscape character photos showing the area around KOP 3.

The visual quality of this view is considered moderate. Hilly rangeland is in the view. Visually discordant man-made alterations include the Byron Power Cogen Plant and several transmission lines. Other nearby structures and facilities along Kelso Road are also visible (PG&E Kelso Substation). Clifton Court Forebay is visible in the background.

Viewer concern is considered moderate to high. Viewers in this area are predominantly recreationists, who are assumed to have high levels of viewer concern and expectation. There is no vehicular access along the bikeway, which means that viewers from the KOP are individuals who are biking or walking along the levee of the reservoir. Views toward the site from boats on the reservoir would be obstructed by the levee.

Viewers looking north of the KOP towards the project site have an expansive view that contains discordant visual elements. Views to the south and west of the KOP are in the Bethany Reservoir State Recreation Area. Viewers are more likely to have a greater interest in activities on or along the reservoir. The project site is partially visible from the reservoir's parking lot. Most activity in the parking lot is focused on activities using the reservoir.

Visibility of the project site from the KOP is considered moderate. Sloping hilly terrain is in the view. The project site is at a lower elevation then the KOP and between hills. The number of viewers is low along the bikeway[3]. The duration of view from this KOP of the project site is considered high, since viewers looking toward the project site from this area will be either pedestrians or bike riders. Duration of views for pedestrians would exceed two minutes. However, the duration of view for bicyclists would likely be shorter than two minutes but exceed 10 seconds and is considered low to moderate.

Simulated project views show the degree of overall contrast of project elements within the existing setting will be low to moderate. Project elements will be conspicuous, but subordinate in the total field of view. The neutral color treatment of the exterior materials of project elements would reduce any potential contrast with regard to color.

Project elements would have a low dominance.

Project elements would not block any recognized scenic vista, scenic resource, or aesthetically important feature from the KOP view.

KOP 4 – Mountain House Road

Visual Resources Figure 17 represents the existing view towards the proposed project site from the southbound lane of Mountain House Road, approximately 1,000 feet north of Mountain House School, approximately 1.3 miles east of the proposed facility location. **Visual Resources Figure 18** presents a photographic simulation of the proposed project's publicly visible structures after completion of construction. **Visual Resources Figure 19** presents landscape character photos showing the area around KOP 4.

This viewpoint was selected to approximate the view toward the project site from Mountain House School. Views to the west from the school are completely obstructed by structures and mature trees.

[3] A specific number count of bicyclist and pedestrian use at KOP 3 was not available. Staff visited KOP 3 on November 12, 2009 and February 4, 2010 and estimated the number of viewers to be low.

The visual quality of this view is considered moderate. Fenced rangeland and a relatively tall transmission towers are in view. Wind turbines throughout the hills are visible. Several wind turbines visibly encroach on the skyline. Both Mount Diablo and Brushy Peak are visible from this location.

Viewer concern is considered low. Primary viewers at this KOP are motorist using Mountain House Road. Motorists include those traveling to and from Mountain House School, residences and workplaces in the area, Bethany Reservoir, and using Mountain House Road as a connecting route between Byron Highway and Interstate 580.

Visibility of the project site is low. The roof of the Byron Power Cogen Plant is visible in the center of the view. The proposed project is south of the cogen plant. The view of the project site from the KOP would be at a nearly 90-degree angle to drivers traveling north or south on Mountain House Road. The annual average daily traffic trips on Mountain House Road is 3,366 (see AFC Table 5.12-3) which is considered moderate. The duration of view from this KOP of the project site is considered low.

Simulated project views show the degree of overall contrast of project elements within the existing setting to be low. The project would be visually absorbed into the existing setting with other structures and features in front of the hills. The neutral color and treatment of the exterior materials of project elements would reduce any potential contrast with regard to color.

Project elements would have a low dominance.

Project elements would not block any recognized scenic vista, scenic resource, or aesthetically important feature from the KOP view.

KOP 5 – Mountain House Community

Visual Resources Figure 20 represents the existing view towards the proposed project site from the southbound lane of Great Valley Parkway, approximately 1,000 feet south of Kelso Road, approximately 2.4 miles east of the proposed MEP site. **Visual Resources Figure 21** presents a photographic simulation of the proposed project's publicly visible structures after completion of construction. **Visual Resources Figure 22** presents landscape character photos showing the area around KOP 5.

This viewpoint was selected to approximate the view toward the project site from the Mountain House community. This KOP is located just east of a portion of Mountain House that is planned for future neighborhood commercial development. At the present time, The KOP view toward the project site is largely unobstructed across a mostly agricultural/open space area.

The visual quality of this view is considered low to moderate. Buildings and structures related to agriculture, natural gas and electric infrastructure are visible. Transmission towers are visible across the horizon in front of the hills, and in some locations encroach on the skyline. Wind turbines are somewhat discernable within the hills.

Viewer concern is considered low. At present, the majority of viewers KOP are assumed to be residents traveling to the community of Mountain House. This view would be seen

mainly by people traveling southbound on Great Valley Parkway from Byron Highway or West Kelso Road to the western entrance to Mountain House, or to the intersection of Great Valley Parkway and West Grant Line Road further south. Great Valley Parkway is the main thoroughfare along the western edge of Mountain House.

Visibility of the project site from KOP 5 is low. The Byron Power Cogen Plant is not visible from the KOP. The project site is in the center-left portion of the view. The view of the project site from the KOP is at a nearly 90-degree angle to drivers traveling on the southbound or northbound lanes of Great Valley Parkway. The view of the project site along Great Valley Parkway is obstructed partially or completely by roadside landscaping and road signage. Annual average daily traffic trips for Great Valley Parkway (northern portion) were not included in the traffic and transportation analysis of the AFC.

Duration of view from this KOP of the project site is considered low. Vehicles traveling southbound on Great Valley Parkway would face west toward the project site for approximately 0.3 miles before turning south offering at the least a brief view of the project site.

Simulated project views show the degree of overall contrast of project elements within the existing setting to be low. The project would appear at the base of the foothills; visually absorbed into the base of the hills. The neutral color of the facility would allow it to blend in with the hills.

Project elements would have a low dominance.

Project elements would not block any recognized scenic vista, scenic resource, or aesthetically important feature from the KOP view.

VISUAL RESOURCES Table 3 – Key Observation Point Evaluation Table

KOP No.	VISUAL SENSITIVITY (Existing Condition)						
	Visual Quality	Viewer Concern	Viewer Exposure				Overall Visual Sensitivity
			Visibility	No. of Viewers	Duration of View	Overall Viewer Exposure	
1	Low to Moderate	Low to Moderate	High	Low	Moderate	Low to Moderate	Low to Moderate
2	Low to Moderate	Low	Low	Low to Moderate	Moderate	Low to Moderate	Low to Moderate
3	Moderate	Moderate to High	Moderate	Low	High	Moderate to High	Moderate
4	Moderate	Low	Low	Moderate	Low	Low	Low to Moderate
5	Low to Moderate	Low	Low	Low to Moderate	Low	Low	Low

KOP No.	VISUAL CHANGE (Proposed Condition)							
	Project Effect							Overall Visual Change
	Contrast					Dominance	View Blockage	
	Form	Line	Color	Texture	Overall Contrast			
1	High	Moderate to High	Low	Moderate	Moderate	Low to Moderate	Low	Low to Moderate
2	Low	Low	Low	Low	Low	Low	Low	Low
3	Low to Moderate	Low to Moderate	Low	Moderate	Low to Moderate	Low	Low	Low
4	Low	Low	Low	Low	Low	Low	Low	Low
5	Low	Low	Low	Low	Low	Low	Low	Low

KOP No.	KOP VISUAL IMPACT SIGNIFICANCE DETERMINATION			
	Overall Visual Sensitivity	**Overall Visual Change**	**Visual Impact Significance (Refer To Visual Resources Table 4)**	**Mitigation (See Staff Proposed KOP Visual Mitigation Measures)**
1	Low to Moderate	Low to Moderate	Less than Significant	None
2	Low to Moderate	Low	Not Significant	None
3	Moderate	Low	Less than Significant	None
4	Low to Moderate	Low	Not Significant	None
5	Low	Low	Not Significant	None

STAFF PROPOSED KOP VISUAL MITIGATION MEASURES

None proposed by staff.

CONSTRUCTION ACTIVITY AND LINEAR FACILITIES

Construction Laydown and Parking Areas

A proposed five acre construction worker parking and laydown area is to be located immediately east of the project site. The construction worker parking and laydown area would be screened from public view by construction activities on the project site.

A proposed one acre water supply pipeline parking and laydown area is to be located at the Bryon Bethany Irrigation District headquarters facility on Bruns Road.

A proposed 0.6 acre laydown area is to be created along the project's transmission line route adjacent to the PG&E's Kelso Substation and Bethany Compressor Station. With the restoration of ground surfaces, the parking and laydown areas would not substantially degrade the existing visual character or quality of the site and its

surroundings. Staff has proposed Condition of Certification **VIS-2**. The condition provides for the restoration of ground surfaces affected by temporary construction activities. The condition includes construction laydown area(s).

Construction Activities

Construction activities have the potential to introduce light offsite to surrounding properties and up-lighting to the nighttime sky. If bright exterior lights were not hooded, and lights not directed onsite they could introduce significant light to the vicinity. The applicant states in the AFC:

> Lighting that may be required to facilitate nighttime construction activities would be, to the extent feasible and consistent with worker safety codes, directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting would be used to the extent practical while complying with worker safety regulations (MEP2009a, page 5.13-36).

Staff has proposed Condition of Certification **VIS-3** to clarify the applicant's lighting mitigation measure during construction activity. Staff concludes that lighting introduced during construction activities to the nighttime view would be "less than significant" with the effective implementation of the applicant's proposed mitigation measures.

Linear Facilities

The project is proposed to interconnect to the PG&E Kelso Substation by a 0.7 mile, 230-kV transmission line that is to run north of the project site crossing Kelso Road and into the Kelso substation. The transmission route would be supported by six new steel monopoles ranging from 84 feet to 95 feet in height (see **Visual Resources Figure 23** – Typical Monopole Transmission Tower).

A specific color or surface treatment for the monopole(s) is not identified in the AFC. The applicant has stated that exteriors of all major project equipment will be treated with a neutral, earth tone finish, in colors ranging from gray to light brown (MEP2009a, page 5.13-31). If new transmission poles are to be of a neutral or earth tone color, and/or if the steel monopoles are made of a non-reflective and non-refractive material, staff concludes this project feature would not substantially degrade the existing visual character or quality the site and its surroundings. To ensure transmission line poles are neutral or earth tone in color, staff has proposed Condition of Certification **VIS-1**.

A natural gas pipeline is to serve the project site. The pipeline is to be approximately 580 feet long. The pipe is to have a four-inch diameter. The pipeline is to run northeast from the project site to interconnect with a PG&E high pressure natural gas pipeline line along Kelso Road. The project's pipeline will be buried and not in view.

A service water pipeline is to serve the project site. The pipeline is to be approximately 1.8 miles long. The pipe is to have a six-inch diameter. The pipeline route spans from Byron Bethany Irrigation District canal 45 to the project site. The pipeline would be within the public right of way of Bruns Road under the paved section of the road or along the east side of the road. The pipeline would be buried and not in view.

Service water pipeline associated facilities include a concrete turnout structure on the canal 45 bank and a small pump station (approximately 250 square feet) sheltering a pre-cast concrete manhole wet well, redundant vertical turbine pumps, pipe manifold and valving, electrical cabinet, and instrumentation. Proposed Condition of Certification **VIS-1** requires surface treatment on project buildings and structures.

PUBLICLY VISIBLE WATER VAPOR PLUMES

The project is to operate limited hours (approximately 4,000 hours per year) mainly during summer when temperatures and electric load demand is high and not on cold, humid days when the potential for the formation of publicly visible water vapor plumes is most likely to occur.

The proposed project uses a chiller/air cooled radiator system (32-cell radiator) for cooling purposes. The use of this system would result in little to no formation of publicly visible water vapor plumes emitted from the project's cooling system.

The extremely high exhaust temperature (approximately 840 degrees) precludes the formation of publicly visible water vapor plumes above the project's exhaust stacks during operation.

Staff concludes that the introduction of publicly visible water vapor plumes by the proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings.

D. LIGHT OR GLARE

"Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?"

Light pollution, as defined by the International Dark-Sky Association, is any adverse effect of artificial light, including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste. Two elements of light pollution may affect residents: sky glow and light trespass. Sky glow is a result of light fixtures that emit a portion of their light directly upward into the sky where light scatters, creating an orange-yellow glow in the sky. This light can interfere with views of the nighttime sky.

Light trespass and glare[4] are quite subjective, they are difficult to eliminate, but they can be minimized through good design practices. In many cases, all that is required is the proper placement of poles, selection of luminaire optics, and shielding accessories. The proposed project, without adequate lighting and glare controls, has the potential to create a new source of substantial light trespass and glare in the area.

Staff concludes with the effective implementation of the applicant's proposed light control measures that lighting introduced by the project to the nighttime view in the area would be "less than significant." Staff has proposed Condition of Certification **VIS-3** to clarify the applicant's light control measures.

[4] For the purposes of this analysis "direct glare" is used and is defined as the visual discomfort resulting from insufficiently shielded light sources in the field of view.

Daytime sources of glare include reflections from light-colored surfaces, windows, and metal details. The amount of glare depends on the intensity and direction of sunlight, which is more acute at sunrise and sunset because the angle of the sun is lower during these times.

Reflection glare or excessive solar reflection becomes undesirable if it accidentally or improperly travels offsite. Reflection glare or excessive solar reflection from project buildings and structures is anticipated to be limited with the applicant's effective implementation of surface treatments that include neutral or earth tone finishes, colors ranging from gray to light brown, and the use of non-glare and non-reflective materials. In addition to the proposed project's surface treatment, the project's location, and its building and structure orientation and design all contribute to reducing reflection glare.

With the effective implementation of the applicant's proposed surface treatment and fixtures, the project's publicly visible buildings and structures would not create a new source of substantial glare that could adversely affect daytime views. Staff has proposed Condition of Certification **VIS-1** to clarify surface treatment measures for the project.

CUMULATIVE IMPACTS AND MITIGATION

Under CEQA Guidelines, "a cumulative impact consists of an impact which is created as a result of the combination of the project evaluated in the EIR [environmental impact report] together with other projects causing related impacts" (14 Cal Code Regs §15130(a)(1)). Cumulative impacts of the project must be discussed if the incremental effect of a project, combined with the effects of other projects is 'cumulatively considerable' (14 Cal Code Regs §15130(a)). Such incremental effects are to be 'viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects'" (14 Cal Code Regs §15164(b)(1)). Together, these projects comprise the cumulative scenario which forms the basis of the cumulative impact analysis.

The discussion of cumulative impacts shall reflect the severity of impacts and their likelihood of occurrence, "but the discussion need not provide as great detail as is provided for the effects attributable to the project alone. The discussion of cumulative impacts shall be guided by standards of practicality and reasonableness, and should focus on the cumulative impact to which the identified other projects contribute rather than the attributes of other projects which do not contribute to the cumulative impact" (14 Cal Code Regs §15130(b)).

Previously approved land use documents such as general plans, specific plans, regional transportation plans, plans for the reduction of greenhouse gas emissions, and local coastal plans may be used in cumulative impact analysis. A pertinent discussion of cumulative impacts contained in one or more previously certified EIRs may be incorporated by reference pursuant to the provisions for tiering and program EIRs. No further cumulative impacts analysis is required when a project is consistent with a general, specific, master, or comparable programmatic plan where the lead agency

determines that the regional or area wide cumulative impacts of the proposed project have already been adequately addressed, as defined in section 15152(f), in a certified EIR for the plan (14 Cal. Code Regs §15130(d)).

If a cumulative impact was adequately addressed in a prior EIR for a community plan, zoning action, or general plan, and the project is consistent with that plan or action, then an EIR for such a project should not further analyze that cumulative impact, as provided in Section 15183(j) (14 Cal. Code Regs §15130(e)).

Geographic Scope of the Cumulative Analysis

The geographic scope for the purposes of the visual cumulative analysis includes the unincorporated area of the County of Alameda shown in **Visual Resources Figure 1** - Aerial View of Mariposa Energy Project Site and Vicinity.

Existing Projects in the Geographic Scope of the Cumulative Analysis

- Byron Power Cogeneration Plant, a 6 MW co-generation/brine wastewater distillation facility originally permitted by the County of Alameda in 1989.
- PG&E Bethany Compressor Station constructed circa 1910.
- PG&E Kelso Substation constructed circa 1910.
- PG&E Kelso-Tesla 230 kV transmission line.
- PG&E and PacifiCorp Round Mountain-Malin 500 kV transmission lines (two separate power lines).
- A 60 kV overhead transmission/utility line.
- Byron Bethany Irrigation District main canal no. 9 constructed 1919.
- Western Area Power Administration Tracy Substation.
- California Department of Water Resources, Harvey O. Banks Delta Pumping Plant, constructed 1968, is the pumping station that marks the beginning of the California Aqueduct. The pumping plant takes water from Clifton Court Forebay and lifts it 244 feet into Bethany Reservoir.
- California Aqueduct, a 40 foot wide concrete-lined channel that runs 444 miles.
- Bethany Reservoir, completed 1967, serves as a forebay for the South Bay Pumping Plant and a conveyance facility for the California Aqueduct. It has a six mile shoreline length. The reservoir area provides opportunities for picnicking, fishing, boating, windsurfing, hiking, and bicycling.
- U.S. Bureau of Reclamation Tracy Pumping Plant, completed 1951, lifts water from the inlet channel 197 feet into the Delta-Mendota Canal using six pumps, each powered by a 22,500 horsepower motor sheltered within a concrete block building.
- Delta-Mendota Canal constructed between 1946 and 1952, the intake channel takes water from the Sacramento River to the Tracy Pumping Plant where it is lifted into an 84 foot wide concrete-lined channel that runs 116 miles.

- Altamont Pass Wind Resource Area, a planning area located in eastern Alameda and Contra Costa Counties (approximately 185,000 acres) that contains approximately 5,000 wind turbines. The northern approximate 1/3 of the wind resource area is 1.5 miles west of the proposed facility site.
- Mountain House, at ultimate buildout in 2030 is estimated to have 15,000 residences and 45,000 people. Mountain House is approximately 2.5 miles east of the MEP site. Construction began in 2001.

Reasonably Foreseeable and Future Projects in the Geographic Scope of the Cumulative Analysis

AFC, Visual Resources, section 5.13.3 Cumulative Effects describes two projects within a five mile radius of the MEP site that are reasonably foreseeable.

- Green Volts Utility Scale Solar Field, the closest of the three foreseeable projects, is a two MW utility-scale solar field on a 20.5 acre property located on the south side of Kelso Road, across from the Western Area Power Administration Tracy Substation. The project would be approximately 0.7 mile from the MEP site. The project is currently being reviewed by the Alameda County Community Development Agency.
- East Altamont Energy Center, a 1,100 MW power plant licensed by the California Energy Commission in August 20, 2003, if built would occupy a 55 acre portion of a 174 acre property bordered by Byron Bethany Road (Byron Highway) to the north, Kelso Road to the south, and Mountain House Road to the west. The East Altamont Energy Center would be approximately 1.5 miles northeast of the Mariposa project site.

Cumulative Impact Issues

The cumulative impact issues used by staff to evaluate the proposed project are based on the issues used in Method And Thresholds For Determining Environmental Consequences in this section.

A. Would the incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis have a substantial adverse effect on a scenic vista?

The incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis would not have a substantial adverse effect on a scenic vista.

Staff found no panoramic view of a publicly recognized broad landscape feature of visual concern.

Staff found no public view towards a broadly recognized human-made or natural scenic feature of unusual importance in the vicinity of the project.

Staff found no public vista point along a highway or view overlook in a national or state forest or park.

Staff found no scenic view locations designated in a federal, state or local government adopted land use planning document, cultural resources document, or historical preservation plan and survey in the vicinity of the project site.

B. Would the incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?

The incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis would not substantially damage scenic resources. Staff found no scenic resource on the project site or in the vicinity.

C. Would the incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis substantially degrade the existing visual character or quality of the site and its surroundings?

The incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis would not substantially degrade the existing visual character or quality of the project site and its surroundings.

An impact under this criterion would occur where project facilities occupy the same field of view as other built facilities or impacted landscapes, and an adverse change in the visible landscape character is perceived. In some cases, a cumulative impact could also occur if a viewer perceives that the general visual quality or landscape character of a localized area or larger region is diminished by the proliferation of visible structures or construction effects, even if the changes are not within the same field of view as existing (or future) structures or facilities.

The proposed project site is located in an area that includes large-parcel agricultural uses and large utility-scale facilities related to power production and water management. Though the proposed project would occupy the same field of view with the Byron Cogen facility as seen from several of the KOPs, the visible landscape character continues to be used as and perceived as agricultural-open space and not as being “industrialized.”

D. Would the incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

The incremental effect of the project, combined with the effects of existing, reasonably foreseeable and future projects in the geographic scope of the cumulative analysis would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Nighttime illumination from the Byron Power Cogeneration Plant, and nearby large federal and state utility scale electric generation, electric transmission, water pumping and conveyance related infrastructure along the north side of Kelso Road have exterior building lighting, parking lot and yard area flood lighting. Exterior lighting at the PG&E Bethany Compressor Station is currently unshielded.

Three residences along Kelso Road, near the Tracy Pumping Station are surrounded by or clustered within mature trees.

Staff concludes with the effective implementation of the applicant's proposed exterior lighting control measures for the project, which include installation of fully shielded, hooded light fixtures, and keeping lights off at night when not needed for a safety or security matter, the residual effect of the project's lighting would not combine with other existing nighttime lighting in the area to become cumulatively considerable.

Staff also concludes with the effective implementation of the applicant's proposed surface treatment and fixtures, the project's publicly visible buildings and structures would not create a new source of substantial glare that could adversely affect daytime views in the area.

Cumulative Impact Issues Conclusion

The incremental effect of the project, combined with the effects of the other projects within the geographic scope identified in the cumulative analysis would have a less than significant cumulative impact on visual resources.

CONCLUSIONS

This analysis focused on if the proposed project would be inconsistent with applicable laws, ordinances, regulations, and standards pertaining to aesthetics, or preservation and protection of sensitive visual resources, and if it would create a substantial adverse impact(s) under the California Environmental Quality Act (CEQA) pertaining to "Aesthetics." Staff concludes the following:

1. The proposed project would not have a substantial adverse effect on a scenic vista.
2. The proposed project would not substantially damage scenic resources.
3. The proposed project would not substantially degrade the existing visual character or quality of the site and its surroundings as shown in KOP 1 through KOP 5.
4. The proposed project would not emit publicly visible water vapor plumes during normal operation and normal weather conditions based on the applicant's proposed facility design.
5. The proposed project would not create a new source of substantial light or glare that would adversely affect daytime or nighttime views.
6. The incremental effect of the proposed project, combined with the effects of existing, reasonably foreseeable and future projects within the geographic scope of the

cumulative analysis would have a less than significant cumulative impact on visual resources.

7. The proposed project would comply with all applicable laws, ordinances, regulations, and standards pertaining to aesthetics, or preservation and protection of sensitive visual resources with the effective implementation of the conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

Staff has drafted conditions of certification for consideration should a decision to issue a license be made on the project.

Surface Treatment of Project Structures and Buildings

VIS-1 The applicant shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; and, (2) minimize glare. The transmission line conductors and insulators shall be non-specular and non-reflective.

The applicant shall submit a surface treatment plan to the Compliance Project Manager (CPM) for approval. The surface treatment plan shall include:

A. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes;

B. A list of each major project structure and building (e.g., building, tank, and pipe; transmission line towers and/or poles; and fencing), specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

C. One set of color brochures or color chips showing each proposed color and finish;

D. A specific schedule for completing the treatment; and

E. A procedure to ensure proper treatment maintenance for the life of the project.

The applicant shall not request vendor surface treatment of any buildings or structures during their manufacture, or perform final field treatment on any buildings or structures, until the applicant has received treatment plan approval by the CPM.

The applicant shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection; and shall submit one set of electronic color photographs from KOPs 1 and 3 showing the “as built” surface treated structures and buildings.

Verification: At least 45 days prior to applying vendor color(s) and finish(es) for structures or buildings to be surface treated during manufacture, the applicant shall submit the proposed treatment plan to the CPM.

If the CPM determines that the plan requires revision, the applicant shall provide to the CPM a plan with the specified revision(s) for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for approval.

Within ninety (90) days after the start of commercial operation, the applicant shall notify the CPM that surface treatment of all listed structures and buildings has been completed and is ready for inspection; and shall submit one set of electronic color photographs from KOPs 1 and 3 showing the "as built" surface treated structures and buildings.

The applicant shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify a): the condition of the surfaces of all structures and buildings at the end of the reporting year; b) major maintenance activities that occurred during the reporting year; and c) the schedule of major maintenance activities for the next year.

Surface Restoration

VIS-2 The applicant shall remove all evidence of temporary construction activities, and shall restore the ground surface to the original condition or better condition, including the replacement of any vegetation during construction where project development does not preclude it. The applicant shall submit to the CPM for approval a surface restoration plan, the proper implementation of which will satisfy these requirements.

Verification: At least 60 days prior to the start of commercial operation, the applicant shall submit the surface restoration plan to the CPM for approval.

If the CPM notifies the applicant that any revisions of the surface restoration plan are needed, within 30 days of receiving that notification the applicant shall submit to the CPM a plan with the specified revisions.

The applicant shall complete surface restoration within 60 days after the start of commercial operation. The applicant shall notify the CPM within seven days after completion of surface restoration that the restoration is ready for inspection.

Construction Activity Lighting

VIS-3 To the extent feasible given safety and security concerns, the applicant shall ensure that lighting on the construction site and the construction laydown area minimizes potential night lighting impacts, as follows:

A. All lighting shall be of minimum necessary brightness;

B. All fixed position lighting shall be shielded/hooded to direct light downward, and toward the area to be illuminated preventing direct illumination of the night sky and direct light trespass (direct light extending

outside the boundaries of the project site, the laydown area, or the site of construction of ancillary facilities, including any security related boundaries);

C. Lighting shall be kept off when not in use; and

D. If the applicant receives a complaint about construction lighting, the applicant shall notify the CPM and shall use the complaint resolution form included in the General Conditions section of the Compliance Plan to record each lighting complaint and to document the resolution of that complaint. The applicant shall provide a copy of each complaint form to the CPM.

Verification: Within seven days after the first use of construction lighting, the applicant shall notify the CPM that the lighting is ready for inspection.

If the CPM notifies the applicant that modifications to the lighting are needed to minimize impacts, within 15 days of receiving that notification the applicant shall implement the necessary modifications and notify the CPM that the modifications have been completed.

Within 48 hours of receiving a lighting complaint, the applicant shall provide to the CPM; a) a report of the complaint, b) a proposal to resolve the complaint, and c) a schedule for implementation of the proposal. The applicant shall notify the CPM within 48 hours after completing implementation of the proposal. The applicant shall provide a copy of the completed complaint resolution form to the CPM in the next Monthly Compliance Report.

Permanent Exterior Lighting

VIS-4 To the extent feasible, consistent with safety and security considerations and commercial availability, the applicant shall design and install all permanent exterior lighting such that:

A. light fixtures do not cause obtrusive spill light beyond the project site;

B. lighting does not cause excessive reflected glare;

C. direct lighting does not illuminate the nighttime sky; and

D. illumination of the project and its immediate vicinity is minimized.

In addition, the applicant shall submit to the CPM for approval a lighting management plan that includes the following:

E. lighting that incorporates “International Dark Sky Association” approved commercially available fixtures;

F. lighting shall be directed downward or toward the area to be illuminated (hooded/shielded);

G. lighting shall be the minimum necessary brightness;

H. lights in high illumination areas not occupied on a continuous basis (such as maintenance platforms) shall have (in addition to hoods) switches, timer switches, or motion detectors so that the lights operate only when the area is occupied; and,

I. a process for addressing and mitigating lighting related complaints.

The applicant shall provide to the CPM a lighting management plan that includes at a minimum the following:

- A depiction on a site plan indicating the location of each proposed and any current outdoor lighting fixture.
- Type and number of luminaire equipment (fixtures), including the "cut off characteristics," indicating manufacturer and model number(s).
- Lighting manufacturer-supplied specifications ("cut sheets") that include photographs of the fixtures, indicating the certified "cut off characteristics" of the fixture.
- Lamp source type (bulb type, i.e. high pressure sodium), lumen output, and wattage.
- Mounting height with distance noted to the nearest property line for each luminaire.
- Types of timing devices used to control the hours set for illumination, as well as the proposed hours when each fixture will be operated.
- Total lumens for each fixture, and total square footage of areas to be illuminated.
- Footcandle Distribution, plotting the light levels in footcandles on the ground, at the designated mounting heights for the proposed fixtures. Maximum illuminance levels should be expressed in footcandle measurements on a grid of the site showing footcandle readings in every ten-foot square. The grid shall include light contributions from all sources (i.e. pole mounted, wall mounted, sign, and street lights.). Show footcandle renderings five feet beyond the property lines.

Verification: At least 60 days prior to ordering any permanent exterior lighting, the applicant shall submit to the CPM for approval a lighting management plan. If the CPM determines that the lighting management plan requires revision, the applicant shall provide to the CPM a plan with the specified revision(s) for approval. The applicant shall not order any exterior lighting until receiving CPM approval of the lighting management plan.

Prior to commercial operation, the applicant shall notify the CPM that the lighting has been installed and is ready for inspection. If after inspection the CPM notifies the applicant that modifications to the lighting are needed, within 30 days of receiving notification the applicant shall implement the modifications and notify the CPM that the modifications have been completed and are ready for inspection.

Within 10 days of receiving a project-related lighting complaint, the applicant shall provide the CPM with a complaint resolution form report as specified in the Compliance General Conditions including a proposal to resolve the complaint, and a schedule for implementation. The applicant shall notify the CPM within 10 days after completing implementation of the proposal. A copy of the complaint resolution form report shall be submitted to the CPM within 30 days of complaint resolution.

Publicly Visible Project-Related Signage

VIS-5 Any publicly visible project-related signage shall be the minimal signage visible to the public, and shall a) have unobtrusive colors and finishes that prevent excessive glare; and b) be consistent with the applicable design and development standards found in Title 17 – Zoning section 17.060.080 *Signs* of the Alameda County Code of Ordinances. The design of any signs required by safety regulations shall conform to the criteria established by those regulations.

The applicant shall submit a sign plan for publicly visible signs for the project to the Director of the Alameda County Community Development Agency Planning Department for comment and to the CPM for approval. The applicant shall not implement the plan until the applicant receives approval of the submittal from the CPM.

Verification: At least 30 days prior to installing publicly visible signs, the applicant shall submit a sign plan for the project to the Director of the Alameda County Community Development Agency Planning Department for comment and to the CPM for approval. The applicant shall provide a copy of the Director of the Alameda County Community Development Agency Planning Department comments to the CPM.

If the CPM determines that the sign plan requires revision, the applicant shall provide to the CPM a plan with the specified revision(s) for approval by the CPM before any signage visible to the public is installed.

The applicant shall inform the CPM that the publicly visible signs have been installed and provide the CPM with electronic color photographs of the installed signage.

Landscaping

VIS-6 The applicant shall provide a comprehensive landscaping and irrigation plan along the northern boundary of the 10 acre facility site and the vehicle access exclusively serving the facility site in accordance with the requirements of Policy 114 of the East County Area Plan. Landscaping shall be installed or bonded prior to the start of commercial operation. In no event shall landscaping be installed any later than 6 months after the start of commercial operation.

The applicant shall submit to the Director of the Alameda County Community Development Agency Planning Department for comment a comprehensive landscaping and irrigation plan. The applicant shall provide a copy of the Director of the Alameda County Community Development Agency Planning Department's written comments on the landscaping and irrigation plan.

The applicant shall not implement the landscaping and irrigation plan until the applicant receives approval from the CPM. Planting must be completed or bonded by the start of commercial operation, and the planting must occur during the optimal planting season, but not later than 6 months after the start of commercial operation.

Verification: Prior to commercial operation and at least 60 days prior to installing the landscaping, the applicant shall provide a copy of the landscaping and irrigation plan to the Director of the Alameda County Community Development Agency Planning Department for review and to the CPM for approval.

The applicant shall provide to the CPM a copy of the transmittal letter submitted to the Director of the Alameda County Community Development Agency Planning Department requesting their review of the submitted landscaping and irrigation plan.

The applicant shall notify the CPM within seven days after completing installation of the landscaping and irrigation that the landscaping and irrigation is ready for inspection.

REFERENCES

Bacon, Warren R. 1979. The Visual Management System of the Forest Service, USDA.

CCOR – California Code of Regulations, Title 14.

CH2M2009f – CH2M Hill/D. Urry (TN 54287). Data Response Sets 1A and 1B, dated 11/30/2009. Submitted to CEC on 11/30/2009.

COA1966 – County of Alameda. Scenic Route Element. May 1966. Revised June 1974.

COA2010a - County of Alameda. East County Area Plan dated November 2000.

COA2010b – County of Alameda. Code of Ordinances enacted November 10, 2009.

MEP2009a – Mariposa Energy LLC/B. Buchynsky (TN 51974). Application for Certification for Mariposa Energy Project, dated 6/15/2009. Submitted to CEC on 6/15/2009.

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APPENDIX VR-1

KEY OBSERVATION POINT EVALUATION

Visual Resources Diagram 1(below) shows the eight factors used by California Energy Commission, Environmental Protection Office staff to assess if a substantially significant visual effect may be created by a proposed project or project feature from a key observation point, or a proposed project's emitted publicly visible water vapor plume.

I. KEY OBSERVATION POINTS

A "Key Observation Point[5]" (KOP) is selected to be representative of the most critical viewsheds[6] from off-site locations where the project would be visible to the public — for example; recreational and residential areas, travel routes, bodies of water, as well as scenic and historic resources. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent a primary viewer group(s) that would potentially be affected by the project (e.g., a group of residences, trail and park users, travelers on thoroughfares). Energy Commission staff participates in the selection of KOPs with the applicant.

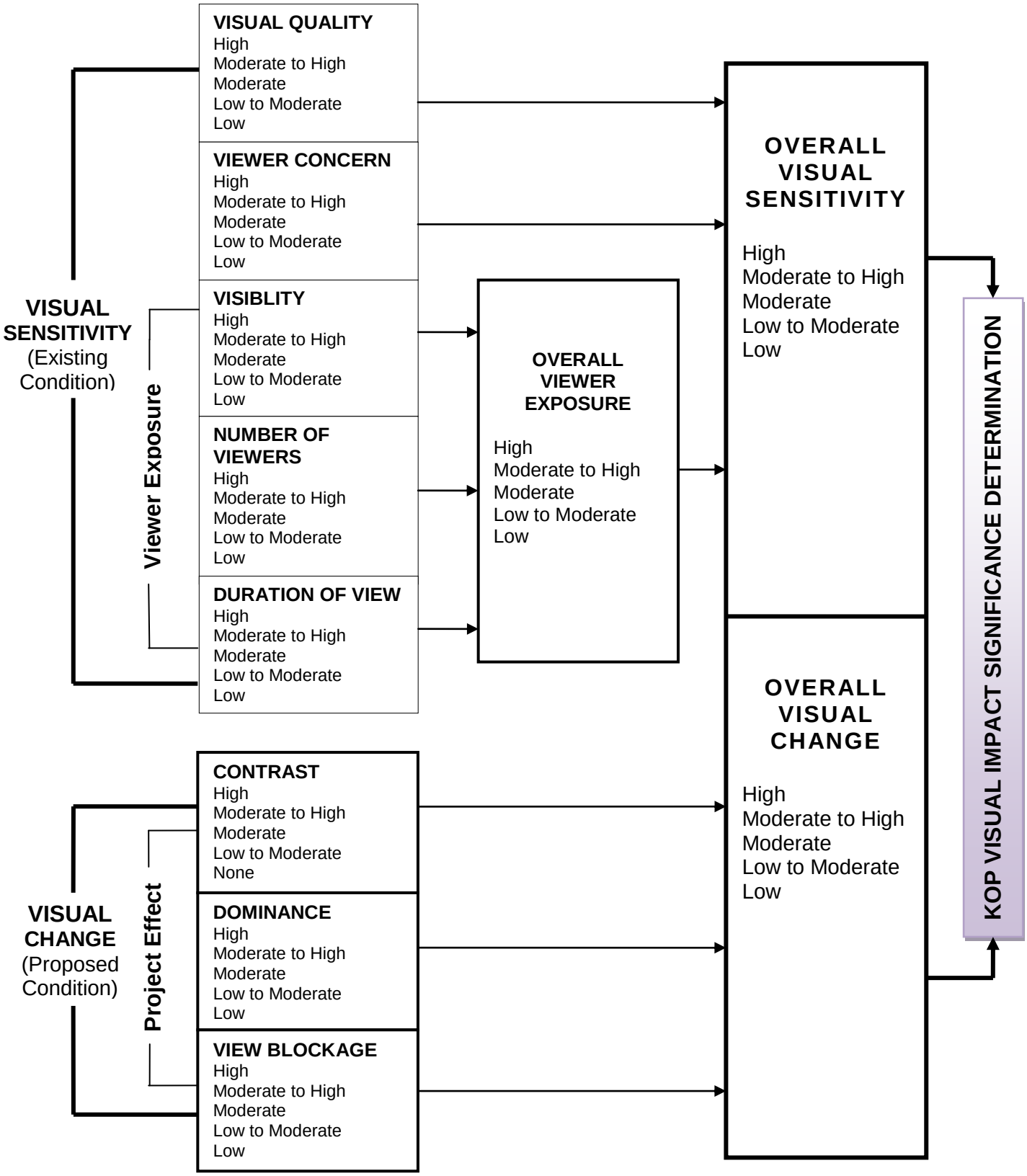
An applicant provides a photograph showing the existing physical environment (*existing condition*) at the KOP. The applicant prepares a photographic simulation of the proposed project or project feature in the existing physical environment (*proposed condition*). Photographic simulations are prepared showing the relative scale and extent of the project. The existing condition photograph and the proposed condition photograph are provided in the applicant's Application for Certification (AFC) filed with the California Energy Commission.

Staff evaluates the photograph and photographic simulation using the eight factors shown on **Visual Resources Diagram 1** to assess the potential visual impact created by the proposed project or project feature from the KOP.

[5] The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

[6] A viewshed is defined as all of the surface area visible from a particular location (e.g., an overlook) or sequence of locations (e.g., a roadway or trail) (Federal Highway Administration 1983).

VISUAL RESOURCES Diagram 1- Key Observation Point Evaluation



VISUAL SENSITIVITY (Existing Condition)

Visual sensitivity, as shown on **Visual Resources Diagram 1**, involves consideration of the following factors: *visual quality*, *viewer concern*, *visibility*, *number of viewers*, and *duration of view* to achieve the *overall viewer sensitivity*. The five factors are described below.

Visual Quality

Visual quality is an expression of the visual impression or appeal of a given landscape and the associated public value attributed to the resource. Table 1 provides a landscape scenic quality scale.

Table 1

LANDSCAPE SCENIC QUALITY SCALE	
RATING	**DESCRIPTION**
Outstanding Visual Quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as “picture postcard” landscapes. People are attracted to these landscapes to view them.
High Visual Quality	Landscapes that have high scenic quality value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These are often landscapes which have high potential for recreational activities or in which the visual experience is important.
Moderately High Visual Quality	Landscapes which have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained within the landscape, to the arrangement of spaces, in the landscape or to the two-dimensional attributes of the landscape.
Moderate Visual Quality	Landscapes that have average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape.
Moderately Low Visual Quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but the landscape is not dominated by these features. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality	Landscapes with low scenic value. The landscape is often dominated by visually discordant man-made alterations; or they are landscapes that do not include places that people will find inviting and lack interest in terms of two dimensional visual attributes.
Source: Adapted from Buhyoff et al., 1994.	

Viewer Concern

Viewer concern represents the estimated reaction of a viewer to visible changes in the view. Viewer concern will vary depending on the characteristics and preference of the viewer group. An assessment of viewer concern can be made based on the extent of the public’s concern for a particular landscape or for scenic quality in general. Existing discordant elements in the landscape may temper viewer concern.

Viewer concern for residential viewers is expected to be high. Residents have extended viewing periods and are concerned about changes in the views from their residence.

The viewer concern for motorists generally depends on when and where travel occurs, the angle of view, view distance, and the frequency of travel of the motorist in the particular area. For example; motorists who are local residents and/or business owners

typically have a higher concern due to their personal investment and greater familiarity with the local area. A motorist using a freeway system during a period of free flow travel would have a long range non-peripheral view while traveling. They typically have a low to moderate concern. A daily commuter using an inner city freeway in heavy traffic would primarily be focused on the freeway itself and not on peripheral views or scenery. A commuter who experiences normal freeway speeds generally has an increased awareness of views from the freeway.

Viewers from a commercial or industrial area would largely consist of employees and patrons. These viewers tend to focus on their work and daily pursuits. Viewer concern is generally expected to be low to moderate.

Scenic views designated in federal, state or local government adopted land use planning or cultural resources documents, or historical preservation plan and survey typically formalized a widely recognized visual value of a resource and the public's desire to protect that value (e.g., scenic corridor, scenic highway, scenic wilderness). Where such official statements exist, the public expectation is that the view at the location or of the identified resource will be preserved. The viewer concern is considered high.

Visibility

Visibility is an assessment of how visible a proposed project or project feature can be seen from the KOP. Visibility depends on the angle or direction of view, extent of existing visual screening (human-made and/or natural), and topography. In this sense, visibility is determined by considering any and all obstructions that may be in the sightline; trees and other vegetation, buildings, hills, transmission poles. The visibility rates from low to high.

Number of Viewers

Number of viewers is the estimated number of viewers who may see the proposed project or project feature. The number is based on an estimated count; the number of residences, the Annual Average Daily Vehicle Trips (AADT) on surface streets and highways, or the number of individuals participating in a recreational activity per day. Staff uses the following table to establish a rating.

Table 2

CATEGORY OF VIEWER AND APPROXIMATE NUMBER OF VIEWERS SCALE			
Residential (number of residences)	**Recreationists** (number of individuals per day)	**Motorist** (number of motor vehicles per day)	**Rating**
More than 100	More than 200	More than 10,000	High
51-100	101-200	5,001 to 10,000	Moderate to High
21-50	51-100	2,501-5,000	Moderate
6 to 20	26-50	501-2,500	Low to Moderate
2 to 5	11 to 25	125-500	Low
Source: California Energy Commission, Environmental Protection Office staff			

Duration of View

Duration of view is the estimated length of time of the view from a viewer to a proposed project or project feature. The sensitivity of the view duration varies depending on the viewer and the activity in which the viewer is engaged.

A view from a residence towards a proposed project longer than two minutes, depending on the orientation of the residence towards the project, is considered to be high; having an extended view.

For a motorist, the duration of view depends on the speed of travel, view distance, and angle of observation. A motorist traveling at 60 miles per hour on a highway that would have a direct view of a proposed project, where the approximate initial point of view to the project is one-mile away would have a 60 second view period.

The duration of view for recreationists will vary depending on whether the particular outdoor recreation is “active” or “passive.” Active recreation entails direct participation in an activity and typically requires use of an organized play area (e.g., a sports field; such as a football field, soccer field, or softball field, or an off-highway vehicle area). An individual observing or engaged in these activities is likely to be focused on the activity at hand and less on the periphery. The duration of view for an observer of a project site is typically low.

Passive recreation activities often occur in tranquil, peaceful and solitary environments. The activities foster appreciation and understanding of the elements of the "natural environment" or wilderness–wild animals, rocks, forest, beaches, in general those things that have not been substantially altered by human intervention. The activities primarily require human muscle-power, use of non-motorized equipment, and do not use an organized play area. Examples of passive recreationist activities include bird watching, camping, hiking, and rock climbing.

Table 3 provides a baseline to determine the rating associated with the view duration.

Table 3

APPROXIMATE DURATION OF VIEW	RATING
Longer than 2 minutes	High (extended period of time)
1 minute to 2 minutes	Moderate to High
20 seconds to 60 seconds	Moderate (mid-length period of time)
10 to 20 seconds	Low to Moderate
Less than 10 seconds	Low (brief period of time)
Source: California Energy Commission, Environmental Protection Office staff	

Overall Viewer Exposure

Overall viewer exposure consists of three factors *visibility*, *number of viewers*, and *duration of view*. These three factors are generally given equal weight in determining the overall viewer exposure. Overall viewer exposure rates from low to high.

Overall Visual Sensitivity

Overall visual sensitivity is based on *visual quality*, *viewer concern*, and *overall viewer exposure*. These factors are generally given equal weight in determining the overall visual sensitivity. Overall visual sensitivity rates from low to high.

VISUAL CHANGE (Proposed Condition)

The visual change introduced by proposed project features at the KOP is assessed by its *contrast*, *dominance*, and *view blockage*. These factors are described below.

Contrast

Contrast is assessed by comparing proposed project features with the major features in the existing landscape using the basic design elements of *form*, *line*, *color*, and *texture.*[7] The basic design elements of form, line, color, and texture are described as follows:

> *Form* - 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.
>
> *Line* - contrast 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.
>
> *Color* - changes in value, or a gradation or variety of a color (hue) tend to create the greatest contrast. Other factors such as saturation of a color (chroma), reflectivity, color temperature, may also increase the contrast.
>
> *Texture* - noticeable contrast in texture usually stems from differences in the grain, density, and internal contrast. Other factors such as irregularity and directional patterns of texture may affect the rating.

Modifications in a landscape which repeat the landscape's basic elements are said to be in harmony with their surroundings. Modifications which do not harmonize often look out of place and are said to contrast or stand out in unpleasing ways."[8] A proposed project designed with similar forms, lines, colors, and textures to that existing in the landscape is more visually absorbent.

Table 4 provides a baseline to determine the rating associated with the degree of contrast.

[7] U.S. Department of Interior - Bureau of Land Management, Manual Section 8431 - Visual Resources Contrast Rating Management.

[8] U.S. Department of Interior - Bureau of Land Management, Manual Section 8400 - Visual Resources Management - Overview of Visual Resource Management System.

Table 4

DEGREE OF CONTRAST CRITERIA	RATING
The element contrast demands attention, will not be overlooked, and is dominant in the landscape.	High (Strong)
	Moderate to High
The element contrast begins to attract attention and begins to dominate the characteristic landscape.	Moderate
The element contrast can be seen but does not attract attention.	Low to Moderate (Weak)
	Low
The element contrast is not visible or perceived.	None
Source: Adapted from U.S. Department of Interior - Bureau of Land Management, Manual 8431 - Visual Resource Contrast Rating	

Dominance

Dominance is an assessment of (a) the proportion of the total field of view that the proposed project feature occupies; (b) a proposed project feature's apparent size relative to other publicly visible landscape features; and (c) the conspicuousness of the proposed project feature due to its location in the view.

A proposed project feature's level of dominance is lower in a panoramic setting than in an enclosed setting with a focus on the project feature itself. A feature's level of dominance is higher if it is (a) near the center of the view; (b) elevated relative to the viewer; or (c) has the sky as a backdrop. As the distance between a viewer and a project feature increases, its apparent size decreases; and consequently, its dominance decrease. The level of dominance rates from low to high.

View Blockage

View blockage is the extent that an existing publicly visible landscape feature(s) (human-made or natural) would be blocked from view by the proposed project feature. The degree of view blockage rates from low to high.

Overall Visual Change

The *overall visual change* is based on the factors of *contrast*, *dominance*, and *view blockage*. Overall visual change rates from low to high.

KOP VISUAL IMPACT SIGNIFICANCE DETERMINATION

The *KOP Visual Impact Significance Determination* is based on comparing the rating for *Overall Visual Sensitivity* and *Overall Visual Change* using Table 5 below.

Table 5

OVERALL VISUAL SENSITIVITY	OVERALL VISUAL CHANGE				
	High	Moderate To High	Moderate	Low to Moderate	Low
High	Significant[(1)]	Significant	Significant	Less Than Significant	Less Than Significant
Moderate to High	Significant	Significant	May Be Significant	Less Than Significant	Less Than Significant
Moderate	Significant	May Be Significant	Less Than Significant	Less Than Significant	Less Than Significant
Low to Moderate	Less Than Significant	Less Than Significant	Less Than Significant	Less Than Significant	Not Significant
Low	Less Than Significant	Less Than Significant	Less Than Significant	Not Significant	Not Significant

[(1)] The introduction of the proposed project or project feature would substantially degrade the existing visual character or quality of the site and its surroundings creating a "potentially significant impact" for the purposes of the California Environmental Quality Act (CEQA). The effective implementation of mitigation may not reduce the visual impact to "less than significant" for the purposes of CEQA.

Source: California Energy Commission, Environmental Protection Office staff

II. PUBLICLY VISIBLE WATER VAPOR PLUMES

When a thermal power generation facility with a cooling tower[9] is operated on a cold, humid day, the warm moisture (water vapor) filled exhaust discharged from the cooling tower condenses as it mixes with cooler ambient air creating a publicly visible plume. The creation of the publicly visible plume potentially could substantially degrade the existing visual character or quality of the project site and its surroundings.

Energy Commission staff prepares an analysis of the cooling tower's emitted visible plume(s) when preliminary computer modeling conducted by staff predicts a plume frequency of occurrence (plume frequency) of 20% or greater during the cooling tower's operation under specific viewing conditions.

Staff established a 20% plume frequency during "daylight, no rain or fog, high visual contrast viewing hours" ("clear hours") as a reasonable worst case scenario. It is during high visual contrast viewing hours ("clear sky[10]") conditions that water vapor plumes

[9] Other potential thermal power generation facility visible water vapor plumes sources, such as combined cycle gas turbine exhausts and geothermal steam exhausts, are evaluated in the same manner as cooling tower plumes.

[10] Staff has included in the daylight "clear sky" category the following:

a) all hours with sky cover equal to or less than 10% plus, and
b) half of the hours with total sky cover 20-90%, or
c) where total sky cover is defined in different increments, all hours defined as clear and half of the hours not defined as overcast or obscured, and
d) subtracting all hours that are identified to have rain or fog and all hours with visibility of less than 5 miles.

The rationale for including these two components in this category;

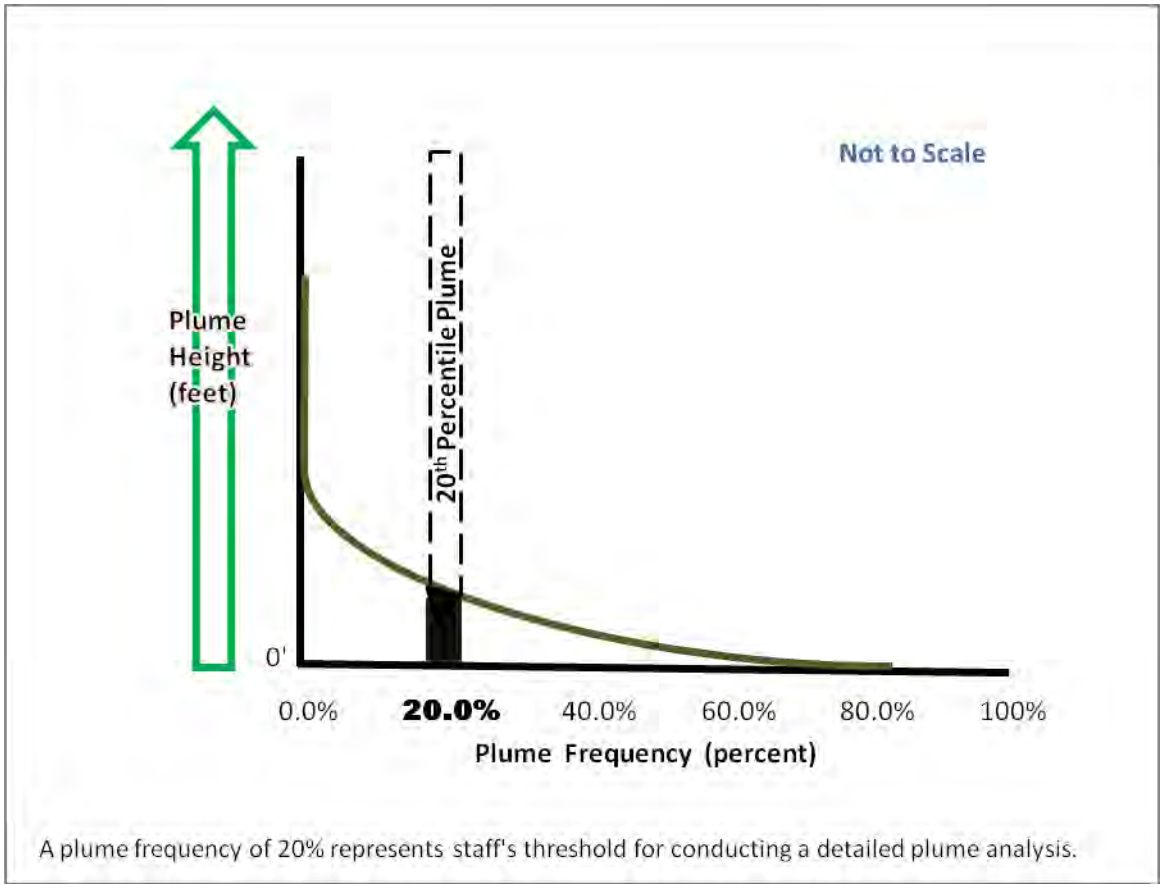
a) visible plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and,
b) for a substantial portion of the time when total sky cover is 20-90% the opacity of sky cover is relatively low (equal to or less than 50%), so this sky cover does not always substantially reduce contrast with visible plumes; staff has estimated that approximately half of the hours meeting the latter sky cover criteria can be considered high visual contrast hours and are included in the "clear sky" definition.

show the greatest contrast with the sky. Water vapor plumes emitted during rain and fog conditions and under some cloud conditions (e.g., marine layer) or at nighttime would not introduce substantial visual contrast.

Plume frequency is calculated on the six month portion of the year when the ambient conditions are such that visible water vapor plumes are most likely to occur. This maximum six month “seasonal” period for plume formation generally occurs between the months of November and April when temperatures are cool or cold and there is high relative humidity.

Staff uses the Combustion Stack Visible Plume (CSVP) model to estimate plume frequency and plume size. If the CSVP modeling conducted for the proposed project’s cooling tower predicts a seasonal daylight “clear hour” plume frequency 20% or greater, staff evaluates the “20th percentile plume” in the visual resources analysis (see **Publicly Visible Water Vapor** section in the Staff Assessment). Staff considers the 20th percentile plume to be the reasonable worst case plume dimension for the purpose of analysis. Publicly visible plumes that occur more than 20% of the time would be more frequent but smaller in size than those that occur less than 20% of the time. This approach recognizes that the largest plumes would occur very rarely, while the most frequent plumes and even the average plumes would be much smaller in size. For example, using a scale of 0 to 100, a 1 percentile plume would be extremely large, very noticeable to a wide area, but would occur very infrequently, and at 100 a plume would be nonexistent (see **Visual Resources Schematic** below). If the modeled publicly visible plume is predicted to have less than a 20% frequency of occurrence during seasonal daylight clear hours, the impacts to the existing visual character or quality of the project site and its surroundings is generally considered less than significant, and it is not considered further in the visual resources analysis.

Visual Resources Schematic – Plume Height/Frequency Curve



Staff assesses if the modeled 20th percentile plume dimensions and frequency potentially would substantially degrade the existing visual character or quality of the project site and its surroundings considering the *Overall Visual Sensitivity* of the existing condition, and the potential *Overall Visual Change* created by the plume's degree of contrast, level of dominance, and view blockage from the selected key observation point (see **Visual Resources Diagram 1**).

Publicly Visible Water Vapor Plume Abatement Methods

Staff has identified four methods to lower a plume frequency or eliminate the plume altogether.

Increase Cooling Tower Air Flow - Increasing the cooling tower air flow will lower the exhaust temperature and reduce plume frequency, but would not eliminate the potential for visible water vapor plumes under all conditions. This method focuses on the design of the cooling tower fan flow capacity versus the amount of heat rejected in the cooling tower. Any specific cooling tower design needs to be fully modeled to determine the effective final plume frequency reductions.

Wet/Dry Cooling Tower - This type of cooling tower reduces plume formation by adding heat or heated ambient air to the saturated wet cooling section exhaust to reduce its saturation level. The saturated exhaust can be heated using a separate dry module above the wet cooling tower. Alternatively, outside air can be pulled into separated

areas where a dry section heats the air to reduce humidity and a wet section creates warm, humid exhaust. The heated ambient air and humid exhaust are mixed to reduce the humidity of the combined exhaust steam to avoid creating a plume when meeting ambient air.

The amount of plume reduction that can be accomplished by this type of system can vary from a relatively moderate reduction to a significant reduction in visible plume frequency. The specific wet/dry design would be based on the desired degree of plume reduction.

Wet Surface Air Cooler - The basic operating principle of a wet surface air cooler (WSAC) is rejection of heat by evaporation. The WSAC technology is similar to a wet/dry cooling tower. Where this system is different is that it could eliminate the need for a heat exchanger. The cooling fluid(s) used for the intercooler and any auxiliary cooling systems could be piped directly into the WSAC which can operate as a non-contact heat rejection system which uses water sprays over the cooling pipes to increase the heat rejection when necessary. The expected hot temperature of the cooling fluid would increase the efficiency of this type of system. There may still be the potential for plumes under high cooling load periods during certain ambient conditions, but the WSAC could be designed, such as being designed for wet/dry operation depending on cooling load, to maintain a minimal plume frequency well below 20% during “clear hours.”

Air Cooled Condenser (Dry Cooling) – The use of an air cooled condenser (ACC) would eliminate the formation of a publicly visible water vapor plume. Air cooled condensers condense exhaust steam from the steam turbine and return condensate to the boiler to perform this function. Steam enters the air cooled condenser above the heat exchangers, flows downward through the heat exchanger tubes, where it condenses and is captured in pipes at the base of the heat exchangers. The condensate is then returned to the boiler water system. Mechanical fans force air over the heat exchangers.

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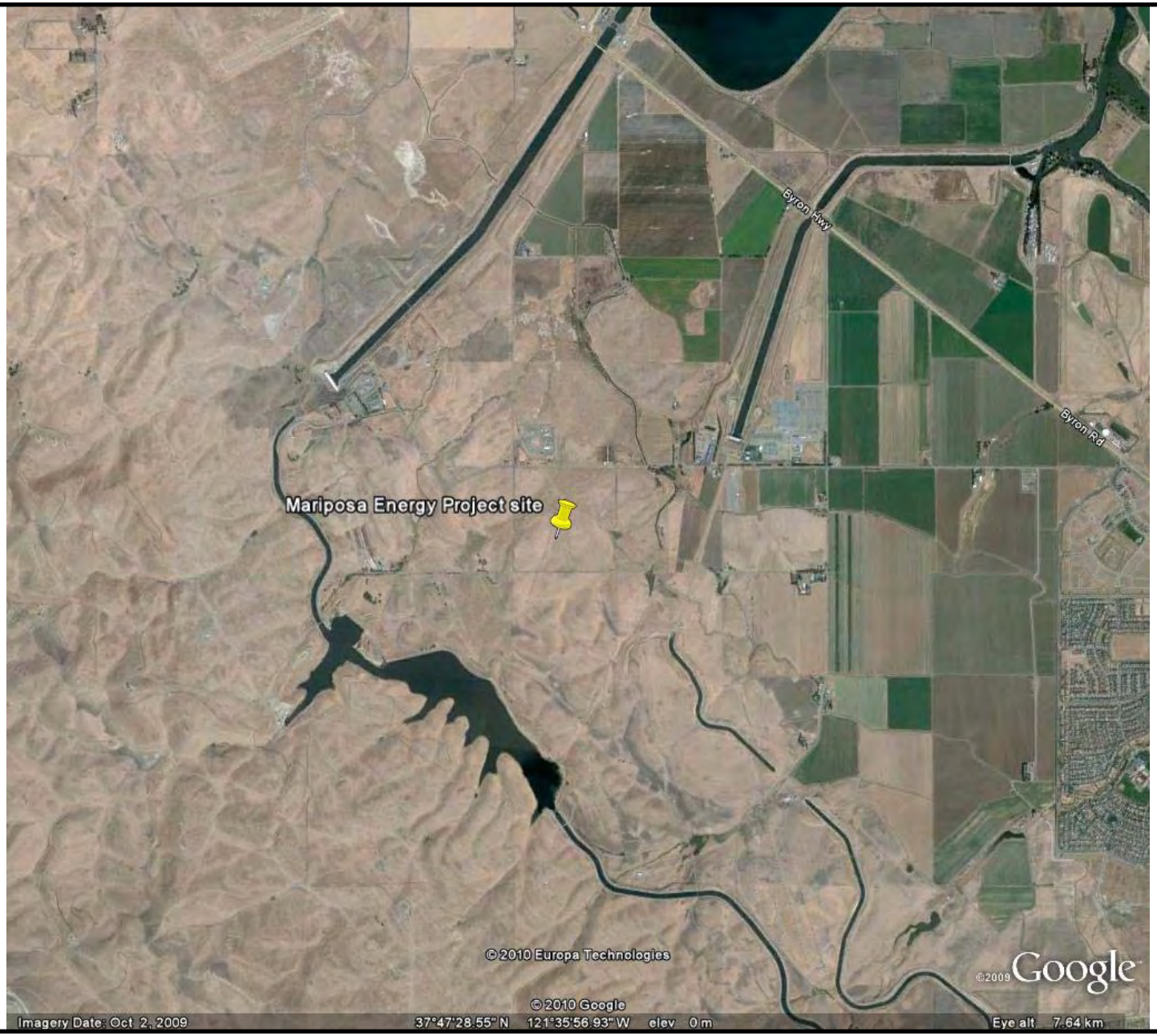
VISUAL RESOURCES - FIGURE 1

Mariposa Energy Project - Aerial View of MEP Site and Vicinity



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Google Earth

VISUAL RESOURCES - FIGURE 2
Mariposa Energy Project - Existing View of Project Site

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: Staff Photo 11/2009

VISUAL RESOURCES - FIGURE 3

Mariposa Energy Project - View of Proposed Facility Site On The Project Site

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo 2/2010

VISUAL RESOURCES - FIGURE 4

Mariposa Energy Project - Architectural Rendering

VISUAL RESOURCES

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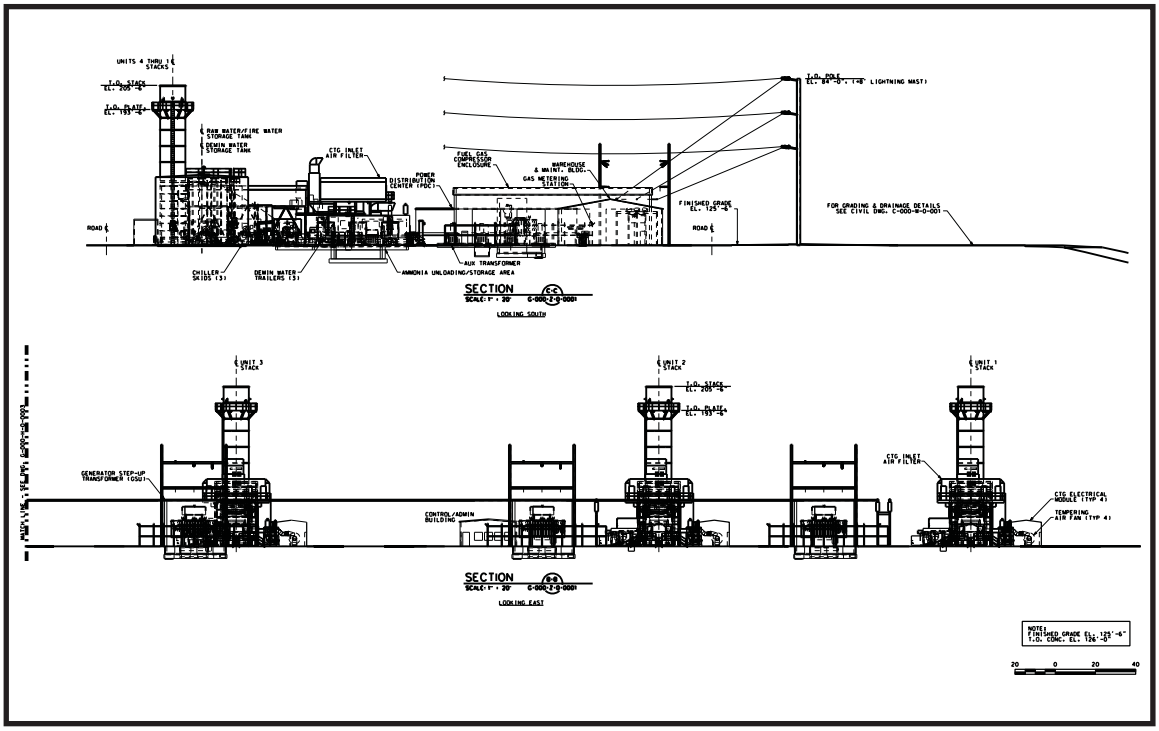
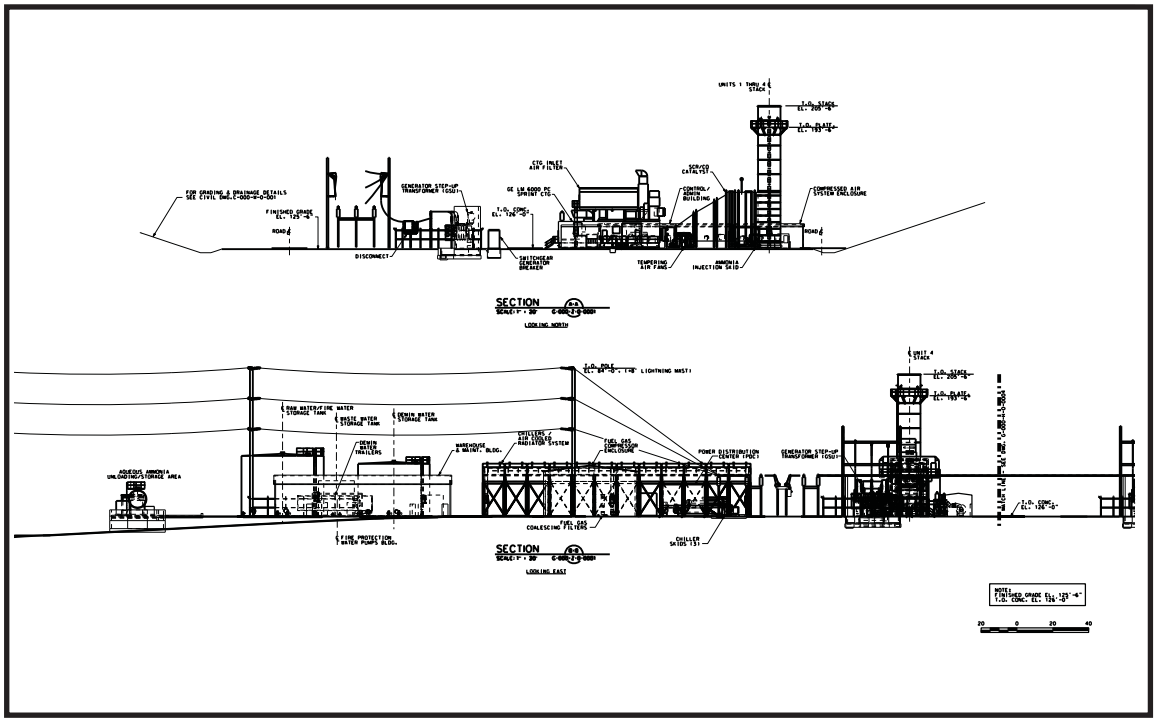
SOURCE: AFC Figure 1.1-1

VISUAL RESOURCES - FIGURE 5
Mariposa Energy Project - MEP Elevations





CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION
SOURCE: AFC Figure 2.3-2A & 2.3-2B

VISUAL RESOURCES - FIGURE 6

Mariposa Energy Project - Aerial Proposed Project Site

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Google Earth

VISUAL RESOURCES - FIGURE 7

Mariposa Energy Project - View From Top of Brushy Peak Towards Project Site

VISUAL RESOURCES

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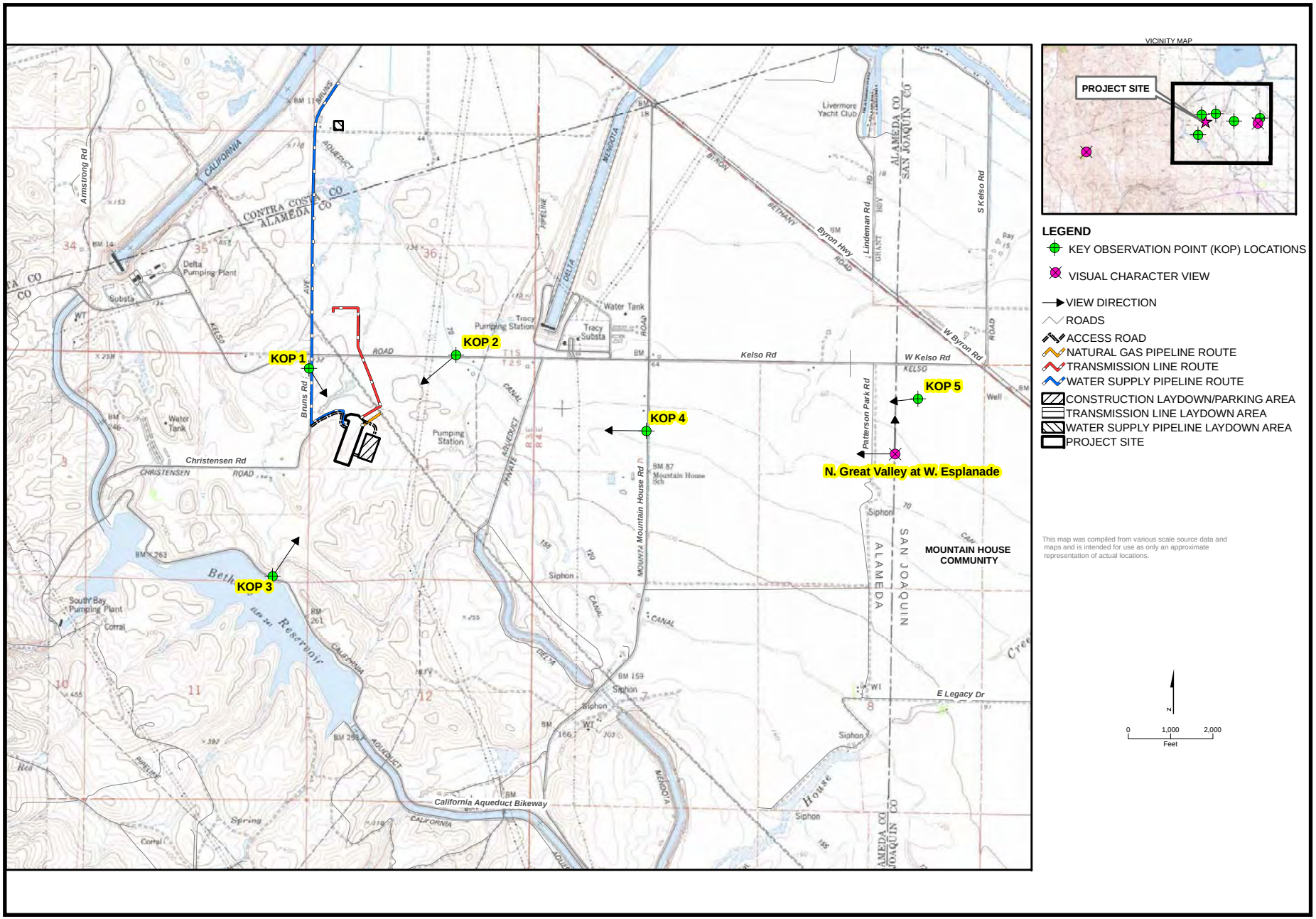
SOURCE: AFC Figure 5.13-8

VISUAL RESOURCES - FIGURE 8

Mariposa Energy Project - Key Observation Point Locations



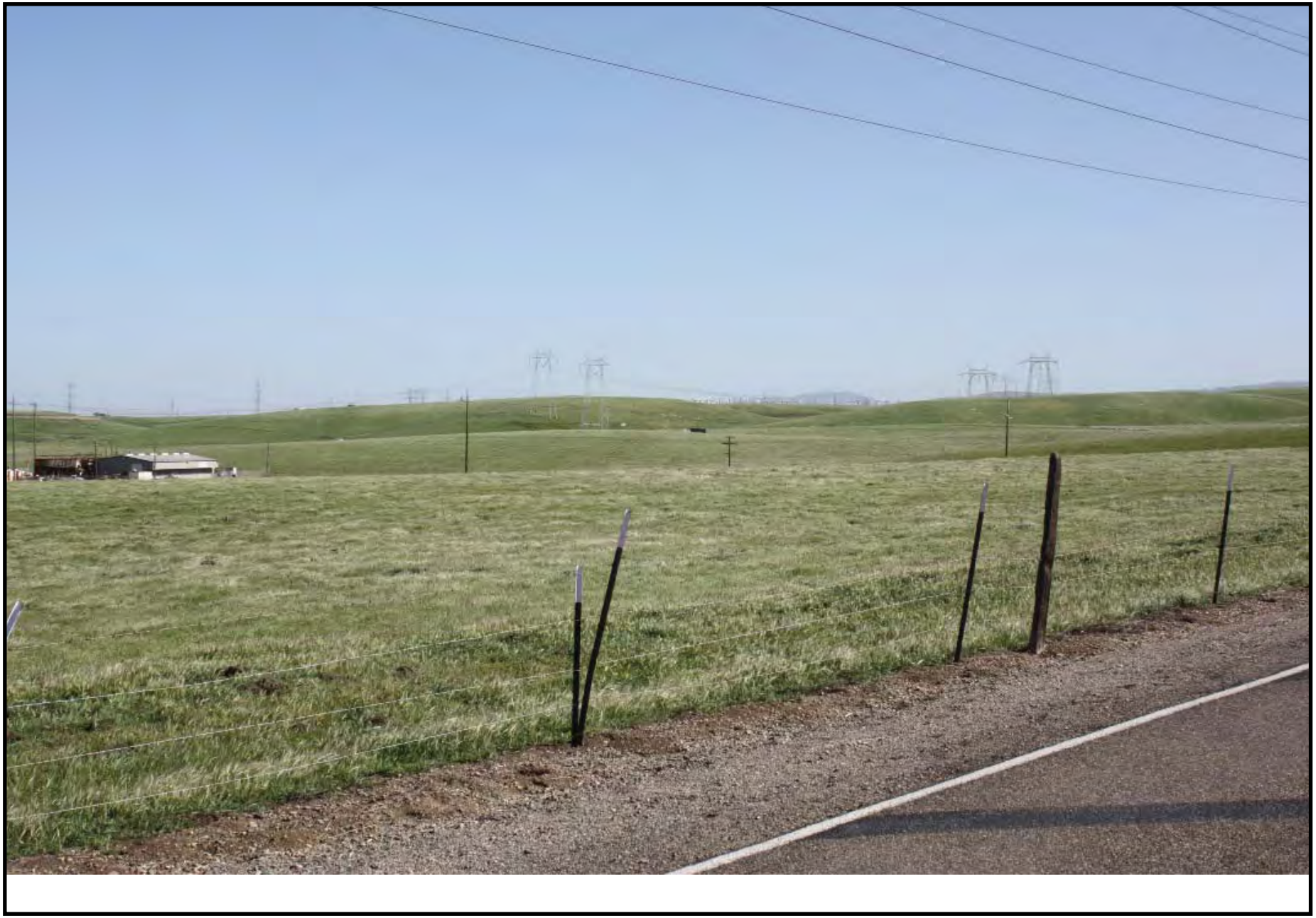
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-1

VISUAL RESOURCES - FIGURE 9

Mariposa Energy Project - KOP 1 - Existing View Towards Facility Site



VISUAL RESOURCES

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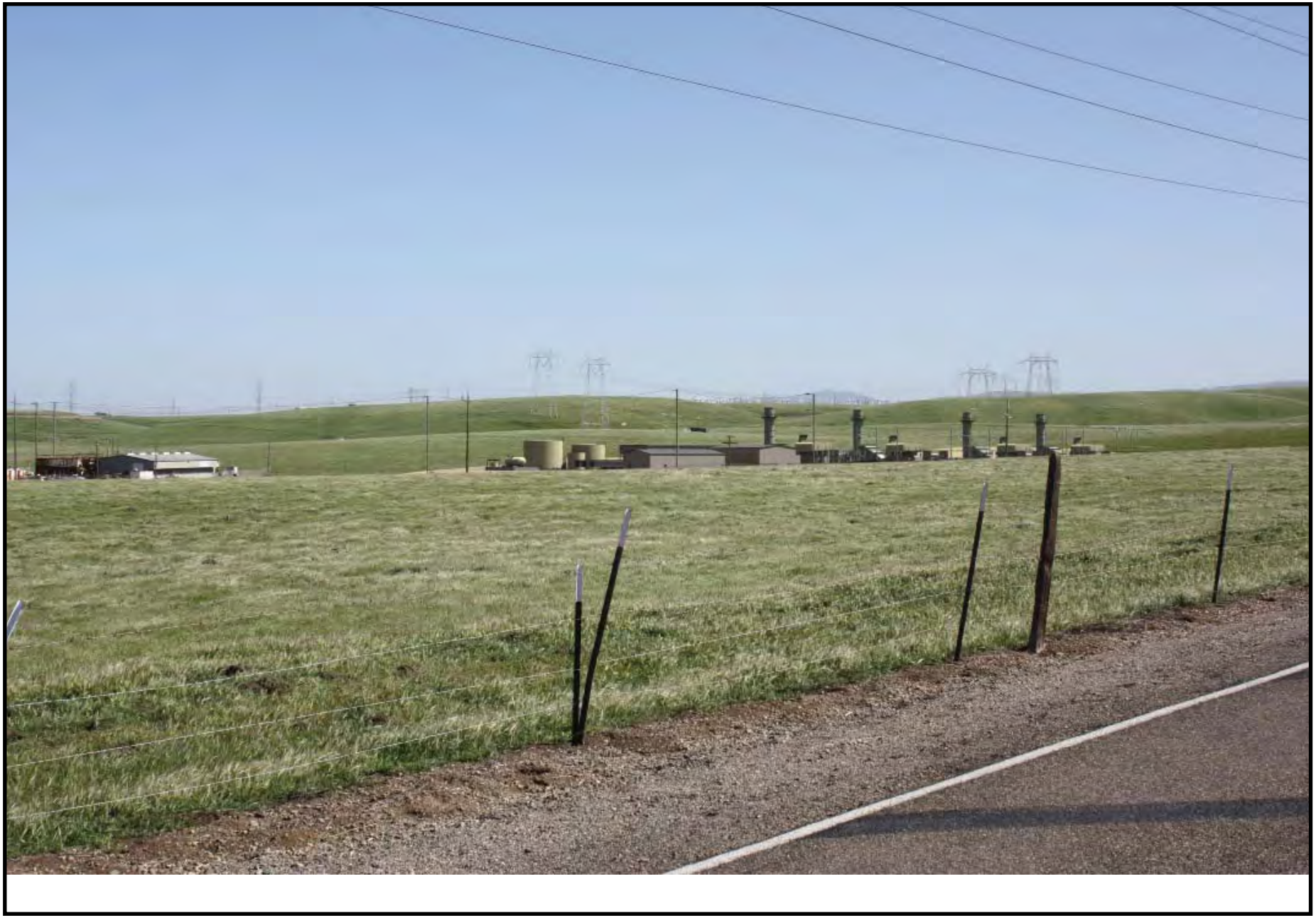
SOURCE: AFC Figure 5.13-2a

VISUAL RESOURCES - FIGURE 10

Mariposa Energy Project - KOP 1 - Photographic Simulation of Project's Publicly Visible Structures



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SOURCE: AFC Figure 5.13-2b

VISUAL RESOURCES - FIGURE 11

Mariposa Energy Project - KOP 2 - Existing View Towards Project Site

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-3a

VISUAL RESOURCES - FIGURE 12

Mariposa Energy Project - KOP 2 - Photographic Simulation of Project's Publicly Visible Structures

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-3b

VISUAL RESOURCES - FIGURE 13

Mariposa Energy Project - Landscape Character Photos Showing Area Around KOP 2

West

East

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo 2/2010

VISUAL RESOURCES - FIGURE 14

Mariposa Energy Project - KOP 3 - Existing View Towards Project Site

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-4a

VISUAL RESOURCES - FIGURE 15

Mariposa Energy Project - KOP 3 - Photographic Simulation of Project's Publicly Visible Structures

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-4b

VISUAL RESOURCES - FIGURE 16

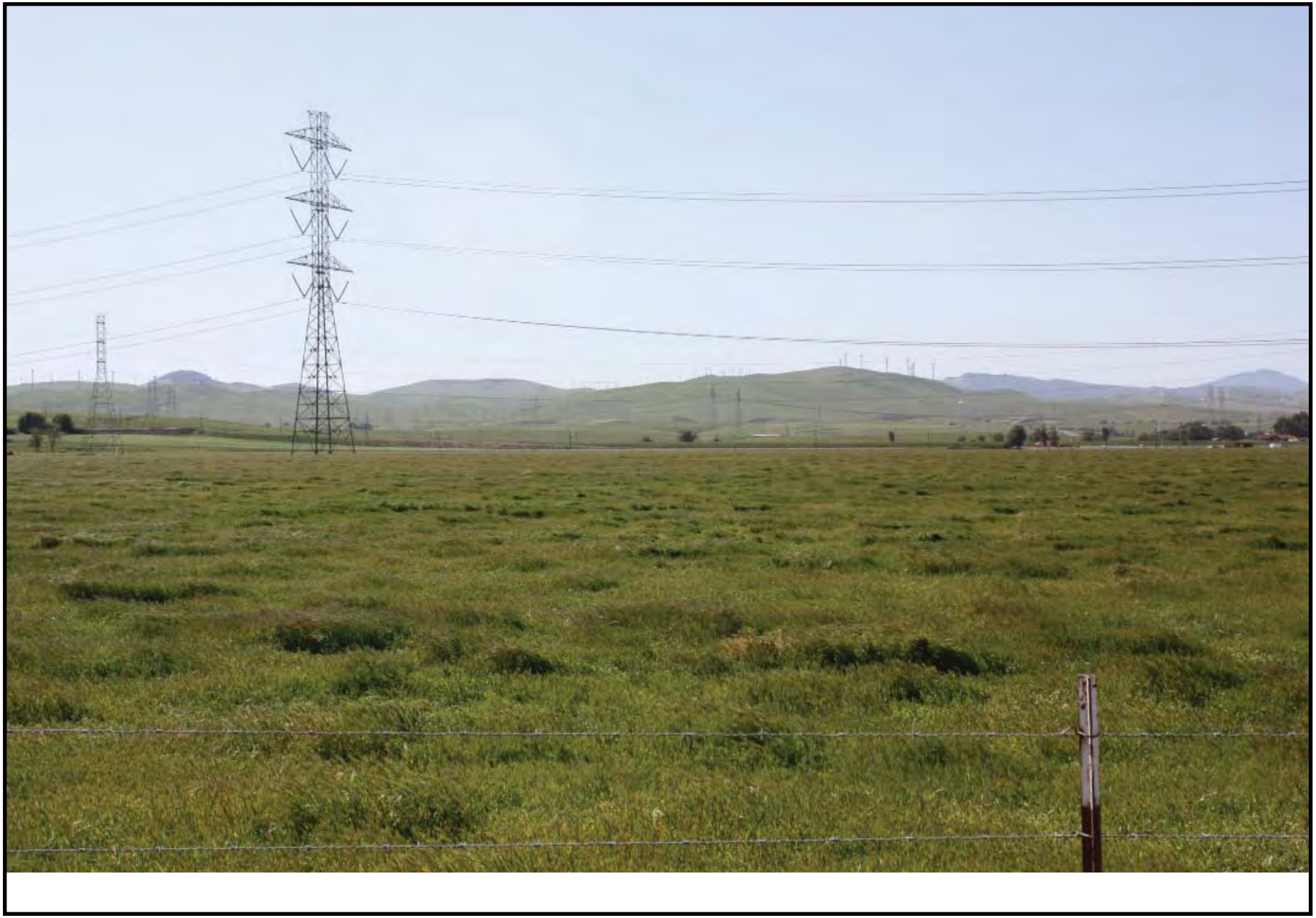
Mariposa Energy Project - Landscape Character Photos Showing Area Around KOP 3

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo 2/2010

VISUAL RESOURCES - FIGURE 17

Mariposa Energy Project - KOP 4 - Existing View Towards Project Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-5a

VISUAL RESOURCES - FIGURE 18

Mariposa Energy Project - KOP 4 - Photographic Simulation of Project's Visible Structures

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-5b

VISUAL RESOURCES - FIGURE 19

Mariposa Energy Project - Landscape Character Photos Showing Area Around KOP 4

North

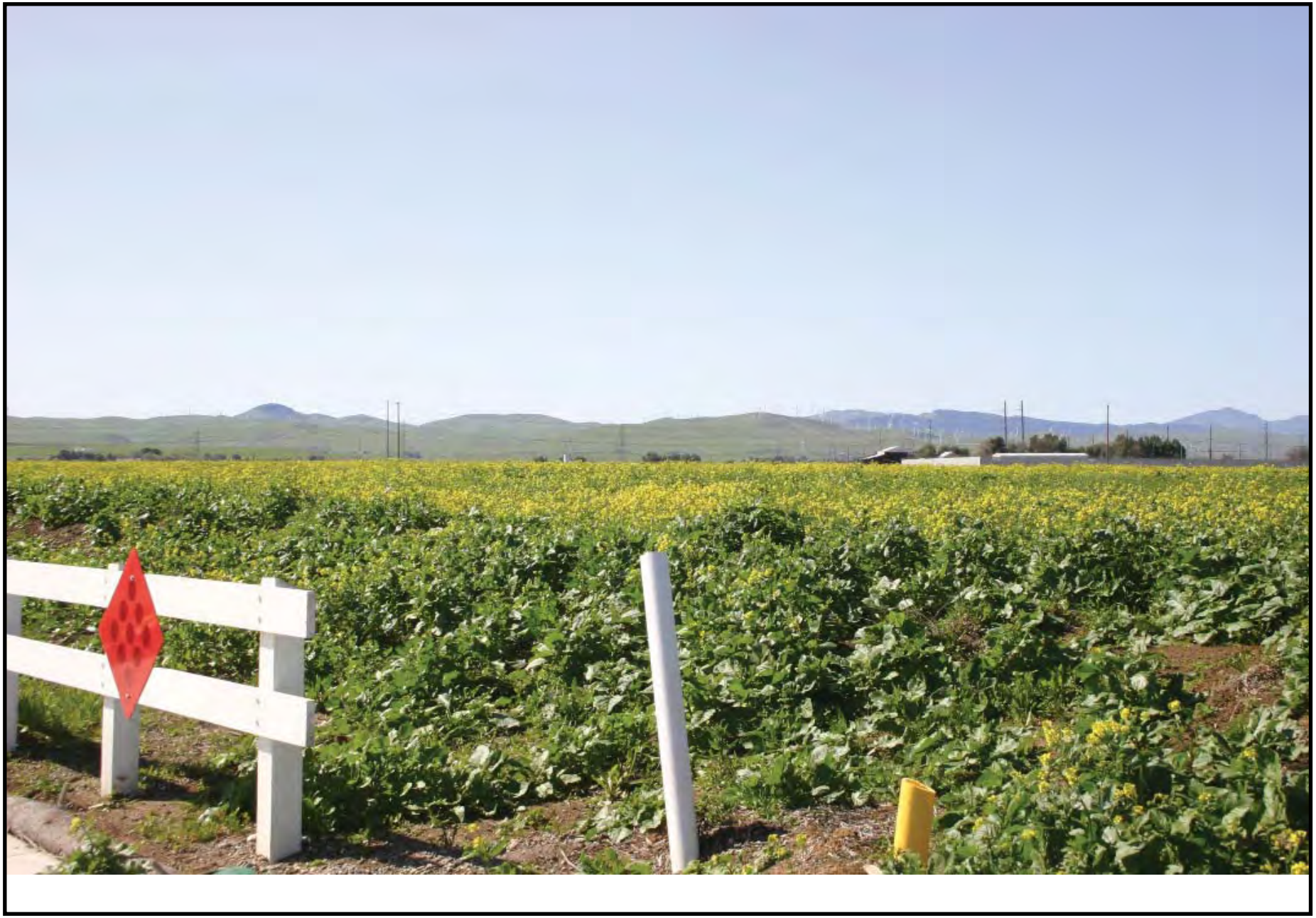
South

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo 11/2009

VISUAL RESOURCES - FIGURE 20

Mariposa Energy Project - KOP 5 - Existing View Towards Project Site



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.13-6a

VISUAL RESOURCES - FIGURE 21

Mariposa Energy Project - KOP 5 - Photographic Simulation of Project's Visible Structures

VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

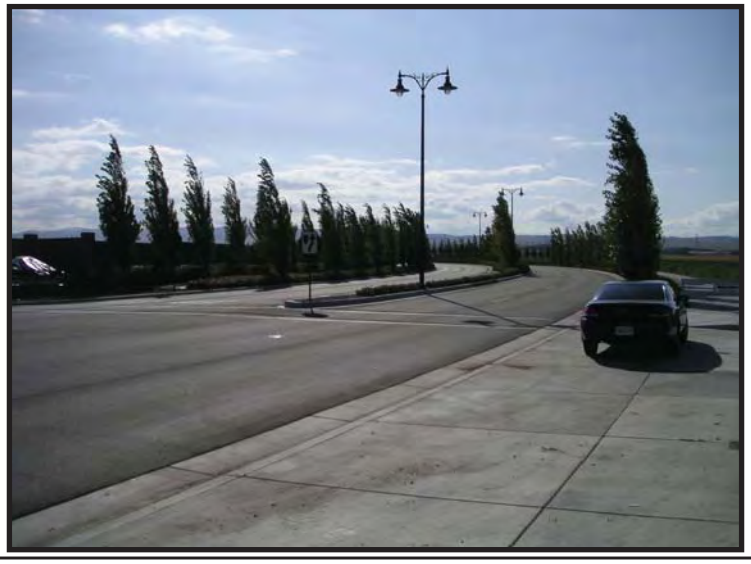
SOURCE: AFC Figure 5.13-6b

VISUAL RESOURCES - FIGURE 22

Mariposa Energy Project - Landscape Character Photos Showing Area Around KOP 5

North

South

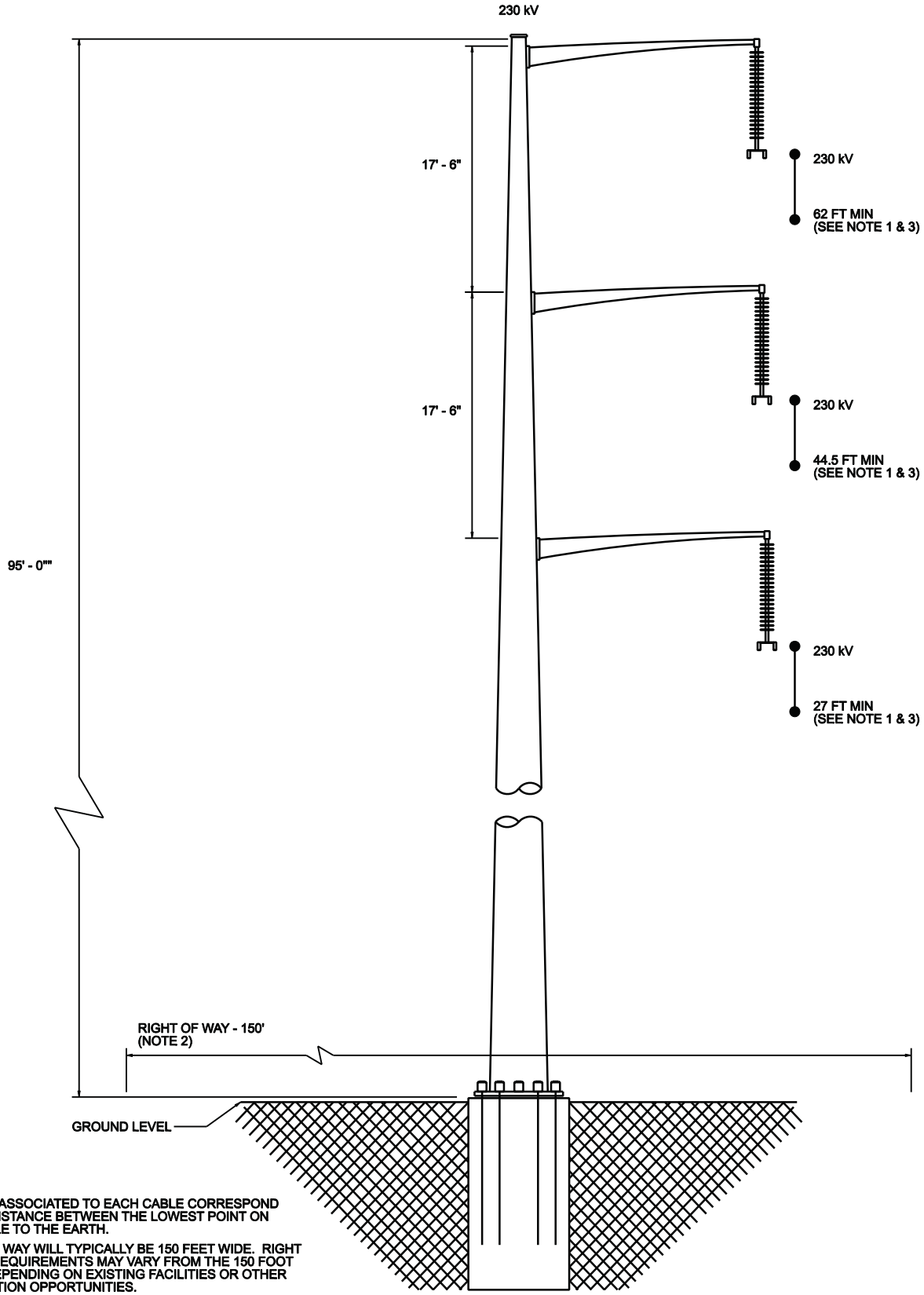


CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Staff Photo 11/2009

VISUAL RESOURCES - FIGURE 23

Mariposa Energy Project -Typical Monopole Transmission Tower



NOTES:

1. HEIGHTS ASSOCIATED TO EACH CABLE CORRESPOND TO THE DISTANCE BETWEEN THE LOWEST POINT ON THE CABLE TO THE EARTH.
2. RIGHT OF WAY WILL TYPICALLY BE 150 FEET WIDE. RIGHT OF WAY REQUIREMENTS MAY VARY FROM THE 150 FOOT WIDTH DEPENDING ON EXISTING FACILITIES OR OTHER CO-LOCATION OPPORTUNITIES.
3. CONDUCTOR SHALL BE: ACSR, DRAKE, 795 KCMILS WITH A CAPACITY OF 922A.

Source: Diamond Generating Corporation, Dwg. No. E-000-0-0001-SKE Rev. B

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Figure DR34-1

WORKER SAFETY AND FIRE PROTECTION

Revised Testimony of Rick Tyler

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Mariposa Energy Project (MEP) provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1** and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant would be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

Staff also concludes that the proposed project would not have significant impacts on local fire protection services. The proposed facility would be located in an area that is currently served by the local fire department. The fire risks at the proposed facility do not pose significant added demands on the Alameda County Fire Department (ACFD) ability to provide fire protection services. Additionally, staff concludes that the response time to the facility and that the ACFD is adequately equipped and staffed to respond to hazardous materials incidents at the proposed facility.

INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Staff Assessment (SA) is to assess the worker safety and fire protection measures proposed by the MEP and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 29 U.S. Code (USC) section 651 et seq (Occupational Safety and Health Act of 1970)	This act 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 § 651).
Title 29 Code of Federal Regulation (CFR) sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections 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 to 1952.175	These sections 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	
Title 8 California Code of Regulations (Cal Code Regs.) all applicable sections (Cal/OSHA regulations)	These sections require that all employers follow these regulations as they pertain to the work involved. This includes 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 Cal Code Regs. section 3, et seq.	This section incorporates the current addition of the Uniform Building Code.
Health and Safety Code section 25500, et seq.	This section presents Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	These sections require a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	
Uniform Fire Code	The fire code contains general provisions for fire safety, including requirements for proper storage and handling of hazardous materials and listing of the information needed by emergency response personnel. Enforced by the Alameda County Fire Department.
National Fire Protection Association standards	These standards provide specifications and requirements for fire safety, including the design, installation, and maintenance of fire protection equipment. Enforced by the Alameda County Fire Department.

SETTING

The proposed facility would be located on a 10-acre portion of a 158-acre parcel (known as the Lee Property) in northeastern Alameda County immediately south of the Pacific Gas and Electric Company (PG&E) Byron Compressor Station and the PG&E Kelso Substation. Fire support services to the site would be under the jurisdiction of the Alameda County Fire Department (ACFD). Station #8 in Livermore would provide first response to the facility. The response time to the facility would be approximately 30 minutes. The facility may also be serviced by the Tracy Fire Department through a mutual aid agreement (MEP 2009a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

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. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal/OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to the facility in an emergency. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff then determines if the presence of the power plant would cause a significant impact on a local fire department. If it does, staff will recommend mitigation for such impacts.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during demolition, construction and operation of facilities. Workers at the proposed MEP would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the MEP to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program would be prepared by the applicant to minimize worker hazards during demolition, construction, and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that would be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

MEP will require construction of a natural gas fired-facility, and its operation. Workers would be exposed to hazards typical of construction and operation of a gas-fired simple cycle electrical generating facility.

Construction Safety Orders are published at Title 8 California Code of Regulations sections 1502, et seq. These requirements are promulgated by Cal/OSHA and would be applicable to the construction phase of the project. The Construction Safety and Health Program would include the following:

- Construction Injury and Illness Prevention Program (8 Cal Code Regs. § 1509)
- Construction Fire Prevention Plan (8 Cal Code Regs. § 1920)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 1514 — 1522)
- Emergency Action Program and Plan

Additional programs under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would include (MEP 2009a):

- Electrical Safety Program
- Motor Vehicle and Heavy Equipment Safety Program
- Forklift Operation Program
- Excavation/Trenching Program
- Fall Protection Program
- Scaffolding/Ladder Safety Program
- Crane and Material Handling Program
- Housekeeping and Material Handling and Storage Program
- Respiratory Protection Program
- Employee Exposure Monitoring Program
- Hand and Portable Power Tool Safety Program
- Hearing Conservation Program
- Hazard Communication Program
- Heat and Cold Stress Monitoring and Control Program
- Pressure Vessel and Pipeline Safety Program
- Hazardous Waste Program
- Hot Work Safety Program
- Line Breaking Safety
- Hoisting and Rigging Safety Program
- Flammable and Combustible Liquid Storage and Handling
- Hazardous Energy Control (Lockout/Tagout)
- Safe Lifting Program

- Permit-Required Confined Space Entry Program

Prior to the start of construction and site-preparation for the MEP, detailed programs and plans would be provided to the California Energy Commission Compliance Project Manager (CPM) and to the ACFD pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations at MEP, the Operations and Maintenance Safety and Health Program would be prepared. This operational safety program would include the following programs and plans:

- Injury and Illness Prevention Program (8 Cal Code Regs. § 3203)
- Fire Protection and Prevention Program (8 Cal Code Regs. § 3221)
- Personal Protective Equipment Program (8 Cal Code Regs. §§ 3401 to 3411)
- Emergency Action Plan (8 Cal Code Regs. § 3220)

In addition, the requirements under General Industry Safety Orders (8 Cal Code Regs. §§ 3200 to 6184), Electrical Safety Orders (8 Cal Code Regs. §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 Cal Code Regs. §§ 450 to 544) would be applicable to the project. Written safety programs for MEP, which the applicant would develop, would ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Emergency Action Plan, Fire Prevention Program, and Personal Protective Equipment Program (URS 2009a). Prior to operation of MEP, all detailed programs and plans would be provided to the CPM and ACFD pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. 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 (MEP 2009a):

- identity of person(s) with authority and responsibility for implementing the program;
- safety and health policy of the plan;
- definition of work rules and safe work practices for construction activities;
- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;

- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- safety procedures; and
- training and instruction.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 Cal Code Regs. § 3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (MEP 2009a). The plan would accomplish the following:

- identify personnel responsible for maintaining equipment and controlling the accumulation of flammable or combustible materials;
- develop procedures in the event of a fire;
- establish fire alarm and protection equipment needs;
- determine system and equipment maintenance schedule;
- specify perimeter fire buffer maintenance;
- specify monthly inspections and annual inspections;
- provide fire-fighting demonstrations and training; and
- establish housekeeping practices.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval and to the ACFD for review and comment to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **-2**.

Personal Protective Equipment Program

California regulations require 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 Cal Code Regs. §§ 3380 to 3400). The MEP operational environment would require PPE.

All safety equipment must 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 must meet NIOSH and Cal/OSHA standards. Each employee must 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.

The PPE Program ensures that employers comply with the applicable requirements for PPE and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 Cal Code Regs. § 3220). The AFC contains a satisfactory outline for an emergency action plan (MEP 2009a).

The outline lists plans to accomplish the following:

- identify personnel with specific responsibilities during an emergency,
- develop a response and notification plan with points of contact,
- establish response procedures for various types of emergencies and establish evacuation routes and procedures,
- specify documentation, emergency notification list, and emergency phone numbers; and
- determine reference procedures including emergency equipment locations, security, accident reporting and investigation, spill containment and reporting, first aid and medical response, and other procedures.

Written Safety Program

In addition to the specific plans listed above, additional LORS called *safe work practices* apply to the project. Both the Construction and the Operations Safety Programs would address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading "Construction Safety and Health Program" in this Worker Safety and Fire Protection section.

Safety Training Programs

Employees would be trained in the safe work practices described in the above-referenced safety programs.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the National Institute for Occupational Safety and Health (NIOSH):

- More than 7 million persons work in the construction industry, representing 6 percent of the labor force. Approximately 1.5 million of these workers are self-employed.
- Of approximately 600,000 construction companies, 90 percent employ fewer than 20 workers. Few have formal safety and health programs.
- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year—more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6 percent) between 1980 and 1993.

- Construction injuries account for 15 percent of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. That this standard practice has reduced and/or eliminated hazards has been evident in the audits staff recently conducted of power plants under construction. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors in four areas:

- to improve their safety and health performance;
- to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections;
- to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and
- to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term *Competent Person* is used in many OSHA and Cal/OSHA standards, documents, and directives. A Competent Person is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer worksites typical of large, complex, industrial-type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- lack of adequate employee- or contractor-written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand-over to operational status. These requirements are outlined in Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner, yet reporting to the Chief Building Official (CBO) and CPM, will serve as an on-site reviewer to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged it in questions about the team's findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed MEP project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, insulating fluid at the power plant switchyard or flammable liquids, explosions, and over-heated equipment, may cause small fires. Major structural fires in areas without automatic fire detection and suppression systems

are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are likewise rare. Compliance with all LORS would be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and contacted representatives of the ACFD to determine if available fire protection services and equipment would adequately protect workers and to determine the project's impact on fire protection services in the area. The project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the ACFD (MEP 2009a).

Construction

During construction, the permanent fire protection system would be installed as soon as practical. Until then, portable fire extinguishers and small hose lines would be placed throughout the site at appropriate intervals and periodically maintained. A sufficient supply of firefighting water would be provided, and safety procedures and training would be implemented according to the guidelines of the Construction Fire Protection and Prevention Plan (URS 2009a).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements. Fire suppression elements in the proposed plant would include both fixed and portable fire extinguishing systems. The proposed underground firewater loop would supply hydrants and fixed suppression systems installed for the MEP structures.

A fixed fire suppression system would be installed in areas of risk (including the transformers and turbine lube oil system). Sprinkler systems or waterless FM-200 systems would be installed in administrative and control buildings as per NFPA standards. A carbon dioxide fire protection system would be provided for the combustion turbine generators and accessory equipment. The CO_2 system would be equipped with fire detection sensors that would automatically trigger alarms, shut down the turbines, stop ventilation, and release the CO_2.

The fixed fire protection system would have fire detection sensors and monitoring equipment that would trigger alarms and automatically actuate the suppression systems. In addition to the fixed fire protection system, appropriate class of service portable extinguishers and fire hydrants/hose stations would be located throughout the facility at code-approved intervals (MEP 2009a). These systems are standard requirements by the NFPA, and the Uniform Fire Code (UFC) and staff has determined that they will ensure adequate fire protection.

The facility will be required to have both a primary access point and secondary access point for fire and emergency services. The applicant would be required by Conditions of

Certification **WORKER SAFETY-1** and**-2** to provide the final Fire Protection and Prevention Programs to staff and to the ACFD prior to construction and operation of the project to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of Emergency Medical Services (EMS) response and off-site fire-fighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer fire-fighting staff. However, staff has determined that the potential for both work-related and non-work-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants shows that many of the responses for cardiac emergencies involved non-work-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for many private and public locations (e.g., airports, factories, government buildings) maintaining on-site cardiac defibrillation devices. Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site in order to treat cardiac arrythmias resulting from industrial accidents or other non-work related causes.

Staff proposes Condition of Certification **WORKER SAFETY-5,** which would require that this portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during demolition, construction, and commissioning also be trained in its use.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the MEP combined with existing industrial facilities and expected new facilities to determine impacts on the fire and emergency service capabilities of the ACFD. Due to the low risk profile and low historic need for fire department response to gas-fired power plants staff concludes that the proposed facility will not have a significant direct or incremental or cumulative burden on the department's ability to respond to a fire or medical emergency.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received the following comments on aspects of the MEP related to Worker Safety and Fire Projtection:

ROBERT SARVEY, INTERVENOR

Comment: Staff's analysis concludes that the Fire support services to the site would be under the jurisdiction of the Alameda County Fire Department (ACFD). Staff's

Assessment predicts the response time to the facility would be approximately 30 minutes from station 8 in Livermore. Obviously in a true medical emergency or fire a 30 minute response time will be inadequate. In the event of a medical response or fire response Tracy Rural Fire would be the first responder. Tracy Rural Fire faces an enormous deficit and the citizens of Tracy recently had to pass a ½ cent sales tax measure in November to support fire services or face reduced fire protection and medical response. The applicant must provide mitigation to the Tracy Fire Department because the Tracy Fire department will be the first responder despite the project being in Alameda County's jurisdiction. We propose a condition of certification which provides mitigation to the Tracy Fire Department who are understaffed and in a difficult budget situation. Otherwise the burden of fire response and EMS services is financed by the citizens of Tracy.

Response: Medical emergency responses to incidents at power plants are very rare. Staff does not believe that there is a significant likelihood of medical emergency response by the Tracy Rural Fire Department to MEP over the life of the project. It should also be noted that fire departments have reciprocal agreements for mutual aid. So it is no more likely the Tracy Rural Fire Department will respond to an incident in Alameda County's service area, than it is that Alameda County will be required to respond to incidents in Tracy's service area. It is staff's belief that impacts resulting from the MEP on the Tracy Rural Fire Department will not be significant.

CONCLUSIONS

Staff concludes that if the applicant for the proposed MEP project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY-1**, and **-2** and fulfils the requirements of Condition of Certification **WORKER SAFETY-3** through**-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that the operation of this power plant would not present a significant incremental or cumulative impact on the local fire department.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

- a Construction Personal Protective Equipment Program;
- a Construction Exposure Monitoring Program;
- a Construction Injury and Illness Prevention Program;
- a Construction Emergency Action Plan; and
- a Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the program with all applicable safety orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Alameda County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Alameda County Fire Department stating the fire department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

- an Operation Injury and Illness Prevention Plan;
- an Emergency Action Plan;
- Hazardous Materials Management Program;
- Fire Prevention Plan (8 Cal Code Regs. § 3221); and
- Personal Protective Equipment Program (8 Cal Code Regs, §§ 3401—3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable safety orders. The Fire Prevention Plan and the Emergency Action Plan shall also be submitted to the Alameda County Fire Department for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program. The project owner shall provide a copy of a letter to the CPM from the Alameda County Fire Department stating the fire department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

- have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;

- assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;
- assure that all construction and commissioning workers and supervisors receive adequate safety training;
- complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and
- assure that all the plans identified in Conditions of Certification Worker Safety-1 and -2 are implemented.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS). The contact information of any replacement CSS shall be submitted to the CPM within one business day.

The CSS shall submit in the Monthly Compliance Report a monthly safety inspection report to include:

- record of all employees trained for that month (all records shall be kept on site for the duration of the project);
- summary report of safety management actions and safety-related incidents that occurred during the month;
- report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
- report of accidents and injuries that occurred during the month.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification **WORKER SAFETY-3**, and for implementing all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: Prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during demolition, construction, and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During demolition, construction, and commissioning, the following persons shall be trained in its use and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager

or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in its use. The training program shall be submitted to the CPM for review and approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

REFERENCES

California Fire Code 2007. Published by the International Fire Code Institute comprised of the International Conference of Building Officials, the Western Fire Chiefs Association, and the California Building Standards Commission. Whittier, Ca.

Uniform Fire Code 1997, Vol. 1. Published by the International Fire Code Institute comprised of the International Conference of Building Officials and the Western Fire Chiefs Association, Whittier, Ca.

MEP 2009a - Mariposa Energy LLC / B. Buchynsky (TN 51974). Application for Certification for Mariposa Energy Project, dated 6/15/2009. Submitted to CEC on 6/15/2009.

USOSHA (United States Occupational Safety and Health Administration). 1993. Process Safety Management / Process Safety Management Guidelines For Compliance. U.S. Department of Labor, Washington, DC.

ENGINEERING ASSESSMENT

TRANSMISSION SYSTEM ENGINEERING

Revised Testimony of Ajoy Guha, P. E. and Mark Hesters

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

The proposed interconnection facilities for the Mariposa Energy Project (MEP) including the new switchyard, the generator 230 kV tie line to the Pacific Gas & Electric (PG&E) Kelso 230 kV substation and its termination would be adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering Laws, Ordinances, Regulations and Standards (LORS).

The Transition Cluster Phase 2 Interconnection Study (Phase 2 Group study) demonstrates that under 2013 summer peak system conditions the addition of six transition cluster queue generation projects in the greater bay area with a total 1,158.9 MW generation output including the 195.9 MW MEP would cause overloads impacts on the PG&E transmission system. The study identified mitigation options for the overloads, including reliability and delivery network upgrades, are adequate to eliminate the overloads. The group mitigation plan is acceptable to staff.

The Phase 2 Group Study identifies the transmission impacts of the group and assigns cost responsibility to individual generators based on the contribution each generator makes to a specific transmission overload. Staff believes that if the Phase 2 Group Study assigns little or no cost responsibility for a particular overload and mitigation to a generator then the overload and required mitigation would not be considered a reasonably foreseeable consequence of the proposed generator. The California Independent System Operator (California ISO) concludes in the Phase 2 Group Study that the addition of the MEP would contribute to new overloads on four 230 kV transmission lines only and assigned the MEP a significant portion of the cost responsibility for network upgrades to mitigate the overloads. The mitigation options for which the MEP is responsible include re-rating of the Lone Tree-USWP JW Ranch and the USWP JW Ranch-Cayetona 230 kV lines, and reconductoring of the following two lines with higher size conductors:

- Kelso-USWP RLF 230 kV line (3.3 miles).
- USWP RLF-Tesla 230 kV line (4.7 miles).

These two lines are immediately downstream of the proposed interconnection of the MEP and their reconductorings are considered as project impacts. A general environmental analysis of the reconductoring is included as Attachment A to this Transmission System Engineering (TSE) section, to meet the California Environmental Quality Act (CEQA) requirements.

The California ISO Operational studies for the MEP determines that in case the related upgrades are not in place in a timely manner to meet the project Commercial Operation

Date (COD), congestion management and/or other operating procedures used in the until the transmission upgrades are completed. The MEP would be treated as an Energy Only generation project during this time.

The project would meet the requirements and standards of all applicable LORS upon satisfactory compliance of the Conditions of Certifications.

The applicant has signed a power purchase agreement with PG&E for power supply during peak hours. The project, a local peaking unit, would meet the increasing load demands in the Alameda County and PG&E greater bay area, provide additional reactive power and voltage support, and enhance system reliability.

INTRODUCTION

STAFF ANALYSIS

This TSE analysis examines whether or not the facilities associated with the proposed interconnection conform to all applicable LORS required for safe and reliable electric power transmission. Staff's analysis evaluates the power plant switchyard, outlet line, termination and downstream facilities identified by the applicant. Additionally, under the CEQA, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (California Code of Regulations, title 14, §15378). Therefore, the Energy Commission must identify the system impacts and necessary new or modified downstream transmission facilities (beyond the first point of the proposed interconnection) that are required for interconnection and represent the "whole of the action." The downstream network upgrade mitigation measures that will be required to maintain system reliability for the addition of the power plant, are used to identify the requirement for any additional CEQA analysis for potential indirect impacts.

Energy Commission staff relies on the interconnecting authority, in this case the California ISO, for the analysis of impacts on the transmission grid from the proposed interconnection as well as the identification and approval of new or modified facilities downstream that may be required as mitigation measures. The proposed MEP would connect to the PG&E transmission network and requires analysis by PG&E and the California ISO and their approval.

ROLE OF PG&E

PG&E is responsible for ensuring electric system reliability on its transmission system for the addition of the proposed generating plant. PG&E will provide analysis in their Phase 1 and Phase 2 Interconnection Studies, and their approval for the facilities and changes required in its system for addition of the proposed transmission modifications.

ROLE OF CALIFORNIA ISO

The California ISO is responsible for system operation in California ISO grid, ensuring electric system reliability for all participating transmission owners and for developing the standards and procedures necessary to achieve system reliability. The California ISO is responsible for completing the Interconnection Studies of the PG&E system to ensure

adequacy of the proposed transmission interconnection. The California ISO will also determine the reliability and delivery impacts of the proposed transmission modifications on the PG&E transmission system in accordance with all applicable reliability criteria. According to the California ISO Tariff, the California ISO will determine the need for transmission additions or upgrades downstream from the interconnection point to ensure reliability of the transmission grid. The California ISO will, therefore, review and complete the Phase 2 Interconnection Study performed by PG&E and/or third party, provide their analysis, conclusions, and recommendations. On satisfactory completion of the PG & E Phase 1 & Phase 2 Interconnection Studies based on the expected COD, the California ISO would execute a Large Generator Interconnection Agreement (LGIA) with the project owner. If necessary, the California ISO may also provide written and verbal testimony on their findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

- California Public Utilities Commission (CPUC) General Order 95 (GO-95), “Rules for Overhead Electric Line Construction,” formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance and operation or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), “Rules for Construction of Underground Electric Supply and Communications Systems,” formulates uniform requirements and minimum standards to be used for underground supply systems to ensure adequate service and safety to persons engaged in the construction, maintenance and operation or use of underground electric lines and to the public in general.
- The National Electric Safety Code, 2007 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- The North American Electric Reliability Corporation (NERC) Reliability Standards define the plans, policies & procedures, methodologies & system models, coordination & responsibilities, and performance criteria for reliable planning, control and operation of the North American Bulk Electric System (BES) over broad spectrum of system conditions and following a wide range of probable disturbances. The Standards cover all aspects of an interconnected BES such as: Transmission system planning & operation, consistent data (steady-state and dynamic) for modeling and simulation, facility ratings methodology and connections, balancing real power, resources & load demand, procedures for voltage control & reactive power, system protection, control, communications & security, nuclear plant interface coordination, emergency operation planning and system restoration plans. The transmission planning standards stipulate periodic system simulations and associated assessments over a planning horizon by the planning authority and transmission planner to ensure that reliable systems are planned with sufficient lead time to meet the system performance requirements and continue to be modified or upgraded as necessary for operating the network reliably to supply projected customer demands and firm transmission services under normal and forced or maintenance outage system conditions.

For an interconnected bulk electric system, the Table I in the NERC Transmission Planning Standards specifies the system performance requirements during normal system conditions with all facilities in service (pre-contingency) and normal operating procedures in effect under Category A, and during probable and rationale contingencies of a single BES element under Category B and two or more (multiple) BES elements under Category C. The performance limits or impacts for the above Categories A-C are specified for a reliable system as to remain stable, and within applicable normal and emergency facility thermal ratings and system voltage limits as determined and applied by the transmission owner according to the NERC Facility Ratings Standards. Specified system performance limits may vary from no loss of load demand or curtailed generation/firm transfers for insignificant adverse impacts (for Categories A & B) to planned/controlled loss of load demand or curtailed generation/firm transfers (for Category C) without any cascading outages. However, during major extreme disturbances such as loss of multiple 500 kV lines on a common right-of-way with cascading outages or multiple generators with loss of a major load center as stated under Category D in the Table I, some of the interconnected systems may become unstable resulting in widespread black out in islanded areas. The standards require the planning authority to evaluate the risks and consequences for such catastrophic events, and be prepared according to the NERC Emergency Operation Planning Standard and/or to restore the system to normal according to the NERC standard for System Restoration Plans (NERC 2005-10).

- The Western Electric Coordinating Council (WECC) Regional System Performance Criteria is similar to the system performance limits as defined in NERC transmission planning standards. The WECC performance criteria incorporate the Table I of the NERC transmission planning standards and in addition include the WECC Disturbance-Performance Table W-1 which provides standards for transient voltage and frequency limits, and post-transient system voltage variation. Certain aspects of the WECC performance criteria are either more stringent or specific than the NERC standards such as inclusion of contingency event frequencies and additional Category C & D contingencies. Adequate reactive power resources planning criteria for transfer path ratings and post-transient voltage stability are also included. For any past disturbance that actually resulted in cascading outages in the interconnected system, the WECC performance criteria require remedial action so that future occurrences of such event would not result in cascading (WECC 2008).
- California ISO Planning Standards also provide standards and guidelines to ensure the adequacy, security and reliability in the planning of the California ISO grid transmission facilities. The Standards incorporate the current NERC Reliability Planning Standards and WECC Regional System Performance Criteria. However, the California ISO Standards are more stringent or specific than the NERC standards and WECC performance criteria. The Standards include additional Category B disturbance elements and criteria for existing nuclear plant unit's control. The Standards also address new transmission vs. involuntary load interruptions and San Francisco greater bay area generation outage criteria for conducting grid planning for the bay area. The California ISO Standards apply to the electric systems of all participating transmission owners interconnecting to the California ISO controlled grid. They also apply when there are any impacts to the California ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the California ISO (California ISO 2002a).

- California ISO/FERC Electric Tariff provides rules, procedures and guidelines for construction of all transmission additions/upgrades (projects) within the California ISO controlled grid. The California ISO determines the “Need” for the proposed project where it will promote economic efficiency or maintain system reliability. The California ISO also determines the Cost Responsibility of the proposed project and provides an Operational Review of all facilities that are to be connected to the California ISO grid. The Tariff specifies the required LGIP and LGIA to be followed for any large generator interconnection to the California ISO controlled grid (California ISO 2010a).

PROJECT DESCRIPTION

The MEP would be located in a 10-acre southern portion of the 158-acre Lee property site southeast of the intersection of Bruns Road and Kelso Road in Alameda County, immediately south of PG&E’s 230 kV Kelso substation. The project would consist of four natural gas-fired GE combustion turbine generator (CTG) units (LM6000 PC-Sprint model) operating in simple cycle mode with a total of 195.9 MW nominal net output. Each CTG unit rated 71.176 MVA, 13.8 kV would be connected through a 4,000-ampere non-segregated bus duct and a 4,000-ampere, 15 kV breaker to the low voltage terminal of a dedicated generator step-up (GSU) 36/48/60/67.2 MVA 13.8/230 kV transformer with a specified impedance of 8.3% @36 MVA. (MEP 2009a, AFC, section 1 & 2).

SWITCHYARD AND INTERCONNECTION FACILITIES

The new MEP 230 kV switchyard is proposed as a 1,200-ampere single bus arrangement. The 230 kV high voltage terminal of each GSU transformer would be connected to the 230 kV switchyard bus through a 1,200-ampere disconnect switch and the generator 230 kV overhead tie line would be connected to the switchyard bus through a 2,000-ampere SF6 circuit breaker and associated two 1,200-ampere disconnect switches.

The new MEP switchyard would be interconnected to the existing Kelso substation 230 kV bus by building a new 0.75-mile long 230 kV single circuit overhead line with 795 kcmil steel-reinforced aluminum conductors (ACSR). The line would be built on eight 84-95 foot steel tubular poles. The line would run generally north from the project site, staying east of the Byron Power Cogeneration Plant, crossing Kelso Road, and staying east of the PG&E Bethany Compressor station. It would turn west just north of the Kelso substation, and then turn south to the Kelso substation. The line would remain within the fence line of 158-acre Lee parcel and the PG&E parcel in the north with the exception of the crossing of Kelso Road. The applicant would build, own and operate the MEP switchyard and the generator 230 kV overhead tie line.

The interconnecting line would be terminated at the PG&E Kelso 230 kV substation bus through a 2,000-ampere SF6 breaker with an associated 2,000-ampere disconnect switch installed within the existing fence line of Kelso substation. PG&E would build, own and operate the interconnecting termination facilities within the fence line of the

Kelso substation including a new breaker, a disconnect switch and transmission outlet (MEP 2009a, AFC, section 3; CH2M 2009c, Data Adequacy Response; CH2M 2010b, Data Response set 1c).

The configuration of the MEP switchyard, the generator interconnection tie line and its termination at the PG&E Kelso 230 kV substation would be adequate in accordance with industry standards and good utility practices, and is acceptable to staff. Proposed Conditions of Certification TSE 1 to TSE 7 insure that the proposed facilities are designed, built and operated in accordance with good utility practices and applicable LORS.

TRANSMISSION SYSTEM IMPACT ANALYSIS AND MITIGATION

For the interconnection of a proposed generating unit or transmission facility to the grid, the interconnecting utility (PG&E in this case) and the control area operator (California ISO) are responsible for ensuring grid reliability. These entities perform the Phase 1 and Phase 2 Interconnection studies and determine the transmission system impacts of the proposed project, and any mitigation measures needed to ensure system conformance with performance levels required by utility reliability criteria, NERC reliability standards, WECC system performance criteria, and California ISO planning standards. Staff relies on these studies and any review conducted by the responsible agencies to determine the project's effect on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with applicable reliability standards.

The Phase 1 and Phase 2 Studies analyze the grid with and without the generation queue projects in the cluster group which includes the proposed project under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies must analyze the impact of the project for the first year of operation and thus are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnecting utility and the California ISO. Generation and transmission forecasts are established by an interconnection queue. The studies are focused on thermal overloads, deliverability assessment, voltage deviations or reactive power deficiency, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), short circuit duties and operational studies.

If the Phase 2 Studies shows that the interconnection of the cluster queue projects causes the grid to be out of compliance with reliability standards, then the study will identify mitigation alternatives or ways in which the grid could be brought into compliance with reliability standards. According to the Phase 2 study results staff will analyze the transmission impacts caused by the cluster group projects and determine whether or not the identified impacts are foreseeable consequence or meaning forecast for the addition of the proposed project. If the mitigation identified by California ISO or interconnecting utility includes downstream transmission facilities modifications or

additions that require CEQA review for potential indirect impacts of the project as part of the “whole of the action,” the Energy Commission must analyze the environmental impacts of these modifications or additions according to the CEQA requirements.

SCOPE OF TRANSITION CLUSTER PHASE 2 INTERCONNECTION STUDY

The September 23, 2010 transition cluster Phase 2 Interconnection study was prepared by the California ISO in coordination with PG&E. The study updates the July 28, 2009, transition cluster Phase 1 Interconnection study to account for withdrawal of Interconnection requests, identify final reliability network upgrades needed to interconnect the large generator facilities and assign responsibility for financing the proposed upgrades. Six queue generation projects including the proposed 195.9 MW MEP (Queue #334) in the greater Bay Area with a total of 1,159 MW net maximum generation output are included in this Group 1 Phase 2 cluster study. The Phase 2 study used four power flow base cases: two for reliability assessment and two for deliverability assessment with the following system conditions:

- A 2013 summer peak base case was developed from PG&E 2009 base case series. For the deliverability assessment case a 28,759 MW load (1-in-5 year heat wave load forecast) was modeled in PG&E system with an import target of 10,726 MW. For the reliability assessment case a 28,882 MW load (1-in-10 year heat wave load forecast) was modeled in PG&E system.
- A 2013 summer off-peak base case with the load level of 50% of the summer peak load level for the reliability assessment. For the deliverability assessment, a 14,038 MW load was modeled.

In the base cases, northern California generation and critical seasonal power flows in WECC Paths are maintained within limits. The base cases include planned California ISO/PG&E approved transmission upgrades that are scheduled to be in service by 2013. The base cases also include the proposed generation projects that would be operational by 2013 along with their associated transmission upgrades required for interconnection. Transition cluster generation projects with associated network upgrades and special protection systems (SPS) are modeled. However, some pre-transition generation projects (serial projects) that are electrically far from the Group 2 cluster projects are either turned off or modeled with reduced generation to balance loads and resources in the power flow model. The base cases are developed to represent stressed scenarios of loading and generation condition in the study group area.

The Phase 2 Group study report provides the combined impacts of all transition queue projects as well as the impacts of this project on the transmission grid. The study includes analyses for steady state power flow, short circuit duty, transient stability, reactive power deficiency and deliverability assessment, and also operational studies.

The study report provides the project and interconnection information, study assumptions, criteria and results for all analyses including preferred mitigation measures for identified reliability criteria violations, and final work scope & cost

responsibility of the project for interconnection facilities, reliability and delivery network upgrades (CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report).

POWER FLOW STUDY RESULTS AND MITIGATION

The steady state power flow analysis for the Transition Cluster Phase 2 Interconnection study was performed with 2013 summer peak and 2013 summer off-peak base cases to evaluate system Impacts caused by the interconnection of six transition group 1 queue projects in the PG&E greater bay area with a total of 1,158.9 MW net generation output including the proposed 195.9 MW MEP (Queue #334) under Category A normal (N-0) system conditions and Category B (N-1, L-1 &G-1) & Category C (N-2 or more) emergency contingency system conditions. The Group study report demonstrates that the addition of group 1 cluster projects would cause significant adverse impacts on the PG&E transmission system. Under 2013 summer peak system conditions, the transition cluster projects cause new overloads on nine transmission lines/line sections during Category A normal (N-0) system conditions, on six transmission facilities during worst Category B (N-1, L-1 & G-1) contingencies and on ten transmission facilities during worst Category C (N-2 or more) contingencies. Under 2013 summer off-peak system conditions, the transition cluster projects cause new overloads on two transmission lines/line sections during Category A normal (N-0) system conditions, on two transmission facilities during worst Category B (N-1, L-1 & G-1) contingency conditions and on four transmission facilities during worst Category C (N-2 or more) contingencies. The mitigation options to offset the identified overloads include reconductoring of five transmission lines/line sections with higher size conductors, re-rating two transmission lines/line sections, installing Special Protection Systems (SPS) to curtail generation output and congestion management. The mitigation plan is adequate to eliminate the identified new overloads and is acceptable to staff. The power flow study results with all transition group projects are shown in Tables 7-1, 7-2 & 7-3 of section 7 and the mitigation plan for the group 1 projects including cost estimates & estimated time for construction of the upgrades are shown in sections 10 and 12 respectively (CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report, pages 15-19, 23-30 & 33-36).

The Appendix A-Q334 report for the MEP demonstrates that the addition of the MEP would contribute to new overloads on four of the transmission facilities as identified in the transition projects group study and these overloaded lines for which the MEP is partially responsible are listed in section 4 of the Appendix A. The project cost allocation factors, cost estimates and construction schedule of the upgrades are listed in the Attachment 6 and section 11 of the Appendix A respectively (CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report, Appendix A-Q334, pages 5, 11-12 and Attachment 6).

Below is a summary of the portion of the California ISO Phase 2 group power flow analysis results pertinent to the MEP's identified contribution to the overloads on the transmission lines along with other transition cluster group 1 projects and the corresponding mitigation measures for which the project is found responsible:

- Under 2013 summer peak system conditions, the study indentifies that the project would contribute to new overloads on the following transmission facilities during Category A normal system conditions:
  - Kelso-USWP Ralph 230 kV line (loading increases from 36 to 105 percent).
  - USWP Ralph-Tesla 230 kV line (loading increases from 38 to 107 percent).
- Under 2013 summer peak system conditions, the group study indentifies that the project would contribute to new overloads on the following transmission facilities during worst Category B contingencies:
  - Kelso-USWP Ralph 230 kV line (loading increases from 45 to 115 percent) for the outage of Contra Costa-Delta Pumps 230 kV line.
  - USWP Ralph-Tesla 230 kV line (loading increases from 46 to 117 percent) for the outage of Contra Costa-Delta Pumps 230 kV line.
  - Lone Tree-USWP JW Ranch 230 kV line (loading increases from 86 to 105 percent) for the outage of Contra Costa-Las Positas 230 kV line.
  - USWP JW Ranch-Cayetano 230 kV line (loading increases from 86 to 104 percent) for the outage of Contra Costa-Las Positas 230 kV line.
- Under 2013 summer peak system conditions, the group study indentifies that the project would contribute in overloading the following transmission facilities for the worst Category C contingencies:
  - Kelso-USWP Ralph 230 kV line (loading increases from 40 to 128 percent) for the Contra Costa 230 kV section 2F bus fault.
  - USWP Ralph-Tesla 230 kV line (loading increases from 41 to 129 percent) for the Contra Costa 230 kV section 2F bus fault.
  - Lone Tree-USWP JW Ranch 230 kV line (loading increases from 85 to 108 percent) for the outages of the Contra Costa-Brentwood and Contra Costa-Delta Pumps 230 kV lines.
  - USWP JW Ranch-Cayetano 230 kV line (loading increases from 85 to 107 percent) for the outages of the Contra Costa-Brentwood and Contra Costa-Delta Pumps 230 kV lines.
- Under 2013 summer Off-peak system conditions, the group study indentifies that the project would contribute in overloading the following transmission facility for the worst Category B contingency:
  - USWP Ralph-Tesla 230 kV line (loading increases from 6 to 102 percent) for the outage of Contra Costa-Delta Pumps 230 kV line.

Mitigation Plan: For the overloads on the Kelso-USWP Ralph-Tesla 230 kV line, the mitigation plan includes reconductoring of 3.3 miles of the Kelso-USWP Ralph 230 kV line and 4.7 miles of the USWP Ralph-Tesla 230 kV line with a higher size conductor

According to the project contribution to the overloads on these lines as identified in the Phase 2 group study (Attachment 6), the MEP has 56.2 percent cost responsibility with other group projects for the upgrades. Staff considers the mitigation acceptable.

According to the project contribution to the overloads on the Lone Tree-USWP JW Ranch and USWP JW Ranch-Cayetano 230 kV lines, the MEP has 19.1 percent cost responsibility with other transition projects to mitigate the overloads. PG&E is evaluating the feasibility of re-rating the line which consists of 3.5-mile overhead conductor and 2.5-mile underground cable. If re-rating of the line is not feasible, other mitigation measures such as congestion management or use of other thermal resources in the area may be used to mitigate the overloads. Staff considers the mitigation measures acceptable.

SHORT CIRCUIT STUDY RESULTS

Three line-to-ground (3LG) and single line-to-ground (SLG) faults were simulated with and without the transition cluster group projects including the MEP to determine whether any equipment or circuit breakers in the PG&E system would be overstressed due to increase in fault currents for the addition of the projects. The short circuit analysis results are shown in Appendix E for the Transition cluster group and in Attachment 4 for the MEP. The preliminary protection requirements for the MEP based upon the interconnection plan are shown in Attachment 3.

The short circuit results indicate that the circuit breaker, CB 672, at the Pittsburg Power Plant switching station would be overstressed due to the addition of the transition cluster projects. However, the MEP contributes less than the PG&E threshold value of 100 Amperes fault current to the CB 672. So the project is not found responsible for the circuit breaker upgrade (CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report, Appendices A-Q334 & E).

TRANSIENT STABILITY STUDY RESULTS

Transient stability analysis is performed to determine whether the transmission system would remain stable as well as operating in a coordinated fashion through abnormal operating conditions after the transition cluster projects including the MEP begin operation. The analysis for the MEP was conducted with 2013 summer peak base case with simulated faults under selected Category B and Category C contingencies. The study concluded that the transmission system would remain stable with the addition of the MEP under Category B and Category C outages. The dynamic stability plots are shown in Attachment 2 of the MEP report (CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report, Appendix A-Q334, Attachment 2).

REACTIVE POWER DEFICIENCY ANALYSIS RESULTS

The power flow analysis for Category B and Category C contingencies indicate that the transition cluster projects did not cause voltage drops of 5 percent or more from the pre-project levels, or cause the PG&E system to fail to meet applicable voltage criteria. The MEP, therefore, did not cause any adverse voltage impacts on the PG&E system CAISO 2010b; Transition Cluster Phase 2 Interconnection study revised final report, Appendix A-Q334, page 7).

DELIVERABILITY ASSESSMENT RESULTS AND MITIGATION

The Deliverability Assessment was performed by California ISO to determine the capability of the transition cluster projects to be deliverable to the aggregate load. This assessment was done for the transition projects that requested Full Capacity status. The generation projects for Energy Only status would be modeled with zero (0) MW output. The on peak and off-peak Deliverability Assessments were performed by the California ISO under 2013 summer peak and summer off-peak system conditions. For summer on peak system conditions a total maximum generation output of 1158.9 MW from the transition cluster projects was modeled. For summer off-peak system conditions, a generation output of 999.065 MW from the transition cluster projects was modeled. The study results for PG&E greater Bay Area system for Category A, B and C contingencies are shown in Appendix C and Attachment 5. The study results indentify overloads on four 230 kV lines under 2013 summer peak conditions and on a 115 kV line under 2013 summer off-peak conditions during worst contingencies. The mitigation options for reconductoring of the impacted overloaded lines with higher size conductors are already included in the group mitigation plan as determined from the steady state group power flow analysis results. The Assessment concludes that the MEP and other cluster group projects as Full Capacity generation projects are deliverable to the California ISO grid (CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report, Appendix C; Appendix A-Q334, page 8, Attachment 5).

OPERATIONAL STUDIES AND MITIGATION

Operational studies were performed on a year-by-year basis by adding projects in the base cases based on their CODs. The studies include power flow, short circuit, transient stability and voltage assessment. The purpose of these studies was to determine whether or not the required reliability upgrades and delivery network upgrades can be constructed in a timely manner to safely and reliably interconnect this project on the California ISO grid. The study results are shown in Attachment 7.

The analysis related to the MEP's COD is summarized below.

Power flow analysis indicates the following overloaded facilities under 2013 summer peak system conditions:

1. Newark 230/115 kV transformer bank #11 for Category B contingency.
2. Las Positas-Newark 230 kV line for Category C contingency.

Short circuit analysis indicates that the circuit breaker, CB672, at the Pittsburgh switching station will be overstressed.

Transient stability analysis indicates that the system would remain stable for the selected disturbances in the vicinity of the project and no adverse impact is found.

The Voltage assessment indicates that the system voltages during Category B and C contingencies are well within operating guidelines and voltage deviations are within the allowable NERC/WECC criteria.

It is possible that the estimated construction time for upgrades of the affected facilities could be exceeded and the facilities may not in service to meet the project COD. In that case the California ISO believes that congestion management and/or operating procedures can be applicable in the interim period until the upgrades are completed. The MEP would have an Energy Only project status in the interim period CAISO 2010b, Transition Cluster Phase 2 Interconnection study revised final report, Appendix A-Q334, page 9).

DOWNSTREAM FACILITIES

Besides the proposed interconnection facilities for the proposed MEP including the switchyard, the interconnection tie line and termination at the PG&E Kelso 230 kV substation, accommodating the interconnection of the project would require downstream delivery network upgrades for reconductoring the PG&E Kelso-USWP Ralph-Tesla 230 kV line, for which the applicant (in coordination with PG&E) has submitted environmental analysis during their AFC process to the Energy Commission for the CEQA review. PG&E would do the construction work for reconductoring the line within their Right of Way.

CUMULATIVE IMPACTS

The TSE analysis focuses on whether or not a proposed project will meet required codes and standards. At all times the transmission grid must remain in compliance with reliability standards, whether one project or many projects interconnect. Potential cumulative impacts on the transmission network are identified through the California ISO and utility generator interconnection process. In cases where a significant number of proposed generation projects could affect a particular portion of the transmission grid, the interconnecting utility or the California ISO performs the interconnection study with the cluster of projects in order to identify the adverse impacts and mitigation measures to interconnect all the proposed projects. Thus staff does not expect the MEP would create any cumulative adverse impacts in the network.

Staff believes that there would be some positive impacts because the project as a local quick start peaking unit, would meet the increasing peak load demand of the PG&E system in the greater bay area and Alameda County and, provide additional reactive power and voltage support, and enhance reliability

ALTERNATIVE TRANSMISSION ROUTES

The applicant considered three alternate routes for the 230 kV interconnection overhead tie line of the project as follows:

- The Preferred option: About 0.75-mile line to the PG&E Kelso 230 kV substation. Alternate routes for this interconnection tie line would be longer with more environmental impacts than the preferred route.
- An approximately 1-mile line through Western Area Power (WAPA) Balancing Authority area to WAPA Tracy 230 kV substation.

- An approximately 1.1-mile line to the California Department of Water Resources (DWR) Delta substation at the Harvey O. Banks Delta pumping plant

Each of two interconnection alternates to WAPA and DWR substations would require longer tie lines with greater potential environmental impacts. Moreover, since the applicant has a power purchase contract with PG&E, neither of these alternatives would provide direct access to PG&E system, requiring additional studies and a contractual agreement with an intermediate agency. The applicant, therefore, preferred the direct 0.75-mile shortest line to nearest PG&E Kelso 230 kV substation. Staff considers the route acceptable (MEP 2009a, AFC, sections 6.5.1.2 & 6.5.2).

CONFORMANCE WITH LORS AND CEQA REVIEW

The proposed interconnection facilities for the MEP including the proposed switchyard, the generator tie line to the PG&E Kelso 230 kV substation and its termination would be adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

The California ISO Phase 2 group Study demonstrates that the addition of six transition cluster queue generation projects in the greater Bay Area with a total 1158.9 MW generation output including the 195.9 MW MEP would cause primarily significant overload impacts on the PG&E system. According to the project contribution to the overloads on the identified transmission lines, the California ISO concludes that the addition of the MEP would contribute to new overloads on four 230 kV transmission lines only and the MEP has cost responsibility for network upgrades to mitigate the overloads.

The mitigation options for which the MEP is responsible include re-rating of the Lone Tree-USWP JW Ranch and the USWP JW Ranch-Cayetona 230 kV lines, and reconductoring of the following two lines with higher size conductors:

- Kelso-USWP RLF 230 kV line (3.3 miles).
- USWP RLF-Tesla 230 kV line (4.7 miles).

A general environmental analysis of the reconductoring is included as Attachment A to this Transmission System Engineering (TSE) section, to meet the CEQA requirements.

The group mitigation plan is adequate to eliminate the overloads and a short circuit duty impact for reliable interconnection of the transition cluster group projects including the MEP, which are deliverable to the grid as Full capacity generation projects.

The MEP would meet the requirements and standards of all applicable LORS upon satisfactory compliance of the Conditions of Certifications.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE discipline have been received.

CONCLUSIONS AND RECOMMENDATIONS

1. The proposed interconnection facilities for the MEP including the proposed switchyard, the generator 230 kV tie line to the PG&E Kelso 230 kV substation and its termination at the Kelso substation would be built according to NESC standards and GO-95 Rules. The new facilities would be adequate in accordance with industry standards and good utility practices, and are acceptable to staff according to engineering LORS.

2. The Transition Cluster Phase 2 Interconnection Study (Phase 2 Group study) demonstrates that under 2013 summer peak system conditions the addition of six transition cluster queue generation projects in the greater bay area with a total 1,158.9 MW generation output including the 195.9 MW MEP would cause overloads impacts on the PG&E transmission system. The study identified mitigation options for the overloads, including reliability and delivery network upgrades, are adequate to eliminate the overloads. The group mitigation plan is acceptable to staff.

   The Phase 2 Group Study identifies the transmission impacts of the group and assigns cost responsibility to individual generators based on the contribution each generator makes to a specific transmission overload. Staff believes that if the Phase 2 Group Study assigns little or no cost responsibility for a particular overload and mitigation to a generator then the overload and required mitigation would not be considered a reasonably foreseeable consequence of the proposed generator. The California Independent System Operator (California ISO) concludes in the Phase 2 Group Study that the addition of the MEP would contribute to new overloads on four 230 kV transmission lines only and assigned the MEP a significant portion of the cost responsibility for network upgrades to mitigate the overloads. The mitigation options for which the MEP is responsible include re-rating of the Lone Tree-USWP JW Ranch and the USWP JW Ranch-Cayetona 230 kV lines, and reconductoring of the following two lines with higher size conductors:

   - Kelso-USWP RLF 230 kV line (3.3 miles).
   - USWP RLF-Tesla 230 kV line (4.7 miles).

   These two lines are immediately downstream of the proposed interconnection of the MEP and their reconductorings are considered as project impacts. A general environmental analysis of the reconductoring is included as Attachment A to this Transmission System Engineering (TSE) section, to meet the California Environmental Quality Act (CEQA) requirements.

3. The California ISO Deliverability Assessment concludes that the MEP and other cluster group projects, as Full Capacity generation projects, are deliverable to the California ISO grid with implementation of the network upgrades for reconductoring of the identified overloaded lines with higher size conductors, as included in the group mitigation plan.

4. The California ISO Operational studies for the MEP determines that in case the related upgrades are not in place in a timely manner to meet the project Commercial Operation Date (COD), congestion management and/or other operating procedures

used in the until the transmission upgrades are completed. The MEP would be treated as an Energy Only generation project during this time.

5. The project would meet the requirements and standards of all applicable LORS upon satisfactory compliance of the Conditions of Certifications.

6. The applicant has signed a power purchase agreement with PG&E for power supply during peak hours. The MEP as a local quick start peaking unit, would meet the increasing load demand in the Alameda County and PG&E greater bay area, provide additional reactive power and voltage support, enhance reliability and may reduce system losses in the PG&E local network.

RECOMMENDATIONS

If the Energy Commission approves the project, staff recommends the following Conditions of Certification to ensure system reliability and conformance with LORS.

CONDITIONS OF CERTIFICATIONS FOR TSE

TSE-1 The project owner shall furnish to the CPM and to the CBO a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in **Table 1: Major Equipment List** below). Additions and deletions shall be made to the table only with CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Table 1: Major Equipment List
Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer <u>and at least one of each</u> of the following to the project:

A. a civil engineer;

B. a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering;

C. a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or

D. a mechanical engineer.

(Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

<u>Verification:</u> At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of rough grading, the project owner shall submit to the CBO for review and approval, the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (1998 CBC, Chapter 1, Section 108.4, Approval Required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

A. receipt or delay of major electrical equipment;

B. testing or energization of major electrical equipment; and

C. the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction, and operation of the proposed transmission facilities will conform to all applicable LORS, and the requirements listed below. The project owner shall submit the required

number of copies of the design drawings and calculations, as determined by the CBO.

Once approved, the project owner shall inform the CPM and CBO of any anticipated changes to the design, and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil, and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC) and related industry standards.

b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

c) Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

d) The project conductors shall be sized to accommodate the full output of the project.

e) Termination facilities shall comply with applicable PG&E interconnection standards.

f) The project owner shall provide to the CPM:

   i) The Special Protection System (SPS) sequencing and timing if applicable,

   ii) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

   iii) A copy of the executed LGIA signed by the California ISO and the project owner.

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lesser number of days mutually agreed to by the project owner and CBO), the project owner shall submit to the CBO for approval:

a) Design drawings, specifications, and calculations conforming with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, CA ISO standards, National Electric Code (NEC) and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems, and major switchyard equipment;

b) For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation

method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or National Electric Safety Code (NESC); Title 8 of the California Code and Regulations (Title 8); Articles 35, 36 and 37 of the *High Voltage Electric Safety Orders*, California ISO standards, National Electric Code (NEC), and related industry standards;

c) Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in charge, a route map, and an engineering description of the equipment and configurations covered by requirements **TSE-5** a) through f);

d) The Special Protection System (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.

e) A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable, and

f) A copy of the executed LGIA signed by the California ISO and the project owner.

Prior to the construction of or start of modification of transmission facilities, the project owner shall inform the CBO and the CPM of any anticipated changes to the design that are different from the design previously submitted and approved and shall submit a detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change to the CPM and CBO for review and approval.

TSE-6 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-7 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or

[1] Worst-case conditions for the foundations would include for instance, a dead-end or angle pole.

NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

A. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

B. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

C. A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

REFERENCES

California ISO (California Independent System Operator) 1998a. California ISO Tariff Scheduling Protocol posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

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California ISO (California Independent System Operator) 2009a, Large Generator Interconnection Procedures, dated.

California ISO (California Independent System Operator) 2010b Transition Cluster Phase II Interconnection Study Greater Bay Area Group Interconnection Study Report Revision 1.0.

CEC 2009q: CEC/C. Hoffman. MEP Data Request set 1 (no.1-57). Submitted 2-12-09.

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CH2M 2009d: CH2M Hill/D.Urry. Transition Cluster Phase I Interconnection study. Submitted 9-8-09.

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CH2M 2010b: CH2M Hill/D.Urry. Data Response Set 1c. Submitted 2-12-10.

MEP 2009a: Mariposa Energy LLC/ B. Buchynsky. Application for Certification (AFC) for the MEP, dated 6-15-09. Submitted on 6-15-2009.

NERC (North American Electric Reliability Council) 2006. Reliability Standards for the Bulk Electric Systems of North America, May 2 2006.

WECC (Western Electricity Coordinating Council) 2006. NERC/WECC Planning Standards, August 2006.

DEFINITION OF TERMS

ACSR	Aluminum cable steel reinforced.
AAC	All Aluminum conductor.
ACSS	Aluminum conductor steel-supported.
Ampacity	Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.
Ampere	The unit of current flowing in a conductor.
Kiloampere (kA)	1,000 Amperes
Bundled	Two wires, 18 inches apart.
Bus	Conductors that serve as a common connection for two or more circuits.
Conductor	The part of the transmission line (the wire) that carries the current.
Congestion Management	Congestion management is a scheduling protocol, which provides that dispatched generation and transmission loading (imports) would not violate criteria.
Emergency	See Single Contingency. This is also called an L-1.

Overload

Hertz	The unit for System Frequency.
Kcmil or KCM	Thousand circular mil. A unit of the conductor's cross sectional area, when divided by 1,273, the area in square inches is obtained.
Kilovolt (kV)	A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground. 1,000 Volts.
Loop	An electrical cul de sac. A transmission configuration that interrupts an existing circuit, diverts it to another connection and returns it back to the interrupted circuit, thus forming a loop or cul de sac.
MVAR or Megavars	Megavolt Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.
Megavolt Ampere (MVA)	A unit of apparent power, equals the product of the line voltage in kilovolts, current in amperes, the square root of 3, and divided by 1000.
Megawatt (MW)	A unit of power equivalent to 1,341 horsepower.
Normal Operation/ Normal Overload	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
N-1 Condition	See Single Contingency.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.
Power Flow Analysis	A power flow analysis is a forward looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment and system voltage levels.
Reactive Power	Reactive power is generally associated with the reactive nature of inductive loads like motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.
Remedial Action Scheme (RAS)	A remedial action scheme is an automatic control provision, which, for instance, would trip a selected generating unit upon a circuit overload.

SSAC	Steel Supported Aluminum Conductor.
SF6	Sulfur hexafluoride is an insulating medium.
Single Contingency	Also known as emergency or N-1 condition, occurs when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.
Solid Dielectric Cable	Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.
SVC	Static VAR Compensator: An equipment made of Capacitors and Reactors with electronic controls for producing and controlling Reactive Power in the Power System.
Switchyard	A power plant switchyard (switchyard) is an integral part of a power plant and is used as an outlet for one or more electric generators.
Thermal rating	See ampacity.
TSE	Transmission System Engineering.
TRV	Transient Recovery Voltage
Tap	A transmission configuration creating an interconnection through a sort single circuit to a small or medium sized load or a generator. The new single circuit line is inserted into an existing circuit by utilizing breakers at existing terminals of the circuit, rather than installing breakers at the interconnection in a new switchyard.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
Underbuild	A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.
VAR	Voltage Ampere Reactive, a measure for Reactive power in the power system.

APPENDIX A

TRANSMISSION SYSTEM ENGINEERING
DOWNSTREAM IMPACTS
RECONDUCTORING ANALYSIS

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APPENDIX TO TRANSMISSION SYSTEM ENGINEERING RECONDUCTORING IMPACT ANALYSIS

Revised Testimony of Sarah Allred, Sara Keeler, Mark Hesters and Craig Hoffman

This section is revised testimony from the Staff Assessment published on November 8, 2010.

1.0 INTRODUCTION AND PURPOSE

Energy Commission staff has prepared this Transmission System Engineering Appendix to the Staff Assessment (SA) for the Mariposa Energy Project (MEP). This analysis discusses transmission system impacts beyond the first point of interconnection. This appendix examines the potential indirect impacts of future reconductoring of transmission lines that may be required as a result of the MEP.

The Energy Commission has the exclusive authority to certify the construction and operation of thermal electric power plants 50 megawatts (MW) or larger and associated facilities. The Energy Commission also has the licensing authority up to the first point of interconnection for transmission facilities. Additionally, under the California Environmental Quality Act, the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission. Therefore, the Energy Commission must identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and represent the "whole of the action."

The off-site downstream transmission facilities would be designed, built and operated by Pacific Gas and Electric (PG&E), and the California Public Utilities Commission (CPUC) would be the lead agency for permitting and licensing of these facilities. The MEP applicant has provided a project description for the Kelso-Tesla 230 kV line reconductoring. This CEQA analysis provides as detailed an analysis as possible with the information available for the project at this time. The downstream transmission facilities will be permitted by the CPUC and that agency will prepare the appropriate level environmental document necessary to license those facilities.

Prior to preparing and filing the Application for Certification (AFC) for the Mariposa Energy Project (09-AFC-03) with the California Energy Commission, Diamond Generating Corporation, parent company of Mariposa Energy, LLC, submitted an Interconnection request to the California Independent System Operator (CAISO) for interconnecting to the CAISO-controlled grid. The September 22, 2010 transition cluster Phase 2 Interconnection study (Phase 2 group study, CAISO 2010b) was prepared by the California ISO in coordination with PG&E. The study updates the July 28, 2009, transition cluster Phase 1 Interconnection study (CAISO 2010a) to account for withdrawal of Interconnection requests, identify final reliability network upgrades needed to interconnect the large generator facilities and assign cost responsibility for financing the proposed upgrades. The Phase 2 Group study demonstrates that under 2013 summer peak system conditions the addition of six transition cluster queue generation projects in the greater bay area with a total 1,158.9 MW generation output including the

195.9 MW MEP would cause overloads on the PG&E transmission system. The study identified mitigation options for the overloads, including reliability and delivery network upgrades, are adequate to eliminate the overloads. The mitigation options include reconductoring five transmission lines/line sections with a higher size conductor that may essentially double the transmission capacities of the lines.

However, according to the project contribution to the overloads on the transmission lines identified in the Phase 2 group study, the California ISO concludes that the addition of the MEP would contribute to new overloads on only four 230 kV transmission lines only and the MEP has cost responsibility for network upgrades to mitigate the overloads.

The MEP is found responsible for the following network upgrades

- Reconductor 3.3 miles of the Kelso - United States Wind Power Regional Linear Facility section of the Kelso-Tesla 230 kV line with 1113 Kcmil Aluminum Conductor Steel-Supported (ACSS) or equivalent.
- Reconductor 4.7 miles of the United States Wind Power Regional Linear Facility - Tesla section of the Kelso-Tesla 230 kV line with 1113 Kcmil ACSS or equivalent.

These two lines being immediately downstream of the proposed interconnection of the MEP, their reconductorings are considered as indirect project impacts and therefore, require a general environmental analysis to meet CEQA requirements as part of the "whole of action". The AFC included analysis of the potential environmental effects of the MEP up to the first point of interconnection with the electrical transmission system at the PG&E Kelso Substation.

The two transmission line segments are shown in **Appendix A Figures 1 and 2**. The reconductoring project would involve replacing the conductors on one or more transmission line segments with new conductors that would increase current-carrying capacity of the segment without increasing the weight or size of the cable. At this time, it is anticipated that reconductoring would not involve modifying any transmission line towers.

The purpose of Staff's reconductoring analysis is to inform the Energy Commission Committee, interested parties and the general public of the environmental and public health effects caused by the approval of the MEP. This analysis describes the process of reconductoring and the types of environmental impacts that might occur as a result of reconductoring. This study discusses some specific aspects of the Project, such as its location. Project-specific details regarding the locations of the pull and tensioning sites and staging areas, and the specific techniques that would be used for each span, however, would not be finalized until the reconductoring project is designed. The project, if implemented, could be accomplished with no significant environmental impacts, if appropriate mitigation measures are applied.

Finally, this analysis draws conclusions as to the likelihood that the reconductoring could be accomplished with no significant environmental impacts, and identifies minimization measures that could be enacted to ensure the reconductoring project would not cause significant impacts.

2.0 DESCRIPTION OF THE PROPOSED PROJECT

This appendix identifies the specific transmission line segments that will be reconductored, and provides an overview of the reconductoring process on a general level. It describes the basic work involved in reconductoring a transmission line segment, as well as specific designs (when known) for the reconductoring project that is a reasonably foreseeable result of the approval of the project.

2.1 PROJECT LOCATION

Construction of the MEP may require PG&E to reconductor two segments within their transmission system, as shown in Figures 1 and 2. The two segments are the Kelso–Tesla 230-kV line (Kelso–United States Wind Power Regional Line Facility), which is referred to as Transmission Line A, and is approximately 3.3 miles long, and the Kelso–Tesla 230-kV line (USWP RLF–Tesla), which is referred to as Transmission Line B, and is approximately 4.7 miles long. The total length of the lines to be reconductored is approximately 8 miles. The lines would be reconductored with 1113 ACSS or equivalent.

The Kelso-Tesla transmission line consists of a single 230-kV circuit with three conductors mounted on the existing lattice towers in the existing right-of-way. Segment A begins at the Kelso Substation, then travels west for approximately 200 feet to Bruns Road, continuing south for approximately 4,000 feet to Christensen Road, and then continues west along Christensen Road for approximately 6,000 feet. The line continues approximately 8,000 feet south to the USWP RLF Substation. Segment A then meets with Segment B, which continues cross country for 4.7 miles southeast to the Tesla Substation, crossing Interstate 580 (I-580). The project includes a total of 39 existing towers. Tower modifications and excavation work near the towers are not anticipated at this time.

The area surrounding the project corridor is primarily undeveloped, with few industrial structures located within 500 feet of the transmission line. The nearest residences are located approximately 1,500 feet from the project. The entire study area has been significantly disturbed by vegetation-management practices beneath the existing transmission line, construction of access roads, and onsite cattle grazing.

2.2 CONSTRUCTION METHODS

In general, reconductoring is accomplished by disconnecting the old conductor and using it like a rope to pull the new conductor through the temporary pulleys, called “travelers” or “sheave blocks,” that are mounted on each tower, until it reaches the other end. Workers would access each tower by truck, then climb the tower or use a truck-mounted aerial bucket to access the tower in order to place the temporary pulleys on each tower and route the conductor through the travelers. If the old conductor is not in good enough condition to be used to pull in the new line, it would be used to pull a carrier cable, or “sock line,” through the pulleys to the end of the segment to be replaced; the sock line would then be used to pull in the new conductors.

The work would involve setting up two work crews on each end of the segment that is being replaced. Each crew would consist of two tractor/trailer units, which either feed

out the new line or wind in the old line on spools mounted on the trailers, and two or three utility trucks carrying tools, other materials, and workers, for a total of six to eight trucks and about 20 workers. One crew would set up at a “pull site” near a tower at one end of the pull, and the other at a “tensioning site” near a tower at the other end of the pull. The tensioning crew would employ a special tensioner truck, which is essentially a large drum winch that is used to put back tension on the conductor being pulled. Each pull generally is limited to 2 to 3 miles.

The tensioning site crew would either climb or use a truck-mounted aerial bucket to access the tower, disconnect the old conductors, and attach them through the tensioner truck to the new conductor on spools on the large trucks. The pull site crew would also climb their tower, disconnect the conductors, and attach them to the spools in the large trucks below the tower. During this time, other crews would set up temporary structures across roads and other potentially inhabited areas to protect those areas in the unlikely event that a conductor breaks and falls to the ground.

Once all protective structures are in place and the pull and tensioning sites are ready, the pull crew would carefully wind the old conductors onto spools on the trucks, pulling the new conductors through the pulleys on the towers along the segment being replaced. The tensioning crew would keep the conductors taught, preventing them from sagging to the ground or other objects in the right-of-way. Once the new conductors are in place, the crews would access each tower, disconnect the new lines from the pulleys and install them permanently to the insulator strings.

The crews usually pull the new conductors through one or more miles of transmission towers at a time, depending on the length of conductor on the reels, and availability of suitable set-up locations. Because the potential for environmental impact is generally nonexistent between the pull and tensioning sites, this analysis focuses on examining potential effects at the pulling and tensioning sites, as well as other locations that could be disturbed by truck movement. Activities between the pull and tensioning sites are generally restricted to:

- Accessing the towers (either by climbing or using a truck-mounted aerial bucket) to place the pulleys and to remove the conductor from the pulleys and refasten it once stringing is completed; and
- Work on the tower structure to repair or replace spars that are damaged, or to replace insulators.

Although determining precisely where the pull and tensioning sites would be located is not possible, they would generally be sited at “angle” towers, which are located where the line makes a change in direction of more than 10 degrees. Pulling the old conductors and reeling out the new conductors is easier at these locations because the pulling and tensioning equipment can be arranged in line with the transmission line. Conversely, the crews try to avoid pulling the line through one or more angle towers because the conductors cannot be efficiently pulled through such an angle. Pulling and tensioning can also take place at “dead-end” sites, which are towers where the transmission line is physically connected to the tower rather than merely passing through the insulator clamps. In general, they are located where one spool of conductor is spliced to the next spool. Dead-end sites are generally located at angle towers, but

also can be located at towers that are in-line with the route, rather than at an angle to the route. Dead-end towers have significant structural strength and resist the forces of pulling.

The work crews would likely have a great deal of flexibility in choosing the locations of the pull and tension sites, as it may be possible to pull through the angles on some of these towers (less than 30 degrees). Because of the flexibility in locating work sites, crews can generally select sites that either avoid creating impacts altogether, or create less-than-significant impacts with certain mitigation measures enacted.

Throughout the reconductoring project, temporary staging areas would be required for equipment and materials storage. The reconductoring project would require two or three staging yards, each about one acre in size, located near each end of the transmission line segments. Although it is not known at this time where the stage areas would be located, it is likely they would be located at existing storage areas near or at the substations during the construction period.

Typical Mitigation Measures

Reasonable measures would be taken to reduce impacts to the environment. Vegetation clearing and trimming would be kept to the minimum necessary for safe construction, operation, and maintenance of the line. Dragging and whipping of conductors and sock lines would be avoided to further minimize vegetation and ground disturbance. Use of materials labeled as potential pollutants would be minimized to the extent practicable. Where possible, use of potential pollutants that could ooze, drip, flake, or crumble would be avoided in and around wetland areas.

3.0 ANALYSIS OF RECONDUCTORING

3.1 AIR QUALITY

The downstream reconductoring would require replacement of approximately 8 miles of transmission line. Reconductoring would require use of heavy-duty construction equipment and motor vehicles that would generate exhaust emissions and activity on unpaved surfaces causing fugitive dust emissions. Because the reconductoring activities would not require additional grading or the replacement of the existing transmission poles, the proposed reconductoring activities would not significantly increase the number of workers, the number of pieces of equipment, or the number of deliveries required for construction of MEP.

Reconductoring activities would generate temporary (short-term) emissions similar to those of the MEP construction phase. Exhaust emissions would occur from the operation of construction equipment and vehicles. Exhaust emissions would include carbon monoxide (CO), ozone precursors including nitrogen oxides (NOx) and volatile organic compounds (VOC), nitrogen dioxide (NO2), sulfur dioxide (SO2), fine particulate matter (PM2.5), and inhalable particles (PM10), including diesel particulate matter, a toxic air contaminant. Impacts from exhaust emissions from heavy-duty diesel-fueled

construction equipment can be reduced by using the newest available engines and other practices such as idle time restrictions and appropriate engine maintenance, similar to those recommended for the MEP construction phase.

The reconductoring emissions would likely comply with applicable LORS, and the emissions would not likely cause or contribute to a violation of the ambient air quality standards or otherwise result in a potential for a significant air quality impact. Therefore, the reconductoring activities would not be expected to result in air quality impacts greater than those analyzed in the staff assessment.

3.2 BIOLOGICAL RESOURCES

The biological resources analysis of the Kelso-Tesla 230-kV transmission line reconductoring project is based on the MEP applicant-provided biological resource information in the *Data Response Set 1D, Responses to CEC Staff Data Request 56* submitted March 31, 2010 (CH2M 2010g). The downstream transmission facilities will be permitted by the CPUC and that agency will prepare the appropriate environmental document necessary to license those facilities. Further biological surveys and analysis would be required to complete that environmental document.

Environmental Setting

Existing Vegetation and Wildlife

The applicant conducted a review of aerial photographs using Google Earth and a site visit on January 15, 2010, and a search of known or potential species occurrences using online database information. The online search included the California Natural Diversity Database, a species list provided by the Sacramento Fish and Wildlife office of U.S. Fish and Wildlife Service, and a search of the California Native Plant Society rare plant database.

Vegetation

California annual grassland

Annual grassland is the most common cover type within the study area. Introduced annual grasses are the dominant plant species in this habitat; characteristic species include wild oats (*Avena barbata*), soft chess (*Bromus hordeaceus*), ripgut brome (*Bromus diandrus*), red brome (*Bromus rubens*), and tall fescue (*Festuca arundinaceae*). Common forbs include broadleaf filaree (*Erodium botrys*), redstem filaree (*Erodium cicutarium*), turkey mullein (*Croton setigerus*), popcorn flower (*Plagiobothrys* sp.), and many others. California poppy (*Eschscholzia californica*), the State flower, is found in this habitat. Vernal pools, which occur in small depressions with a hardpan soil layer, are also found within this habitat (Mayer and Laudenslayer eds. 1988).

Freshwater marsh

Freshwater marshes occur where fresh water creates inundated or saturated soil conditions for most or all of the year. These marsh areas are typically composed of stands of perennial emergent plants such as cattail (*Typha* spp.), bulrush (*Scirpus* spp.), rush (*Juncus* spp.), and sedge (*Carex* spp.). Non-native emergents such as common

reed (*Arundo donax*) may also be present. Certain upland areas that are permanent wetlands may remain wet all year long and host a different plant cohort. Marsh wetlands may occur on the golf course property along a drainage channel. In addition, there is a wetland just outside the project corridor along Christensen Road.

Seasonal wetland

Seasonal wetlands are depression areas which may have wetland indicators of all three parameters (hydrophytic vegetation, hydric soils, and wetland hydrology) during the wetter portion of the growing season, but usually lack wetland indicators of hydrology and/or vegetation during the drier portion of the growing season (Environmental Laboratory 1987). These wetlands are found in many of the roadside ditches and irrigation ditches found within the Project corridor, and may be present in other drainage features along the entire corridor.

Cottonwood-willow riparian

Mixed riparian forest occurs along perennial or nearly perennial stream and other water bodies that provide subsurface irrigation even when the surface may be dry (Holland 1986). This habitat was formerly extensive, but is now reduced to scattered, isolated remnants or young stands because of flood control, water diversion, agricultural development, and urban expansion (Holland 1986). Typical species include willows (*Salix* sp.), Fremont cottonwood (*Populus fremontii*), and walnut (*Juglans* sp.). This riparian habitat occurs along Christensen Road just outside of the Project corridor.

Open water

The Project crosses the northernmost arm of the Bethany Reservoir, as well as the California Aqueduct. There are also numerous cattle stock ponds within and adjacent to the Project area.

Ruderal

Ruderal plant communities occur in areas of high disturbance, including along roadways, agricultural areas, canals, and other developments. Characteristic plants include species that thrive in disturbed areas, such as annual grasses and weedy herbs.

Urban/Developed/Landscaped

There are intermittent areas of developed land along the Project corridor, including substations, some commercial development, residential development, and some areas of landscaping that consist of non-native trees.

Special-Status Species

Special-status species include those listed as threatened or endangered under the federal or state endangered species acts, species proposed for listing, California species of concern, and other species that have been identified by the U.S. Fish and Wildlife Service (USFWS), and/or California Department of Fish and Game (CDFG) as unique or rare, as well as species included on the California Native Plant Society's (CNPS) list of rare, threatened, or endangered plants in California. **Table 1** identifies the special-status species that could potentially occur within the Project corridor.

Comprehensive biological surveys, including protocol-level surveys for burrowing owl, wetland delineation, and rare plant surveys have not yet been conducted, and would need to be conducted in order to complete an environmental analysis pursuant to CEQA. The results for potential occurrence have been provided by the MEP applicant (CH2M 2010g). It is likely that additional species will be considered as a part of the CEQA -level environmental analysis for this project.

Table 2
Special-status Species Potentially Occurring in the MEP Study Area

Scientific Name	Status	Habitat
Plants		
Allium sharsmithiae Sharsmith's onion	G2, S2.3 List 1B.3	In Cismontane woodland on rocky, serpentine slopes. 1300-4000 ft. Blooms March – May.
Amsinckia grandiflora large-flowered fiddleneck	FE, SE, G1, S1.1, List 1B.1	Cismontane woodland, Valley and foothill grassland. Blooms April – May.
Amsinckia lunaris bent-flowered fiddleneck	G2, S2.2, List 1B.2	Cismontane woodland, Valley and foothill grassland. Openly wooded or somewhat shaded slopes in the hills, 200 to 1500 feet, San Francisco Bay region; open woods. Blooms March – June.
Anomobryum julaceum slender silver moss	G4G5, S2, List 2.2	Broadleaved upland forest, Lower montane coniferous forest, North coast coniferous forest. Moss grows on damp rocks and soil, usually seen on road cuts. 328-3280 ft.
Arctostaphylos auriculata Mt. Diablo Manzanita	G2, S2.2, List 1B.3	Chaparral, Cismontane woodland. Mount Diablo manzanita is endemic to Contra Costa County, where it occurs only on Mount Diablo and in the adjacent foothills. It is found between 700 and 1,860 feet above sea level. Blooms January – March.
Astragalus tener var. tener alkali milk-vetch	G1T1, S1.1, List 1B.2	Alkali playa, Valley and foothill grassland, Vernal pool, Wetland; Alkali sink, Freshwater wetlands, Wetland-riparian; Habitat includes Playas, Vernal-pools; usually occurs in Wetlands, but occasionally found in non wetlands. Blooms March – June.
Atriplex cordulata heartscale	G2?, S2.2?, List 1B.2	Chenopod scrub, Meadow and seep, Valley and foothill grassland. Blooms April – October.
Atriplex depressa brittlescale	G2Q, S2.2, List 1B.2	Alkali playa, Chenopod scrub, Meadow and seep, Valley and foothill grassland, Vernal pool, Wetland. Blooms April – October.
Atriplex joaquiniana San Joaquin spearscale	G2, S2, List 1B.2	Chenopod scrub, Meadow and seep, Valley and foothill grassland. Blooms April – October.
Balsamorhiza macrolepis var. macrolepis big-scale balsamroot	G3G4T2, S2.2, List 1B.2	Cismontane woodland, Ultramafic, Valley and foothill grassland. Blooms March – June.
Blepharizonia plumosa big tarplant	G1, S1.1, List 1B.1	Valley and foothill grassland. Blooms July – October.
California macrophylla (=*Erodium macrophyllum*) Round-leaved filaree	G2, S2, List 1B.1	Cismontane woodland, Valley and foothill grassland; friable clay soils. Blooms March – May.
Calochortus pulchellus Mt. Diablo Fairy-Lantern	G2, S2.1, 1B.2	Chaparral, Cismontane woodland, Riparian woodland, Valley and foothill grassland. Blooms April – June.
Campanula exigua chaparral harebell	G2, S2.2, List 1B.2	Rocky sites in Chaparral, usually on serpentine. 902-4100 ft. Blooms May – June.
Carex comosa bristly sedge	G5, S2?, List 2.1	Freshwater marsh, Marsh and swamp, Wetland. Blooms May – September.

Scientific Name	Status	Habitat
Carex vulpinoidea brown fox sedge	G5, S2.2, List 2.2	Marshes and swamps, Riparian woodland. Blooms May – June.
Caulanthus coulteri var. lemmonii Lemmon's jewel-flower	G4T2, S2.2, List 1B.2	Pinon and juniper woodlands, Valley and foothill grassland; dry, exposed slopes. Blooms March – May.
Centromadia parryi ssp. congdonii Congdon's tarplant	G4T3, S3.2, List 1B.2	Valley and foothill grassland. Blooms May – October (November).
Cirsium crassicaule slough thistle	G2, S2.2, List 1B.1	Chenopod scrub, Marshes and swamps, Riparian scrub. 10-328 ft. Blooms May – August.
Cirsium fontinale var. campylon Mt. Hamilton fountain thistle	G2T2, S2.2 , List 1B.2	Cismontane woodland, Chaparral, Valley and foothill grassland, in Seasonal and perennial drainages on serpentine. 311-2920 ft. Blooms April – October.
Clarkia concinna ssp. automixa Santa Clara red riboons	G5?T3, S3.3, List 4.3	Cismontane woodland, chaparral, on slopes and near drainages. 295-3182 ft. Blooms May – June.
Cordylanthus mollis ssp. hispidus hispid bird's-beak	G2T2, S2.1, List 1B.1	Alkali playa, Meadow and seep, Wetland. Blooms June – September.
Cordylanthus palmatus palmate-bracted bird's-beak	FE, SE, G1, S1.1, List 1B.1	Chenopod scrub, Meadow and seep, Valley and foothill grassland, Wetland. Blooms May – October.
Coreopsis hamiltonii Mt. Hamilton coreopsis	G2, S2.2, List 1B	Cismontane woodland, on steep shale talus with open southwestern exposure. 1739-4265 ft Blooms March – May.
Cryptantha hooveri Hoover's Cryptantha	GH/SH, List 1A	Valley and foothill grassland in coarse sand. 0-492 ft. Blooms April – May.
Deinandra bacigalupii Livermore tarplant	G1, S1.2, List 1B.2	Meadow and seep. Blooms June – October.
Delphinium californicum ssp. interius Hospital Canyon larkspur	G3T2?, S2?, List 1B.2	Chaparral, Cismontane woodland, Meadow and seep. Blooms April – June.
Delphinium recurvatum recurved larkspur	G2, S2.2, List 1B.2	Chenopod scrub, Cismontane woodland, Valley and foothill grassland. Blooms March – June.
Eriogonun nudum var. decurrens Ben Lomond buckwheat	G5T2, S2.1, List 1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest. On sandy soils, also in maritime ponderosa pine sand hills. 164-2625 ft. Blooms June – October.
Eriogonum truncatum Mt. Diablo buckwheat	G1, S1.1, List 1B.1	Chaparral, coastal scrub, Valley and foothill grassland on dry, exposed clay or sandy substrates. 328-2000 ft. Blooms April – September.
Eryngium racemosum Delta button-celery	SE, G2Q, S2.1, List 1B.1	Riparian scrub, Wetland. Blooms June – October.
Eschscholzia rhombipetala diamond-petaled California poppy	G1, S1.1, List 1B.1	Valley and foothill grassland. Blooms March – April.
Fritillaria agrestis stinkbells	G3, S3.2, List 4.2	Chaparral, Cismontane woodland, Ultramafic soils, Valley and foothill grassland. Blooms March – June.
Fritillaria falcate Talus fritillary	G5T2, S2.1, List 1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest on shale, granite, or serpentine talus. 984-5000 ft. Blooms March – May.
Helianthella castanea Diablo helianthella	G3, S3.2, List 1B.2	Broadleaved upland forest, Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland. Blooms March – June.

Scientific Name	Status	Habitat
Hesperolinon breweri Brewer's Dwarf Flax	G2, S2.2, List 1B.2	Chaparral, Cismontane woodland, Ultramafic, Valley and foothill grassland; dry hill or canyon sides, grassy open areas amongst oaks or brush, 400 to 1700 feet. Blooms May – July.
Hesperolinon sp. nov. "serpentinum" Napa western flax	G2, S2.1, List 1B.1	Chaparral, predominantly serpentine chaparral. 164-2625 ft. Blooms May – July.
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	G4, S2.2, List 2.2	Freshwater marsh, Marsh and swamp, Wetland. Moist, freshwater-soaked river banks and low peat islands in sloughs. In California, known from the delta watershed, 0 - 500 feet. Blooms June – September.
Lasthenia conjugens Contra Costa goldfields	FE, G1, S1.1, List 1B.1	Cismontane woodland, Valley and foothill grassland, Vernal pool, Wetland. Blooms March – June.
Lathyrus jepsonii var. jepsonii Delta tule pea	G5T2, S2.2, List 1B.2	Freshwater marsh, Marsh and swamp, Wetland. Blooms May – July (September).
Legenere limosa Legenere	G2/S2.2, List 1B	In beds of vernal pools. 3-2887 ft. Blooms April – June.
Lilaeopsis masonii Mason's lilaeopsis	Rare, G3, S3.1, List 1B.1	Freshwater marsh, Marsh and swamp, Riparian scrub, Wetland. Blooms April – November.
Limosella subulata Delta mudwort	G4?Q, S2.1, List 2.1	Brackish marsh, Freshwater marsh, Marsh and swamp, Riparian scrub, Wetland. Blooms May – August.
Madia radiata showy golden madia	G2, S2.1, List 1B.1	Chenopod scrub, Cismontane woodland, Valley and foothill grassland. Blooms March – May.
Malacothamnus hallii Hall's bush-mallow	G1Q, S1.2, List 1B.2	Chaparral, some populations on serpentine. 33-2493 ft. Blooms May – September.
Micropus amphiboles Mt. Diablo cottonweed	G3, S3.2?, List 3.2	Broadleafed upland forest, Chaparral, Cismontane woodland, Valley and foothill grassland. 147-2707 ft. Blooms March – May.
Myosurus minimus ssp. apus little mousetail	G5T2Q, S2.2, List 3.1	Vernal pools. Alkaline soils. 60 to 2100 feet. Blooms March – June.
Phacelia phacelioides Mt. Diablo phacelia	G1, S1.2, List 1B.2	Chaparral, cismontane woodland. Adjacent to trails, on rock outcrops and talus slopes, sometimes on serpentine. 1640-4494 ft. Blooms April – May.
Plagiobothrys glaber hairless popcorn-flower	GH, SH, List 1A	Marsh and swamp, Salt marsh, Vernal pool, Wetland. Blooms March – May.
Sagittaria sanfordii Sanford's arrowhead	G3, S3.2, List 1B.2	Marshes and swamps in standing or slow-moving freshwater ponds, marshes, and ditches. 0-2133 ft. Blooms May – October.
Scutellaria galericulata marsh skullcap	G5, S2.2?, List 2.2	Lower montane coniferous forest, Marsh and swamp, Meadow and seep, Wetland. Blooms June – September.
Senecio aphanactis chaparral ragwort	G3?, S1.2, List 2.2	Cismontane woodland, Coastal scrub. Blooms January – April.
Streptanthus albidus ssp. peramoenus most beautiful jewel-flower	G2T2, S2.2, List 1B.2	Chaparral, Valley and foothill grassland, Cismontane woodland. 308-3280 ft. Blooms April – September.
Symphyotrichum lentum Suisun Marsh aster	G2, S2, List 1B.2	Brackish marsh, Freshwater marsh, Marsh and swamp, Wetland. Blooms May – November.
Trichocoronis wrightii var. wrightii Wright's trichocoronis	G4T3, S1.1, List 2.1	Marshes and swamps, Riparian forest, Meadows and seeps, Vernal pools. 16-1427 ft. Blooms May – September

Scientific Name	Status	Habitat
Trifolium depauperatum var. hydrophilum saline clover	G5T2?, S2.2?, List 1B.2	Marsh and swamp, Valley and foothill grassland, Vernal pool, Wetland. Blooms April – June.
Tropidocarpum capparideum caper fruited tropidocarpum	G1, S1.1, List 1B.1	Valley and foothill grassland. Blooms March – April.
Viburnum ellipticum Oval-leaved viburnum	G5, S2.3, List 2.3	Chaparral, Cismontane woodland, Lower montane coniferous forest. 705-4600 ft. Blooms May – June.
Reptiles and Amphibians		
Actinemys marmorata western pond turtle	CSC	Aquatic, Artificial flowing waters, Klamath/North coast flowing waters, Klamath/North coast standing waters, Marsh and swamp, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Ambystoma californiense California tiger salamander	FT, SE, CSC	Cismontane woodland, Meadow and seep, Riparian woodland, Valley and foothill grassland, Vernal pool, Wetland
Anniella pulchra pulchra silvery legless lizard	CSC	Chaparral, Coastal dunes, Coastal scrub
Masticophis flagellum ruddocki San Joaquin whipsnake	CSC	Chenopod scrub, Valley and foothill grassland
Masticophis lateralis euryxanthus Alameda whipsnake	FT, ST	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland
Phrynosoma blainvillii coast horned lizard	CSC	Chaparral, Cismontane woodland, Coastal bluff scrub, Coastal scrub, Desert wash, Pinon and juniper woodlands, Riparian scrub, Riparian woodland, Valley and foothill grassland
Rana boylii foothill yellow-legged frog	CSC	Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow and seep, Riparian forest, Riparian woodland, Sacramento/San Joaquin flowing waters
Rana draytonii California red-legged frog	FT, CSC	Aquatic, Artificial flowing waters, Artificial standing waters, Freshwater marsh, Marsh and swamp, Riparian forest, Riparian scrub, Riparian woodland, Sacramento/San Joaquin flowing waters, Sacramento/San Joaquin standing waters, South coast flowing waters, South coast standing waters, Wetland
Spea hammondii western spadefoot	CSC	Cismontane woodland, Coastal scrub, Valley and foothill grassland, Vernal pool, Wetland - requires sandy/gravely soils.
Thamnophis gigas giant garter snake	FT	Marsh and swamp, Riparian scrub, Wetland
Mammals		
Antrozous pallidus pallid bat	CSC, WBWG-H	Chaparral, Coastal scrub, Desert wash, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Riparian woodland, Sonoran desert scrub, Upper montane coniferous forest, Valley and foothill grassland

Scientific Name	Status	Habitat
Corynorhinus townsendii townsendii Townsend's big-eared bat	CSC	Broadleaved upland forest, Chaparral, Chenopod scrub, Great Basin grassland, Great Basin scrub, Joshua tree woodland, Lower montane coniferous forest, Meadow and seep, Mojavean desert scrub, Riparian forest, Riparian woodland, Sonoran desert scrub, Sonoran thorn woodland, Upper montane coniferous forest, Valley and foothill grassland
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	--	Open grassy hilltops and open spaces in chaparral and blue oak/digger pine woodlands. Needs fine, deep, well-drained soil for burrowing.
Eumops perotis californicus western mastiff bat	CSC, WBWG-H	Chaparral, Cismontane woodland, Coastal scrub, Valley and foothill grassland
Lasiurus blossevillii western red bat	CSC, WBWG-H	Prefers habitat mosaics and edges, roosting in trees protected from above and open below.
Lasiurus cinereus hoary bat	WBWG-M	Broadleaved upland forest, Cismontane woodland, Lower montane coniferous forest, North coast coniferous forest
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	CSC	Forest habitats of moderate canopy and moderate to dense understory. Constructs nests of shredded grass, leaves, and other material.
Perognathus inornatus inornatus San Joaquin pocket mouse	--	Coastal scrub, Valley and foothill grassland. Hawbecker (1951) found that the San Joaquin pocket mouse occurred on shrubby ridge tops and hillsides. Grinnell (1933) characterized the habitat as being open, sandy areas with grasses and forbs. (Zeiner et. al. 1988-1990, updated date unk.)
Sylvilagus bachmani riparius riparian brush rabbit	FE	Riparian forest. *S. b. riparius* is found only at Caswell Memorial State Park on the Stanislaus River, San Joaquin Co. (Zeiner et al. 1988-1990, updated May 2000).
Taxidea taxus American badger	CSC	Alkali marsh, Alkali playa, Alpine, Alpine dwarf scrub, Bog and fen, Brackish marsh, Broadleaved upland forest, Chaparral, Chenopod scrub, Cismontane woodland, Closed-cone coniferous forest, Coastal bluff scrub, Coastal dunes, Coastal prairie, Coastal scrub, Desert dunes, Desert wash, Freshwater marsh, Great Basin grassland, Great Basin scrub, Interior dunes, Ione formation, Joshua tree woodland, Limestone, Lower montane coniferous forest, Marsh and swamp, Meadow and seep, Mojavean desert scrub, Montane dwarf scrub, North coast coniferous forest, Oldgrowth, Pavement plain, Redwood, Riparian forest, Riparian scrub, Riparian woodland, Salt marsh, Sonoran desert scrub, Sonoran thorn woodland, Ultramafic, Upper montane coniferous forest, Upper Sonoran scrub, Valley and foothill grassland.
Vulpes macrotis mutica San Joaquin kit fox	FE, ST	Chenopod scrub, Valley and foothill grassland
Birds		
Accipiter cooperii Cooper's hawk	CSC	Open, interrupted, or marginal woodland. Nests in riparian areas of deciduous trees and live oaks.
Accipiter striatus Sharp-shinned hawk	CSC	Ponderosa pine, black oak, riparian deciduous, mixed conifer, and Jeffrey pine habitats, preferably riparian. Northfacing slopes with plucking perches are critical. Usually nests within 275 ft of water.

Scientific Name	Status	Habitat
Agelaius tricolor tricolored blackbird	CSC, USFWS-BCC	Freshwater marsh, Marsh and swamp, Swamp, Wetland
Aquila chrysaetos golden eagle	CFP, USFWS-BCC	Broadleaved upland forest, Cismontane woodland, Coastal prairie, Great Basin grassland, Great Basin scrub, Lower montane coniferous forest, Pinon and juniper woodlands, Upper montane coniferous forest, Valley and foothill grassland
Ardea herodias great blue heron (rookery site)	--	Brackish marsh, Estuary, Freshwater marsh, Marsh and swamp, Riparian forest, Wetland
Asio flammeus Short-eared owl (Nesting)	CSC	Usually found in open areas with few trees such as annual and perennial grasslands, prairies, dunes, wetlands, and irrigated lands.
Athene cunicularia burrowing owl	CSC, USFWS-BCC	Coastal prairie, Coastal scrub, Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley and foothill grassland
Buteo regalis ferruginous hawk	USFWS-BCC	Great Basin grassland, Great Basin scrub, Pinon and juniper woodlands, Valley and foothill grassland
Buteo swainsoni Swainson's hawk	ST, USFWS-BCC	Great Basin grassland, Riparian forest, Riparian woodland, Valley and foothill grassland
Circus cyaneus northern harrier	CSC	Coastal scrub, Great Basin grassland, Marsh and swamp, Riparian scrub, Valley and foothill grassland, Wetland
Elanus leucurus white-tailed kite	CFP	Cismontane woodland, Marsh and swamp, Riparian woodland, Valley and foothill grassland, Wetland
Eremophila alpestris actia California horned lark	--	Variety of open habitat where trees and large shrubs are present.
Falco mexicanus prairie falcon	USFWS-BCC	Great Basin grassland, Great Basin scrub, Mojavean desert scrub, Sonoran desert scrub, Valley and foothill grassland
Falco peregrines anatum peregrine falcon	FD, SE, CFP	Near water, on cliffs, banks, dunes, mounds, or human architecture. Nest is a scrape in a depression or a ledge in an open site.
Haliaeetus leucocephalus bald eagle	FD, SE, CFP	Ocean shore, lake margins, and rivers for both nesting and wintering. Nests within one mile of water in large, open-branched live trees.
Lanius ludovicianus loggerhead shrike	CSC, USFWS-BCC	Broadleaved upland forest, Desert wash, Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodlands, Riparian woodland, Sonoran desert scrub
Laterallus jamaicensis coturniculus California black rail	CT, CFP, USFWS-BCC	Brackish marsh, Freshwater marsh, Marsh and swamp, Salt marsh, Wetland
Xanthocephalus xanthocephalus Yellow-headed blackbird	CSC	Dense emergent wetland of cattails, tules, and other wetland plants, often along border of lake or pond.
Invertebrates		
Branchinecta conservatio Conservancy fairy shrimp	FE	Large, cool-water vernal pools with moderately turbid water.
Branchinecta longiantenna longhorn fairy shrimp	FE	Vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats.
Branchinecta lynchi vernal pool fairy shrimp	FT	Valley and foothill grassland, Vernal pool, Wetland

Scientific Name	Status	Habitat
Branchinecta mesovallensis midvalley fairy shrimp	--	Vernal pools, ephemeral alkali pools, seasonal drainages, stock ponds, vernal swales and rock outcrops.
Desmocerus californicus dimorphus valley elderberry longhorn beetle	FT	Riparian scrub
Euphydryas editha bayensis Bay checkerspot butterfly	FT	Found on shallow, serpentine-derived soils along the spine of the San Francisco peninsula, now restricted to San Mateo and Santa Clara counties.
Helminthoglypta nickliana bridgesi Bridges' coast range shoulderband (snail)	--	Inhabits open hillsides of Alameda and Contra Costa counties. Tends to colonize under tall grasses and weeds.
Hygrotus curvipes curved-foot hygrotus diving beetle	--	Aquatic
Lepidurus packardi vernal pool tadpole shrimp	FE	Typically larger playa pools or vernal pool complexes.
Linderiella occidentalis California linderiella	--	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity and total dissolved solids.
Fishes		
Acipenser medirostris green sturgeon	FT	Aquatic, Klamath/North coast flowing waters, Sacramento/San Joaquin flowing waters
Hypomesus transpacificus delta smelt	FT	Aquatic, Estuary
Oncorhynchus mykiss steelhead (Coastal, Central Valley)	FT	Aquatic
Oncorhynchus tshawytscha Central Valley spring-run, winter-run chinook salmon	FT (spring run) FE (winter run)	Aquatic, Sacramento/San Joaquin flowing waters

Sources: (CNDDB 2010, USFWS 2010, CDFG 2009, CDFG 2010, CH2M 2010g)

"—" on CDFG's Special Animals List (CDFG 2009) but without other status tracked in this table.

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.
CFP = California Fully Protected
SE = State-listed as Endangered
ST = State-listed as Threatened
SCE = State candidate for listing as Endangered
Rare = State listed as rare
WL = State watch list

Western Bat Working Group
WBWG-H = High Priority are imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats.
WBWG-M = Medium Priority medium risk of imperilment based on available information on distribution, status, ecology and known threats.

California Native Plant Society (Plants only)
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)

Global Rank/State Rank (Included for plants only**)**

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.
Q = Questionable taxonomy that may reduce conservation priority.
H = Possibly extinct
? = Inexact numeric rank

Threat Rank
T/ .1 = very threatened
T/.2 = threatened
T/.3 = no current threats known

Potential Impacts of Proposed Downstream Upgrades

The potential impact analysis has been provided by the MEP applicant (CH2M 2010g). Further surveys and impact analysis would need to be conducted as part of the CPUC environmental analysis prior to licensing this project.

While excavation is not expected, reconductoring would require construction equipment access, potentially across drainages and through special-status species habitat. In addition, construction of this project would require temporary staging areas for equipment and materials. These activities could affect habitat and biological resources in the project corridor.

Potential Impacts to Special-Status Plant Species

Rare plant surveys during the appropriate blooming period would be required to identify the distribution of potentially affected special-status plants. If present on the Project site or in the vicinity, direct and indirect impacts could occur from Project construction. Direct impacts could occur if plants are crushed by construction equipment or foot traffic, or if they are present in the staging and laydown area. Indirect impacts could occur to species associated with wetlands or drainages, if drainages are affected during project construction. In addition, ground-disturbing activities have the potential to indirectly affect adjacent vegetation communities by facilitating the transport and dispersal of invasive weed propagules, thereby potentially introducing new weeds and exacerbating invasions already present in the project vicinity.

Special-status plant surveys would be required in order for the licensing agency CPUC to complete environmental review. If special-status plants are found to occur within the project area and cannot be avoided, then consultation with the appropriate agency (CDFG and/or USFWS) would be needed to identify appropriate mitigation measures.

Potential Impacts to Special-Status Wildlife Species

There is potential for several special-status wildlife species to occur in the project corridor, including vernal pool fairy shrimp, California tiger salamander, California red-legged frog, tricolored blackbird, golden eagle, western burrowing owl, Swainson's hawk, and San Joaquin kit fox. In addition, breeding birds protected under the Migratory Bird Treaty Act are likely to be present within the proposed Project area. Protocol-level or other focused surveys must be completed to identify the distribution of potentially affected special-status wildlife. This project is within California red-legged frog critical habitat (Critical Habitat Unit CCS-2).

Potential impacts to special-status wildlife include direct mortality from encounters with construction equipment, burrow/nest destruction during equipment staging, entombing adults, eggs, or young, and disruption or harassment. In addition, short and long-term habitat loss, modification, and fragmentation, as well as the potential spread of noxious weeds could decrease local and regional wildlife habitat values.

Consultation with resource agencies (USFWS and CDFG) would be required to identify appropriate impact avoidance, minimization, and mitigation measures and ensure compliance with the federal and California endangered species acts.

Impacts to Sensitive Habitats

Direct impacts to waters potentially under the jurisdiction of the U.S. Army Corps of Engineers (USACE), the state, or both could occur if construction equipment is staged on or crosses Project area drainages. The drainages that occur within the Project area may be regulated by the CDFG under Fish and Game Code section 1600, the Regional Water Quality Control Board, and potentially the USACE and the state and federal clean water acts. A wetland delineation would provide information to further assess potential impacts to jurisdictional wetlands and waters. If warranted, acquisition of a Lake and Streambed Alteration Agreement (section 1602 permit), Water Quality Certification (section 401 permit), and USACE section 404 permit and implementation of the measures within these permits and agreements would ensure that potential impacts to sensitive habitats are mitigated and compliance with applicable Laws, Ordinances, Regulations, and Standards (LORS) is achieved.

Required Permits and Authorizations

Based on the biological resources known or potentially present in the Project area, at a minimum the following authorizations and/or permits may be required:

- Federal ESA Consultation for Biological Opinion or determination of "no effect";
- Preconstruction Notification for Nationwide Permit;
- Section 401 Water Quality Certificate and Porter-Cologne waste discharge requirements;
- 1602 Streambed Alteration Agreement, and;
- California ESA 2081 Incidental Take Permit or Consistency Determination.

Impact Minimization Measures

Agency consultation would identify appropriate measures to avoid, minimize, and mitigate potential impacts to species listed under the federal and/or California endangered species acts (e.g., California red-legged frog, California tiger salamander, Swainson's hawk, vernal pool fairy shrimp) and sensitive habitats (e.g., jurisdictional waters), as described above. If special-status species or sensitive habitats are identified within the Project area, limited construction periods, no-disturbance buffers, passive relocation, artificial burrow construction, revegetation plans, and habitat compensation may be required to avoid, minimize, or mitigate impacts to special-status species and sensitive habitats.

To minimize impacts to nesting birds, pre-construction surveys would need to be conducted and no-disturbance buffers established if project activities occur during the nesting season (typically February 1 through August 30). At all times of the year, noise generating activities should be limited during early morning and evening to avoid impacts to birds protected under the Migratory Bird Treaty Act.

In addition, standard measures and best management practices recommended to minimize impacts to biological resources include but are not limited to:

- Preconstruction special-status species surveys
- Onsite biological monitor
- Equipment Fueling, Maintenance and Staging Controls
- Minimal Ground Disturbance and Revegetation
- Establish Environmentally Sensitive Areas
- Sediment Control
- Worker Environmental Awareness Training
- Construction Activities Conducted during Dry Summer Months
- Trash and Debris Control
- Pet Control

Conclusion

The potential impacts to sensitive biological resources from the proposed project may be reduced through careful planning of the construction schedule and placement of temporary work areas. Surveys would be required to identify sensitive habitats and special-status species; the discrete work areas along the transmission line corridor may then be specifically sited to avoid local sensitive biological resources to the maximum extent practicable.

Biological surveys, including protocol-level burrowing owl surveys, rare plant surveys, and wetland delineation, are required before the licensing agency CPUC can complete the environmental review. Both federally- and state-listed species are expected to occur and jurisdictional waters may occur. Consultation with appropriate agencies will be required to acquire the appropriate permits and authorizations, and to determine appropriate impact avoidance, minimization, and mitigation requirements.

3.3 CULTURAL RESOURCES

Environmental Setting

The proposed reconductor project corridor and its immediate vicinity is primarily undeveloped land with few industrial structures located within 500 feet of the transmission line. There are two residences close to the 200-foot transmission line utility corridor; one approximately 225 feet from the transmission line (north of Altamont Pass Road) and the other approximately 300 feet from the transmission line (north of Christensen Road). The residence near Altamont Pass Road is adjacent to the property that appears to once have been a golf course and also a small substation. The residence near Christensen Road appears to be associated with the adjacent dairy. The residence is buffered by mature landscaping between the house and Christensen Road. The entire proposed project area has been previously disturbed by the initial construction of the transmission line, by vegetation-management practices beneath the existing transmission line, by the construction of access roads within the transmission line right-of-way, and by onsite cattle grazing/agriculture (CH2M 2010g, p. 2-1).

If cultural resources, including structures, are more than 45 years old, and might be affected by the project, the cultural resources would need to be evaluated for eligibility for listing on the California Register of Historical Resources (CRHR) and the National Register of Historic Places (NRHP). As part of the effort to identify cultural resources within the proposed project area, CH2M HILL commissioned a literature search from the staff of the Northwest Information Center (NWIC) of the California Historical Resources Information System (CHRIS) in November 2009 (CH2M 2010g, Appendix B, pp. 1–3). In accordance with the California Energy Commission's *Rules of Practice and Procedure & Power Plant Site Certification Regulations* for assessing potential impacts to archaeological and architectural resources, the literature search area was defined by a one-quarter mile buffer zone on either side of the transmission line facility (half-mile-wide corridor in total). The literature research at the NWIC included a review of all previously recorded archaeological sites and historic architectural resources, as well as all known cultural resource survey and excavation reports, within the designated search area. In addition, the NRHP, the CRHR, the California Historical Landmarks, the California Points of Historical Interest, and assorted historic maps were also consulted as part of the literature and records review. The literature search identified one previously recorded cultural resource, the historic Pittsburg-Tesla Transmission Line (P-01-010947/P-07-002956), within the project corridor. In addition, three other cultural resources were identified within the one-quarter mile buffer zone, but outside of the proposed reconductor project area, including: a historic ranch complex with associated ranch debris (P-01-000163); the historic Vaca Dixon-Tesla and Table Mountain-Tesla

transmission lines (P-01-010499); and the historic Midway Road segment (P-01-010614). The literature research identified no prehistoric or historic-era archaeological resources within the search area.

CH2M HILL's cultural resource staff conducted a pedestrian archaeological survey of the proposed MEP transmission line reconductor project area over the period of January 18 – 20, 2010. The archaeological survey area consisted of a 200-foot-wide corridor centered on the eight-mile-long proposed reconductor route. The majority of the project area provided good to excellent (70 – 100%) ground visibility with the exception of the northernmost half-mile (just north and south of Kelso Road), which was populated by 18 – 24-inch-high grasses. Previous ground disturbances noted within the survey area include disturbances related to the initial construction of the existing transmission line, cattle grazing, and intensive agricultural activities. In addition, CH2M HILL observed heavy ground disturbances in connection with a decommissioned golf course that lies in the southern half of the project area and extends from just north of Altamont Road to a point roughly 0.6-miles northwest along the transmission line route (CH2M 2010g, Appendix B, pp. 1–3).

No new historic or prehistoric cultural resources were identified as a result of the pedestrian field survey. One previously identified resource, the Pittsburg-Tesla Transmission Line (P-01-010947/P-07-002956), was observed during the survey. This resource was previously recorded and evaluated in 2008 and was recommended not eligible for either the NRHP or the CRHR. CH2M HILL reviewed the existing documentation for the Pittsburg-Tesla Transmission Line, examined the resource during the field inventory, and is in agreement with the original recommendation that the Pittsburg-Tesla Transmission Line is not eligible for the NRHP or the CRHR. Staff also concurs with this assessment. CH2M HILL carefully examined the portion of the reconductor study area in closest proximity to previously recorded site P-01-000163 (historic ranch complex and related debris) during the survey, and no evidence was found to indicate that the site extends into the project area (CH2M 2010g, Appendix B, pp. 1–3).

The applicant's consultant, CH2M HILL, contacted the Native American Heritage Commission (NAHC), and obtained a list of Native Americans who might have heritage concerns in the vicinity of the MEP site area in January 2009. On April 2, 2009, CH2MHILL sent letters, including maps and a description of the proposed MEP, to the eight Native American representatives requesting input as to whether or not there were any concerns regarding cultural resources within the proposed MEP area. To date, no responses have been received (MEP 2009, Appendix 5.3, p. 13). Should the reconductoring project be necessary, staff recommends that the applicant obtain an updated list of Native American representatives from the NAHC and seek input from the Native American representatives regarding potential concerns they may have for heritage resources along the proposed eight-mile reconductor route.

Impacts of Reconductoring

The literature research and pedestrian archaeological survey conducted for the project revealed no important prehistoric or historic cultural resources within the proposed reconductor project area. It is highly unlikely, due to the lack of any cultural resources in

the project area and the minimal degree of disturbance likely to result from the reconductoring work, that disturbances to cultural resources would occur. Nevertheless, although no important cultural resources were identified during the cultural resources inventory effort, it is theoretically possible that ground disturbing activities, such as vehicles driving overland or excavation work of any sort, could encounter as-yet-unknown buried archaeological elements. For this reason, staff recommends that the proposed project, if implemented, should include measures to mitigate any potential resultant adverse impacts, in the event that significant buried cultural materials are unearthed during construction.

Should the proposed reconductor project area and/or associated staging areas change or expand beyond what has currently been investigated for cultural resources, as described here, further studies, including literature research, pedestrian field survey, and Native American consultation, would be necessary.

Impact Avoidance and Minimization Measures

Although no cultural resources were identified within the proposed reconductor project corridor, staff recommends that measures be put in place to minimize potential impacts to cultural resources in the event that buried cultural resources are encountered during construction. Such measures would include, but are not limited to, the following:

1. Designation of a qualified on-call Cultural Resources Specialist (CRS) to investigate any cultural resources discovered during construction.
2. Implementation of a construction worker cultural resources awareness training program, to be conducted by the CRS.
3. Procedures for halting construction in the event of inadvertent discovery of surface or subsurface archaeological deposits or subsurface human remains.
4. Procedures for evaluation of any inadvertent archaeological discovery by the designated CRS.
5. Procedures for the mitigation of adverse impacts on any inadvertent archaeological discovery determined to be significant.

Should any human remains be discovered during construction, project officials should contact the designated CRS immediately, and are required by the California Health and Safety Code (Section 7050.5) to contact the Alameda County coroner. If the Coroner determines that the find is Native American, he or she must contact the NAHC. The NAHC, as required by Public Resources Code (Section 5097.98), would then determine and notify the Most Likely Descendant (MLD), tendering a formal request to inspect the burial and make appropriate recommendations regarding the disposition of the remains.

Details for these and any other additional measures should be arranged prior to the proposed reconductoring work and the necessary information disseminated to the appropriate project manager(s) and/or field supervisor(s), prior to the commencement of construction operations for the proposed reconductor project.

Conclusion

The applicant completed a cultural resources investigation within the corridor of the proposed reconductoring project, including a literature review and a pedestrian field survey (CH2M 2010g, Appendix B, pp. 1–3). No important cultural resources were identified within the proposed project area as a result of the cultural resources inventory. Based on the information provided by the applicant regarding proposed reconductoring project, there appears to be very little potential that the project would encounter as-yet-unknown cultural resources during construction. In the unlikely event that cultural resources are unearthed during construction, staff believes that it would be possible to mitigate any potential impacts to a less-than-significant level through the implementation of avoidance and minimization measures that apply to cultural resources, as outlined above.

3.4 GEOLOGY AND PALEONTOLOGY

Environmental Setting

The MEP site is located at the northwest end of the San Joaquin Valley, a sub-basin of the Great (Central) Valley of California, along the boundary between of the Great Valley and Coast Ranges physiographic provinces (CGS 2002; Norris and Webb 1990). The Great Valley is approximately 400 miles long and 60 miles wide. It is bounded to the north by low-lying hills, to the northeast by the volcanic plateau of the Cascade Range, on the west side by the Coast Ranges, on the east side by the Sierra Nevada, and to the south by the Coast Ranges and Tehachapi Mountains. The northern one-third and southern two-thirds of the valley are known as the Sacramento and San Joaquin Valleys, respectively. The boundary between the two sub-basins is located at the confluence of the Sacramento and San Joaquin Rivers in the delta area near Suisun Bay and the City of Stockton (USGS 1986), just north and northeast of the proposed MEP site.

The Great Valley physiographic province is characterized by dissected uplands, and relatively undeformed low alluvial plains and fans, river flood plains and channels, and lake bottoms. The Coast Ranges are characterized by elongate, northwest-striking mountains and narrow valleys that formed from regional strike-slip faulting related to the San Andreas fault system. In the late Cenozoic era, much of the San Joaquin Valley was occupied by shallow brackish and freshwater lakes, which had receded by the Pliocene-Pleistocene epochs (Norris and Webb 1990). Basement beneath Cenozoic marine to terrestrial sediments in the Great Valley is composed primarily of Mesozoic crystalline rocks similar to the Sierra Nevada Range. Deep marine greywacke and ophiolite sequences underlie younger sediments in the Eastern Franciscan Block of the Coast Ranges physiographic province, which borders the east side of the Great Valley physiographic province. The boundary zone between the two major physiographic provinces is generally defined by the Coast Range Thrust Zone. Sedimentary rocks in the vicinity of the fault zone, including those underlying the proposed MEP site, have been tilted and folded as a result of the thrust faulting, which began in the middle Jurassic period and is still active today. Structure in the Diablo Range west of the proposed project site, which is characterized by a series of en echelon anticlines

composed of Franciscan Complex rocks (deep marine deposits), intervening synclines containing younger rocks, and major strike-slip faults, developed in response to both compressional and San Andreas-style tectonics (Norris and Webb 1990).

The project transmission line corridor is underlain by Quaternary alluvial and bedrock deposits (CH2M 2010g). The local geology consists of alluvial fan deposits of Holocene age underlain by consolidated to semi-consolidated deposits of Cretaceous to Pleistocene age.

The project area has experienced seismic activity with strong ground motion during past earthquakes, and it is likely that strong earthquakes causing seismic shaking will occur in the future (CH2M 2010g). The most significant geologic hazard in the Project area is the potential for strong ground shaking from an earthquake. Ground shaking from a magnitude 6.0 earthquake or greater could occur along several active faults within a 100-mile radius of the Project area (Blake 2004). The estimated peak horizontal ground acceleration for the Project is 0.62 times the acceleration of gravity (0.62g) for a bedrock acceleration with a 2 percent probability of exceedence in 50 years, based on 2007 California Building Code (CBC) criteria (USGS 2009a).

Ground rupture is caused when an earthquake along a fault creates rupture at the surface. Because no known active faults cross the project area, the potential for ground rupture is considered low.

Liquefaction is a condition in which a cohesionless soil may lose shear strength due to a sudden increase in pore water pressure. The project area is underlain by a relatively thin surficial layer of fine grain soils, which are underlain by bedrock. No ground water was encountered during the exploration and is expected to be present greater than 100 feet below the existing ground surface. Based on these conditions, liquefaction potential along the transmission line alignment is negligible.

Subsidence can be caused by natural phenomena during seismic activity, consolidation, hydrocompaction, or rapid sedimentation. Subsidence can also result from human activities, such as ground water or hydrocarbon withdrawal. No known subsidence problems exist in the Project area (CH2M 2010g).

Potentially fossiliferous rock units occur in the project area; however, because the reconductoring activities would take place above ground, it is unlikely that these activities would encounter paleontological resources (CH2M 2010g). Other than surface disturbance due to construction vehicle operation along the transmission line alignment, no grading or earthwork activities are expected to be required for the Project. Surface disturbance due to construction vehicle operation would disturb materials previously disturbed during original transmission line construction. Operation of the transmission line would not cause any ground disturbance and, therefore, would not affect paleontological resources.

Impacts of Reconductoring

Since no new facilities are anticipated, the identified reconductoring project would not change the impacts of seismic hazards, including but not limited to strong ground shaking, fault rupture and subsidence, on the transmission line above current levels.

The potential impacts to geologic and paleontological resources would be limited to temporary construction sites. These sites would not require grading or other disturbance of surface soils, other than construction vehicle disturbance. Since such ground disturbance was experienced during original construction, the impacts to geologic and paleontological resources would not be significant. Should new (or replacement) tower foundations be required as part of reconductoring, compliance with applicable laws, ordinances, regulations, and standards (LORS) and the condition of certifications (COCs) contained in the staff assessment for the MEP would reduce these potential impacts to a less-than-significant level.

Impact Minimization Measures

Although not anticipated, in the event that reconductoring of the transmission line would involve construction of new tower footings or replacement of existing tower footings, the area affected by such construction would need to be evaluated with respect to paleontological resources. For this condition, a paleontologist would periodically examine excavation spoils during reconductoring operations in paleontologically sensitive materials. Any fossil materials found and recovered in native materials might be considered scientifically significant. Transmission line towers represent small areas of disturbance, typically at 500 to 1,500-foot spacing. Adherence to the COCs contained in the staff assessment for the MEP would reduce these potential impacts to a less-than-significant level.

Conclusion

The proposed work would comply with applicable LORS as related to the identified reconductoring project. The existing transmission line was most likely designed and constructed in accordance with seismic requirements of the CBC. No significant geologic or paleontological resources have been identified in the project area. Because the reconductoring route has been subjected to previous ground disturbance activities during installation of the existing transmission line, and new ground disturbances are not anticipated, the project would not result in potential significant impacts and would comply with applicable LORS.

3.5 LAND USE

Environmental Setting

The Land Use analysis for the proposed reconductoring of the two transmission line segments of the Kelso-Tesla 230 kV line focuses on the project's compatibility with the existing and planned land uses, and the project's consistency with local land use plans, ordinances, and policies. A 3.3-mile section of the Kelso-USWP RLF and a 4.7-mile section of the USWP RLF-Tesla would be reconductored. The existing 230 kV transmission line corridor extends from the Kelso Substation to the north to the Tesla Substation to the south in unincorporated Alameda County. The reconductoring project would use existing transmission towers in an established 200 foot wide utility corridor.

Bruce Jensen (Senior Planner with the Alameda County Community Development Agency) confirmed that the Alameda County East County Area Plan land use designation within the 2,000-foot buffer around the transmission line (presented in AFC Figures 3-5 and 3-6, CH2M 2010g) is Large Parcel Agriculture and Parklands (Bethany

Reservoir). Land use within the buffer consists primarily of undeveloped land, a few scattered residences, Bethany Reservoir, California Aqueduct Bikeway, California Aqueduct, South Bay pumping plant, USWP RLF Substation plus two other substations, wind turbine developments, and a property that appears to have once been a golf course. There are two residences close to the 200-foot transmission line utility corridor; one approximately 225 feet from the transmission line (north of Altamont Pass Road) and the other approximately 300 feet from the transmission line (north of Christensen Road). The residence near Altamont Pass Road is adjacent to the property that appears to once have been a golf course and also a small substation. The residence near Christensen Road appears to be associated with the adjacent dairy. The residence is buffered by mature landscaping between the house and Christensen Road.

While the reconductoring activities may disturb these nearby residents, the disturbance would be temporary and would likely not be significantly greater than the adjacent land uses. It is also likely that these residents may have already experienced disturbance associated with maintenance activities along the transmission line as the line is an existing infrastructure versus a new one. No schools, hospitals, daycare centers, or other sensitive receptors have been identified within 2000 feet of the transmission line. The transmission line transects the California Aqueduct and Interstate 580. Temporary structures would be set up along the project route to protect roads and other inhabited areas in the event that a conductor breaks and falls to the ground.

Impacts of Reconductoring

The reconductoring project would replace transmission conductors within an existing utility corridor. This transmission system upgrade would not involve changing existing or planned land uses in Alameda County. Two or three construction staging yards would be required for the temporary stockpiling of materials and equipment along the transmission line corridor. These yards, approximately one acre in size, would be within the existing transmission line right-of-way. Although their specific location is not known at this time, it is likely they would be located near existing storage areas near or at the substations during construction (CH2M 2010g). Any impacts to land use would be isolated and short term while construction crews reconductor the existing transmission lines. Because the stockpile areas would be temporary and would not displace any existing use, the impact would not be significant.

Reconductoring would also require access to the existing transmission line right-of- way by construction vehicles and equipment, which would use existing access roads and utility easements. . If overland travel is necessary the applicant may need to secure access rights or an access agreement from the affected property owner.Any additional impacts to land use would be temporary and confined to the work areas. There would be no displacement of any existing land use. Furthermore, since the utility corridor is an established land use, reconductoring of this line is not expected to conflict with applicable Alameda County Laws, Ordinances, Regulations, and Standards.

Impact Minimization Measures

To ensure disturbance is minimized to the greatest extent possible, staff recommends the following:

- Any fences and gates damaged during maintenance and upgrade activities, such as reconductoring, would be repaired or replaced, and fences and gates would be restored to their preconstruction condition.
- If any land uses occurring within the ROW need to be temporarily closed or have limited access, proper signage would be posted in these areas.
- Landowners adjacent to the ROW should be notified of upcoming project activities.
- If overland travel is necessary, secure access rights or an access agreement from the affected property owner.

Conclusion

Reconductoring of the Kelso-Tesla 230 kV transmission line would not cause a change in land use. Since the reconductoring would be entirely within an existing and established right-of-way, the reconductored transmission line would not disrupt or divide the physical arrangement of an established community. Also for these reasons, the reconductored transmission line would not restrict existing or future land uses along the route.

3.6 NOISE AND VIBRATION

Environmental Setting

The surrounding land uses along the downstream reconductoring route include open grazing and agricultural land, and some industrial facilities (pump stations and wind farms and two residences). The primary source of noise in the area is traffic on local roads, and near Interstate-580.

Due to the remoteness of the downstream reconductoring, no sensitive receptors (schools, churches, and daycares) are located within 1 mile of the transmission line.

Impacts of Reconductoring

Noise would be produced temporarily along the transmission line rights-of-way during reconductoring by construction-type activities. Reconductoring work at each of the pull and tensioning sites would be short term (approximately one week at each site). Noise levels would be similar to heavy trucks at maximum engine speed. Because the transmission line right-of-way is generally located in agricultural-dominated areas with few residences and no sensitive receptors, project impacts are expected to be insignificant. The nearest resident is located approximately 225 feet from the transmission line corridor. After the transmission lines are reconductored, there would be no change in existing noise levels in the Project area as a result of operation of the transmission line.

Conclusion

Reconductoring activities are anticipated to take place between 7 a.m. and 5 p.m. on week days, and standard noise-reduction devices would be used to reduce equipment noise. Temporary increases in noise levels above existing ambient levels during reconductoring may be noticeable beyond areas immediately adjacent to the rights-of-way; however, they would be temporary and no additional mitigation measures are

proposed. The reconductored transmission line route would not result in potential impacts greater than those analyzed in the AFC and would be consistent with applicable LORS. Therefore, any potential noise and vibration impacts would be less than significant.

3.7 PUBLIC HEATH

The downstream reconductoring would require replacement of approximately 8 miles of transmission line. However, because the reconductoring activities would not require additional grading or the replacement of the existing transmission poles, the reconductoring activities are not expected to significantly increase the toxic air contaminant emissions estimates associated with the number of workers, the number of pieces of equipment, or the number of deliveries required for the MEP. Therefore, the downstream reconductoring is not expected to result in impacts greater than those analyzed in the staff assessment, and would comply with applicable LORS.

3.8 SOCIOECONOMICS

The construction workforce for the downstream reconductoring would not change substantially from that presented in the AFC. Construction of the Project would not result in a substantial change in local purchases of materials or local construction labor. The Project would not result in potential impacts or benefits substantially greater than those analyzed in the staff assessment and would comply with applicable LORS. Therefore, any potential socioeconomic impacts would be less than significant.

3.9 SOIL AND WATER RESOURCES

Environmental Setting

The project is located within an existing transmission line right-of-way and would cross the California Aqueduct south of the MEP and a western arm of the Bethany Reservoir. Because the reconductoring work would be on existing transmission towers, no additional foundations or earth work are anticipated, therefore groundwater resources would not be impacted.

Impacts of Reconductoring

The reconductoring project will result in short-term increased water and wind erosion rates until disturbed areas are stabilized. Increased soil compaction may decrease the ability of vegetation to reestablish following disturbance, which may result in increased erosion. However, disturbed areas along the route would be allowed to revegetate following construction activities.

The project would have limited impacts to the water resources in the area. During construction, water would be needed for dust control at some of the pull and tensioning locations. Water requirements would likely be less than one water truck per day. Water will be obtained from Byron Bethany Irrigation District Canal 45.

Impact Avoidance and Minimization Measures

During construction, implementation of the Stormwater Pollution Prevention Plan and implementation of erosion and dust control best management practices (BMPs) would

limit impacts to the soil resources associated with construction of the transmission system to acceptable levels. These measures including standard items for erosion prevention and water quality assurance, such as filter fabric or hay bale filtration. Portable toilets would be supplied by a licensed contractor for collection and disposal of sanitary wastes during the construction period.

Conclusion

Overall, the construction impacts to soils along the project corridor would not be significant. Therefore, with implementation of the appropriate BMPs, the additional potential soil impacts would be less than significant. The project is not expected to result in significant impacts, and would comply with the applicable LORS.

Water for dust suppression would be minimal and is not anticipated to create impacts on either groundwater or stormwater. Dust suppression would be temporary and construction related. Any potential water resource impacts would be less than significant with proposed minimization measures.

3.10 TRAFFIC AND TRANSPORTATION

Environmental Setting

The transmission line segments to be reconductored are located in northeastern Alameda County, mostly in undeveloped areas comprised of grazing land, agricultural land, and wind farms. The affected transmission line segments stretch between the PG&E Kelso Substation less than a mile north of the proposed MEP site to the Tesla Substation less than 2 miles south of the junction of I-205 and I-580. Parts of the transmission line parallel Bruns Road and Christensen Road near the proposed MEP site. To the south of the MEP's proposed location, the line crosses Altamont Pass Road, Patterson Pass Road, Grant Line Road, and I-580.

The applicant has estimated that the reconductoring project would require a maximum of 20 workers. During reconductoring, workers would meet at the PG&E Kelso Substation at the northeast corner of Kelso Road and Bruns Road and carpool to the construction/staging areas. The exact locations of construction/staging areas along the transmission line corridor will not be available until completion of the reconductoring project design.

Impacts of Reconductoring

The traffic congestion impacts of 20 workers traveling to and from the reconductoring sites would be negligible, especially if they gathered at the PG&E Kelso Substation and carpooled from there to the construction areas. Even if each worker commuted individually in his/her own vehicle, construction would generate a maximum of only 40 daily one-way trips. This is much less than the 372 daily one-way trips that would be generated by peak construction of the MEP, and peak construction of the MEP would not cause significant impacts to roadway or freeway level of service (LOS). However, traffic impacts from reconductoring could be significant when combined with the MEP's peak construction traffic. To mitigate this potential impact, if reconductoring was to

coincide with MEP peak construction, all reconductoring-related trips should occur during off-peak commute hours, or at least during hours with the least MEP-generated construction traffic.

Reconductoring could also cause potential traffic impacts where the line crosses over Altamont Pass Road, Patterson Pass Road, Grant Line Road, and I-580. During reconductoring, there would be a small chance of a conductor breaking and falling across these roads, which would create a traffic hazard and block traffic. To mitigate this potential impact, crews should set up temporary structures (i.e., netting) across these roadways and freeways to catch any falling conductors, as described in the Transmission Line Reconductoring Analysis submitted by Mariposa Energy, LLC (CH2M 2010g). Construction of these temporary structures should occur during off-peak commute hours to mitigate any potential impacts to LOS.

Improper staging could also cause impacts by blocking traffic. To avoid this impact, crews should stage construction in areas as far from roadways and freeways as possible.

Impact Minimization Measures

Staff recommends that the following measures, discussed above, be implemented during construction to mitigate potential impacts resulting from reconductoring:

- If reconductoring is to coincide with peak construction of the MEP, reconductoring-related trips should occur during off-peak commute hours, or at least during hours with the least MEP-generated construction traffic. (Morning peak hours are from approximately 6:00 to 9:00 AM and evening peak hours are from approximately 3:30 to 6:30 PM.)
- Crews should set up protective temporary structures (i.e., netting) across roadways and freeways crossed by the transmission lines to be reconductored. These structures must prevent any broken conductors from landing in the path of vehicles below. When setting up these temporary structures, the crew should use signing and flagmen to redirect traffic.
- Crews should stage construction in areas as far from roadways and freeways as possible and in a way to minimize impacts to LOS.

Conclusion

Because the majority of reconductoring activities would take place in undeveloped areas, it is projected that the activities would have minimal impact on the traffic level of service for nearby roadways and freeways, except during peak construction of the MEP. Based on the temporary nature of the reconductoring activities (approximately six to eight weeks) and the minimal staffing (a maximum of 20 workers), combined with implementation of mitigation measures similar to Conditions of Certification, staff concludes that any potential impacts to traffic and transportation would be less than significant.

3.11 TRANSMISSION LINE SAFETY AND NUISANCE

Impacts of Reconductoring

The Right of Way (ROW) for the Kelso-Tesla transmission line is approximately 130 feet in width. Therefore, the edge of ROW would be approximately 65 feet from the line. The level of Corona Noise depends on line voltage and not the level of power flow. Because line voltage remains nearly constant for a transmission line during normal operation, the audible noise associated with the 230-kV lines in the area will be of the same magnitude at the edge of ROW before and after the project. Corona typically becomes a design concern for transmission lines having voltages of 345-kV and above. Since MEP will be connected at a 230-kV voltage level, it is expected that no corona-related design issues will be encountered. The reconductoring is not expected to result in significant impacts related to corona noise.

While electric fields are directly proportional to a transmission line's voltage, and unrelated to amperes, magnetic fields vary depending on amperes transmitted through the line. Therefore, there is a potential for a change in the overall electromagnetic field (EMF), related to the increased current capacity from the reconductoring project. The strength of the magnetic field is inversely proportional to the distance from the conductors. Since the route of the proposed transmission line upgrade is not near residences, long-term residential field exposures would not be a significant concern. The field strengths of most significance in this regard would be as encountered at the edge of the line's 130 foot right-of-way.

Following a decision from 1993 (D.93-11-013) that was reaffirmed on January 27, 2006 (D.06-01-042), the CPUC requires utilities to incorporate "low-cost" or "no-cost" measures to mitigate EMF concerns. No specific regulatory thresholds have been established for EMF. Specific field strength-reducing measures will be evaluated by PG&E and incorporated into the proposed line's design as appropriate to ensure the field strength minimization in accordance with CPUC requirements. PG&E will perform upgrades to the existing transmission line according to the requirements of CPUC's General Order 95, General Order 52, General Order 131 D, Title 8, and Group 2. High Voltage Electrical Safety Orders, sections 2700 through 2974 of the California Code of Regulations.

Conclusion

The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed line given the absence of residences along the proposed route. On-site worker or public exposure would be short term and at levels expected for PG&E lines of similar design and current-carrying capacity. Such exposure has not been established as posing a significant human health hazard.

3.12 TRANSMISSION SYSTEM ENGINEERING

Environmental Setting

Accommodating the interconnection of the MEP at the PG&E Kelso 230 kV substation would involve downstream reliability upgrades for reconductoring two sections (3.3 miles of the Kelso-USWP-RLF section and 4.7 miles of USWO RLF-Tesla section) of

the PG&E Kelso-Tesla 230 kV line and PG&E would do the construction work for reconductoring the line. Reconductorung the line would involve removing the existing 954 Kcmil ACSR conductors and replacing them with new 1113 Kcmil ACSS or equivalent conductors, in a manner that complies with applicable construction, safety and reliability standards. This would increase in approximately a doubling of transmission capacity. Insulators would also be removed and replaced with new strings, which would increase the line's capability to withstand voltage surges. Please see Chapters 1 and 2 of this Appendix A for additional description of the likely construction areas and methods.

Impacts of Reconductoring

During construction, applicable safety and reliability Laws, Ordinances, Regulations and Standards (LORS) must be met. These include the CPUC GO-95, Title 8 CCR Construction Safety Orders, PG&E Construction Standards and National Electric Safety Code, 1999 (NESC). Additionally, to maintain system reliability, the Cal-ISO must be advised by PG&E per the Cal-ISO scheduling protocol of scheduled circuit outages prior to occurrence. Such outages are scheduled about 30 days prior to occurrence and are verified just prior to actual outage. In the event that system reliability requires restoring such circuits, a "no work" order is given and where practicable, circuits are *restored.*

Reconductoring two sections of the Kelso-Tesla 230-kV transmission line would result in local system benefits, in that it would provide considerably greater flexibility in routing power in the PG&E greater bay area transmission network, even if the MEP is not built. The reconductoring project would ensure that the project could generate at its rated/reasonable capacity as it would mitigate overloads on the existing Kelso-Tesla 230 kV line.

Impact Minimization Measures

To mitigate potential safety and reliability impacts, the above-stated applicable LORS and California ISO scheduling protocols would be used. PG&E would assure conformance with the above safety and reliability requirements in coordination with the California ISO.

Conclusion

Conformance with applicable construction standards, safety and reliability LORS as stated above is likely to occur and would be successful in mitigating any safety or reliability implications of reconductoring the transmission line.

3.13 VISUAL RESOURCES

Environmental Setting

The Kelso–Tesla 230 kV transmission line is within an existing 230 kV corridor and crosses through primarily undeveloped land within the jurisdiction of Alameda County. The line runs through rolling hills between the Kelso Substation and the Tesla Substation. Few residences are located adjacent to the transmission line right-of-way. The project primarily traverses grazing land, agricultural lands, and wind farms, occasionally paralleling Christensen and Bruns roads and traversing Altamont Pass

Road, Patterson Pass Road, Grant Line Road, I-580, the California Aqueduct, and a western arm of the Bethany Reservoir. All work would take place within the existing right-of-way and substations and, where possible, work would be conducted using existing access roads adjacent to the existing transmission line corridor.

The project is expected to last approximately six to eight weeks and would require temporary staging areas for equipment and materials storage. The staging yards would likely be located within or immediately adjacent to the Kelso, USWP-RLF, and the Tesla substations. Equipment may also be stored within the right-of-way adjacent to reconductoring activities. At this time, the exact number of required pull stations is unknown, but it is assumed they would be located at turning poles whenever possible. Tower modifications and excavation work near the towers are not anticipated at this time.

Construction equipment and activities would be visible to motorists on Christensen Road, Bruns Road, Altamont Pass Road, Patterson Pass Road, Grant Line Road, I-580 and other local roadways, as well as to residents living near the existing corridor. Due to the short duration project construction, any adverse visual impacts that would occur during construction would not be significant. The construction areas and the right-of-way would be restored to their pre-project conditions.

Conclusion

Much of the landscape between the Kelso Substation and the Tesla substation that the Kelso-Tesla 230kV line would pass though is remote and highly altered by human-activities. It contains major linear infrastructure features including numerous high-voltage transmission lines, the California Aqueduct, and also crosses Interstate 580. Most of the route is also parallel to the PG&E Pittsburg-Tesla 230kV transmission line. Other industrial features that are present in the area include numerous large-scale wind turbines throughout the Altamont Hills, the PG&E Bethany Compressor station immediately south of the Kelso Substation, and the Harvey O. Banks Delta Pumping Plant located less than one mile west of the Kelso Substation. The conductors of the upgraded 230kV Kelso-Tesla line would replace existing conductors. The new conductors would be similar in appearance with the existing transmission line, adjacent transmission lines, and also other industrial features in the landscape they would pass near. No changes to the existing transmission towers are anticipated. Therefore the new conductors would not degrade the visual quality of the viewed landscape.

Once construction is complete, this change to the transmission line would be undetectable to most viewers of the line, including motorists and residents living near the area. The project would not have any significant impacts on visual resources; therefore no mitigation measures are necessary. The project would comply with applicable LORS. Therefore, any potential visual resource impacts would be less than significant.

3.14 WASTE MANAGEMENT AND HAZARDOUS MATERIALS

Hazardous materials use during reconductoring activities would be limited to fuels and lubricants associated with the equipment. Potential impacts would be limited to small fuel or oil spills. Equipment refueling would most likely be performed away from the

linear reconductoring area; any hazardous material use would be performed away from water bodies to prevent contamination of water in the event of a spill. Therefore, any potential environmental effects would be limited to small areas of contaminated soil. In the unlikely event of a spill, the contaminated soil would be placed into barrels or trucks for offsite disposal as a hazardous waste.

The downstream reconductoring would not result in hazardous material use beyond activities documented in the staff assessment for MEP construction, and would not result in any potential impacts greater than those analyzed in the staff assessment. Construction of the downstream reconductoring would not result in a significant increase in waste. Therefore, any potential hazardous materials management impacts and waste management would be less than significant.

Impact Minimization Measures

Staff recommends that the following measures be implemented during construction to mitigate potential impacts resulting from improper waste or hazardous materials management:

- A waste management plan should be prepared to ensure that all construction materials and debris would be removed from the area and recycled or properly disposed of offsite.
- Construction waste should be recycled where feasible.
- Hazardous waste handling should incorporate the following: properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees to comply with state and federal hazardous waste management requirements.
- Hazardous wastes should be stored in accordance with accumulation time limits and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

Conclusion

The downstream reconductoring would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both project construction and operation. In addition, the site should be managed such that contaminants would not pose a significant risk to humans or to the environment. Implementing the measures recommended above or similar for construction and operation would avoid impacts to workers and the environment.

3.15 WORKER SAFETY AND FIRE PROTECTION

Implementation of worker safety plans and protocols would be the same for the downstream reconductoring as those described in the staff assessment.

Impact Minimization Measures

A fire prevention and response plan will be implemented similar to that utilized at the MEP project site and would include fire protection and prevention methods specific to

the reconductoring work. The plan would include procedures to reduce the potential for igniting combustible materials by preventing electrical hazards, use of flammable materials, and smoking onsite during construction. Project personnel would be directed to park away from dry vegetation; to equip vehicles with fire extinguishers; not to smoke; and to carry water, shovels, and fire extinguishers in times of high fire hazard. Construction crews will receive training on fire prevention requirements prior to reconductoring construction activities.

Conclusion

The reconductoring would not result in potential impacts greater than those analyzed in the staff assessment and would comply with applicable LORS. Therefore, any potential worker safety and fire protection impacts would be less than significant.

4.0 SUMMARY OF CONCLUSION

This analysis of downstream potential impacts of reconductoring the Kelso–Tesla 230-kV line transmission line upgrades was prepared to inform the Energy Commission Committee and the general public of the potential direct and indirect effects of this project, which is considered a reasonably foreseeable development resulting from the MEP project. The analysis of potential environmental impacts is based on a planning-level project description of required facilities and measures to minimize potential effects are recommended.

The proposed project would not result in significant and unmitigable impacts to any issue area. The following issue areas would not be impacted by the proposed project: Facility Design, Power Plant Efficiency and Power Plant Reliability, For the remainder of the issue areas, it is anticipated that environmental impacts associated with the proposed downstream upgrades would be less than significant with implementation of the recommended mitigation measures identified herein. Additional measures may be required by CPUC and CALISO upon further environmental analysis pursuant to CEQA, once preliminary project design information is available.

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6.0 LIST OF CONTRIBUTORS

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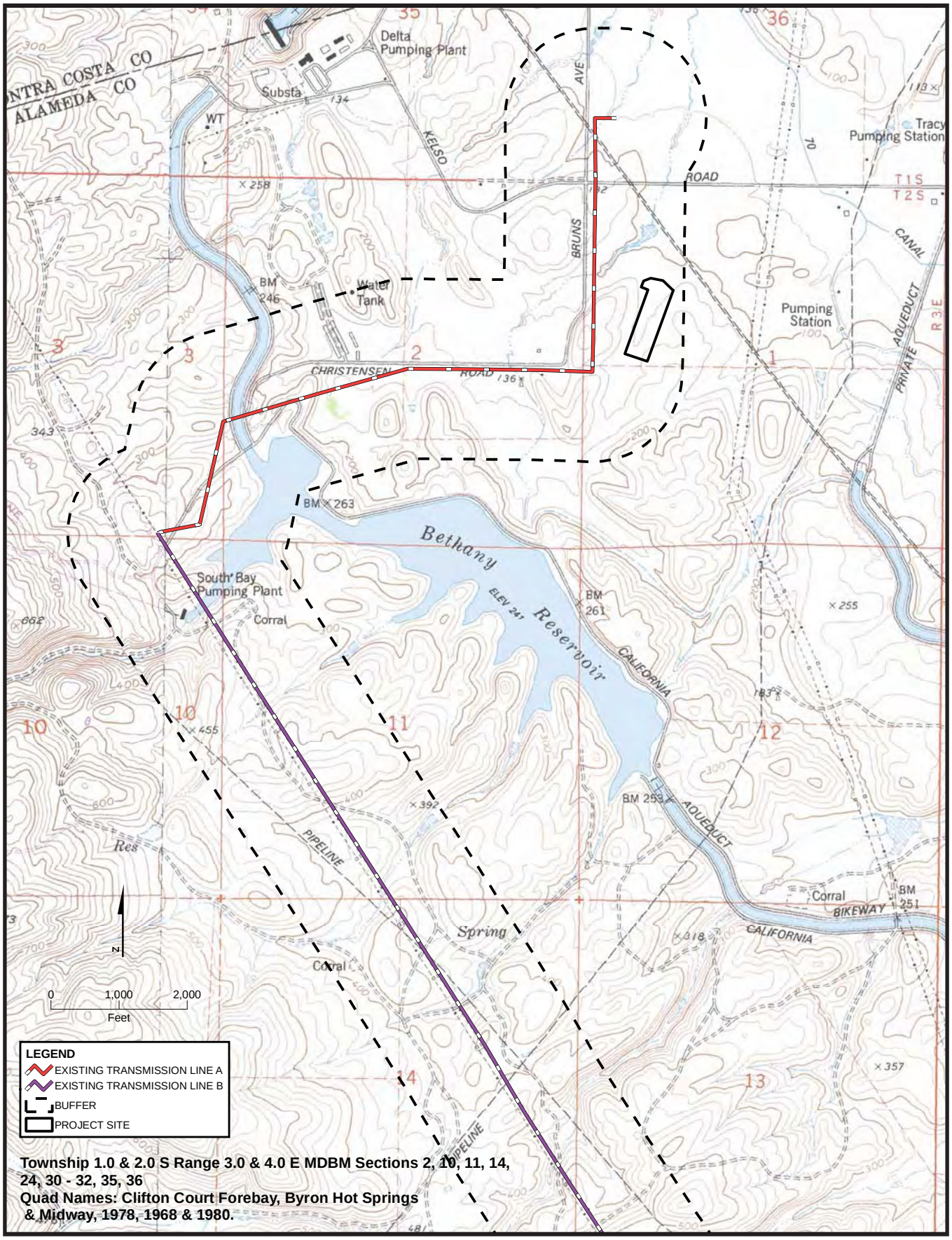
Visual Resources: Mark Hamblin

TRANSMISSION SYSTEM ENGINEERING - APPENDIX A - FIGURE 1

Mariposa Energy Project - Project Area Map, 1 of 2



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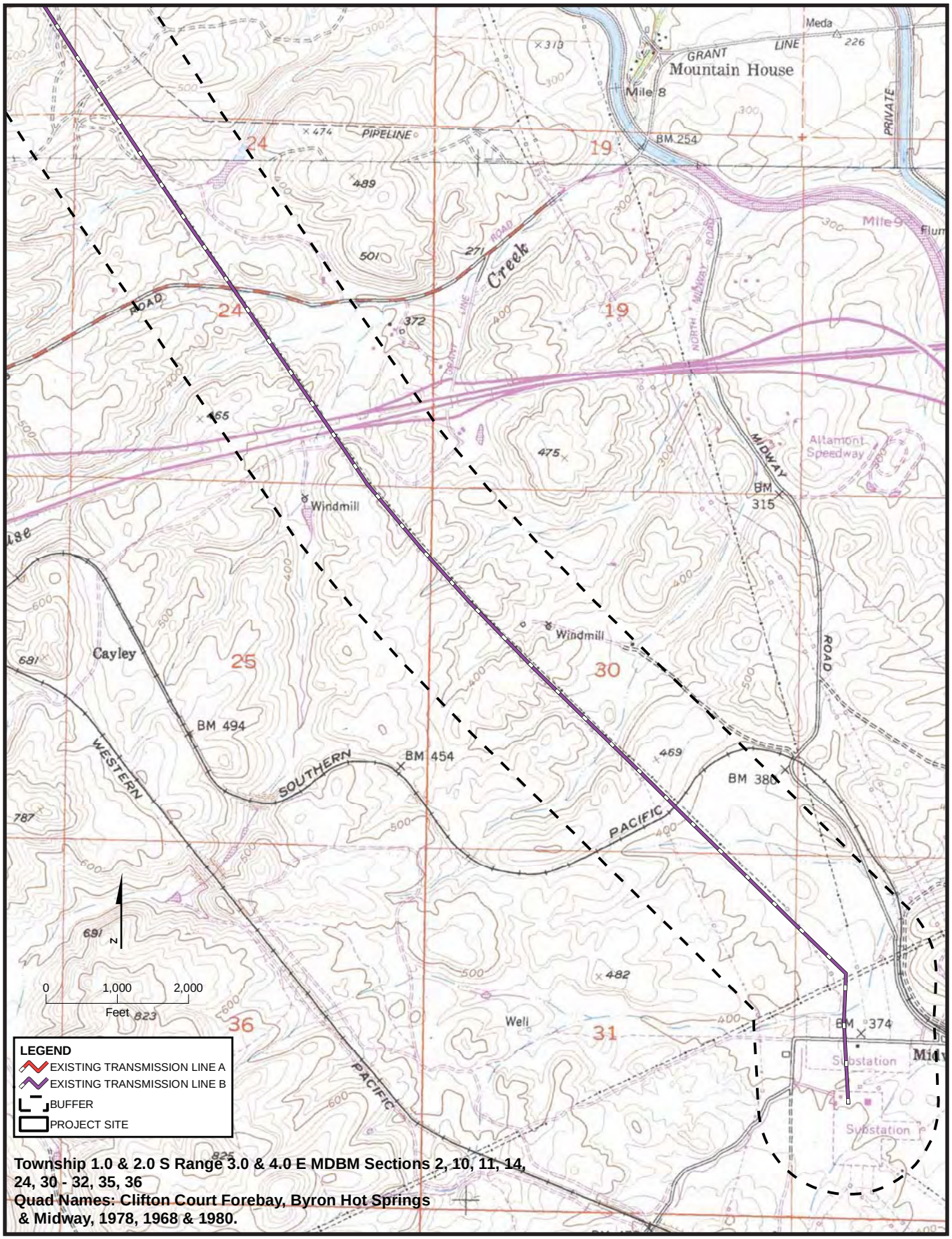
SOURCE: Data Response, Set 1D, March 2010 - **CH2M**Hill

TRANSMISSION SYSTEM ENGINEERING

TRANSMISSION SYSTEM ENGINEERING - APPENDIX A - FIGURE 2

Mariposa Energy Project - Project Area Map, 2 of 2



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SOURCE: Data Response, Set 1D, March 2010 - **CH2M**Hill

ALTERNATIVES

Revised Testimony of Craig Hoffman

This section is revised testimony from the Staff Assessment published on November 8, 2010.

SUMMARY OF CONCLUSIONS

The Mariposa Energy Project (MEP) would be a natural gas-fired, simple cycle peaking facility with a generating capacity of 200-megawatts (MW) located on approximately 10 acres. The applicant provided an analysis of the proposed project site and two alternative sites as possible locations for the proposed site, and site screening criteria that was used to eliminate alternative locations. Staff determined these alternative sites would not reduce or eliminate environmental effects of the proposed project, as the proposed site would be more advantageous over the alternative sites because of potential agricultural and biological impacts resulting from use of the alternative sites for the MEP.

The applicant also provided alternative technologies to be considered for the project. Staff agrees with the applicant's assessment that alternative technologies such as solar, wind, geothermal, biomass, tidal, and wave do not present feasible alternatives to the proposed project. The alternative linear routes are feasible but present no clear advantage. Power plants that are not natural gas-fired were eliminated from consideration because they did not meet the project objectives for a dispatchable energy project. With no significant issues at this time, staff does not recommend an alternative over the project as proposed.

Staff also believes that the "no project" alternative is not superior to the proposed project. The "no project" scenario could lead to increased operation of existing plants (and reliance on older, more polluting technology) or development of new plants on other undeveloped land. In addition, conservation and demand side management programs would likely not meet the state's growing electricity needs that could be served by the MEP.

Therefore, as the MEP would not have any significant unmitigated impacts, staff does not recommend the "no project" alternative or an alternative site, generation technology, or configuration over the project proposed by Mariposa Energy, LLC.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed MEP. The purpose of this alternatives analysis is to provide an analysis of a reasonable range of feasible alternative sites and technologies which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, §1765). This section identifies potentially significant impacts of the proposed project and analyzes different technologies and alternative sites that may reduce or avoid significant impacts. Staff has also analyzed the impacts that may be created by locating the project at alternative sites.

The Energy Commission does not have the authority to require Mariposa Energy, LLC to move the proposed project to another location, even if it identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of any significant effects of the project. Moving the proposed MEP to an alternative site would require that the applicant submit a new Application for Certification (AFC), including revised engineering and environmental analysis; this more rigorous AFC-level analysis of any of the alternative sites could reveal environmental impacts, non-conformity with laws, ordinances, regulations, and standards; or potential mitigation requirements that were not identified during the more general alternatives analysis presented herein.

CALIFORNIA ENVIRONMENTAL QUALITY ACT CRITERIA

The "Guidelines for Implementation of the California Environmental Quality Act," Title 14, California Code of Regulation, Section 15126.6(a), provides direction by requiring an evaluation of the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6(e)).

The range of alternatives is governed by the "rule of reason" which requires consideration only of those alternatives necessary to permit informed decision-making and public participation. CEQA states that an environmental document does not have to consider an alternative where the effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6(f)(3)).

PROJECT DESCRIPTION AND SETTING

The proposed project site is in northeastern Alameda County, in an unincorporated area designated for Large Parcel Agriculture by the East County Area Plan. The site is located approximately 7 miles northwest of Tracy, 7 miles east of Livermore, 6 miles south of Byron, and approximately 2.5 miles west of the community of Mountain House in San Joaquin County. The power plant site is approximately 2.7 miles south of the Byron Airport and approximately 1 mile west of the centerline of the main runway approach path.

The MEP would be a natural gas-fired, simple-cycle peaking facility with a generating capacity of 200 megawatts (MW). The project proposes to operate on average, 600 hours per year, but if licensed, can run up to 4,000 hours. Primary equipment for the generating facility would include four General Electric (GE) LM6000 PC-Sprint natural gas-fired combustion turbine generators (CTG) and associated equipment. Power would be transmitted to the grid at 230-kV through a new 0.7-mile transmission line that would connect to the existing Kelso Substation. A new 580-foot natural gas pipeline would connect the project site to PG&E's Line 2, which is an existing high-pressure natural gas pipeline located northeast of the project site. Service and process water would be fresh irrigation water provided from a new connection to the Byron-Bethany Irrigation District (BBID) via a new pump station and 1.8-mile pipeline.

The MEP is proposing to utilize on average 35 acre feet of water per year. In the event of continuous and maximum permitted operation, the MEP would utilize 187 acre feet of water for 4,000 hours of operation. All domestic wastewater would be routed to an on-site septic system and either discharged to an on-site leach field or removed via truck for off-site disposal. Stormwater runoff would be detained on-site in an extended detention basin and released according to regulatory standards for stormwater quality control. Air emissions control systems would include a selective catalytic reduction (SCR) system for nitrogen oxides (NOx) control using 19% aqueous ammonia and an oxidation catalyst for carbon monoxide (CO) control.

Temporary construction facilities would include a 5-acre worker parking and laydown area immediately east of the project site, a 1-acre water supply pipeline parking and laydown area located at the BBID headquarters facility, to serve water pipeline construction needs, and a 0.6-acre laydown area along the transmission line route.

The project would have the following design features:

- Four General Electric (GE) LM6000 PC Sprint combustion turbine generators CTGs and associated support equipment.
- Air emissions control systems including selective catalytic reduction (SCR) systems for nitrogen oxides (NOx) control and oxidation catalyst for carbon monoxide (CO) control.
- A new, approximately 0.7-mile-long, 230-kV transmission line to deliver the plant output to the electrical grid via the existing 230-kV Kelso Substation located north of the project site.
- Approximately 580 feet of new 8-inch-diameter natural gas pipeline that will run directly northeast from the project site to interconnect with PG&E's existing high pressure natural gas pipeline.
- A new 10-inch-diameter, 1.8-mile water supply line from the Byron-Bethany Irrigation District (BBID) Canal 45.

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The purpose of staff's alternatives analysis is to determine the potential significant impacts of MEP and then focus on alternatives that are capable of reducing or avoiding these impacts.

To prepare this alternatives analysis, the staff used the methodology summarized below:

- Describe the basic objectives of the project.
- Identify any potential significant environmental impacts of the project.
- Identify and evaluate alternative locations or sites to determine whether the environmental impacts of the alternatives are the same, better, or worse than the proposed project.
- Identify and evaluate technology alternatives to the project which would mitigate impacts.

- Evaluate the impacts of not constructing the project to determine whether the “no project” alternative is superior to the project as proposed.

MEP’s primary objective is to provide dispatchable, operationally flexible, and efficient generation to meet PG&E's need for new energy sources. PG&E issued a Request for Offers on April 1, 2008, indicating that additional peak electric generation capacity is needed in the vicinity (PG&E, 2008). Staff began by identifying an initial study region that consisted of the geographic area surrounding the PG&E Kelso Substation. Staff chose this region to determine whether alternative sites were close enough to PG&E’s Kelso Substation to provide power to that substation, similar to the proposed project.

Alternative generation technologies, as discussed in this analysis, include both methods to reduce the demand for electricity and also alternative methods to generate electricity.

There may also be specific technologies that could be applied to MEP project that would reduce impacts of the project. The in-depth discussion of such technology alternatives is included in the technical area chapters of this staff assessment, where appropriate.

BASIC OBJECTIVES OF THE PROJECT

The main objective of MEP is to provide dispatchable, operationally flexible, and efficient generation to meet Pacific Gas and Electric Company’s (PG&E) need for new energy sources in Alameda County and the San Francisco Bay Area, to support and back up intermittent renewable resources (e.g., wind and solar), and to satisfy the terms of MEP’s power purchase agreement with PG&E.

Operationally flexible resources are required to assist with the integration of intermittent renewable resources, such as solar and wind facilities. Additionally, peaking capacity is needed to respond to increases in the local demand for electricity that typically occur in the afternoons of summer days. A facility that provides peaking capacity must be able to be up and running at peak generation within 10 minutes to meet California Independent System Operator (CAISO) requirements. As a peaking facility, MEP would not run continuously, but instead would start, run for as many hours as necessary, and then shut down. MEP is designed to reliably provide this type of fast-start capability and highly flexible dispatchable energy and capacity.

MEP would provide a resource to balance the variability of renewable recourses, to satisfy peak energy and capacity needs during high load events, and to support the electrical grid during outages of transmission lines and other generating facilities. PG&E has identified a near-term need for new power facilities that can be on line by or before 2015 and that can support easily dispatchable and flexible system operation. PG&E issued a Request for Offers on April 1, 2008, to obtain these energy resources from qualified bidders. MEP’s objectives are consistent with this need as follows:

- Safely construct and operate a 200-megawatt (MW), natural gas-fired, simple-cycle generating facility to meet PG&E’s growing peak load and the growing energy demands of customers within PG&E’s service territory.

- Site the project within the Altamont Wind Resource Area in order to supply back-up generation when the local wind turbines decrease output due to decreased wind. The quick start, peaking facility will be utilized to supplement the renewable wind generation during periods of low or variable wind resource in order to maintain grid stability.
- Site the project as near as possible to a PG&E substation with available transmission capacity.
- Site the project to minimize or eliminate the length of any project linears, including gas and water supply pipelines, as well as transmission interconnections. These objectives minimize potential offsite environmental impacts and the cost of construction.
- Assist Alameda County in meeting its electrical energy needs by providing additional local dispatchable generation, decreasing the amount of imported energy and providing system/grid support at critical times, such as periods of decreasing renewable generation and peak load conditions.
- Minimize environmental and air quality impacts.
- Assist the State of California in developing increased local generation projects, thus reducing dependence on imported power.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

As determined by Energy Commission staff in the SA, the MEP is not likely to cause potentially significant impacts with mitigation included in the form of Conditions of Certification.

SITE ALTERNATIVES TO THE PROJECT

This section evaluates the alternative sites identified by Mariposa Energy, LLC and other site possibilities identified by staff or the public.

Staff considered the following criteria in identifying potential alternative sites:

1. Avoid or substantially lessen one or more of the potential significant effects of the project;
2. Satisfy the following criteria:
   A. Location near the PG&E Kelso Substation;
   B. Site suitability. Approximately 20+ acres are required for the site. This includes both the actual project sites and any temporary construction areas. The shape of the site also affects its usability;
   C. Availability of infrastructure. Site the project to minimize or eliminate the length of any project linears, including gas and water supply pipelines, as well as transmission interconnections;

D. Not located adjacent to moderate or high density residential areas or to sensitive receptors (such as schools and hospitals) or to recreation areas;
E. Not located in the Byron Airport Precision Instrument Outer Approach Surface 40:1 Slope or Precision Instrument Inner Approach Surface 50:1 Slope
F. Compliance with general plan designation and zoning district; and
G. Availability of the site.

Staff began by identifying an initial study region. The region consisted of the geographic area surrounding the PG&E Kelso Substation along with existing water and natural gas facilities. Staff chose this region to determine whether alternative sites were close enough to PG&E's Kelso Substation to provide power to that substation, similar to the proposed project.

Initial screening for the MEP site include several key factors. First and foremost were locating a site outside of the Precision Instrument Outer Approach Surface 40:1 Slope for the Byron Airport and outside of the Precision Instrument Inner Approach Surface 50:1 Slope for the Byron Airport. The Byron Airport land plan was a key factor in the siting of the potential power plant.

It was also important not to locate the project adjacent to moderate or high density residential areas or to sensitive receptors (such as schools and hospitals) or to recreation areas. The Mountain House Community is approximately 2.5 miles to the east and the Mountain House School is about 1.25 miles to the east.

Other site screening included the location of the project on land not designated "Prime Farmland" and being consistent with the Alameda County General Plan and Zoning Code. The project includes utilizing water for energy generation processes, natural gas for power generation and needs to be located near transmission facilities and a substation facility. Alternatives included the evaluation of proximity to necessary infrastructure (e.g., an electrical transmission system) and proximity to available water.

Staff reviewed the project site and alternative sites for location near or containing sensitive environmental habitats and potential presence of threatened and endangered species. The properties were reviewed to determine sufficient land area (needed to accommodate a minimum 20 acres of power plant site area and construction laydown), with minimal or no Federal or State land ownership restrictions, flat topography with preferred slope and aspect ratios

SITES INITIALLY IDENTIFIED FOR FURTHER EVALUATION

Staff reviewed the two proposed alternative sites within the MEP AFC. Staff found that potential sites that could meet staff's criteria are rare. Much of the land in the study area is within restricted areas of the Byron Airport FAA airspace protection surface, are closer to moderate or high density residential areas (Mountain House community) or to sensitive receptors (such as schools and hospitals), or is located further from water supplies, natural gas facilities and transmission facilities. Finding a relatively flat 20 acre site with significantly lesser environmental value in the Altamont area is also restrictive.

The alternative sites are located in the general area of the proposed MEP site and share some common attributes.

Sites not Meeting Screening Criteria

Staff toured the project area and discovered that available properties were either within the Byron Airport FAA airspace protection surface, are closer to moderate or high density residential areas (Mountain House community) or to sensitive receptors (such as schools and hospitals), or is located further from water supplies, natural gas facilities and transmission facilities. Staff determined that it was not appropriate to undertake a detailed evaluation of sites with obvious environmental impacts greater than the proposed project.

Sites Meeting Screening Criteria

A discussion of those sites which generally meet the screening criteria is provided below. These sites are identified in **Alternatives Figure 1**. The Alternative Sites include two sites identified in the MEP AFC and are discussed below. **Alternatives Table 1** also provides a site comparison of property characteristics and screening criteria.

Costanza Alternative Site Location 1

The Costanza parcel (Alternative 1) is located immediately west of the Lee Parcel, on the western side of Bruns Road. The 143-acre parcel is vacant and is used for cattle grazing. Two drainages run through the parcel; one running north on the western portion of the property and one running northeast across the southeast corner of the property. A cattle stock pond has been developed along the drainage on the eastern portion of the parcel. The northern portion of the parcel has several small hills. The property is zoned Ag-100 (Agricultural, 100-acre minimum) and is within unincorporated eastern Alameda County. The parcel does not have a Williamson Act contract. Residential dwellings are located nearby on adjacent parcels near the northern and southwestern parcel boundaries. Based on the location of these residences, the southeast corner of the Costanza parcel was considered for a potential power plant development site.

It is unknown whether site control is feasible at this location.

A comparison of the Costanza Alternative Site with the MEP site follows:

- **Linears.** The site would require an approximately 0.7-mile-long electrical transmission line to connect to the 230-kV Kelso Substation and an approximately 0.5-mile-long natural gas line to tie into the existing PG&E high-pressure gas main to the north. This site would require an approximately 1.7-mile-long water supply pipeline to BBID Canal 45. The Costanza linear facilities are similar to the MEP proposed site.
- **Air Quality.** The Costanza Alternative is located within the same air basin, and the type and quantity of air emissions would be similar to the MEP. Receptors would be located a similar distance away and impacts from air emissions would be consistent with the MEP.

- **Biological Resources.** Both the Costanza and proposed MEP sites have the potential for biological resources. The sites contain many of the same biological features and habitat. The Costanza site does contain a couple drainages that could contain additional species and habitat than the MEP site. The impacts to biological resources would potentially be greater on the Costanza site.
- **Cultural Resources.** Staff identified no significant cultural resources would be affected by the construction and/or operation of the proposed MEP, and the results of the geoarchaeological assessment indicate that the potential for encountering as-yet-unknown buried archaeological deposits is low. It is anticipated the Costanza site would have consistent cultural resources.
- **Geological Resources and Hazards.** Effects of the project on geological resources and hazards are expected to be minimal and would be similar to the MEP site.
- **Hazardous Materials.** Hazardous material handling would be similar for the Costanza site and the proposed MEP location. In addition, the differences in the distances and types of roads for transport of hazardous materials would be minor.
- **Land Use and Agriculture.** Impacts to agricultural resources would be similar. The Costanza and MEP site have the same land use designation and Farmland Map soils type.
- **Noise.** The Costanza and MEP sites are both located within a similar distance of the nearest residence. Noise impacts will not be significant or greater on either site.
- **Paleontology.** Paleontological resources are not likely to be impacted at the Costanza or proposed MEP site.
- **Public Health.** The project is unlikely to cause significant long-term public health impacts at either site.
- **Socioeconomics.** The Costanza and MEP sites would draw similar numbers of workers, primarily from Alameda and other counties in the Delta region. For either site, most workers would commute, with a few moving temporarily to the local area during construction. Local socioeconomic impacts to the region would be similar.
- **Soils.** The Costanza site and the MEP has similar soils types and are both currently used for grazing purposes. With best management practices for soil erosion, impacts to soil resources are expected to be similar.
- **Traffic and Transportation.** Both sites are directly accessed by Bruns Road and within the safe Byron Airport overflight zone. Traffic and transportation impacts are expected to be the same on the MEP and Costanza sites.
- **Visual Resources.** The Costanza and MEP sites are both within the rolling hills of the Altamont Pass area. The MEP site is within a slight valley that screens the project from offsite views. It is unknown if the Costanza site would have less visual impacts to the power plant. The two sites would have similar visual impacts from transmission and other linear infrastructure.
- **Water Resources.** The sites would have similar linear facilities for water use and supply from Byron Bethany Irrigation District.

- **Waste Management.** Similar quantities of waste would be generated at the Costanza alternative site in comparison to the MEP.
- **Worker Safety.** No differences are expected with respect to worker safety at the Costanza site or proposed MEP site.

Gomes Alternative Site Location 2

The Gomes parcel (alternative 2) is located immediately northeast of the Lee Parcel, across Kelso Road. The 150-acre parcel contains a feedlot facility adjacent to Kelso Road and is bisected by BBID Canal 70, which runs generally north/south through the parcel. The western portion of the parcel is used for cattle grazing; the eastern portion is cultivated farmland. The northern portion of the parcel has slightly elevated terrain compared to the surroundings. A western "panhandle" extends west to Bruns Road across to a topographically low-lying area with multiple drainages. The property is zoned Ag-100 (Agricultural, 100-acre minimum) and is located within unincorporated eastern Alameda County. The parcel has a Williamson Act contract. Two 500-kV transmission lines run generally north/south through the center of the parcel. Residential dwellings are located on adjacent parcels immediately south and east of the parcel boundaries. Based on the location of these residences, potential power plant development would likely be limited to the middle of the parcel (from north to south), along the western property boundary, west of the BBID Canal 70 and the 500-kV transmission lines.

It is unknown whether site control is feasible at this location.

A comparison of the Gomes Alternative Site with the MEP site follows:

- **Linears.** The site would require an approximately 0.4-mile-long electrical transmission line to connect to the 230-kV Kelso Substation and an approximately 0.5-mile-long natural gas line to tie into the existing PG&E high-pressure gas main to the west. This site would require an approximately 2.0-mile water supply pipeline from BBID Canal 45 via Bruns Road and Kelso Road.
- **Air Quality.** The Gomes Alternative is located within the same air basin, and the type and quantity of air emissions would be similar to the MEP. Receptors would be located a similar distance away and impacts from air emissions would be consistent with the MEP.
- **Biological Resources.** Both the Gomes and proposed MEP sites have the potential for biological resources. The sites contain many of the same biological features and habitat. The impacts to biological resources would be similar on the Gomes site to the MEP.
- **Cultural Resources.** Staff identified no significant cultural resources would be affected by the construction and/or operation of the proposed MEP, and the results of the geoarchaeological assessment indicate that the potential for encountering as-yet-unknown buried archaeological deposits is low. It is anticipated the Gomes site would have consistent cultural resources.
- **Geological Resources and Hazards.** Effects of the project on geological resources and hazards are expected to be minimal and would be similar to the MEP site.

- **Hazardous Materials.** Hazardous material handling would be similar for the Gomes site and the proposed MEP location. In addition, the differences in the distances and types of roads for transport of hazardous materials would be minor.
- **Land Use and Agriculture.** Impacts to agricultural resources would be similar. The Gomes and MEP site have the same land use designation and Farmland Map soils type. The property is currently subject to a Williamson Act Contract. It is anticipated that Alameda County would not require a modification to the Contract and find the project a compatible use on this property.
- **Noise.** The Gomes and MEP sites are both located within a similar distance of the nearest residence. Noise impacts will not be significant or greater on either site.
- **Paleontology.** Paleontological resources are not likely to be impacted at the Gomes or proposed MEP site.
- **Public Health.** The project is unlikely to cause significant long-term public health impacts at either site.
- **Socioeconomics.** The Gomes and MEP sites would draw similar numbers of workers, primarily from Alameda and other counties in the Delta region. For either site, most workers would commute, with a few moving temporarily to the local area during construction. Local socioeconomic impacts to the region would be similar.
- **Soils.** The Gomes site and the MEP has similar soils types and are both currently used for grazing purposes. With best management practices for soil erosion, impacts to soil resources are expected to be similar.
- **Traffic and Transportation.** The Gomes site is accessed by Bruns and Kelso Road and is within the safe Byron Airport overflight zone. Traffic and transportation impacts are expected to be the same on the MEP and Gomes sites.
- **Visual Resources.** The Gomes and MEP sites are both within the rolling hills of the Altamont Pass area. The MEP site is within a slight valley that screens the project from offsite views. It is anticipated that the Gomes site would have a greater visual impacts to the power plant. The two sites would have similar visual impacts from transmission and other linear infrastructure.
- **Water Resources.** The sites would have similar linear facilities for water use and supply from Byron Bethany Irrigation District.
- **Waste Management.** Similar quantities of waste would be generated at the Gomes alternative site in comparison to the MEP.
- **Worker Safety.** No differences are expected with respect to worker safety at the Gomes site or proposed MEP site.

Project Site Analysis

After a review of the alternative and proposed project sites, it was determined by staff that the proposed project site would create less of an impact upon the environment. The advantages of the proposed project site include:

- Not being located on “Prime Farmland”;
- Not require the cancellation of a Williamson Act Contract;

- Close proximity to Kelso substation;
- Outside of the Precision Instrument Outer Approach Surface 40:1 Slope for the Byron Airport;
- Outside of the Precision Instrument Inner Approach Surface 50:1 Slope for the Byron Airport;
- Consistent with the Alameda County General Plan;
- Consistent with the Alameda County Municipal Code;
- Located 2.5 miles away from the Mountain House community;
- Close proximity to water supply;
- Close proximity to natural gas supply;
- Low potential for presence of threatened and endangered species and habitat;
- Low cultural/archaeological sensitivity;
- Low noise and visual impacts.

ALTERNATIVES Table 1 compares the proposed project with alternative sites. This analysis includes approximate lengths of linears (transmission lines and water lines) and site characteristics.

ALTERNATIVES Table 1 – Comparison of Impacts and Linears

Characteristic	Project Site	Costanza (Alternative 1)	Gomes (Alternative 2)
Ability to Gain Site Control	Yes	Unknown	Unknown
Sufficient land area	Yes	Yes	Yes
Proximity to existing transmission, distribution lines and an existing substation	0.7 miles	0.7 miles	0.4 miles
General Plan / East County Area Plan	Large Parcel Agriculture 100 acres	Large Parcel Agriculture 100 acres	Large Parcel Agriculture 100 acres
Consistent with General Plan	Yes	Yes	Yes
Zoning	Agricultural District	Agricultural District	Agricultural District
Consistent with Zoning	Yes	Yes	Yes
Williamson Act Contract	Yes	No	Yes
Located on “Prime Farmland”	No	No	No
Within the Byron Airport FAA Conical Airspace Protection Surface	Yes	Yes	Yes
Outside of the Precision Instrument Outer Approach Surface 40:1 Slope	Yes	Yes	Yes
Outside of the Precision Instrument Inner Approach Surface 50:1 Slope	Yes	Yes	Yes
Distance to water supply source of appropriate quality and quantity	1.8 miles	1.7 miles	2.0 miles
Distance to Mountain House Community	2.5 miles	2.6 miles	2.4 miles
Proximity to nearest residence	2,112 feet	2,500 feet	2,100 feet
Potential Presence of Threatened and Endangered Species and Habitat	Low	Low	Low
Cultural/ Archaeological Sensitivity	Low	Moderate	Low
Potential noise impacts	Low	Moderate	Moderate
Potential visual impacts	Low	Moderate	Moderate
Potential soils impacts	Low	Low	Low

PROJECT DESIGN ALTERNATIVES

WATER SUPPLY SOURCE ALTERNATIVES

MEP proposes to use water supplied by the Byron Bethany Irrigation District (BBID). BBID is the main water provider for projects in the area where MEP is located. As a peaking power plant, the project would operate only a small percentage of the time, and water use therefore would be minimal compared with a baseload facility

Mariposa Energy has incorporated cost-effective water conservation features into the project design to minimize the use of water. MEP would not include evaporative (wet) cooling. Notwithstanding these significant measures to minimize water use, tertiary-treated recycled water supply sources were evaluated as an alternative to the BBID Canal 45 water supply. The nearest potential source of recycled water is Mountain House Community Services District (MHCSD) Wastewater Treatment Plant (WWTP), at a distance of approximately 5.5 miles from the MEP. Recycled water is also potentially available from the City of Tracy WWTP at a distance of approximately 11.5 miles from MEP.

Total water use is expected to average 34.8 acre-feet per year based on an expected operating scenario of 600 hours per year and 200 start and stop cycles. The estimated annual usage associated with the maximum-permitted operating scenario of 4,000 hours per year and 300 start and stop cycles is approximately 187 acre-feet per year.

Alternate Water Supply –MHCSD WWTP:

The Mountain House Community Services District, which is in neighboring San Joaquin County, has developed its WWTP in a phased approach to meet the needs of its growing community. The second phase of development included tertiary treatment of WWTP effluent, allowing for recycled water use. As of March 13, 2007, the MHCSD WWTP began to discharge tertiary-treated waste water to the Old River consistent with Phase II requirements specified in the California Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements (Order No. R5-2007- 0039/National Pollutant Discharge Elimination System (NPDES No. CA0084271).

The MHCSD priority use for recycled wastewater will be for uses within the Mountain House community. The initial community priority is to supply irrigation water for a planned (but not yet constructed) community golf course (Shreghi, 2009). The golf course will use approximately 1 million gallons per day (mgd) of water (during the irrigation season). Additionally, the California Energy Commission (CEC) has required in its license of the proposed East Altamont Energy Center (CEC, 2003), that prior to operation of that facility: (1) a pipeline capable of conveying 5,900 gallons per minute (8.5 mgd) of recycled water from the Mountain House WWTP be constructed, and (2) a formal request be submitted for recycled water to satisfy cooling needs for the project. Subsequently, this facility would be required to use all available recycled water to meet its cooling needs.

The current Phase II WWTP is designed to process a daily flow of 3.0 mgd, and includes tertiary filtration and ultraviolet disinfection. The average 2008 annual effluent

flows (based on monthly averages reported in discharger self-monitoring reports) were approximately 0.483 mgd; the 2008 annual total was 560 acre-feet. This quantity is sufficient to meet neither the planned Mountain House golf course irrigation needs nor the needs of the East Altamont Energy Center when built. Significant additional development in the Mountain House community would be required before sufficient supply is available to meet the needs of the planned golf course and additional potential recycled water uses. Based on the current uncertainty in growth of the housing market, it is difficult to predict the timing of future capacity increases. Therefore, the MHCSD WWTP is not expected to have recycled water supply available for use at MEP.

An approximately 5.5-mile pipeline would be required to provide recycled water to the MEP, **Alternatives Figure 2**. The conceptual recycled water supply pipeline route with the least environmental impacts would be northeast from MEP to Kelso Road; along the south side of Kelso Road to North Great Valley Parkway; along the north side of North Great Valley Parkway and crossing underneath Byron Bethany Road; within the existing utility corridor between the Union Pacific Railroad right-of-way and Byron Bethany Road southeast to West Bethany Road; along north side of West Bethany Road to the MHCSD WWTP site, and north into the WWTP facility. Future Mountain House commercial development plans near the WWTP facility would need to be considered in finalizing this route.

Mariposa Energy performed a preliminary engineering pipeline route analysis for the alternate water supply pipeline alignment. This analysis identified numerous utility crossings that would be required, including Union Pacific Railroad, Delta Mendota Canal, two petroleum pipelines, a natural gas pipeline, and several storm drain, water, electrical, and communications lines. Significant engineering design and third party coordination would be required to design and obtain approvals for encroachment of the existing utilities.

Chevron’s environmental division commented on the alternative water supply alignments and identified that portions of former crude-oil pipelines known as the Old Valley Pipeline (OVP) and Tidewater Associated Oil Company (TAOC) systems existed within portions of the proposed MEP alternative water supply route. The proposed route will parallel the former OVP and TAOC alignments along a 2.5-mile stretch of Byron Road in San Joaquin County.

The OVP was installed in the early 1900s and carried crude oil from the Kern River Oil Fields in and near Bakersfield to the Richmond Refinery until pipeline operations ceased in the 1940s. The TAOC system was also constructed in the early 1900s and transmitted crude oil from the southern San Joaquin Valley to the Bay Area until the 1970s.

The pipelines were originally installed at depths ranging from 18 inches to 10 feet below ground surface. The steel pipelines were typically encased in a protective coating composed of primer, coal tar, and asbestos-containing felt material (ACM). When pipeline operations ceased, the pipelines were taken out of commission. The degree and method of decommission varied; in some instances the pipelines were removed, while in others they remain in place.

Chevron's environmental division recommends that the project proponent be prepared to address residual weathered crude oil, pipelines, and asbestos-containing felt material from the former OVP and/or TAOC systems during subsurface construction activity if this alternative is going to be moved forward.

Alternate Water Supply – City of Tracy WWTP

The City of Tracy plans to provide recycled water to several proposed power generation projects, including Mulqueeney Ranch Pumped Storage Project, and Stockton Generation LLC Roberts Island Project (City of Tracy, 2009). Each of these proposed projects would generate significant evaporative losses (500 acre-feet per year or greater). Based on the significant conveyance distance with proportionally greater potential environmental impacts, and MEP's relatively low expected water usage, the City of Tracy WWTP is not likely to be a viable water supply source for MEP.

A recycled water reliability assessment was prepared for the Tracy WWTP facility based on daily effluent flow data from 2005 through 2007 (CH2M HILL, 2008). This study concluded that the WWTP discharges at least 8 million gallons per day (mgd) 92.9% of the time, and discharges at least 4.52 mgd 100% of the time. Therefore, recycled water is potentially available from this source.

Recycled water from the City of Tracy WWTP was considered as an alternate water supply source for MEP, but rejected based on the proportionally larger costs and potential environmental impacts associated the approximate 11.5-mile conveyance distance **Alternatives Figure 3**. The estimated present value water supply cost per megawatt-hour (MWH) generated would increase from $0.17 to $2.18 according to the applicant, by constructing an alternate water supply conveyance system from the City of Tracy and using 100% City of Tracy recycled water for the expected MEP water demand, an almost thirteen-fold increase in cost.

The City of Tracy water supply alternative faces the same constraints within the Byron Road right of way as the MHCSD alignment. Chevron's environmental division has indicated that portions of former crude-oil pipelines known as the Old Valley Pipeline (OVP) and Tidewater Associated Oil Company (TAOC) systems exist and could pose alignment constraints and environmental concerns.

ALTERNATE WATER SUPPLY – CONCLUSIONS

MEP is within the service area of the BBID, and is not located within the boundaries of the MHCSD or City of Tracy, which are in neighboring San Joaquin County. Therefore, Mariposa Energy is required to contract with BBID for the MEP water supply. Regardless of the source, BBID has adopted a Recycled Water Policy to negotiate the purchase of recycled water from developments such as the MHCSD. BBID is prepared to use recycled water to meet the MEP water supply demands provided that a sufficiently reliable supply of tertiary recycled water may be obtained from MHCSD at a reasonable cost.

Energy Commission staff is concerned about jurisdictional issues that would occur if the MHCSD or City of Tracy were to provide a water supply outside their legally created jurisdictional boundaries. Staff is also concerned about the environmental conflicts

created by a longer water supply alternative. The potential for impacts to former crude-oil pipelines is also a concern that could create unknown environmental impacts until investigations would take place, that could include test borings and trenching. For these reasons, these water supply alternatives do not create less environmental impacts than the water supply proposal.

The inclusion of facility-specific water conservation measures and the implementation of a regional water conservation program, the proposed use of a freshwater supply would be consistent with state water policy found in State Water Resources Control Board (SWRCB) Resolution 75-58, and the Energy Commission's 2003 Integrated Energy Policy Report (IEPR) water policy because there is no other economically feasible or environmentally desirable alternative.

GENERATION TECHNOLOGY ALTERNATIVES

CONSERVATION AND DEMAND SIDE MANAGEMENT

One alternative to meeting California's electricity demand with new generation is to reduce that demand for electricity. Such "demand side" measures include programs that increase energy efficiency, reduce electricity use, or shift electricity use away from "peak" hours of demand.

In California there is a considerable array of demand side programs. At the federal level, the Department of Energy adopts national standards for appliance efficiency and building standards to reduce the use of energy in federal buildings and at military bases.

At the state level, the Energy Commission adopts comprehensive energy efficiency standards for most buildings, appliance standards for specific items not subject to federal appliance standards, and load management standards. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program.

The California Public Utilities Commission, along with the Energy Commission, oversees investor-owned utility demand side management programs financed by the utilities and its ratepayers. At the local level, many municipal utilities administer demand side management and energy conservation programs. These include subsidies for the replacement of older appliances through rebates, building weatherization programs, and peak load management programs. In addition, several local governments have adopted building standards which exceed the state standards for building efficiency, or have by ordinance set retrofit energy efficiency requirements for older buildings. New buildings may combine the need for heat and power through a single fuel source or a common source may supply heating and/or heating and cooling to a number of adjacent buildings, increasing overall efficiency.

Even with this great variety of federal, state, and local demand side management programs, the state's electricity use is still increasing as a result of population growth and business expansion. Current demand side programs are not sufficient to satisfy

future electricity needs, nor is it likely that even much more aggressive demand side programs could accomplish this at the economic and population growth rates of the last ten years.

Therefore, although it is likely that federal, state, and local demand side programs will receive even greater emphasis in the future, both new generation and new transmission facilities will be needed in the immediate future and beyond in order to maintain adequate supplies.

POWER GENERATION ALTERNATIVES

Selection of the power generation technology focused on those technologies that can utilize the natural gas readily available from the existing distribution system. The following is a discussion of the suitability of such technologies for application to MEP.

Conventional Boiler and Steam Turbine

This technology burns fuel in the furnace of a conventional boiler to create steam. The steam is used to drive a steam turbine-generator, and the steam is then condensed and returned to the boiler. This is a dated technology that is able to achieve thermal efficiencies up to approximately 36% when utilizing natural gas, although efficiencies are somewhat higher when utilizing oil or coal. Because of this low efficiency and large space requirement, the conventional boiler and steam turbine technology was eliminated from consideration.

Conventional Combined-Cycle Combustion Turbine

This technology integrates combustion turbines and steam turbines to achieve higher efficiencies. The combustion turbine's hot exhaust is passed through a heat recovery system generator to create steam used to drive a steam turbine-generator. This technology is able to achieve high thermal efficiencies. The combined-cycle alternative, however, requires very large capital cost more appropriate for a baseload facility, a large site, and very large quantities of water for wet cooling. Additionally, conventional combined-cycle technology cannot match the General Electric (GE) LM6000 technology for rapid startup, efficient cycling, high part-load efficiency, and load following capability, all of which are critical basic project objectives of MEP.

Kalina Combined-Cycle

This technology is similar to the conventional combined-cycle, except a mixture of ammonia and water is used in place of pure water in the steam cycle. The Kalina cycle could potentially increase combined-cycle thermal efficiencies by several percentage points. This technology is still in the development phase and has not been commercially demonstrated; therefore, it was eliminated from consideration.

Internal Combustion Engines

Reciprocating internal combustion engine designs are also available for small peaking power plant configurations. These are based on the design for large marine diesel engines, fitted to burn natural gas. Advantages of internal combustion engines are that they: (1) use very little water for cooling, because they use a closed-loop coolant system with radiators and fans; (2) provide quick-start capability (on-line at full power in 10

minutes); (3) have more efficient heat rates at both partial and full loads; and (4) are responsive to load-following needs because they are deployed in small units (8 megawatts [MW] per unit with 10 to 14 engines in one power plant), that can be started up and shut down at will. Disadvantages of this design include higher emissions than comparable combustion turbine technology and much higher capital costs. Mariposa Energy proposed the use of internal combustion engines to PG&E, and PG&E rejected that configuration as not meeting the basic project objectives as efficiently and effectively as the MEP configuration.

Conventional Simple-Cycle Combustion Turbine

The GE LM6000 PC Sprint combustion turbine technology was selected primarily because it is proven, reliable equipment that also provides operational flexibility. The configuration of four LM6000 PC Sprint units provides a well proven technology that is flexible in operation, efficient, cost effective, and easily dispatchable. The factors Mariposa Energy considered in selecting four LM6000 units included the following:

- High reliability/availability – The LM6000 gas generator has an overall reliability of 99.42% and package availability of 98.36% based on GE data compiled from November 2004 to July 2007.
- Low equivalent forced outage rate – The LM6000 had an equivalent forced outage rate of 1.43% from November 2004 to July 2007.
- Mariposa Energy's parent company, Diamond Generating Corporation, owns and operates five LM 6000 Sprint units in peaking service in California.

Fuel Technology Alternatives

Technologies based on fuels other than natural gas were eliminated from consideration because they do not meet the project objective of providing operationally flexible, dispatchable, quick start, and reliable power. Some of these alternative fuels have potential for additional air quality and public health impacts. Others, like certain biofuels, are not available in commercial quantities or are not available via pipeline or other reliable delivery system. Additional factors rendering alternative fuel technologies unsuitable for the proposed project are as follows:

- No new geothermal or new hydroelectric resources of sufficient size and sufficient operational profile exist in the PG&E service territory or adjacent territories that can meet the contractually obligated online date of July 1, 2012.
- Biomass fuel facilities do not provide quick start capabilities and have additional environmental impacts related to air emissions and solid waste generation. Additionally, biomass facilities would require additional acreage, taller structures, and larger quantities of water.
- Solar and wind technologies are generally not dispatchable and, therefore, are not capable of providing fast-starting, flexible generating capacity and are not capable of producing ancillary services other than reactive power.
- Coal, fuel oil, and other similar fuels emit more air pollutants and greenhouse gases than technologies utilizing natural gas.

- Nuclear fission is an established technology. However, California law currently prohibits nuclear fission as an energy generation technology.

The availability of the natural gas resource provided by PG&E, as well as the environmental and operational advantages of natural gas technologies, makes natural gas the preferred choice for the proposed project.

THE "NO PROJECT" ALTERNATIVE

The "no project" alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the "no project" alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that "the purpose of describing and analyzing a No Project Alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. §15126.6(i)). Toward that end, the "no project" analysis considers "existing conditions" and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (§15126.6(e)(2)). CEQA Guidelines and Energy Commission regulations require consideration of the "no project" alternative. The no-action alternative provides a baseline against which the effects of the proposed action may be compared. In short, the site-specific and direct impacts associated with the power plant would not occur at this site if the project does not go forward.

Selection of the "no project" alternative would render all concerns about project impact moot. The "no project" alternative would preclude any construction or operation and, thus, installation of new foundations, piping, or utility connections.

If the "no project" alternative was selected, the construction and operational impacts from the proposed MEP would not occur. In the absence of MEP, however, Diamond Generating Corporation or another power company would likely propose that other power plants be constructed along the PG&E transmission system to serve the demand that could be met with the MEP.

If the project is not built, the region will not benefit from the relatively efficient source of 200 MW of new generation that this facility would provide. This new generation would increase the supply of energy and potentially serve load demands in the Bay Area of Northern California. It is thus difficult to determine whether the "no project" alternative would have serious, long-term consequences on air quality and the cost or reliability of electricity in the region.

If no new natural gas plants were constructed, reliance on older power plants may increase. These plants would consume more fuel and emit more air pollutants per kilowatt-hour generated than the proposed project. In the near term, the more likely result is that existing plants, many of which produce higher level of pollutants, would operate more than they do now. Thus, the "no project" alternative is not environmentally superior to the MEP project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received the following comments on aspects of the MEP related to alternatives:

RAJESH DIGHE , INTERVENOR AND MOUNTAIN HOUSE RESIDENT

November 29, 2010 Staff Assessment Workshop

Rajesh Dighe raised the following concerns in regard to the alternatives analysis.

Comment: The alternatives analysis only includes a couple sites within close proximity to the proposed site and not really further away from the Mountain House Community. The analysis should include sites further away.

> **Response:** The applicant provided a list of basic objectives for the project. Based upon these objectives, staff developed siting criteria to develop a range of reasonable alternatives. As identified on pages 6-5 to 6-7 of this section, staff tried to find alternatives that would reduce environmental impacts and still meet the project objectives. Trying to find an alternative site in close proximity to existing infrastructure and meeting the project design objectives was rare based upon the proximity to the Byron Airport and the Mountain House Community.
>
> Alternative sites to the east were eliminated because the project would move closer to the Mountain House Community and would potentially be located on prime farmland. Alternative sites to the north and northeast were eliminated because of potential inconsistencies with the Byron Airport and would potentially be located on prime farmland.
>
> The remaining alternative options require the project to be built further to the south or west. The project site is located in a transitional zone at the base of the Altamont Hills and off the valley floor containing prime farmlands. As the terrain moves into the Altamont Hills, cultural resource sensitivity remains generally low to mild depending on proximity to water ways and habitable sites. However, impacts to biological resources has the potential to increase. Alternative sites on relatively undisturbed upland terrain can create greater habitat impacts, and the impact on sensitive and endangered species can increase. Alternative sites to the south and west would generally require additional grading in the rolling hills and location of a 20-acre relatively flat site is unknown.
>
> The alternatives remaining are generally in the same location as the proposed project site. The project site is currently located as far to the west and south of the Mountain House Community as possible while still being close to existing infrastructure including water, natural gas and electricity transmission facilities.

Comment: The generation technology alternatives should do a better job identifying other technologies that may meet the project design goals. Should other combined-cycle combustion turbines be considered?

Response: The main objective of the MEP applicant is to provide dispatchable and efficient generation to meet Pacific Gas and Electric Company's (PG&E) need for energy sources in Alameda County and the San Francisco Bay Area, to support and back up intermittent renewable resources (e.g., wind and solar), and to satisfy the terms of MEP's power purchase agreement with PG&E.

The applicant has proposed to use a conventional simple-cycle combustion turbine (the GE LM6000 PC Sprint combustion turbine) because it provides operational flexibility and reliability.

Operationally flexible resources are required to assist with the integration of intermittent renewable resources, such as solar and wind facilities. A facility that provides peaking capacity must be able to be up and running at peak generation within 10 minutes to meet California Independent System Operator (CAISO) requirements. As a peaking facility, MEP would not run continuously, but instead would start, run for as many hours as necessary, and then shut down. MEP is designed to reliably provide this type of fast-start capability and highly flexible dispatchable energy and capacity.

The combined-cycle combustion turbines technology integrates combustion turbines and steam turbines to achieve higher thermal efficiencies. The combined-cycle alternative, however, requires very large capital cost more appropriate for a baseload facility, a large site, and very large quantities of water for wet cooling or a dry cooling facility. Additionally, conventional combined-cycle technology cannot match the simple cycle technology for rapid startup, efficient cycling, high part-load efficiency, and load following capability, all of which are critical basic project objectives of MEP.

The **Power Plant Efficiency** section of the Staff Assessment provides a greater detail on the proposed project efficiencies and alternative technologies. The applicant's proposed technology meets the project objectives.

Comment: Can the Energy Commission make the applicant move the proposed site away from the Mountain House Community?

Response: The Energy Commission is required to review the application submitted by Mariposa Energy, LLC and does not have the authority to require the applicant to move the proposed project to another location, even if it identifies an alternative site that meets the project objectives and avoids or substantially lessens one or more of any significant effects of the project. Moving the proposed MEP to an alternative site would require that the applicant submit a new Application for Certification (AFC), including revised engineering and environmental analysis; this more rigorous AFC-level analysis of any of the alternative sites could reveal environmental impacts, non-conformity with laws, ordinances, regulations, and standards; or potential mitigation requirements that were not identified during the more general alternatives analysis presented herein.

ROBERT SARVEY, INTERVENOR

Comment: Staff's Assessment properly concludes that the potential use of 186.9 AFY of surface water is a significant impact and does not comply with State Water Laws related to power plant cooling. Sixty-nine percent of that water usage is for NOx control. The project can by utilizing Dry Low NOx Combustors as an alternative NOx control method and eliminate the potential use of 130.2 AFY of surface water.

GE has several variants of the LM -6000 which incorporate DLE technology.
For example The LM 6000 PF can, by incorporating DLE technology, eliminate the use of 130.2 AFY of water while lowering emissions of NO_x to 15 ppm as compared to the turbine the applicant is proposing which would lower NOx to only 25 ppm before post combustion controls. This can avoid annual water consumption of 130.2 AFY, and can yield $100,000 per year in operational savings and eliminate the need to purchase a water treatment system. The turbine variant would provide superior NOx control and eliminate 69% of the projects water usage

> **Response:** As part of the proposed project, Mariposa Energy has commited to voluntarily fund a water conservation program designed to conserve annually a volume of raw water equal to the volume of water consumed by the Mariposa Energy Project annually. As a result of this commitment to voluntarily fund water conservation, the Mariposa Energy Project will not result in a net increase in consumption of raw water within Byron Bethany Irrigation District. Since the water use will be essentially zero, a technology change to conserve water would not provide any conservation benefits. The water conservation program is described in the **Soils and Water Resources** section of the SSA.

Comment: The applicant and Energy Commission should incorporate alternative Turbine Inlet Conditioning including the new Absorption Refrigeration Cycle Turbine Inlet Chilling, or ARCTIC, system. This new system has the ability to provide more power on the hottest temperature days, which enables an even better heat rate than all other alternatives. There are some key economic advantages ARCTIC provides customers, notably: more power and fewer support systems. The use of absorption chilling reduces the parasitic loads associated with mechanical chiller compressors, pumps and motors. In applications where selective catalytic reduction is needed for emissions abatement, the reduced temperature of the exhaust can also eliminate the need for tempering air fans.

> **Response:** Energy Commission staff in Efficiency, Reliability, Facility Design, Air Quality and Water Resources have reviewed the applicants proposal to utilize four General Electric (GE) LM6000 PC-Sprint natural gas-fired combustion turbine generators (CTG) and associated equipment. This proposal meets the Energy Commission thresholds for Efficiency and Reliability, and the use of this equipment will not create a significant impact upon the environment.
>
> The Bay Area Air Quality Management District has also reviewed the applicant's proposal and has prepared a Final Determination of Compliance for the equipment proposed.

Modifications to the proposed equipment would need to be reviewed by the Energy Commission and applicable federal, state and local agencies.

CONCLUSIONS AND RECOMMENDATION

As determined by Energy Commission staff in the SA and SSA, the MEP is not likely to cause potentially significant adverse impacts. The alternative sites in the vicinity have disadvantages (e.g. longer gas and transmission interconnections, greater visual presence, closer to receptors) and no significant advantages over the proposed site.

Staff does not believe that alternative technologies such as solar, wind, geothermal, biomass, tidal, and wave present feasible alternatives to the proposed project. The alternative linear routes are feasible but present no clear advantage. With no significant issues at this time, staff does not recommend an alternative over the project as proposed. Based on the analysis of alternative sites, the environmental impacts associated with proposed MEP site appear less than those for the other alternatives sites.

REFERENCES

BBID 2009a - Byron Bethany Irrigation District / R. Gilmore (TN 54252) Letter Regarding District Background, dated 11/23/2009. Submitted to CEC on 11/24/2009.

CHEV 2010a- Chevron / L. Higgins (TN 55420). Comments on the Mariposa Energy Project (09-AFC-03) United States Army Corps of Engineers Wetland Delineation Amendment for the Mariposa Energy Project – Field Verification Including the Alternative Water Supply Pipeline Route, dated 2/16/10. Submitted to CEC on 2/16/2010

CH2M 2009c- CH2M HILL / D Urry (TN52651). Supplement A – Data Adequacy Responses dated July 2009 Submitted to CEC on 7/31/2009.

CH2M 2009f- CH2M Hill / D. Urry (TN 54287). Data response Sets 1A and 1B, dated 11/30/2009. Submitted to CEC on 11/30/2009.

CH2M 2010d - CH2M Hill / D. Urry (TN 55797). Applicant's Supplement B Additional Laydown Area Analysis, dated 3/5/2010 Submitted to CEC on 3/8/2010.

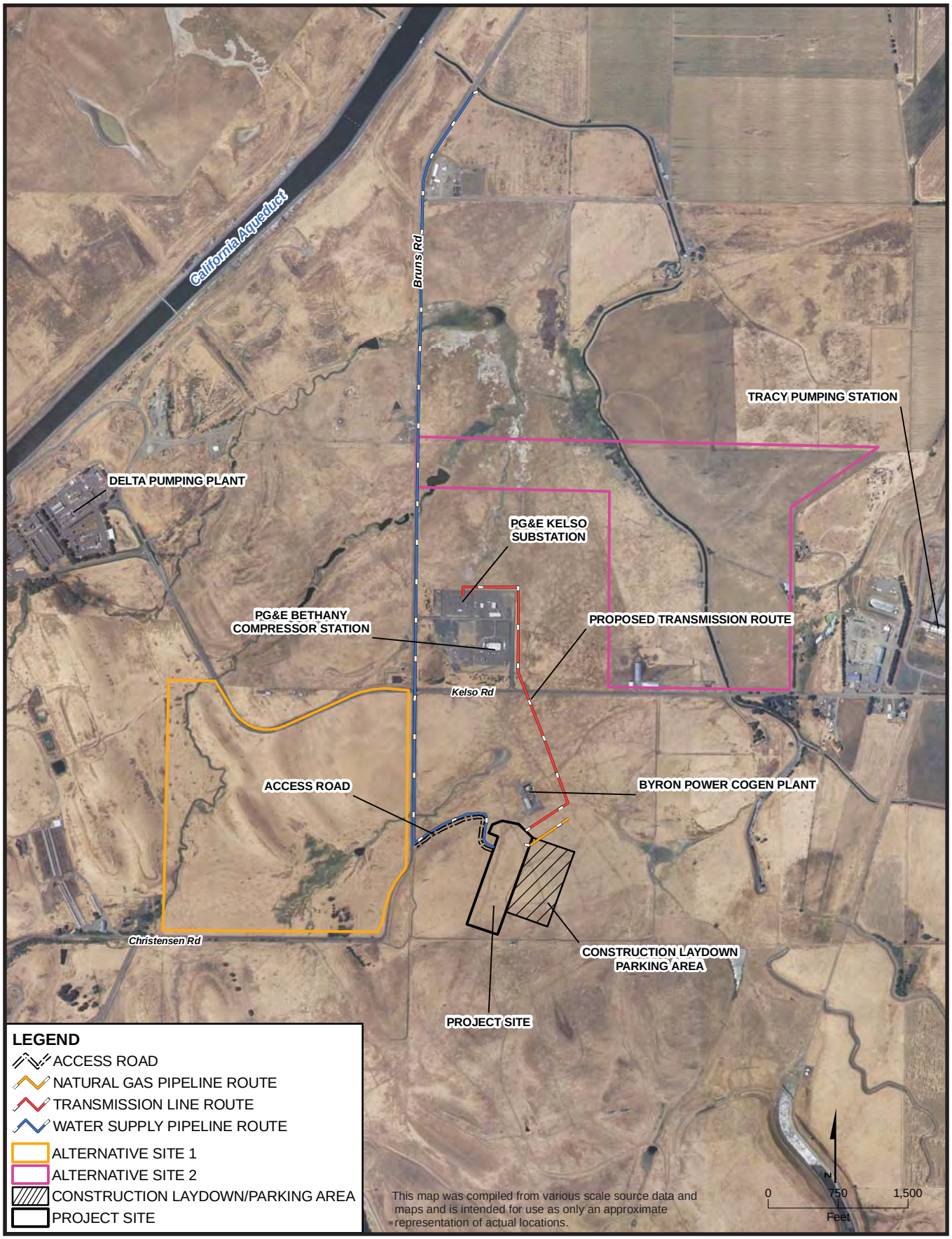
CH2M 2010ae - CH2M Hill / D. Urry (TN 59197). MEP Voluntary Water Conservation Program, dated 12/9/10. Submitted to CEC on 12/10/2010.

MEP 2009a - Mariposa Energy LLC / B. Buchynsky (TN 51974). Application for Certification for Mariposa Energy Project, dated 6/15/2009. Submitted to CEC on 6/15/2009.

MEP 2009b - Mariposa Energy LLC / B. Buchynsky (TN 53543). Applicant Power Point presentation regarding informational site visit and hearing, dated 10/1/2009. Submitted to CEC on 10/5/2009.

ALTERNATIVES - FIGURE 1

Mariposa Energy Project - Alternative Site Locations



CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Figure 6.3-1R

ALTERNATIVES - FIGURE 2

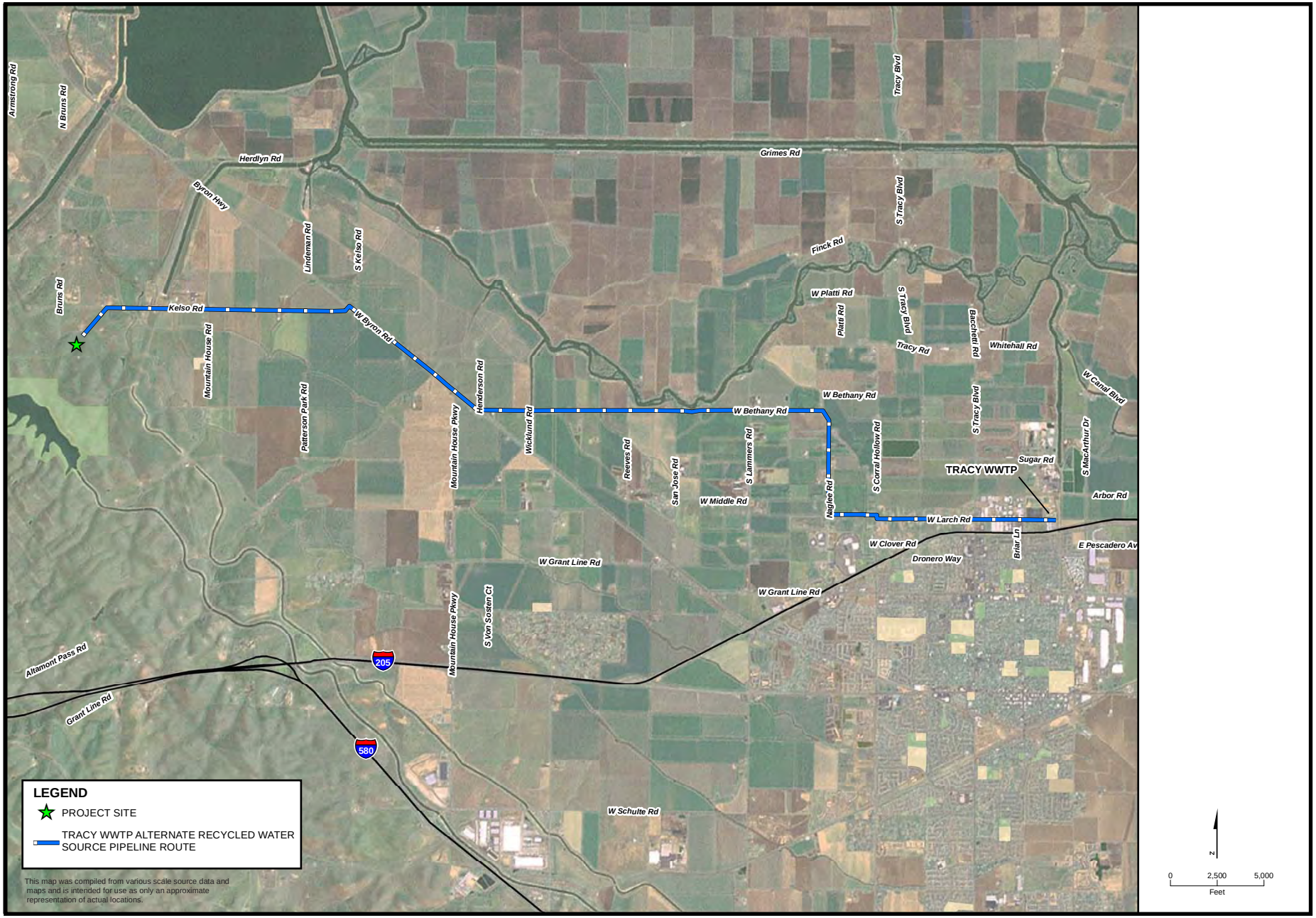
Mariposa Energy Project - Alternate Water Supply Pipeline Route - Mountain House WWTP

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Figure DR15-1

ALTERNATIVES - FIGURE 3

Mariposa Energy Project - Tracy WWTP Alternate Recycled Water Source Pipeline Route



ALTERNATIVES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Figure DR15-2

PREPARATION TEAM

MARIPOSA ENERGY PROJECT
09-AFC-3
PREPARATION TEAM

Executive Summary ..... Craig Hoffman

Project Description ..... Craig Hoffman

Air Quality ..... Brewster Birdsall, Jacquelyn Leyva and Wenjun Qian

Biological Resources ..... Sara Keeler

Hazardous Materials Management ..... Rick Tyler

Land Use ..... Lisa Worrall

Noise and Vibration ..... Shahab Khoshmashrab

Public Health ..... Obed Odoemelam, Ph.D.

Socioeconomic Resources ..... Kristin Ford

Soils and Water Resources ..... Mark Lindley, Rachel Cancienne and Paul Marshall

Traffic and Transportation ..... Andrea Koch, Shaelyn Strattan and Will Walters

Transmission Line Safety and Nuisance ..... Obed Odoemelam, Ph.D.

Visual Resources ..... Mark Hamblin

Worker Safety and Fire Protection ..... Rick Tyler

Transmission System Engineering ..... Ajoy Guha, P.E. and Mark Hesters

Transmission System Engineering Appendix A ..... Sarah Allred, Sara Keeler, Mark Hesters and Craig Hoffman

Alternatives ..... Craig Hoffman

Project Assistant ..... Hilarie Anderson

Staff Counsel ..... Kerry Willis

DECLARATION OF
Sarah M. Allred

I, (Your Name), declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner II – Cultural Resources.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony for the **Transmission System Engineering - Appendix A** for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 30, 2010 Signed: original signed by S. Allred

At: Sacramento, California

RESUME

September 2010

SARAH M. ALLRED
Environmental Planning and Cultural Resource Management

PROFESSIONAL STATEMENT

Twenty years experience working in an environmental planning capacity with an emphasis on archaeological investigations and cultural resources management in both private consulting and civil service settings. Currently employed with the California Energy Commission as a Planner II - Cultural Resources Specialist, responsible for conducting technical analyses and preparing staff assessments for cultural resources in the context of the Energy Commission's certified regulatory program under the California Environmental Quality Act (CEQA) for the licensing of thermal power plants and related facilities.

EDUCATION

Graduate Studies
Department of Anthropology
California State University, Sacramento, *1998 - 2003*

Bachelor of Arts Degree, *1993*
Department of Anthropology
California State University, Sacramento

EMPLOYMENT HISTORY

California Energy Commission
Title: Planner II – Cultural Resources Specialist
Dates: December 2009 – Present
Office location: Sacramento, California

California Department of Transportation
Title: Associate Environmental Planner
Dates: June 1998 -- Present, full-time
Office location: Sacramento, California

Pacific Legacy, Incorporated
Title: Archaeologist
Dates: November 1995 -- September 1997, full-time
Office location: Woodland, California

KEA Environmental
Title: Cultural Resource Specialist
Dates: May 1995 -- November 1995, full-time
Office location: Fair Oaks, California

BioSystems Analysis, Incorporated
Title: Archaeologist
Dates: October 1993 -- May 1995, full-time
Office location: Sacramento, California

Archaeological Services, Incorporated
Title: Archaeological Technician
Dates: May 1990 -- October 1993, part- and full-time
Office location: Stockton, California

EXPERIENCE AND SKILL SUMMARY

- Compliance with a variety of both state and federal environmental laws including: the National Environmental Policy Act; the National Historic Preservation Act; The California Environmental Quality Act; the California Public Resources Code; California Department of Transportation Policies and Guidelines; and the California Energy Commission's certified regulatory program.

- Experience coordinating and consulting with a wide variety of local, state, and federal agencies, as well as private organizations, Native Americans, preservation interest groups, and individuals as a part of the planning and public participation process.

- Experience and proficiency in all aspects of archaeological method and analysis including literature research; cartography and map interpretation; field reconnaissance and inventory; resource documentation; archaeological site excavation; laboratory analyses; and the preparation and production of a variety of technical reports and environmental compliance documents.

- Proficient in a number of computer technologies enabling the collection, analysis, management, and presentation of cultural resource data, including the use of all major hardware and software applications for word processing, database management, spreadsheets, and graphic design/illustration; skilled in both conventional and digital photography.

- Training and experience in the use of Geographic Information Systems (GIS) tools and techniques for the research and management of resources in a planning setting; use of Global Positioning System (GPS) equipment for data input and ArcView software for spatial and relational database analyses.

DECLARATION OF
James Brewster Birdsall

I, James Brewster Birdsall, declare as follows:

1. I am under contract with Aspen Environmental Group to provide environmental technical assistance to the California Energy Commission. Under Contract No. 700-08-001, I am serving as an Air Quality Specialist and Project Manager to provide Peak Workload Support for the Energy Facility Siting Program and for the Energy Planning Program and the Siting, Transmission, and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Air Quality and Greenhouse Gas Emissions** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: Original Signed

At: San Francisco, California

Aspen
Environmental Group

BREWSTER BIRDSALL, P.E., QEP
Senior Associate, Air Quality and Engineering

ACADEMIC BACKGROUND
M.S., Civil Engineering, Colorado State University, 1993
B.S., Mechanical Engineering, Lehigh University, 1991

PROFESSIONAL EXPERIENCE

Mr. Birdsall is an environmental scientist who specializes in air quality and noise analyses for land development related projects and air quality risk assessments. He has nine years of consulting experience with expertise in environmental impact assessment under the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), and the Clean Air Act. His focus is on air permitting, and air quality and noise-impact modeling, which includes field monitoring for traffic and other community noise sources.

Aspen Environmental Group — 2001 to present

Mr. Birdsall's project experience at Aspen includes the following:

Technical Studies for CEC Contract – Review of Power Plant AFCs. Mr. Birdsall assists the California Energy Commission (CEC) as a technical specialist by reviewing and providing testimony on Applications for Certification (AFC) for new power plants throughout California.

- **Tesla Power Plant.** Lead technical staff for air quality assessment and analyst of visible plumes for new 1,120 MW combined cycle power plant and 11-mile recycled water pipeline in rural eastern Alameda County near Tracy.
- **Inland Empire Energy Center.** Lead technical staff for air quality assessment for new 670 MW combined cycle power plant near Romoland in Riverside County.
- **Palomar Energy.** Lead technical staff for air quality assessment and supporting staff for cooling system studies for new 540 MW combined cycle power plant in northern San Diego County.
- **Kings River Conservation District Peaking Power Plant.** Lead technical staff for air quality assessment of new 97 MW simple cycle power plant in Fresno County.
- **Avenal Energy.** Lead technical staff for air quality assessment and analyst of visible plumes for large new combined cycle power plant near Avenal in Kings County.
- **Blythe Energy Project Phase II.** Lead technical staff for air quality assessment for new 520 MW combined cycle power plant and affiliated 118-mile transmission line, in the Mojave Desert and Coachella Valley of Riverside County.
- **Russell City Energy Center.** Lead technical staff for noise assessment of new 600 MW combined cycle power plant adjacent to shoreline recreational areas in Hayward.
- **Los Esteros Critical Energy Facility.** Lead technical staff for noise assessment and analyst of visible plumes for new 180 MW simple cycle power plant adjacent to recreational areas in San Jose.

- **Environmental Performance Report.** Technical review and editorial assistance for environmental portion of the first Integrated Energy Policy Report for the Governor and Legislature.
- **Air Quality Compliance.** Technical staff for analysis of modifications to permit conditions at the Moss Landing Power Plant. Prepared independent analysis of permit requirements and environmental consequences of increasing the capacity of the Midway-Sunset Cogeneration Project.
- **Alternative Cooling Technology Studies.** Supporting staff for analyses of dry cooling and hybrid cooling alternatives for the Cosumnes Power Plant and Palomar Energy Project. Coordinated and edited documentation from design engineers and other specialists.

For the **California Public Utilities Commission**:

- **San Onofre Nuclear Generating Station and Diablo Canyon Power Plant, Steam Generator Replacement Projects.** Currently serving as Deputy Project Manager for Environmental Impact Reports on the proposed improvements to these controversial nuclear power plants. Preparing certain administrative and technical portions of reports and coordinating the environmental documents with team of analysts.
- **Miguel-Mission 230 kV #2 Transmission Line.** Conducted the air quality and noise review for a system that would reduce transmission constraints between San Diego County and generators within the U.S. and Mexico. Provided oversight of the engineers studying impacts to traffic and transportation and the transmission system design.
- **Jefferson-Martin 230 kV Transmission Line.** Prepared air quality and noise studies for construction and operation of a 27-mile transmission line through urban and rural San Mateo County. The project is proposed to meet the projected electric demand in the Cities of Burlingame, Millbrae, San Bruno, South San Francisco, Brisbane, Colma, Daly City, and San Francisco.
- **Viejo System Transmission Project.** Prepared air quality, noise, and traffic analyses for construction of a controversial transmission improvement project in suburban south Orange County.
- **Looking Glass Networks Telecommunications Project.** Prepared the air quality and noise analyses for this Initial Study/Mitigated Negative Declaration (IS/MND) evaluating proposed fiber optic connections throughout the San Francisco Bay and Los Angeles areas, and developed programmatic mitigation measures for implementation of the metropolitan area network.

Presidio Trust, Presidio of San Francisco. Provided impact analysis for demolition, rehabilitation, and infill construction within the Public Health Service Hospital District, within the Golden Gate National Recreation Area and adjacent to sensitive San Francisco residences. Provided technical support and peer review of noise and vibration analyses related to the Doyle Drive Reconstruction through the Presidio of San Francisco. Involved protecting natural sounds consistent with National Park Service policy.

California State Lands Commission, Monterey Accelerated Research System Cabled Observatory. Providing technical analysis of air quality and noise effects of installing new underwater equipment in Monterey Bay. Supporting efforts of marine biologists with analysis of underwater noise.

California State Lands Commission, Concord-Sacramento Pipeline. Provided technical analysis of air quality and noise effects of constructing a new 20-inch, 70-mile petroleum products pipeline, including upgrades to storage tank facilities in Concord and distribution systems in West Sacramento.

California Department of Water Resources, Piru Creek Erosion Repairs and Bridge Seismic Retrofit Project. Provided assessment of air quality and noise impacts for construction of upgrades.

Ventura County Resource Conservation District, Casitas Springs *Arundo Donax* Removal Demonstration Project. Prepared estimates of community noise impacts and air quality assessment for cutting and removing non-native plants for improving flood control along the Ventura River.

Technical Support for U.S. Army Corps of Engineers. Analyzed construction noise and air quality effects and described applicability of general conformity rule for various flood control improvements in Arizona and Southern California.

Technical Support for Los Angeles Unified School District. Provided technical analysis of air quality and noise effects for school expansion, play area expansion, and temporary classroom projects, including reviews of cumulative, regional air quality consequences of temporary projects.

EIP Associates 1998 to 2001

As a Senior Environmental Scientist at **EIP Associates**, Mr. Birdsall performed comprehensive analyses of air quality and noise impacts for Environmental Impact Reports/Statements and independent studies. His projects at EIP included:

- **Bay Area Rapid Transit District, Oakland Airport Connector EIS/EIR.** Prepared noise impact evaluation and mitigation strategies. Conducted community noise monitoring and assessment according to Federal Transit Administration methodology.
- **Presidio Trust Implementation Plan EIS and Letterman Complex Supplemental EIS.** Prepared community noise impact assessment and traffic noise mitigation strategies. Air quality management policy consistency analysis. The plan was awarded the 2003 Outstanding Land Use Plan from the Association of Environmental Professionals.
- **San Francisco International Airport, Offshore Runway Construction Concepts, AGS Design Team.** Conducted preliminary environmental review of design and construction concepts for runway expansion. Prepared emission control strategies for general conformity rule.
- **Sacramento Metropolitan Airport Master Plan EIS/EIR, Sacramento County Department of Environmental Review and Assessment.** Baseline emission inventory and regulatory constraints.
- **Desert Resorts Regional Airport, Thermal, Riverside County.** Emission inventory and general conformity determination for runway extension and taxiway improvements.
- **San Joaquin Area Flood Control Agency, Stockton Areawide Flood Control Projects.** Reviewed emission inventories and retroactive general conformity rule applicability for construction activities.
- **Alameda County Flood Control and Water Conservation District, Zone 7, Altamont Water Treatment Plant EIR.** Analyzed air quality and community noise effects of three potential water plant sites in remote eastern Alameda County.
- **Santa Clara Valley Water District, Coyote Watershed, Lower Silver Creek Project.** Analyzed air quality and community noise effects for Initial Study/Environmental Assessment of constructing flood control improvements and habitat restoration.
- **University of California, Davis.** Prepared campuswide health risk assessment update, which included toxic air contaminant emission inventory and dispersion modeling using ISC.

- **University of California, Berkeley.** Prepared initial air quality and noise technical studies for Long Range Development Plan Update EIR and analyses for Northeast Quadrant Science and Safety Project (Stanley Hall replacement building) EIR.
- **Merced County, Draft University Community Plan.** Prepared air quality and noise background studies and policy discussion papers for the new Merced Campus of the University of California.
- **Allegro Jack London Square Project, SNK Development.** Provided expert testimony on the pile driving noise impacts to residents in a revitalized, high-density City of Oakland neighborhood. Conducted field surveys with City Staff and evaluated compliance with City noise ordinance.
- **Maranatha High School and Playing Fields Project, City of Sierra Madre.** Prepared the community noise technical study for a new private high school with outdoor amphitheater and athletic facilities. Characterized noise from events to determine impact level on sensitive residential community.
- **State Route 275 Modification Project, City of West Sacramento.** Prepared noise technical studies on the realignment of the State Route 275 Modification Project. Required assessment of new traffic noise impacts caused by rerouting traffic to grade level in close proximity of existing sensitive land uses and identification of feasible measures to insulate lodging uses.
- **City of Mountain View, Whisman Road Transit Oriented Development MND.** Deputy Project Manager for Negative Declaration related to high-density office development at the Middlefield-Ellis-Whisman Superfund Site. Prepared various technical sections, managed traffic subconsultant, and coordinated preparing the environmental documents with the city staff.

Trinity Consultants 1994 to 1998

Mr. Birdsall prepared compliance strategies, evaluated modeled impacts, and negotiated air permits while a Project Supervisor at **Trinity Consultants**, an environmental firm specializing in air quality.

- **Browning-Ferris Gas Services.** Coordinated nationwide Title V program implementation, secured numerous new source and operating permits, supported rollout of federal new source performance standards for municipal solid waste landfills and landfill gas to energy facilities.
- **Newmont Mining Joint Venture, Batu Hijau Project.** Environmental impact studies for open-pit metallic mineral mining facility and independent power production facility. Included noise assessment for "greenfield" power plant and air quality impacts evaluation in complex, coastal terrain.
- **Questar Pipeline, TransColorado Pipeline Project.** Secured new source permits for air quality effects related to construction and operation of major natural gas pipeline including compressor stations.
- **Coastal Field Services, Altamont Gas Plant.** Negotiated Title V operating permits for upstream natural gas processing plant and associated field compressor stations.
- **Solvay Soda Ash Joint Venture.** Developed particulate matter modeling protocol with State agency.
- **Potlatch Corporation.** Facilitywide emission inventory and permitting for a wood products plant. Included regionwide analyses of ambient air quality standards and resolving existing modeled violations.

NOISE IMPACT ASSESSMENT MODELS

- Federal Highway Administration Traffic Noise Model
- California Department of Transportation Traffic Noise Model (SOUND32)
- FTA Transit Noise Assessment and Mitigation Methodology

AIR QUALITY MODELING EXPERTISE

MVEI/EMFAC; URBEMIS; CALINE4; SCREEN; ISC; CTDM; TANKS; Landfill Gas Emissions Model.

ADDITIONAL TRAINING AND COURSES

- Fundamentals of Noise and Vibration for the California Energy Commission
- Expert Witness Training, California Energy Commission
- Co-Instructor, Air Permitting Issues for Municipal Solid Waste Landfills, Trinity Consultants
- Fundamentals of New Source Review Workshop, Air and Waste Management Association
- Title V and Compliance Assurance Monitoring Workshops, Air and Waste Management Association
- NATO Advanced Studies Institute, Wind Climates in Cities

PROFESSIONAL AFFILIATIONS AND AWARDS

- Professional Engineer (Mechanical, California #32565)
- Qualified Environmental Professional, Institute of Professional Environmental Practice (#03030005)
- 2001 Outstanding Performance Award presented by the California Energy Commission
- Air and Waste Management Association since 1994

PUBLICATIONS

Smith, P.J., J.B. Birdsall, and P.E. Delamater. "A Discussion of Air Permitting Issues for Landfill Gas-To-Energy Projects." 88th Annual Meeting and Exhibition of the Air and Waste Management Association, San Antonio, Texas, 1995.

Meroney, R.N., D.E. Neff, and J.B. Birdsall. "Wind-Tunnel Simulation of Infiltration Across Permeable Building Envelopes: Energy and Air Pollution Exchange Rates." 7th International Symposium on Measurement and Modeling of Environmental Flows. International Mechanical Engineering Congress and Exposition, San Francisco, California, 1995.

Birdsall, J.B. and R.N. Meroney. "Model Scale and Numerical Evaluation of Tracer Gas Distribution Due to Wind-Forced Natural Ventilation." 9th International Conference on Wind Engineering, New Delhi, India, 1995.

Birdsall, J.B. Physical and Numerical Simulation of Wind-Forced Natural Ventilation, MS Thesis, Colorado State University, Fort Collins, Colorado, 1993.

DECLARATION OF
Rachel Cancienne

I, **Rachel Cancienne**, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Soil and Water Resources** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 2, 2010 Signed: Original Signed

At: Sacramento, California

Rachel M. Cancienne, MS

Hydrologist

Ms. Cancienne is a hydraulic and environmental engineer with experience in river dynamics and streambank stability. She received her Master of Science degree in Biosystems Engineering with an emphasis in Natural Resources from Oklahoma State University, where she was a student of Dr. Garey Fox. She conducted laboratory research on simulated streambanks and used numerical modeling through USDA-ARS National Sedimentation Laboratory software to study streambank stability. Since joining PWA's Fluvial Team, she has focused on hydraulic modeling and environmental impacts analyses for the California Energy Commission.

Education

M.S. 2008 — Biosystems and Agricultural Engineering
Emphasis in Environment and Natural Resources
Oklahoma State University, Stillwater, OK

B.S. 2006 — Biosystems and Agricultural Engineering
Oklahoma State University, Stillwater, OK

Certifications

Engineer in Training (EIT), OK License: EI 13655

Honors/Awards

Tau Beta Pi Engineering Honor Society, 2006—2008
Alpha Epsilon, Biosystems Engineering Honor Society, 2005—2008
National Society of Collegiate Scholars, 2003—2008
Phi Eta Sigma Freshman Honor Society, 2002—2003
Boy Scouts of America Venturing Leadership Award, 2002

Selected Project Experience

Marsh Landing, Antioch, CA 2009 – Present. Ms. Cancienne provided environmental review for a proposed power plant project by Mirant Delta, LLC for the California Energy Commission. The environmental review focuses on the impacts to soil and water use, submittal and review of data requests, and includes writing a Staff Assessment. Ms. Cancienne is specifically reviewing the project's proposed stormwater related facilities, BMPs, and water use to evaluate potential soil and water impacts. Ms. Cancienne has and will provide extensive written input for the Data Requests and Soil and Water Section of the Preliminary Staff Assessment.

Almond 2 Power Plant, Ceres, CA 2009 - Present. Ms. Cancienne is providing environmental review for a proposed power plant project by the Turlock Irrigation District for the California Energy Commission. The environmental review focuses on the impacts to soil and water use, submittal and review of data requests, and includes writing a Staff Assessment. Ms. Cancienne is specifically reviewing the project's proposed stormwater related facilities, BMPs, and water use to evaluate potential soil and water impacts. Ms. Cancienne has and will provide extensive written input for the Data Requests and Soil and Water Section of the Preliminary Staff Assessment.

GWF Tracy; Tracy, CA 2008 – 2010. Ms. Cancienne provided environmental review of a proposed combined-cycle power plant in the City of Tracy for the California Energy Commission. The environmental review focused on the impacts to soil and water use and included writing a Staff Assessment. Ms. Cancienne specifically reviewed the project's proposed stormwater related facilities, BMPs, and water use to evaluate potential soil and water impacts. Ms. Cancienne provided extensive written input for the Soil and Water Section of the Preliminary Staff Assessment.

Cherokee Canal (Dry Creek): Geomorphic Assessment and Channel Reconstruction Project, California Department of Water Resources. Butte County, CA, 2009 – Present. Cherokee Canal is impacted from a highly augmented sediment supply caused by hydraulic mining debris originating near Table Mountain, which has decreased the flood capacity of the system. Ms. Cancienne is a part of PWA's team to assess the sediment regime and geomorphic processes in this system to develop a one-time channel reconstruction effort that seeks to balance the needs of habitat and flood conveyance.

DWR-San Joaquin Non-Urban Levees, San Joaquin Valley, CA, 2008 – present. Hydrologist. Ms. Cancienne reviewed and digitized historic topographic maps and aerial photos using ArcGIS 9.2. Developed mapping products which included geologic and soils data, as well as a written report, to aid client's knowledge of potential levee instability locations.

DWR Geomorphic Study, Urban Non-Project, Stockton, 2008 – Present. Hydrologist. Ms. Cancienne reviewed and digitized historic topographic maps and aerial photos using ArcGIS 9.2. Developed mapping products which included geologic and soils data, as well as a written report, to aid client's knowledge of potential levee instability locations.

Whidbey Island NAS Mitigation and Stormwater Planning, Whidbey Island, WA, 2008. Ms. Cancienne aided the PWA team in developing a Stormwater Management Plan for a proposed airfield expansion at the Whidbey Island Naval Air Station at Whidbey Island in Puget Sound, Washington. The project involved hydromodification modeling to assess the potential impact to receiving waters as a result of potential runoff impacts due to an increase in impervious area. Ms. Cancienne performed HEC-RAS analysis for re-designed channel through mitigation site.

Graduate Research Assistant, Oklahoma State University, Stillwater, OK. 2007
Under advisor, Dr. Garey A. Fox, Ms. Cancienne directed and performed experimental analyses involving streambank stability; simulated stability of streambanks using the USDA-ARS Bank Stability and Toe Erosion (BSTEM) model; and reviewed and wrote detailed reports and manuscripts regarding research procedures and findings. Graduate Thesis: *Influence of Seepage Undercutting on the Root Reinforcement of Streambanks*

Publications

Cancienne, R., G.A. Fox, and A. Simon. 2008. Influence of seepage undercutting on the root reinforcement of streambanks. *Earth Surface Processes and Landforms* (In Press).

Cancienne, R., G.A. Fox, and G.V. Wilson. 2008. Vegetated Soil Block Experiments Investigating Three-Dimensional Seepage Erosion Phenomena. Proceedings of the American Society of Agricultural and Biological Engineers Annual Conference, June 29-July 2, 2008.

DECLARATION OF
Kristin Ford

I, Kristin Ford, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Socioeconomics** section for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: original signed by K. Ford

At: Sacramento, California

Kristin S. Ford

Experience

Environmental Planner November 2009 to Present
California Energy Commission, Sacramento, California

- Conduct CEQA-equivalent environmental review for proposed and existing power plants.
- Write analysis for Socioeconomics, Traffic, Visual Resources and Land Use sections for staff assessments.
- Provide expert witness testimony on Socioeconomics, Traffic, Visual Resources and Land Use issues at Energy Commission hearings.

Assistant Planner June 2006 to July 2009
City of Sacramento, Environmental Planning Services, Sacramento, California

- Evaluated, prepared and supervised the preparation of a variety of environmental documents under the California Environmental Quality Act (CEQA); analyzed data and made recommendations on complex planning matters involving issues related to land use, traffic, utilities, aesthetics, noise, energy, historic preservation, air quality and biological resources.
- Prepared, researched and reviewed Mitigation Monitoring Plans per CEQA, the California State & Federal Endangered Species Acts (CESA & FESA), the Clean Water Act (CWA), the Migratory Bird Treaty Act (MBTA) and the Natomas Basin Habitat Conservation Plan.
- Conducted biological resources site assessments for proposed development projects. Determined the need for preparation and/or review of specific studies, such as Wetland Delineations, Nesting Raptor Surveys, and Arborist Reports, to identify resources and provide mitigation measures.
- Coordinated the release of the City of Sacramento's 2030 General Plan Draft/Final Environmental Impact Report between various City departments, the Planning Commission, City Council and the consultant team.

Environmental Coordinator August 2005 to June 2006
Nella Oil Company, Auburn, California

- Coordinated company-wide environmental regulatory compliance activities, including:
  - site investigations;
  - underground fuel-storage tank environmental compliance recommendations and subsequent tank upgrades; and
  - hazardous waste removal.
- Maintained and managed Air Quality Management District and Environmental Health Department permits for 60+ gas stations.

Student Assistant March 2005 to August 2005
California Energy Commission, Sacramento, California

- Conducted research and provided technical writing support to Biology and Water Departments for the annual Energy Policy Report impact analyses.
- Maintained and managed compliance files on power plant facilities.

Student Assistant June 2004 to March 2005
Central Valley Regional Water Quality Control Board, Sacramento, California

- Supported National Pollutant Discharge Elimination System (NPDES) staff by:
  - maintaining waste water treatment plant discharge self-monitoring reports and case files; and
  - analyzed (Amador, Sutter, Placer and Yolo county) wastewater treatment plant monthly monitoring reports for possible permit violations.

Education

2005 Bachelor of Arts, Environmental Studies, *California State University, Sacramento*
2001 Associate of Arts, Liberal Studies, *Allan Hancock College, Santa Maria, California*

DECLARATION OF
Ajoy Guha

I, **Ajoy Guha**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Associate Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Transmission System Engineering** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 30, 2010 Signed: Original signed by A. Guha

At: Sacramento, California

RESUME

AJOY GUHA

Associate Electrical Engineer
California Energy Commission
1516 Ninth Street, MS 46
Sacramento, CA 95814

EDUCATION:

MSEE, POWER SYSTEMS ENGINEERING, PURDUE UNIVERSITY, INDIANA
BSEE, ELECTRICAL ENGINEERING, CALCUTTA UNIVERSITY, INDIA

CERTIFICATIONS:

REGISTERED PROFESSIONAL ENGINEER, CALIFORNIA, INDIANA & ILLIINOIS
MEMBER OF IEEE; MEMBER OF THE INSTITUTION OF ENGINEERS OF INDIA

SUMMARY OF PROFESSIONAL BACKGROUND:

Ajoy Guha, P. E. has 34 years of electric utility experience with an extensive background in evaluating and determining current and potential transmission system reliability problems and their cost effective solutions. He has a good understanding of the transmission issues and concerns. He is proficient in utilizing computer models of electrical systems in performing power flow, dynamic stability and short circuit studies, and provide system evaluations and solutions, and had performed generator interconnection studies, area transfer and interconnected transmission studies, and prepared five year transmission alternate plans and annual operating plans. He is also experienced in utilizing Integrated Resource Planning computer models for generation production costing and long term resource plans, and had worked as an Executive in electric utilities and experienced in construction, operation, maintenance and standardization of transmission and distribution lines.

WORK EXPERIENCE:

CALIFORNIA ENERGY COMMISSION, ENERGY FACLITIES SITING AND ENVIRONMENTAL DIVISION, SACRAMENTO, CA, 11/2000-Present.
Working as Associate Electrical Engineer in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies and their impacts on transmission system, and providing staff assessments and testimony to the commission, and coordination with utilities and other agencies.

ALLIANT ENERGY, DELIVERY SYSTEM PLANNING, MADISON, WI, 4/2000-9/2000.
Worked as Transmission Services Engineer, performed Generator Interconnection studies and system planning studies.

IMPERIAL IRRIGATION DISTRICT, POWER DEPT., Imperial, California, 1985-1998.
Worked as Senior Planning Engineer in a supervisory position and in Transmission, Distribution and Integrated Resource planning areas. Performed interconnection studies for 500 MW geothermal plants and developed plan for a collector system, developed methodologies for transmission service charges , scheduling fees and losses. Worked as the Project Leader in the 1992 Electricity Report (ER 92) process of the California Energy Commission. Worked as the Project Leader for installation of an engineering computer system and softwares. Assumed the Project Lead in the standardization of construction and materials, and published construction standards.

CITY LIGHT & POWER, Frankfort, Indiana, 1980 – 1985.
Worked as Assistant Superintendent and managed engineering, construction and operation depts.

WESTERN ILLINOIS POWER CO-OP., Jacksonville, Illinois, 1978 – 1980.
Worked as Planning Engineer and was involved in transmission system planning.

THE CALCUTTA ELECTRIC SUPPLY CORPORATION LTD. (CESC), Calcutta, India, 1964 –1978.
Worked as District Engineer and was responsible for managing customer relations, purchasing and stores, system planning, construction, operation and maintenance departments of the most industrialized Transmission and Distribution division of the Utility. Worked as PROJECT MANAGER for construction of a 30 mile Double Circuit 132 kV gas-filled Underground Cable urban project. During 1961-63, worked as Factory Engineer for design, manufacturing and testing of transformers, motor starters and worked in a coal-fired generating plant.

DECLARATION OF
Mark R. Hamblin

I, Mark R. Hamblin declare as follows:

I am presently employed by the California Energy Commission in the Siting, Transmission, Environmental Protection Division, Environmental Protection Office as a Planner II.

My professional qualifications and experience were included in the SSA, and are incorporated by reference herein.

I prepared the staff testimony for the **Visual Resources** section for the proposed **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 1, 2010 Signed: original signed by M. Hamblin

At: Sacramento, California

MARK R. HAMBLIN

Summary

Public administrator/land use planner with 15 years experience addressing land use development matters of concern to citizens and government leaders. Expertise in interpreting public policy pertaining to land use and environmental assessment. Demonstrated ability in working with individuals, and on teams involved in the development permitting process.

Professional Experience

California Energy Commission, Sacramento, CA.
Planner II November 2000 to present.
Prepares an independent technical analysis in the area(s) of land use, traffic & transportation, and visual resources to inform interested persons and to make recommendations to the Energy Commission regarding the consequences of a natural gas fired power generation plant proposal; reviews information provided by the applicant and other sources to assess the environmental effects of a proposal as required by the California Environmental Quality Act (CEQA), and the California Energy Commission siting regulations; evaluates project in accordance with federal, state and local laws, ordinances, regulations, standards (LORS); coordinates proposal with federal, state and local agencies; conducts field studies; oversees technical consultant(s); participates in public workshop(s) on proposal; presents sworn testimony during evidentiary hearings; implements compliance monitoring programs for projects approved by the Energy Commission to ensure that power plants are constructed and operated according to the conditions of certification of their license.

Yolo County Planning and Public Works Department, Woodland, CA.
Associate Planner June 1992 to October 2000.
Advised and assisted individuals in the processing of land use requests (general plan amendments, conditional use permits, subdivision maps, etc.); reviewed information provided by the applicant and other sources for consistency with the state zoning and planning law, the county General Plan, the county government code, and the requirements of the CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission and/or county board of supervisors; board of supervisors liaison, and planning department staff person to citizen and inter-agency committees (county airport advisory committee, county habitat conservation plan steering committee, and community general plan citizen advisory committee(s); drafted zoning ordinances and regulations; prepared environmental assessment documents in accordance with CEQA and NEPA (National Environmental Protection Act); hired and supervised consultants; executed county zoning administrator duties; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use issues and development proposals in the County.

Yolo County Community Development Agency, Woodland, CA.
Assistant Planner January 1991 to June 1992.
Advised and assisted individuals in the processing of land use requests; reviewed information provided by the applicant and other sources for consistency with the county

General Plan, the state and county government code, and the requirements of CEQA; collected and analyzed information pertaining to a land use request and presented it in a staff report for consideration by the county planning commission; drafted zoning ordinances; prepared environmental assessment documents in accordance to the CEQA; supervised consultants; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Tulare County Planning and Development Department, Visalia, CA.
Planning Technician II March 1988 to January 1990.
Advised and assisted individuals in the processing of land use requests, specifically special-use permits, variances, parcel and subdivision maps; reviewed information provided by the applicant and other sources for consistency with the county General Plan, the state and county government code, and the requirements of CEQA; collected and evaluated information for presentation in a staff report on the proposed land use request for consideration by the county zoning administrator, site plan review committee, or planning commission; prepared environmental assessment documents in accordance with CEQA; conducted zone code enforcement; reviewed building plans for issuance of permits; answered questions at the public counter, or on the telephone regarding land use and development in the County.

Education

University of California, Davis Extension. Coursework in California Land Use Planning and the California Environmental Quality Act 1988 to 1995.
Cosumnes River College. Coursework in Television and Radio Broadcasting1990 to 1991.
California State University, Bakersfield. Master of Public Administration; August 1988. Concentration in Public Policy. Coursework in Business Administration and Political Science.
California State University, Sacramento. Bachelor of Science in Public Administration; May 1984. Concentration in Human Resources Management.
Porterville College. Associate in Arts Social Science; May 1982. Coursework in Administration of Justice.

Awards

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the “21 Day, 4, 6, and 12 Month Processes Team.” California Energy Commission.

2001 Superior Accomplishment Award - Recognition of outstanding performance and contribution as a Team Member of the “Expedited 4 Month AFC/SPPE Team,”
California Energy Commission.

DECLARATION OF
Mark Hesters

I, Mark Hesters, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Senior Electrical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Transmission System Engineering** and **Transmission System Engineering Appendix A** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 30, 2010 Signed: Original signed by M. Hesters

At: Sacramento, California

Mark Hesters

916-654-5049
mark.hesters@energy.state.ca.us

Qualifications

- Analyzed the reliability impacts of electric power plants for nine years.
- As an expert witness, produced written and oral testimony in numerous California Energy Commission proceedings on power plant licensing.
- Expertise in power flow models (GE PSLF and PowerWorld), production cost models (GE MAPS), Microsoft word-processing, spreadsheet and database programs.
- Contributing author to many California Energy Commission reports.
- Represented the Energy Commission in the development of electric reliability and planning standards for California.

Experience

Senior Electrical Engineer

2005-Present California Energy Commission, Sacramento, CA

- Program manager of the transmission system engineering analysis for new generator Applications of Certification.
- Lead the development of transmission data collection regulations.
- Overhauled the transmission data adequacy regulations for the Energy Commission's power plant certification process.
- Participated in the analysis of regional transmission projects.
- Technical lead for Commission in regional planning groups.
- Energy Commission representative to the Western Electric Coordinating Council Operations Committee.

Associate Electrical Engineer

1998–2005 California Energy Commission, Sacramento, CA

- Lead transmission systems analyst for power plant licensing under 12-month, 6-month and 21-day licensing processes.
- Provided expert witness testimony on the potential transmission impacts of new power plants in California Energy Commission licensing hearings.
- Authored chapters for California Energy Commission staff reports on regional transmission issues.
- Studied the economics of transmission projects using electricity production simulation tools.
- Analyzed transmission systems using the GE PSLF and PowerWorld load flow models.
- Collected and evaluated transmission data for California and the Western United States

Electric Generation Systems Specialist

1990–1998 California Energy Commission, Sacramento, CA

- Lead generation planner for southern California utilities.
- Analyzed electric generation systems using complex simulation tools.
- Provided analysis on the impact of resource plans on air quality and electricity costs for California Energy Commission reports.
- Developed modeling characteristics for emerging technologies.
- Evaluated resource plans.

Education

1985–1989 University of California at Davis Davis, CA

- B.S., Environmental Policy Analysis and Planning

DECLARATION OF
Craig Hoffman

I, Craig Hoffman, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Project Manager (Planner III).

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Executive Summary, Project Description, Alternatives** and **Transmission System Engineering – Appendix A** for the **Mariposa Energy Project** (09-AFC-3) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 2, 2010 Signed: Original signed by C. Hoffman

At: Sacramento, California

CRAIG D. HOFFMAN

EDUCATION

Master of Rural and Town Planning May 1997
California State University, Chico

Bachelor of Arts in History; Minor in Planning and Development May 1995
California State University, Chico

PROFESSIONAL EXPERIENCE

California Energy Commission June 2009 to Present
Siting, Transmission and Environmental Protection Division

Project Manager
Responsible for the day-to-day management of the certification process for thermal power plants of 50 megawatts or greater along with transmission lines, fuel supply lines, and related facilities to serve them. Works as a team leader on the coordination of activities and work product of technical specialists in 20 environmental and engineering disciplines. Coordinates project calendaring, public notices, workshops and public hearing meetings, the preparation of a preliminary staff assessment (draft EIR) and final staff assessment (final EIR). Responsible for identifying key technical and process issues and notifying management team of issues and process concerns. Recommends actions, policies and procedures affecting projects and program direction in order to ensure that needed energy facilities were authorized in an expeditious, safe and environmentally acceptable manner, consistent with the requirements of the Warren-Alquist Act and the California Environmental Quality Act (CEQA).

Trinity Investment Partners December 2008 to June 2009

Senior Associate
Was involved in project site investigation, due diligence, feasibility reports, budgets, funding source books and presentations to financial investors and institutions. Projects ranged in complexity and were typically impaired brownfield developments. Interacted with local jurisdiction community development staff to determine appropriate project land use mix and determine design feature limitations. The selection of project sites and land use assumptions were important to gain funding and financial backing to move

forward with the entitlement and development of projects. Prepared CEQA screening studies in order to determine potential impacts and provide the jurisdictions base line information for preparation of CEQA environmental reviews.

RCH Group / The Hodgson Company November 2007 to December 2008

Project Manager
Provided a full-range of real estate consulting and advisory services in mixed-use land development, entitlement processing, urban design and project management. These services included a range of legal, strategic, management and political advisory services - from advocating a project property before government agencies to resolving conflicts among project participants. Was the project manager for several large specific plans in the Sacramento region. This included coordination with owners groups, consultants, city and county jurisdictions, preparation of budgets, time lines and process charts and interaction with public and jurisdictional groups. Coordinated the preparation of EIRs and EIS's for projects along with securing proposals from various consultants to prepare technical studies for the environmental document. Also prepared numerous property evaluation and feasibility reports for lending institutions on foreclosed properties including large development entitlements.

Dunmore Communities / Dunmore Capital April 2005 to September 2007

Project Manager
As a project manager, was involved in project development from the acquisition of undeveloped property to the ultimate development of a successful project. These projects included the entitlement of large land parcels for master planned communities, commercial developments and residential subdivisions. Prepared due diligence, feasibility reports, and budgets; interacted with local jurisdiction staff; was involved in the layout and development of land plans; worked on design charettes; presented projects at public hearings; processed construction documents and helped facilitate building contracts and activities. Coordinated the preparation of EIRs and EIS's for projects along with securing proposals from various consultants to prepare technical studies for the environmental document. Prepared CEQA screening studies in order to determine potential impacts and provide the jurisdictions base line information for preparation of CEQA environmental reviews.

Pacific Municipal Consultants January 2000 to April 2005

Associate and Senior Planner
As a public agency contract planner, provided current, long range and environmental planning services to numerous city and county jurisdictions. Work efforts included the processing of General Plan Amendments, Specific Plans, Rezones, Williamson Act Contracts, Annexations, Vesting Tentative Subdivision Maps, Tentative Subdivision

Maps, Use Permits, Design Review for large scale residential master plans, commercial centers, multi-family projects, and mixed-use sites, policy document preparation, and appropriate environmental documentation for projects consistent with the requirements of CEQA. Presentations to community groups, Planning Commissions, City Councils and Board of Supervisors were routine activities and an integral part of public hearing process.

Was a senior planner from 2001 to 2003 and was the lead current planner for the City of Elk Grove from 2003 to 2005. Was responsible for the management of projects that were complicated, had the potential for public scrutiny and the city needed the projects to move forward. Was the lead planner on the Laguna Ridge Specific Plan and coordinated the planning process, the EIR and all approval documents.

Sierra County Planning Department October 1997 to January 2000

Planner II

Responsible for current planning functions including review, recommendation, and presentation to Planning Commission and Board of Supervisors. Evaluation of land-use and development applications, including general plan amendments, zone amendments, zone variances, special use permits, site plan review, reclamation plans, and tentative parcel map review, for consistency with County and State regulations. Prepared environmental documents as required by CEQA for development projects. A typical environmental document was the preparation of a mitigated negative declaration with attached technical studies. Review of building applications for consistency with General Plan, Zoning Ordinance and other County policies. Answer public inquiries regarding county planning and building issues, demographics and statistics.

DECLARATION OF
Sara Keeler

I, Sara Keeler, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Biologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Biological Resources** and **Transmission System Engineering – Appendix A** sections for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 30, 2010 Signed: original signed by S. Keeler

At: Sacramento, California

Sara M. Keeler

Employment History

California Energy Commission

Planner II- Staff Biologist *12/2009 to present*

As a staff biologist with the Energy Commission, Ms. Keeler analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable local, state, and federal laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to ensure the best available information is included in staff analyses.

California Department of Transportation, District 3

Associate Environmental Planner/Environmental Planner *11/2007 to 12/2009*

Ms. Keeler's primary duties with Caltrans were to coordinate and complete environmental documents to satisfy CEQA, NEPA, regional, and permitting requirements, and act as the Project Biologist on various transportation-related projects in California.

Entrix, Inc.

Senior Staff Scientist/Staff Scientist *01/2005 to 11/2007*

While with the environmental consulting firm Entrix, Inc., Ms. Keeler specialized in California wildlife and floristics studies. She worked throughout California including in the Lake Tahoe Basin, Great Basin, Central Valley, Sierra Nevada, in coastal California, and desert areas. Projects while at Entrix included biological resource field studies such as habitat assessments, protocol-level surveys for special-status plants and animals, wetland delineations, and riparian surveys; project, task, and budget management; and writing biological resources sections of a variety of documents including documents to satisfy NEPA and CEQA requirements, environmental assessments, and existing conditions reports.

USDA, Forest Service, Pacific Southwest Research Station

Biological Sciences Technician *05/2001 to 09/2002*

Ms. Keeler conducted breeding bird surveys and vegetation inventories and assessments on a breeding bird survey crew in the Sierra Nevada. This included conducting surveys using a variety of techniques including tree-climbing (ascenders, 3-point climbing, Swedish ladders), auditory surveys, and vegetation sampling.

EDUCATION

Biological Sciences (Evolution and Ecology) *B.S (High Honors)*
University of California, Davis *June 2004*

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as a **Mechanical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Noise and Vibration** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 30, 2010 Signed: Original Signed

At: Sacramento, California

Shahab Khoshmashrab
Mechanical Engineer

Experience Summary

Nine years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2004--Mechanical Engineer, Systems Assessment and Facilities Siting– California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil/structural and geotechnical engineering aspects of power plant siting cases.

1998-2001--Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998--Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Andrea Koch

I, Andrea Koch, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner in Land Use.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Traffic and Transportation** section for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: original signed

At: Sacramento, California

ANDREA KOCH

PROFESSIONAL EXPERIENCE

CALIFORNIA ENERGY COMMISSION, December 2009 – Present
Siting, Transmission, and Environmental Protection Division, Sacramento, California
Environmental Planner I- Perform environmental review of power plant applications.

- Review power plant applications for transportation, land use, visual, and socioeconomic impacts.
- Write environmental analysis documents.

CITY OF SACRAMENTO, June 2007 – July 2009
Planning Department, Long-Range Planning Division, Sacramento, California
Assistant Planner- Performed long-range city planning for Sacramento.

- Coordinated review of the Draft 2030 General Plan, a comprehensive citywide land use plan.
- Prepared Ben Ali and Hagginwood neighborhood plans. Worked with City staff and community members to identify strategies for resolving neighborhood issues, such as infrastructure deficiencies.
- Reviewed 70 development applications, analyzing their consistency with City policy and providing written feedback to applicants.

COUNTY OF SANTA CRUZ, June 2005 – June 2007
Planning Department, Environmental Planning Division, Santa Cruz, California
Resource Planner II- Performed resource planning for Santa Cruz County.

- Reviewed development permit applications to ensure their consistency with regulations for creeks, wetlands, grading, geologic hazards, erosion control, and sensitive plant and animal species.
- Wrote staff reports analyzing development proposals and providing recommendations to the Environmental Planning Division Manager.
- Performed an average of 5 weekly pre-construction meetings and final inspections at project sites to ensure that development was consistent with County regulations and required mitigations.
- Regularly assisted the public with resource planning questions, both in-person and over the phone.

COUNTY OF MONTEREY, November 2004 – June 2005
Planning Department, Marina, California
Assistant Planner- Performed current planning for Monterey County.

- Reviewed development permit applications for consistency with County regulations.
- Prepared and presented staff reports for development applications. Reports provided recommendations to the Zoning Administrator.
- Assisted the public with zoning questions, both in-person and over the phone.

EDUCATION

California Polytechnic State University, San Luis Obispo, California

- Master of City and Regional Planning, Concentration in Environmental Planning, 2004

University of California, Davis

- Bachelor of Science in Wildlife, Fish, & Conservation Biology, Concentration in Conservation Biology, 2002
- Graduated with High Honors and a Department Citation

DECLARATION OF
Jacquelyn Leyva

I, Jacquelyn Leyva, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Air Quality** Section for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: Original signed and on file

At: Sacramento, California

Jacquelyn Leyva

Objective

Expanding my knowledge of engineering to improve life and teach others.

Experience

March '09 – Present **CA Energy Commission** **Sacramento, CA**

Air Resources Engineer

- Currently co-authoring staff assessment for the technical area of air quality for the Engineering and Siting Division permitting power plant projects over 50 MW in the state of CA. Currently working on renewable ARRA funding projects along with natural gas power projects.
- Reviewing emission compliance reports
- Authoring staff analysis for project amendments
- Trained in CEQA and NEPA analysis, along with AERMOD air modeling.

August '08 – March '09 **ERRG, Inc.** **Martinez, CA**

Engineering Assistant

- Assisted with both technical and field duties for a variety of environmental investigations.
- Assisted on an environmental site assessment, preliminary assessments (PA), site inspections, and remedial investigations feasibility studies.
- Field duties performed include groundwater sampling and air sampling

June '07 – March '08 **Tetra Tech EC, Inc** **Santa Ana, CA**

Engineering Assistant Intern

- Working on various Department of Defense projects in environmental engineering.
- Helped assist in 5 year review of remediation approaches.
- Helping assist with a commercial project creating a water reuse/recycle treatment plant.

June '05 – September '05 **SF Regional Water Board** **Oakland, CA**

Consultant

- Wrote a memorandum regarding total petroleum hydrocarbons showing up as false positives in submitted quarterly monitoring reports for NPDES FUEL permit.
- Researched various EPA methods of testing for VOC, and Fuel constituents in water.
- Communicated with consultants from Weiss Associates and state funded laboratories to come to a conclusion for memorandum.
- Site inspections, site reports.

June '04 – September '04 **SF Regional Water Board** **Oakland, CA**

Student Intern

- Reviewing NPDES (National Pollutant Discharge Elimination System) permit Quarterly Monitoring reports for compliance.
- Site inspections. Site Reports.
- Writing letters to dischargers and consultants, various reasons such as site closures, opening a new site.
- Imputing data to the various Water Board databases.
- Administrative duties such as faxing, photocopying, updating consultants and principles list.
- Proficient in Word, Excel, PowerPoint.

Education

2003-June 2008 University of California Irvine Irvine, CA

- B.S., Chemical Engineering, minor in Materials Engineering.
- MAES (Mexican American Engineers and Scientists) - Vice Chair 2004-2005
- CAMP summer science program participant 2003

June 1999 – September 2003 Las Lomas High School Walnut Creek, CA

- High School Diploma
- Life time member of CSF (California Scholarship Federation).

DECLARATION OF
Mark Lindley

I, **Mark Lindley**, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the Siting, Transmission and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Soil and Water Resources** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 2, 2010 Signed: Original Signed by M. Lindley

At: Sacramento, California

Mark Lindley, P.E.

Senior Associate

Mr. Lindley is a water resources engineer with experience in stormwater management, hydraulic design, creek and wetland restoration design, construction management, environmental impact/CEQA review, surface and groundwater hydrology, field data collection, water quality, and remediation. His graduate studies focused on the application of analytical and numerical modeling techniques to hydraulic routing and sedimentation in wetlands, impoundments, detention basins and small sediment control structures.

Mr. Lindley combines his expertise in technical analyses and engineering design with his project management responsibilities to effectively address client needs. His technical work has included analysis and engineering design guidance in creek and wetland restoration projects, as well as hydraulic design guidance for stormwater management and flood control projects and environmental impact analysis for CEQA projects.

Education

M.S., 1994 — Biosystems & Agricultural Engineering, Oklahoma State University, Stillwater, OK

B.S., 1989 — Mechanical Engineering, University of Kentucky, Lexington, KY

Professional Registration

2004 Civil Engineer, California (License No. C 66701)

Awards

Phoenix Award for Outstanding Master's Student—First Runner-Up

Professional Societies

American Society of Agricultural Engineers

Selected Project Experience

GWF Hanford Combined Cycle Power Plant, Environmental Impact Review. Hanford, California. Provided environmental review of a proposed power plant upgrade in Kings County for the California Energy Commission. The environmental review was focused on the conversion of the existing simple cycle plant to a combined cycle plant utilizing air cooled condensers to provide plant cooling. The analysis also examined the stormwater drainage, treatment, and flood control facilities shared with the adjacent Hanford LP Plant and required improved stormwater treatment practices to address existing contamination associated with the existing plants.

GWF Henrietta Combined Cycle Power Plant, Environmental Impact Review. Lemoore, California. Provided environmental review of a proposed power plant upgrade in Kings County for the California Energy Commission. The environmental review was focused on the conversion of the existing simple cycle plant to a combined cycle plant utilizing air cooled condensers to provide plant cooling. The analysis also examined the potential to utilize recycled water from the neighboring Lemoore Naval Air Station as an alternate water supply. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

Carrizo Energy Solar Farm, Environmental Impact Review. Carrizo Plain, California. Provided environmental review of a proposed solar thermal power plant in Carrizo for the California Energy Commission. The environmental review was focused on the use of groundwater for collector mirror washing and other process needs and the potential for impacts to neighboring groundwater users. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

Selected Project Experience
(continued)

San Francisco Electric Reliability Project, Environmental Impact Review. San Francisco, California. Provided environmental review of a proposed power plant in San Francisco for the California Energy Commission. The environmental review was focused on the utilization of recycled wastewater from the City of San Francisco's combined sewer system and treated onsite for power plant evaporative cooling. In addition, the project site is located in a historic industrial area with existing subsurface impacts from previous land uses that required specific assessment and management to limit risks to onsite workers and neighboring businesses and residences. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

Soil and Water Resource Compliance Reviews, Storm Water Pollution Prevention Plan review and implementation. Throughout California. Provided technical review of construction and operation Storm Water Pollution Prevention Plans (SWPPPs) for several power plants located throughout California on behalf of the California Energy Commission. Review of SWPPPs to determine if the SWPPPs met the requirements of Conditions of Certification specified in the Energy Commission's licensing decision and included sufficient detail and specified appropriate Best Management Practices (BMPs) to address potential erosion and water quality impacts. Site visits involved inspection of installed BMPs to verify that the measures included in the SWPPP were properly installed in preparation for the rainy season.

Blythe Energy Project - Phase II, Environmental Impact Review. Blythe, California. Provided environmental review of a proposed power plant in Blythe for the California Energy Commission. The environmental review was focused on the impacts of the proposed use of groundwater on the neighboring Colorado River. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's evaporation pond, retention basin, and storm water drainage channels.

University of California – Santa Cruz, Stormwater Improvement Projects. Santa Cruz County, California. Developed the design of stormwater management projects intended to increase infiltration and percolation of runoff from paved surfaces to address impacts of increased runoff on downstream creeks. Conducted analysis and design of detention facilities, bio-retention facilities, vegetated bio-swales, and infiltration channels. Managed the development of the designs from the conceptual level through final design and construction.

Pond A8 Phase I Restoration. range County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

Interstate 5 - Runoff Management Plan. Orange County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

Selected Project Experience
(continued)

Windemere Development, Surface Runoff Management. Contra Costa County, California. Conducted analysis and design of water quality treatment and flood control detention facilities for the Windemere Development. Developed a sediment management and monitoring plan for a wetland detention basin, collecting runoff from the Windemere Development.

Wendt Ranch Development, Surface Runoff Management. Contra Costa County, California. Conducted hydrologic and hydraulic analysis and design of water quality treatment and flood control detention facilities for the Wendt Ranch Development.

Knightsen, Runoff Management Plan. Contra Costa County, California. Developed a conceptual runoff management plan utilizing treatment wetlands and bio-swales to treat runoff and agricultural wastewater while addressing local flooding issues.

Petaluma Marsh Restoration Project, Construction Management. Marin County, California. Provided construction management and observation services for the Petaluma Marsh Restoration Project, which entailed re-creation of a 102-acre tidal marsh on diked and subsided farmland. The restoration plan included excavation of tidal slough channels, breaching and lowering the existing perimeter levee, creation of wind-wave berms, construction of a significant new levee to protect an adjacent railroad easement, and revegetation.

Martinez Salt Marsh Restoration Project, Post-Construction Marsh Restoration Monitoring. Contra Costa County. Managed mitigation monitoring for a restored salt marsh for the California Department of Transportation. The mitigation project included removing fill, excavating a slough channel network, revegetation, and public access trails and bridges. Post-construction mitigation monitoring involves geomorphic monitoring of marshplain and slough channel development and biological monitoring of vegetation establishment and endangered species habitat development.

Bahia Marsh Restoration Project, Wetland Design. Marin County. Developed wetland restoration design plans to restore both diked and filled baylands to tidal marsh. Restoration designs include grading plans, an excavated slough channel network, breaching and lowering levees, phased water level management with culvert structures, seasonal wetland enhancement, and revegetation. Performed construction support and post-construction monitoring.

Los Capitancillos Wetland Mitigation Project, Wetland Design. San Jose, California. Conducted hydrologic and hydraulic analysis and design of freshwater mitigation wetland facility for Santa Clara Valley Water District. Provided preliminary design of grading, clean soil liner, as well as, inlet and outlet channels and structures. Analyses included water usage, percolation and seepage, rainfall-runoff, and flood routing.

Hamilton Seasonal Wetland Design Guidelines, Wetland Design. Novato, California. Developed design guidelines for seasonal wetland at the Hamilton Airfield. Provided water balance and percolation analyses related of placement of dredged materials at pilot seasonal wetland sites.

Selected Project Experience
(continued)

Lincoln Creek Restoration, Creek Restoration Design. Auburn, California. Developed Creek Restoration design plans for day-lighting a 500 feet reach of Lincoln Creek within the Auburn School Park Preserve for the City of Auburn. Conducted hydraulic analyses and engineering design for the restored creek to determine design sections and rock sizes that met the client's aesthetic requirements for the park and engineering design/stability requirements. Developed design drawings from conceptual level through 100% construction plans.

Sonoma Baylands Wetlands Demonstration Project, Post-Construction Marsh Restoration Monitoring. Sonoma County, California. Managed a team of surveyors and vegetation, avian, and fish scientists in the monitoring of a marsh restoration project for the U.S. Army Corps of Engineers. The Sonoma Baylands Wetlands Demonstration Project utilized dredge materials to raise the elevation of subsided farmland by several feet to approximately mean tide level to accelerate the establishment of wetland vegetation. Post-Construction Restoration Monitoring is focused on slough channel development, tidal elevation monitoring, sedimentation, bird and fish use, and vegetation establishment.

Alamo Creek Restoration Project, Construction Management. Contra Costa County, California. Provided construction management and observation services for the Alamo Creek Restoration Project which entailed re-creation of a multi-stage channel for 6,000 feet of the deeply incised main branch and channel relocation of 3,000 feet of the east branch. The restoration plan included grading, grade control, bank restoration and vegetative treatments.

Laguna de Santa Rosa, Suspended Sediment/Turbidity Monitoring. Santa Rosa, California. Monitored turbidity, water level and flow at three locations discharging into the Laguna de Santa Rosa for the U.S. Army Corps of Engineers. Turbidity was measured with optical backscatter instruments calibrated to estimate suspended sediment concentrations at each location. Suspended sediment data was utilized with flow data to estimate sediment yield into the Laguna de Santa Rosa to help determine sedimentation rates within the Laguna and to guide decisions on projects to limit sedimentation.

DECLARATION OF
Paul Marshall

I**, Paul Marshall** declare as follows:

1. I am presently an employee of the California Energy Commission for the Siting Office of the Siting, Transmission and Environmental Protection Division as the Senior for the Water and Waste Unit**.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Soils and Water Resources,** for the **Mariposa Energy Project (09-AFC-3)** based on my independent analysis of the Application, supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 2, 2010 Signed: Original Signed by P. Marshall

At: Sacramento, California

Paul D. Marshall

EDUCATION

SAN DIEGO STATE UNIVERSITY, CALIFORNIA
Bachelor of Science Degree in Engineering Geology
Completed post-baccalaureate courses in Engineering Geology

FRESNO STATE UNIVERSITY, CALIFORNIA
Completed post-baccalaureate courses in Civil Engineering

LICENSES

California Registered Geologist, No. 5718
California Certified Engineering Geologist, No. 1817
California Certified Hydrogeologist, No. 468

EMPLOYMENT HISTORY

CALIFORNIA ENERGY COMMISSION
Siting, Transmission, and Environmental Protection Division – Supervisor, Soil, Water Resources, and Waste Management Unit/ January 2008 -Present
Supervise a multidisciplinary team of engineers and geologists responsible for analysis of potential environmental impacts from power plant construction and operation to soil and water resources and from waste management activities. Provide guidance and technical assistance to staff for complex analysis of power plant impacts on water supply, water quality, wastewater disposal, discharges to surface water and groundwater, development and utilization of groundwater, flood impacts and storm water management, and assessment of potential impacts on human health and the environment. Ensures staff work products are consistent with laws, regulations, and policies of the US EPA, US ACOE, SWRCB, RWQCB's, CDFG, DTSC, and other local ordinances. Contract with and direct the work of consultants conducting technical reviews of power plants. Schedule and confer with a multidisciplinary staff of planners, engineers, and scientists to ensure staff analyses are coordinated with other disciplines where there is overlap. Ensure product delivery in a timely manner. Hire and develop staff, complete probationary and performance reports, counsel and mentor staff. Take adverse actions when appropriate.

CALIFORNIA DEPARTMENT OF CONSERVATION
Office of Mine Reclamation – Supervisor, Compliance Unit/October 2006 – January 2008
Supervise a team of engineering geologists responsible for ensuring compliance with mine reclamation plans and specifications. Review and approve staff work conducted to ensure plans and specifications were adequate and enforceable. Direct staff responsible for enforcement actions and preparation of data and reports for presentation to the State Mining and Geology Board. Oversight of staff review of cost estimates for mine reclamation and conduct statewide workshops outlining requirements for mine reclamation cost estimates. Implement Lead Agency review and audit program.

STATE WATER RESOURCES CONTROL BOARD
Division of Financial Assistance – Chief, Project Implementation Unit/January 2001 – September 2006
Supervise a multidisciplinary team responsible for contract and project management associated with Prop 13, Prop 40, Prop 50, Water Bond 1986 and 1996, and the Federal Clean Water Act funding programs. Develop program policies and procedures for implementation and management of grant and loan programs and projects. Direct the work of staff and coordinate with state and federal agencies in the development of technical review criteria for selection of projects recommended for grant award. Direct the work of staff and contractors developing a Project Assessment and Evaluation Program used to evaluate program effectiveness. Provide guidance and technical support to stakeholders for project development. Represent SWRCB at public meetings and conduct training on program procedures. Ensure project integrity and compliance with State and Federal laws.

CALIFORNIA DEPARTMENT OF WATER RESOURCES

Division of Local Assistance - Senior Engineering Geologist/ July 2000 – January 2001

Manage multidisciplinary staff to identify and develop conjunctive water management programs throughout Southern California. Organize, guide, and support local stakeholder groups in development of conjunctive water management plans. Develop partnering opportunities with other local, state, and federal agencies to spread program benefits region-wide and implement CALFED goals and objectives. Write and review contract documents, task orders, grant applications, and provide input on program policy. Solicit and assist agencies with loan and grant applications for various Water Bond 2000 programs.

Division of Safety of Dams - Senior Engineering Geologist/October 1995 – June 2000

Serve as an engineering geology consultant to a staff of 47 design and field engineers performing regulatory oversight of dam construction and operation. Evaluate existing and proposed dam sites for geologic and seismic hazards; review and comment on geotechnical site assessments and construction plans and specifications; act as technical adviser to staff during construction; inspect and document geologic conditions. Communicate findings to staff, consultants, and owners through written reports, briefings, and meetings. Give presentations to DSOD Board of Consultants on development of state-of-the-art procedures. Develop information and monitor changes in the regional geologic environment.

Division of Local Assistance - Associate Engineering Geologist/November 1993 - October 1995

As a member of the Water Quality Assessment Program I independently performed surface and groundwater studies, and environmental site assessments for both DWR and federal and local government agencies. Negotiated contracts, authored task assignments, and oversaw the work of consultants. Authored reports with analysis of data from various types of exploration and sampling programs. Assembled a Department-wide Site Assessment Project Team and assisted in developing DWR policy for site assessments. Trained team members and gave staff presentations outlining program and team goals.

Division of Local Assistance - Associate Engineering Geologist/October 1992 - October 1993

Under the auspices of the Proposition 82 Water Conservation Bond Law of 1988, I directed the Department's technical, environmental, and economic review of ground water recharge and water supply loan applications. Performed independent technical review and certified feasibility and construction loan applications. Provided assistance to public water agencies regarding compliance with environmental and water rights regulations, and institutional and legal requirements for project development. Coordinated Department's technical review and comment on various CEQA documents.

KLEINFELDER, INC.

Project Geologist - 4 years

Worked in regional offices throughout Central and Southern California, Western Arizona and Southern Nevada performing geotechnical investigations and environmental site characterizations. Supervised field exploration activities throughout the Central Valley and Central Coast of California. Directed water resource, groundwater recharge, geotechnical, and environmental site characterization studies. Marketed clients, determined scope of services, and prepared cost proposals. Monitored project schedules and billing. Briefed clients and supervisors on project status. Authored reports providing geotechnical recommendations for various federal, state, municipal, and commercial projects. Inspected remediation and stabilization projects. Other responsibilities included compilation of data using spreadsheets and databases, conducting literature and aerial photograph review, and writing reports.

EARTH SYSTEMS, INC.

Staff Geologist - 3 years

Designed and supervised installation of monitoring well arrays, extraction wells, drains, dewatering, and slope monitoring equipment throughout central and southern California. Directed subsurface exploration using various drilling and geophysical techniques. Conducted liquefaction, fault rupture hazard, and coastal bluff stability studies. Conducted special inspections of excavations, deep foundations, reinforced earth, and concrete. Performed numerical analyses for slope stability, liquefaction, and earthquake ground motion studies. Authored reports containing cross-sections, maps, and graphs presenting various types of water resource and geotechnical data.

DECLARATION OF
Dr Obed Odoemelam

I, Obed Odoemelam, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as a Staff Toxicologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Public Health** and **Transmission Line Safety and Nuisance** for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: November 30, 2010 Signed: Original Signed

At: Sacramento, California

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Wenjun Qian

I, Wenjun Qian, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as an Air Resources Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Air Quality** Section for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 13, 2010 Signed: Original signed and on file

At: Sacramento, California

Wenjun Qian, Ph.D.

Professional Experience

Air Resources Engineer ***(July 2010 – Present)***

California Energy Commission, Siting Transmission and Environmental Protection Division

Currently acting as air quality technical staff on Siting projects filed with the Energy Commission including Mariposa, Pio Pico, Blythe II, Sentinel, and Inland Empire. Specific responsibilities include the following:

- Analyze the impacts of the construction and operation of large power generation projects on air quality, Green House Gas and climate change
- Determine the conformance to applicable U.S. EPA, CARB and local air district regulations and standards
- Investigate and recommend appropriate emission mitigation measures
- Prepare air quality staff assessments and technical testimony
- Develop and monitor air quality compliance plans
- Review and evaluate U.S. EPA, CARB, and local air district air quality rules and regulations
- Collect, analyze and evaluate data for the effects of air pollutants and power plant emissions on human health, vegetation, wildlife, water resources and the environment
- Develop, recommend, and implement statewide planning and policy initiatives for the Energy Commission and Governor

Research Assistant ***(Sept. 2005 – June 2010)***

University of California, Riverside, Mechanical Engineering

- Evaluated air quality impact of distributed generations in South Coast Air Basin of California
- Estimated air quality impact from the key power plant of Los Angeles Department of Water and Power in shoreline urban areas
- Improved air quality model results by evaluation with experimental data
- Prepared and presented multiple comprehensive reports, journal papers, and conference papers

Education

PhD Mechanical Engineering, University of California, Riverside (August 2010)
MS Mechanical Engineering, George Washington University (August 2005)
BS Mechanical Engineering, Shanghai Jiao Tong University (June 2004)

DECLARATION OF
Marsha L. (Shaelyn) Strattan

I, **Shaelyn Strattan**, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner III (Supervisor).

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared a portion of the staff testimony on the **Traffic and Transportation** section for the **Mariposa Energy Project** (**09-AFC-3**), based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: original signed by S. Strattan

At: Sacramento, California

Marsha L. (Shaelyn) Strattan
Environmental Planner III (Supervisor)
California Energy Commission
Siting, Transmission, and Environmental Protection Division
Environmental Protection Office

EXPERIENCE SUMMARY

Twelve years experience in land use and environmental planning, environmental review and analysis both CEQA and NEPA, and project management with the California Energy Commission, California State Parks, and Calaveras County Planning Department. Twenty-five years of writing, editing, and research experience, focused on land use, aviation, recreation, agriculture, and the environment, with the California Air Resources Board, California Department of Toxic Substances Control, California Department of Fish and Game, and as owner of *The Wordworker*, a writing, editing, and research company, specializing in environmental research, education, and public relations. Seven years experience as an Air Traffic Control Specialist with the Federal Aviation Administration and U.S. Air Force. Six years as National Weather Service (NWS) certified Weather Observer. Currently, supervisor of the Cultural Resources Unit/Energy Commission's Environmental Protection Office

PROFESSIONAL EXPERIENCE

California Energy Commission 3 months
Planner III

Supervisor – Cultural Resources Unit - First-level supervisor, performing a variety of supervisory, administrative, and analytical tasks. Responsible for a staff of 6-10 technical specialists and consultants performing cultural resource analyses in the areas of power plant siting, electric transmission line corridor planning, electric transmission line licensing, electric generation resource planning, energy conservation, new energy technology development, and energy policy/planning. Advises the Office Manager and Deputy Director on procedural, legislative, and technical issues. Exercises a high degree of quality control (rigorous analytical foundation and meticulous writing technique) over all products originating from staff in the Unit and ensures timely completion of staff assignments. Acts as a consultant to Commission management on the most complex energy and environmental issues, including energy facility siting plans prepared by federal, state and local agencies; adoption, deletion or modification of environmental or energy-oriented legislation, ordinances or regulations; new policies being proposed by the Commission or other agencies; and implications of energy development proposals for siting regulations. Completes regular performance evaluations of unit staff. Completes the most complex multi-disciplinary environmental analyses. Provides training in the areas of land use, aviation, and CEQA/NEPA compliance.

California Energy Commission
Planner II 2 yrs/9 mos[1]

Environmental Technical Specialist - Identify, describe, and analyze complex environmental issues related to the construction and operation of electrical energy production facilities, transmission corridors, alternative energy technologies and energy conservation, and Commission programs and policies. Prepare components of Staff Analyses to comply with requirements of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA), with emphasis on the identification and mitigation of environmental impacts to land use, traffic and transportation, visual resources, and environmental justice. Prepare and present Commission reports and expert technical testimony.

Project Manager - Plan, organize, and direct the work of an interdisciplinary environmental and engineering staff team engaged in the evaluation of complex/controversial energy facility siting applications and major commission programs.

[1] Nov 2006 – Nov 2008 and Dec 2009 – present.

California Energy Commission (CEC): Analyst for Eastshore Energy Power Plant (06-AFC-06; Land Use and Traffic & Transportation/Aviation); Victorville II Hybrid Power Project (07-AFC-01; Land Use); Humboldt Bay Generating Station (06-AFC-07); Traffic & Transportation); Ridgecrest Solar Power Project (09-AFC-9; Land Use/Recreation/ Wilderness); Rice Solar Energy Project (09-AFC-10; Land Use/Recreation/Wilderness and Aviation); Mariposa Energy Project (09-AFC-03; Aviation) and Russell City Energy Center Amendment (01-AFC-7C; Land Use and Traffic & Transportation/ Aviation). Project Manager for Beacon Solar Energy Project (08-AFC-02); San Gabriel Generating Station (07-AFC-02); and Kings River Conservation District Community Power Project (07-AFC-07)

Calaveras County Planning Department 2 yrs/9 mos[2]
Planner III (Senior Planner)
Planning and evaluation of complex land use projects; environment review (CEQA/NEPA; Timber Harvest Plans; outside agency reviews); project and contract manager for consultants (EIR, natural and cultural resource studies, and peer reviews); preparation/review of resource ordinances; preparation/coordination of conservation and utility easements; CEQA/NEPA coordinator; liaison with Calaveras Council of Governments and county counsel on land use issues; planning liaison with State and federal resource agencies (e.g., California Department of Fish and Game, Forestry and Fire (CalFIRE), and Parks & Recreation; U.S. Fish and Wildlife Service, U.S. Forest Service, and Bureau of Land Management) to develop consistent mitigations and policies, and coordinate project evaluation and enforcement.

California Department of Parks & Recreation Jan 2001 - Jan 2005
Environmental Coordinator (Associate Park & Recreation Specialist)
Supervising Lead: Coordinate environmental review for DPR's Major Capital Outlay, Minor Capital Outlay, and Accessibility programs with Service Center and district staff. Consult with project managers, designers, and environmental specialists to refine project scope and identify potentially environmental impacts for park projects in Northern and Central California. Prepare environmental documents (CEQA/NEPA) for DPR and joint agency (DPR/BLM,NPS,USFS, USFWS) projects,. Project and contract manager for consultants preparing environmental analysis. Prepare or work with consultants to prepare the environmental impact analysis for General Plans (GPs) and Resource Management Plans for State Park units. Prepare application(s) for project-specific state and federal environmental permits, grant proposal, application, and supporting documents for project-related federal funding (High Sierra Museum and Visitor Center at Donner Memorial State Park). Review environmental documents prepared by non-departmental entities to determine the potential impact on ongoing or proposed projects or programs. Prepare comments identifying potential impacts to the department's interests and/or effectiveness of proposed mitigation. Review and comment on pending legislation, as it relates to environmental issues, CEQA/NEPA, and Departmental policy/procedures.

Statewide Environmental Coordinator (January 2002 - June 2003): Develop and coordinate a standardized CEQA/NEPA review process and establish criteria for evaluating project impacts and environmental compliance documents. Provide training for District and Service Center personnel involved in the preparation and processing of environmental documents. Develop training support materials. Conduct CEQA seminars at California Trails and Greenways Conference (September 2002 & 03) and Resource Ecologists' In-Service Training Seminar (2002). Act as Service Center liaison with the Environmental Stewardship Section of the Natural Resources Division regarding the effectiveness and improvement of the environmental review process.

California Air Resources Board (Research Division) Nov 1998-Nov 2000
Research Writer
Research, write, and/or edit technical documents, presentations, and related materials, with special emphasis on scientific and environmental writing for a general readership. These documents include

[2] Feb 2005 – Nov 2006 and Nov 2008 – Nov 2009

Requests for Proposals; responses to public inquiries; consumer guidelines and fact sheets; articles for magazines and technical journals; brochures; webpage information (both internal and external); legislative bill analyses; briefing documents; proposals; and Board presentations and agenda items. Evaluate suitability of documents for publication.

The Wordworker May 1987-Nov 1999
Owner & Primary Researcher/Editor/Author

Work included narratives (including voice-overs), scripting, copy editing, transcription, and technical writing; proposals (grants, bids, and new business); legal briefs (environmental and family law); training and teacher's manuals; desktop publishing (brochures, newsletters, flyers, etc.); and adaptation of scientific information for general readership. Research, draft, review/edit, and comment on CEQA/NEPA environmental documents; coordinate preparation of materials among project scientists, lead and responsible agencies, and applicants. Promotional consultant and press liaison for several non-profit fundraisers, seminars, and symposiums.

Federal Aviation Administration 1975-1981
Air Traffic Control Specialist

Control air traffic at Salem Tower (Salem, OR) and the Oakland Air Traffic Control Center in Fremont, CA. Coordinate aviation-related search and rescue operations. Provide pilot weather briefings, flight plan assistance, and in-flight information at Bellingham International Airport, Dannelly Field (Montgomery, AL) and Purdue University Airport (W. Lafayette, IN).

Tennessee Valley Authority 1974-75 (18 mos)
Engineering Aide

Set, monitor, and analyze dosimeters at Browns Ferry and Sequoia Nuclear Power Plants. Collect and analyze vegetation, silage, milk, water, and air samples from surrounding areas to establish background radiation levels and provide on-going radiation monitoring.

EDUCATION

- Colleges & Universities
  - American River College (Sacramento, CA)
  - Sacramento City College (Sacramento, CA)
  - Consumnes River College (Sacramento, CA)
  - Calhoun Community College (Huntsville, AL)
  - University of Alabama (Tuscaloosa, AL)
  - Whatcom Community College (Bellingham, WA)
  - California State University – Sacramento, CA
  - University of California – Davis (Davis, CA)
- Certificate: Land Use and Environmental Planning [University of California – Davis; 20 units of core classes and 22 elective courses (272.5 hours)]
- Certificate: Technical Writing (American River College)
- Certificate: Meteorology/Weather Observer (National Weather Service; 1975); Licensed from 1975-1982

MILITARY SERVICE

- U.S. Air Force - Aircraft Control & Warning Operator (honorable discharge – August 1969)
- California Air National Guard – Air Traffic Controller (honorable discharge 1984)

DECLARATION OF
Rick Tyler

I, Rick Tyler, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Senior Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Hazardous Materials** and **Worker Safety and Fire Protection** sections for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 13, 2010 Signed: original signed by R. Tyler

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-Present — California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-Jan. 1998 — California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Testimony of William Walters, P.E.

I**, William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting,Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Traffic and Transportation** (Plume Velocity Analysis Appendix TT-1) for the **Mariposa Energy Project Staff Assessment** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: Original Signed by W. Walters

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., CHEMICAL ENGINEERING, 1985, CORNELL UNIVERSITY

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring.

Aspen Environmental Group 2000 to present

Responsible as lead technical and/or project manager of environmental projects, including the following specific relevant recent (2000 and forward) responsibilities and projects:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project*; Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project*; Colusa Power Project; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project*; Avenal Energy Project; San Joaquin Valley Energy Center*; Salton Sea Unit 6 Project*; Modesto Irrigation District Electric Generation Station*; Walnut Energy Center*; Riverside Energy Resource Center*; Pastoria Energy Facility Expansion; Bullard Energy Center; Panoche Energy Center; Starwood Power Plant; Riverside Energy Resource Center Units 3 and 4 Project; Colusa Generating Station*; Chula Vista Energy Upgrade Project*; Orange Grove Power Plant Project*; Carlsbad Energy Center Power Project*; Hydrogen Energy California (in process); Canyon Power Plant Project*; Imperial Valley Solar Project*; Beacon Solar Energy Project; Calico Solar Power (in process); Abengoa Mojave Solar Project; Genesis Solar Energy Project; Blythe Solar Power Project; Palen Solar Power Project (in process); Ridgecrest Solar Power Project; Rice Solar Energy Project (in process); Ivanpah Solar Electric Generating Station project.
  - Preparation and project management of the visible plume assessment for the following licensing projects: Metcalf Energy Center Power Project*; Contra Costa Power Plant Project*; Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center*; SMUD Cosumnes Power Plant Project*; Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Community Power Project; San Gabriel Generating Station; Sentinel Energy Project; Victorville 2 Hybrid Power Project; City of Palmdale Hybrid Energy Project (in process); Chevron Richmond Power plant Replacement Project; Tracy Combined Cycle Power Plant; Lodi Energy Center; and San Joaquin Solar 1&2 Power Plant.
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment*; Eastshore Energy Power Plant*; Carlsbad Energy Center (in progress), City of Palmdale Hybrid Energy Project; Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; Blythe Energy Project Phase II*, Tracy Power Plant; Avenal Energy Project; and Blythe Solar Energy Project siting cases. Assistance in the aircraft safety review of

* - Includes providing expert witness testimony.

thermal and visual plumes of the operating Blythe Energy Power Plant. Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.

- **Other California Energy Commission and relevant project experience:**
  - Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
  - Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
  - Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; Salton Sea Unit 6 Project; Black Rock 1, 2, and 3 Geothermal Power Project, and Starwood Power-Midway Peaking Power Plant.
  - Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
  - Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
  - Preparation of information request and data analysis to update the Energy Commission's Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC's 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis. Prepared an update to the Energy Commission's capital and operating cost factors for combined and simple cycle gas turbine projects within the Cost of Generation model as part of the 2009 Integrated Energy Policy Report process.
  - Preparation of the Air Quality Section, air quality emission calculations, or other technical studies, is support of the environmental documentation for renewable energy projects including; the Liberty Energy XXIII Renewable Energy Project; the Topaz Solar Farm, the Pacific Wind Energy Project, and the Pine Tree Wind Development Project.
  - Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

CERTIFICATION

- Chemical Engineer, California License 5973

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Lisa Worrall

I, Lisa Worrall, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division, as a Planner in Land Use.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Land Use** section for the **Mariposa Energy Project** (**09-AFC-3**) based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: December 3, 2010 Signed: original signed by L. Worrall

At: Sacramento, California

LISA WORRALL

Summary

- Over eight years of environmental analysis experience.
- Preparation of environmental documents in compliance with the California Environmental Quality Act (CEQA), National Environmental Policy Act (NEPA), California Energy Commission siting regulations, and federal, state and local laws, ordinances, regulations and standards (LORS).
- Projects include thermal power plants, private residential and commercial development, county and public works, and State transportation.

Employment Experience

California Energy Commission
Planner II Sacramento, California
January 2010 to Present

- Prepare an independent CEQA-like analysis of the environmental impacts from thermal power plants related to land use.
- Evaluate projects in accordance with CEQA, the California Energy Commission siting regulations, and federal, state and local LORS.
- Review information provided by the project applicant and other resources to assess the environmental effects of energy facility proposals

Sacramento County Department of Environmental Review & Assessment
Associate Environmental Analyst Sacramento, California
April, 2006 – May, 2009

- Prepared a variety of environmental documents in compliance with CEQA, NEPA and local, state and federal LORS.
- Conducted project site assessments, reviewed engineering plans, and researched and interpreted scientific data for project impact analysis.
- Managed multiple public works and private development projects with a variety of environmental concerns and overlapping deadlines.
- Maintained effective relationships with other Sacramento County departments, agencies, and service providers to ensure comments and recommended conditions of project approval were obtained and any associated environmental impacts assessed.

Analytical Environmental Services Sacramento, California
Associate April, 2004 – October, 2005

- Interpreted highly technical traffic impact studies, utilizing the information to develop a traffic impact assessment chapter for use in a variety of environmental documents complying with CEQA, NEPA, and county and city transportation policies and codes.
- Managed the preparation of traffic studies, including developing the scope of study, securing the contract, and reviewing the work product.
- Managed multiple private development projects simultaneously under tight deadlines. Clients included Native American tribes and cities.
- Coordinated with state, county and city officials in the development of traffic study methodology, parameters and assumptions for proposed projects.

- Worked closely with transportation engineers to understand the complexities of each project's specific traffic impacts.

California Department of Transportation (Caltrans) Fresno, California
Associate Environmental Planner March, 2003 – March, 2004
Environmental Planner August, 2000 – March, 2003

- Prepared all levels of environmental documentation for transportation projects in compliance with CEQA and NEPA.
- Coordinated and interpreted environmental technical studies for incorporation into the environmental document and for explanation to other team members, agencies, and the public.
- Managed and represented environmental concerns with other functional units.
- Led and participated in public outreach events.
- Coordinated project development with other Caltrans departments, agencies and the public.

Education

California State University, Northridge May, 2000
Bachelor of Arts in Geography

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION FOR THE *MARIPOSA ENERGY PROJECT* (MEP)

Docket No. 09-AFC-3

PROOF OF SERVICE
(Revised 10/20/2010)

APPLICANT

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*indicates change

DECLARATION OF SERVICE

I, Hilarie Anderson, declare that on December 16, 2010, I served and filed copies of the attached Supplemental Staff Assessment. The original document, filed with the Docket Unit, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at:
[http://www.energy.ca.gov/sitingcases/mariposa/index.html].
The document has been sent to both the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, in the following manner:

(***Check all that Apply***)

FOR SERVICE TO ALL OTHER PARTIES:

_X_ sent electronically to all email addresses on the Proof of Service list;

____ by personal delivery;

_X_ by delivering on this date, for mailing with the United States Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses **NOT** marked "email preferred."

AND

FOR FILING WITH THE ENERGY COMMISSION:

_X_ **sending an original paper copy and one electronic copy, mailed and emailed respectively, to the address below (*preferred method*);**

OR

____ depositing in the mail an original and 12 paper copies, as follows:

CALIFORNIA ENERGY COMMISSION
Attn: Docket No. 09-AFC-3
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

I declare under penalty of perjury that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Original Signed
Hilarie Anderson